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18 OCTOBER—6 DECEMBER 1909.

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18 October—6 December, 1909.

Monday, 18 October, 1909.

The Rev. Dr STOKES, President, in the Chair.

Mr W. B. REDFERN read a paper, illustrated with lantern slides and objects relating to the subject, on

HAIR AND WIG POWDERING FROM EARLY DAYS.

THE discovery, among some of the almost forgotten treasures in my collection of curios, of an ancient receipt for the payment of the tax on hair powder, led me to search for and compile some details regarding the use of powder on the human hair and on wigs. I find that the custom of using powder for the hair may be traced to the luxurious days of ancient Rome, when, it seems, gold dust was used for the purpose. The custom, probably, came from the East, since the Jews are known to have used hair powder in early ages. Coming to a later date there is evidence that our Saxon ancestors coloured the hair either by dyeing or powdering, for we see in Saxon drawings the heads and beards of the men coloured blue.

The use of hair powder, of some colour or other, can be traced through the Saxon and Mediaeval periods. During the reign of Queen Elizabeth we find it was a common practice for the ladies of the Court to dye or powder their hair yellow, in compliment to their Queen, whose natural hair was of this colour, as was also that of her cousin and rival Mary Queen of Scots. It is recorded that Queen Elizabeth had as many as 80 changes of false hair, and the Scottish Queen had such a number of changes of wigs that one of her favourite maids, Mary Seaton, could deck the head of her Royal Mistress with a different wig or false hair every day. The use of wigs and hair powder was not common in the reigns of James I and Charles I, but on his Restoration after his exile on the continent Charles II introduced into England many of the things and fashions with which he was familiar during his residence in France. Among these were enormous wigs which soon took the place of natural hair, which had been more generally worn in this country during the previous reigns. The portraits of courtiers and gentlemen with the enormous flowing wigs seem to us uncomfortable and absurd. Some faint idea of their size may be gathered from those still worn, in a very modified form, by our Judges.

In 1640 a writer said "On Monsieur Powder-wig"—

"Oh, doe but marke yon crisped sir, you meete!
How like a pageant he doth walk the street!
See how his perfumed head is powder'd o'er!
'Twould stink else, for it wanted salt before!"

and in 1655 in another satire—

"At the devill's shoppes you buy
A dresse of powdered hayre,
On which your feathers flaunt and fly;
But I'de wish you have a care,
Lest Lucifer's selfe, who is not prouder,
Do one day dresse your haire with a powder."

Again a little later—

"To eject powder in your hayre
Here is a pretty puff."

"Mealing" the head was a common term—as flour—or meal—was used as a hair powder.

In 1698 a French author, in his *Mémoires et Observations en Angleterre*, says of our gentlemen: "their perruques and their habits (clothes) were charged with powder like millers, and their faces daubed with snuff."

Wigs grew in size, and more powder was consumed, as time went on, and in the reigns of James II and William III they reached their greatest extravagance. The beaux of the period used vast quantities of powder in their wigs. Cibber in his play, *Love's Last Shift*, 1695, speaks of "a cloud of powder battered out of a Beau's Periwig," and other observations come down to us from Gay, in advising persons passing a coxcomb—

"With caution by,
Lest from his shoulders clouds of powder fly."

When Simon Frazer, Lord Lovat of the '45 Highland Rising, was about to be executed on Tower Hill, he was angry with the hairdresser for having insufficiently dressed his wig that he had sent the day before to be powdered. The man's excuse was that the weather threatened to be rainy. A shower of rain would have made the powder almost into dough.

In alluding to the material of which hair powder was made, viz., corn, an author on the *Art of Hair Dressing* in 1770, says that

"Their hoarded grain contractors spare
And starve the poor to beautify the hair."

The pictures by Hogarth give examples of the variety of wigs worn during his time in the middle of the 18th century. At this time we are nearing the period of the beaux of the Georges and the Regency, and foremost among these men of the fashionable world stands the well-known and much discussed Beau Brummell, the man who did a great deal in making Brighton a centre of the Beau monde. Strange to relate he was one of the first to lead the fashion of wearing the hair unpowdered, and gradually from this time both wigs and powder disappeared. Brummell introduced the using of starch

to keep in proper form the "elaborate but neat folds of his cravat."

In the days of wigs and powder a small room in the houses of the upper classes was set aside for the purpose of the hairdresser, or for those who had the care of the owner's wigs, which was known as the powdering chamber. Some of these rooms still remain, though long since devoted to other uses. One of these is preserved in the ancient house known as Rainthorpe Hall, not far from Norwich, and another in the Elizabethan mansion, Hintlesham Hall, near Ipswich. Frequently these retiring rooms opened off the entrance hall of the mansion, and on arrival in his or her Sedan-chair, and having removed, in the lady's case, the dainty embroidered clogs from her high-heeled shoes, the visitor would enter the powdering room and retouch any part of the wig which required arranging or repowdering. Those dainty little stands with which some of us now adorn the corners or windows of our drawing-rooms played an important part on these occasions. The ewers and basins have disappeared, but the stands, or faked reproductions, still remain with us.

Till about 1715 the powder for the hair was simply wheat-flour, but at this time one John Schnorr, a rich ironmaster of Germany, discovered that a soft white earth, in which his horse's feet stuck one day as he was riding, could be dried and ground into powder, and he quickly introduced this as a substitute for wheat-flour. Singularly enough the head of a pottery firm on using this powder on his own wig was struck with the fact that the earth from which it was made was exactly the material he required for making white porcelain.

It is said that C. J. Fox, the statesman, who, in his time, was one of the most fashionable young men in London, resumed the Saxon custom of powdering his hair with *blue* powder. For in the *Monthly Magazine* in 1806, he is described as "having his chapeau-bras, his red-heeled shoes and his *blue* hair powder." But the end of powdering was coming; the great statesman Pitt gave it its death-blow, when in 1795, on February 23rd, he proposed to put a tax upon hair powder from which he estimated an annual revenue of £210,000.

The Act was passed, but, as nearly everyone gave up using powder, the tax proved of small value. It is recorded that the Whigs, headed by the Duke of Bedford, decided to baulk the Minister of his expected revenue by abandoning the use of powder. The Duke of Bedford, the Marquis of Anglesea, the Earl of Jersey, Lord William Russell and others, met in solemn conclave at Woburn Abbey, and there sorrowfully cut off their queues or pigtails, and renounced the use of hair powder. Pitt's tax settled the ancient fashion. The Act contained many curious exemptions which prove how completely the use of hair powder was then looked upon as a social necessity. In addition to the Royal Family and their servants, clergymen not possessing an income of £100 a year, subalterns in the army and officers in the navy, under the rank of masters and commanders, were exempted, and in families all daughters except the two eldest were also exempted. The receipt, particulars of which are given below, is for an elder daughter.

In 1768 the heads of ladies were dressed with great care by the then all-important hairdresser. The substratum was composed of wool, tow, pads, and wire, over which was drawn the natural or false hair; on this again were arranged gauze trimmings, ribbons, feathers of enormous size and of all the colours of the rainbow, artificial flowers, etc., adding some 24 or 36 inches to the actual height of the fair wearer. Ropes of pearls, small models of sows, coaches and horses made of blown glass, also added to the grotesque appearance of the pile. Altogether the size and weight (several pounds) must have been a source of great inconvenience and discomfort to the unfortunate victims of fashion. Heads thus carefully dressed were not of course very frequently taken to pieces.

In a number of the *London Magazine* of 1768, the whole process is given: "False locks to supply deficiency of natural hair, pomatums in profusion, greasy wool to bolster up the adopted locks, and grey powder to conceal dust."

A hairdresser is described as asking a lady "how long it was since her head had been opened and repaired. She replied, not above nine weeks; to which he replied that that was as long as a head could well go in summer, and that

therefore it was proper to deliver it now as it began to be a little *Hasardé*." The description of the said opening of the hair and the disturbance that it occasioned to its numerous inhabitants is best left to the imagination.

The Duchess of Devonshire in 1774 was one of those who introduced the wearing of plumes of gaily coloured feathers.

As I said before, the tax killed the sale of hair powder, for nearly everyone either evaded the tax or gave up the luxury, for by 1812 there were only some 46,000 "guinea-pigs," or hair-tax payers, in the country, and "Periwigs large enough to load a camel and holding a bushel of powder" became only things to be read about by the matter-of-fact people of the present day. I ought to have said that powder was applied to the hair or wigs by a dredger (silver). I exhibit a receipt issued from the Stamp Office of the day to "Hannah Hutchinson, Spinster, Daughter of and Inmate with Mr Wm. Hutchinson of Hetton le Hole in the Parish of Houghton le Spring in the County of Durham, Housekeeper." Then follows the signature of the official and the statement that "This Certificate will expire on the fifth day of April 1798." The receipt describes itself "Hair Powder Annual Duty, 1797," and is issued at Durham. This you notice confirms the remark previously made as to the eldest daughter of a house *not* being exempt.

I also exhibit a case containing a number of pipes or roulettes used in the process of curling wigs. These were of pipe-clay and were heated by being laid in a tray of white sand which was heated over a stove, and when the pipes were sufficiently hot they were used on the wigs in the same way as curling-tongs are now employed. The various sizes range from the small pipe for the upper part of the wig to the enormous roulette which formed the larger curls seen at the lower end of it. The wig was not only absurd from its immense size, but also from the fact that it was worn with suits of armour when the owner's head and shoulders were being transferred to canvas by the court painters of the period.

The following communications were also made:

1. W. L. H. DUCKWORTH, M.D., Sc.D. and W. INNES
POCOCK, M.A.

ON THE HUMAN BONES FOUND ON THE SITE OF THE
AUGUSTINE FRIARY, BENE'T STREET, CAMBRIDGE.

PART I. REPORT BY W. INNES POCOCK.

IN August 1908¹ a number of human remains were disinterred during the excavation of the foundations of the New Examination Hall adjacent to the Corn Market. It is known that there was an Augustinian Friary here, but it is possible that the spot is part of the site of the old graveyard attached to the church of St Benet which is only a few rods distant. Considerable interest therefore attaches to the remains. Dr Duckworth, who was still in residence, made a careful survey of the ground and gave the necessary instructions. Immediately below the surface soil and turf, was found two feet of loose gravel and sand (cf. Fig. 1), then a very distinct zone three feet deep consisting of blocks of clunch and fragments of stone and pottery, apparently lying at the foundations of the monastery walls. This was succeeded by two feet of sand with small flints and six feet more of sand and coarse gravel. The skeletons were found at the line of demarcation between these last two; in other words, two feet below the old foundations of walls referred to some part of the monastery.

The remains consist of twenty-three skulls, crania and calvariae which were associated with other bones of the

¹ In the later stages of the excavations more skeletons were discovered. They have now been measured by Mr Pocock, and a supplementary Report will be presented in due course. The complete plan of the excavations should be consulted in reference to the position of all the skeletons. (See Plan facing page 38, and the accompanying note.)

respective skeletons; ten crania and eight sets of bones not so associated; and detached long bones representing perhaps a dozen individuals. The principal measurements of the complete skeletons were made at the time by Dr Duckworth; the remainder have now been dealt with in the same way. The long bones have been measured and estimates of stature deduced according to Prof. Karl Pearson's methods¹. Tables of indices have been made out from the cranial and facial measurements.

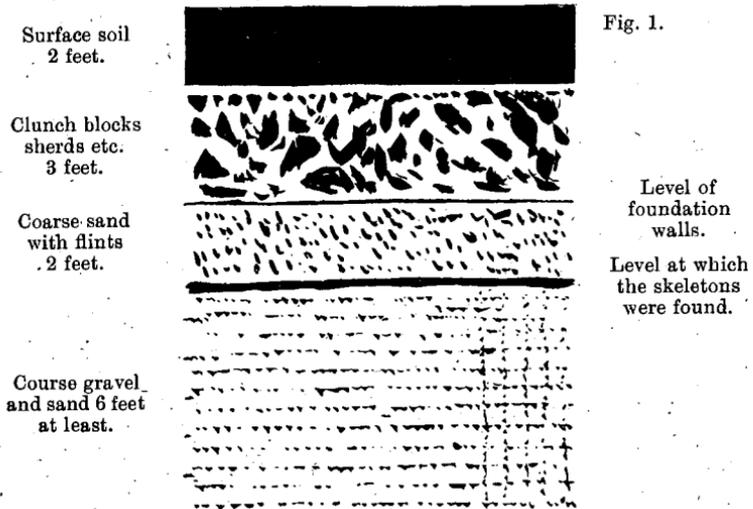


Fig. 1.

SECTION AT SITE OF AUGUSTINIAN FRIARY.

Aug. 1908.

It must be said at once that the range of the principal (cephalic) index is much too wide for drawing definite conclusions from so limited a number of crania. Probably a hundred more individuals would be required to fill up the seriation and show whether we have to deal here with one or more homogeneous races. In some ways the longest and shortest skulls here approach each other more closely than does either group to those of moderate length. The artificial division of the remains into skeletons and detached skulls and bones

¹ "Mathematical Contributions to the theory of Evolution." *Philosophical Transactions of the Royal Society*. A. Vol. 192. 1899.

serves to indicate a slight superiority of stature for the shorter skulls. (Breadth index 81, Stature 167 centimetres; Breadth index 79.5, Stature 164—166, these figures being averages.) A comparison of the skeletons with each other appears to confirm this, though not in the case of four female skeletons. Male statures calculated from the humerus, from the femur and from the whole lower limb show, in the first case, a rather doubtful result, in the other two an unequivocal superiority in the possessors of the short crania. It may be noted also that there is a slight tendency to phaenozgy (or narrowing of the upper temples) to be seen in some of the longer skulls. Further; there is one instance of extraordinary prognathism (the indicative figure is 107) and two of an approach to that condition, all of which occur in the mesaticcephalic skulls. When we turn to the capacities—calculated by Dr A. Lee's formula for German skulls—we find the same thing. Nine of fifteen capacities exceeding 1500 cub. cent. are brachycephalic; three of six exceeding 1600 are hyper-brachycephalic. As an additional test the absolute sizes of the crania indicated by the horizontal circumference, and the capacity, have been compared with the basi-nasal length as a measure of the cranio-facial axis. The comparison with the circumference gives the short skulls a slight, that with the capacity a more decisive advantage.

The average facial index of Köllmann (53.84) merely expresses the fact that the short skulls are in a minority. The average nasal index of 46 representing a range from 40 to 56 requires no comment. With regard to the gonio-zygomatic index—that which gives the width of the lower jaw as compared with the temples—it is to be observed that the average (79) of an immense range of variation, 62—101, is considerably higher than Topinard's figures for Europeans. On the whole the higher indices here—including the exceptional figures 95 and 101—belong to the broad skulls.

Pearson (in the memoir already cited) gives the average stature of Anglo-Saxons as 1709; for women 1560. Our figures are 1678 and 1577. This is not very near, but the male stature will be further depressed when the statures from the detached bones are reckoned in.

I am indebted to Dr Duckworth for the following figures:
Anglo-Saxons,

		Stature
31 Dolichocephali.	Av. ceph. index 72.3	5 ft. 5 $\frac{5}{8}$ in.
23 Mesaticephali	" " 77	5 ft. 3 $\frac{1}{2}$ in.
7 Brachycephali	" " 81.1	5 ft. 4 in.

(Mortimer, *Brit. Assn. Rept.* 1907, p. 657.)

Our figures give

3 Crania averaging ceph. index 73.6, and stature 1660 mm. say		5 ft. 6 in.
7 " " " 78 " "	1669 " "	5 ft. 6 $\frac{1}{2}$ in.
7 " " " 85.6 " "	1694 " "	5 ft. 7 $\frac{1}{3}$ in.

Again, the skeletons at Cambridge from the Anglo-Saxon Cemetery at Mitcham have an estimated average stature of 1682 for ten men, 1569 for three women. This is better, but the cranial indices render all comparison abortive. They range from 63 to 86, and average 75.

Thus however small may be the value of the term "Anglo-Saxon" which can include Pearson's, Mortimer's and the Mitcham examples it will become still smaller if stretched to include all these here described. If we take each group separately, our dolichocephalic skulls seem quite comparable with Mortimer's series, but the small number is disadvantageous, so that no sure ground is present here. Equally is this the case with the mesaticephalic examples, but the brachycephalic crania appear to be different from those reported on by Mortimer.

A synthesis of the Breadth and Height Indices of our crania shows that they fall into half a dozen overlapping groups—but, not to labour the figures, we may simplify the scheme as follows:

1. A heterogeneous mesaticephalic group of twelve. Br. Index 72—83.
2. A homogeneous " " " nine. " " 74—77.
and Ht. " 68—71.
3. A brachycephalic acrocephalic " " eight. Br. " 81—91.

One exceptional skull, Br. index 94, Ht. index 82, gonio-zyg. index 95.

Other exceptional figures are: gonio-zygomatic indices of 62 and 101 both in short skulls—the alveolar index of 107

already mentioned—and a facial index of 64 in a skull which though the lowest of the dolichocephali (72.63) is continuous with the seriation.

It may be remarked that there is a natural break in the cephalic indices just below eighty, and that the figures from 78 downwards average about 76, the average of English of the present day. Possibly then our brachycephalic skulls may be those of foreigners, ecclesiastics or otherwise. On the Anglo-Saxon theory they may perhaps be referred to the Cimbric Chersonese. The extreme shortness of some of the crania may be illusive; it is certain that in a few cases there has been posthumous or other deformation; and if there are one or two instances of a perfectly typical round skull there are no more.

The shapes of the crania are mostly ovoid, becoming sphenoid in the shorter skulls, and oval. In profile there is a strong contrast between the backward projection of some of the occipita and the well tucked under appearance of the same bone in other specimens. One or two of the skulls have a convex facial profile caused by retreat of the frontal above and mandible below, producing that appearance which the ingenuity of the modern caricaturist has seized upon as typical of an effete aristocracy. There is great variation in the size of the foramina magna and of the mastoid processes with their associated fossae. Most of the skulls have deeply excavated glenoid fossae and large, sometimes enormous, *spinous* processes. These are often under-propped by the tympanic plate which thus wears the aspect of a Eustachian process though without the projecting simian spine. There are three instances of division of the posterior lacerate foramen, one if not more of exclusion of the malar from the spheno-maxillary. A tolerably common feature is that of slight bathrocephaly associated except in one case with Wormian bones at the lambda and sometimes accompanied by a slighter clinoccephalic constriction behind the bregma. There is an instance of ridging of the coronal suture perhaps due to early synostosis. One or two cases of small paracondylar processes are seen and one of perforated tympanic plates, that on the left pierced close to the Glaserian fissure.

The superciliary and especially the glabellar regions are well developed. There are the uncommon number of six metopic sutures (nearly twenty per cent.), also a skull which has a marked ridge along the synostotic line. One cranium has an atlas bone attached. A calvaria has the petrous bones cleft by fissures between the extremity and the ascending branch of the carotid canal. There is a case also where the superior borders of the petrous are incised by the floccular fossae and a well-marked case of constriction or lateral notching of the basioccipital.

One or two of the mandibles have strongly everted gonias, which may account for the high index referred to above. The sigmoid notches are often noticeably shallow. In one case there is sagittal thickening of the left condyle. One of the mandibles has a body curved like that of a Maori's, with an ill-defined angle, and there are two which display the rare phenomenon of a foramen at the anterior end of the mylohyoid groove.

Many of the radii and ulnae strike the eye as being rather bowed. There are several retroverted heads among the tibiae. The femora are stout and many very straight. The muscular attachments are well marked, the development of the linea aspera in some cases approaching that of the pilastered femur. A third trochanter is seen in one or two cases. One of them has a noticeable tuberosity on the pectineal line close to the small trochanter.

There is a good deal of Platymeria and Platynemia in these bones, but apparently not of racial distribution. The indices for the bones belonging to the skeletons are

	Men	Women
Platymeria	R. 80.98	R. 77.96
	L. 81.30	L. 81.64
Platynemia	R. 74.66	R. 78.21
	L. 74.80	L. 73.23

The other bones do not show such low figures.

Numerous traces of osteo-arthritis are to be seen affecting—sometimes considerably—the glenoid cavities of the crania and the articular surfaces of the long bones.

Some measurements of a skeleton and three long bones disinterred three months later have been placed in a separate table. They do not call for special remark.

In a report like the present no writer can neglect the aid to be derived from historical and archaeological research. And this the more because at least one other solution than that suggested may be obtained from considerations of the craniometry. It is to be observed that while the indices of breadth and height—bregmatic and vertical—agree, in suggesting a double apex to the curve of frequency, with a less definite but quite clear indication of a third, it is the difficulty of collating these that has led to the conception of the five groups referred to. The position would be simplified if the arrangement of the brachycephalic crania was clear; but, as shown, the evidence of the figures tended to group only part of these with the regular brachycephals. If then on the principle of parsimony we divide the entire number into two groups both of these groups will appear heterogeneous, and hence we may have three or possibly four different stocks to deal with. Next it is to be noticed that of the wide indicial range much the wider part is that embracing the comparatively few brachycephalic crania; and of this consideration the outstanding feature is that while the latter group contains one or two of almost pure round type there is scarcely a genuine long head in the other. We arrive thus at the idea of a stock in which true dolichocephaly has been absorbed or modified or fallen out under the stress of new conditions.

Now what are the relations of these short skulls to the longer? A review of the collection shows three main types. One or two of the pure round Ligurian or Slavo-Celt pattern; a small number of large, short, but not chamaeprosopic crania which afford points of comparison with a type obtained from ancient British sepulchres; and a larger number of moderate length containing some examples of what has been called the Anglo-Saxon cranium, ovoid both laterally and *in verticali*. There may then be three races represented here; and the third of these, possibly too, the second, looks like being a mixed stock: admit that the round skulls are those of strangers—then to

whom are we to refer the short? To a dominant caste or the remnant of an extruded population, their greater cranial capacity notwithstanding? An intellectually inferior race has often exercised the arts of conquest and government. At all events the superiority of the short crania does not warrant any but the most cautious inferences in this kind. But the fact that the female crania belong to the majority—the mesati-cephals—does seem to support the idea that here we have the native population. However, this is going beyond craniology proper.

Let us look at the indices again. Suppose we take an average of the indices up to 83. It is true the increments are discontinuous—but let that pass—it may be due to the small number of skulls. This average comes out at $77\frac{1}{2}$ while if we only include the four tapeinocephalic short skulls it is barely 77. The average of all the crania except the two whose index is over 90 is 79; if those two are included it is just 80.

Now plainly the import of these figures for the craniometrician depends on his conception of the relations of cranial measure to measurement of the living subject. If he holds that there is no real discrepancy between the two, he may accept these averages of 77 and $77\frac{1}{2}$ for English; whereas if he believes in adding the conventional two units the figures 79 and 80 become too high even for French. There is a sliding scale of improbability against the inclusion of the successively higher figures with those below 80. But, other considerations apart, out of these four averages there are two if not three which would support a theory that these bones are the relics of a non-English community—possibly Normans and Angevins. Then who were the owners of the two round skulls? Anyone can guess and no one can do more than guess. Perhaps they were a Piedmontese Prior and Sub-prior.

SETS OF BONES WITHOUT CRANIA. LENGTH MEASUREMENTS.

	Male						Female	Average
	1	2	3	4	5	6	7	Male
Right Femur	420	446	426	425	436	420		429
„ Tibia	*346	350	345	348	*369	350	R. 318 L. 320	351
„ Humerus	314	324		*323	329	312		320
„ Radius	*235	235		229	*247	227		235
Stature from								
Femur	1603	1652	1615	1612	1632	1603		1619
Tibia	1610	1617	1605	1611	1663	1617	1495 or 1500	1620
Humerus	1613	1645		1642	1660	1610		1634
Radius	1630	1630		1610	1670	1605		1629

* Left bone measured, the right not being available.

LONG BONES NOT ASSOCIATED WITH CRANIA.
MEASUREMENTS OF RIGHT SIDE.

Right Femora	Right Tibiae	Right Humeri	Right Radii
(7) 1 466	(10) 1 353	1 Headless Shaft	1 250
(8) 2 413	(11) 2 336	(8) ♀ 2 296	2 229
(9) 3 423	(12) 3 337	(9) 3 320	(9) 3 235
4 471	4 397	4 346	4 267
5 450	5 383	5 333	(11) 5 242
6 458	6 371	(12) 6 330	(12) 6 239
	♀ 7 330		
	8 370		
	9 broken		
Average of unpaired Right Femora and all Left Femora 450	Average of ♂ unpaired Right Tibiae and all Left Tibiae 364	Average of unpaired ♂ Right Humeri and all Left Humeri 332	Average of unpaired Right Radii and all Left Radii 241

The bracketed numbers indicate the probable pairs of those bones to which fellows could be found.

Femora 2, 3, 5, 6 seem to belong to the Tibiae of the same numbers.

Tibiae 1 and 4 may correspond to the Fibulae numbered 1 and 4, and Radii 4, 5, 6 to the Ulnae numbered 2, 3, 4.

CORRESPONDING STATURES IN CENTIMETRES.

Femur	1	169	Tibia	1	163	Humerus	1	Radius	1	168	
"	2	159	"	2	158	"	♀ 2	156	"	2	161
"	3	161	"	3	158.5	"	3	162	"	3	163
"	4	170	"	4	173	"	4	171	"	4	173
"	5	166	"	5	170	"	5	167	"	5	165.5
"	6	167+	"	6	167	"	6	166	"	6	164
Average		165.3	"	♀ 7	157	Average ♂		166.5	Average		165.5
			"	8	167-						
			Average ♂								165.2

LONG BONES NOT ASSOCIATED WITH CRANIA.

MEASUREMENTS OF LEFT SIDE.

Left Femora	Left Tibiae	Left Humeri	Left Radii
(1) 7 460	(1) 10 356	7 326	7 241
(2) 8 419	(2) 11 338	♀ (2) 8 300	8 styloid process broken
(3) 9 422	(3) 12 337	(3) 9 315	(3) 9 237
10 481	♀ 13 329	10 349	10 241
11 443		11 325	(5) 11 240
12 467		(6) 12 332	(6) 12 241
13 430		Immature 13 294	13 260
14 Juv. shaft.			14 217
15 "			15 233
Average of unpaired Left and all Right Femora 450	Average of Right Tibiae including fellows of the above ♂ 364	Average of unpaired adult ♂ Left Humeri and all Right ♂ Humeri 332	Average of unpaired Left and all Right Radii 241

Bracketed figures indicate the probable pairs of the numbers to which they are contiguous. Tibiae 11 and 12 seem to belong to Femora 8 and 9; and Fibula 2 to Tibia 11. Radii 10—15 inclusive seem to be matched by Ulnae 6, 7, 8, 9, 10 and 5.

CORRESPONDING STATURES IN CENTIMETRES.

7 168	10 163	7 165	7 165
8 160	11 159	♀ 8 157.5	8 ?
9 161	12 158.5	9 162	9 164
10 171.5	♀ 13 157	10 172	10 165
11 165		11 165	11 165
12 169	Average ♂ 160.2	12 167	12 165
13 162		13 156	13 171
Average 165.2		Average ♂ 164.5	14 157
			15 162.5
			Average 164.2

INDICES OF PLATYMERIA AND PLATYCNEMIA.
BONES DETACHED AND NOT ASSOCIATED WITH CRANIA.

		Sagittal	Coronal	Index		Sagittal	Coronal	Index
Femora	1	29	30	96.67	Tibiae	1	34	22 64.71
"	2	33	38	86.84	"	2	37	27 72.97
"	3	30	38	78.95	"	3	35	25 71.43
"	4	27	34	79.41	"	4	40	28 70
"	5	29	31	93.55	"	5	40	28 70
"	6	27	32	84.38	"	6	36	28 77.78
Left	7	28	29	96.55	"	7	30	22 73.33
"	8	30	36	83.33	"	8	37	24 64.86
"	9	30	37	81.08	"	9	32	24 75
"	10	31	34	91.18	Left	10	34	24 70.59
"	11	30	37	81.08	"	11	38	27 71.05
"	12	31	36	86.11	"	12	33	26 78.79
"	13	30	35	85.71	"	♀ 13	32	24 75
"	14	26	32	81.25				
"	15	23	26	88.46				

SETS OF ASSOCIATED LONG BONES NOT
ASSOCIATED WITH CRANIA.

		Femora				Tibiae		
Right	1	28	35	80	Right	1	35	25 71.43
"	2	25	31	80.65	"	2	32	22 68.75
"	3	26	30	86.67	"	3	32	22 68.75
"	4	30	34	88.24	"	4	32	29 90.63
"	5	26	33	78.79	"	5		
"	6	29	30	96.67	"	6	34	30 88.24
Left	1				Left	1	34	24 70.59
"	2	25	31	80.65	"	2	33	23 69.70
"	3	27	31	87.10	"	3	32	23 71.88
"	4	30	35	85.71	"	4	33	30 90.91
"	5	25	34	73.53	"	5	32	27 84.38
"	6	28	31	90.32	"	6	34	30 88.24
		Average Index		85.50		Average Index		75

	1	2	3	4	5	6	7	8
Sex and Age: 18 males	Adult	Adult	Aged	Adult	Aged	Adult	Adult	Adult
Maximum length	190	180	189	178	183	179	184	196
Maximum breadth	138	142	148	163	138	161	161	151
Maximum circumference	536	522	537	545	520	540	544	555
Auricular height	125	118	120	126	122	127	126	121
Basal height	139	137	138		139	139		
Basi-nasal length	107	102			102	94		
Basi-alveolar length	94	92						
Nasal height	57	56		51				
Nasal width	28	23	28	27				
Bizygomatic width	124	132		148	131 (?)	140	146 (?)	122 (?)
Bigonial width	102	109	114	124		106		
Facial height	80	79		72				
Indices :								
Cephalic	72.63	78.89	78.31	91.57	75.41	89.94	87.50	77.04
Altitudinal (A)	66.14	65.56	63.49	70.79	66.67	70.95	68.48	61.73
Altitudinal (B)	73.16	76.11	73.02		75.96	77.65		
Alveolar	87.85	90.20						
Nasal	49.12	41.07		52.94				
Estimated capacity	1466	1399	1542	1655	1399	1646	1678	1631
Facial (Kollmann)	64.52	59.85		48.64				
Gonio-zygomatic (Topinard)	82.26	82.58		83.78		75.71		
Length of Femur	459	455	440	470	448	451	504	476
Length of Tibia	357	367	343	376	356	360	430	390
Length of Humerus	328	326	322 (?)	344	329 L.	321	359	334 L.
Length of Radius	239	239	239	257	240	249	275	244 L.
Statures estimated from								
Femur (diagram)	centimetres 167.5	167	164	169.8	165.5	166	176	171
F. + T. (formula)	millimetres 1658	1665	1620	1693	1645	1653	1795	1716
Humerus (diagram)	centimetres 165.5	165	164	170.5	166	164	175	167.5

9	10	11	12	13	14	15	16	17	18	Average
Adult	Aged	Adult	Adult	Adult	Adult	Aged	Adult	Adult	Aged	
193	191	184	177	181	184	190	180	186	172	184
143	146	150	145	142	148	154	145	156	151	149
537	539	532	520	524	535	555	510	547	510	534
121	121	131	126	125	122	128	119	121	118	123
127	134		145	133		138	129	132	134	136
108	107		92	95		101	96	100	100	100
108	97		80				91	89	98	92.5
53	54	51	55		53		45	54	50	52.5
25	23	26	23		24		24	24	22	25
141	134 (?)	119	145 (?)		134	128	132	138	136 (?)	134.5
96	113	121		106	110	92	109	102	85 (?)	106
72	71	64	75		73		65	71	64	71.5
74.09	76.44	81.52	81.92	78.45	80.43	81.05	80.56	83.87	87.79	80.96
62.69	63.35	71.20	71.19	69.06	66.30	67.37	66.11	65.05	68.60	66.93
65.80	70.16		81.92	73.48		72.63	71.67	70.97	77.91	73.88
100	90.65		86.96				94.79	89	98	92.18
47.17	42.59	50.98	41.82		45.28		53.33	44.44	44	46.61
1522	1540	1584	1452	1443	1515	1656	1437	1612	1438	1534
51.06	52.99	53.78	51.72		54.48		49.24	51.44	46.04	53.07
68.09	84.33	101.68			82.09	71.88	82.58	73.91	62.50	79.28
445	458 L.	479		450	448	481	458	466	429	462 R.*
373	356	387		389 (?)	360 L.	396	373	383	376	373+
325	330	340 L.	330	362	314		330	333	327	332 †
240		257 L.		262	235		250 L.	257		248 §
165	167.5	171.5		166	165.5	171.8	167.5	169	162	167.8
1661	1656	1716		1685	1649	1729	1676	1697	1646	1680
165	166	169	166	175	162		166	166.1	165.5	166.9

* one L. femur 458 † one L. tibia 360 ‡ three L. humeri 334 § three L. radii 250

	19	20	21	22	Average
Age		Adult	Adult	Aged	
Sex: Female					
Maximum length	174	180 (?)	184	167	176
Maximum breadth	138	135	141	140	138.5
Maximum circumference	514		522	485	507
Auricular height	116		116	119	117
Basal height			131	129	130
Basi-nasal length			98	91	94.5
Basi-alveolar length			85	84	84.5
Nasal height			52	44	48
Nasal width			24	21	22.5
Bizygomatic width	130		119	117	122
Bigonial width	104		105	91	100
Facial height			68	59	63.5

Indices:

Cephalic	79.31	75	76.63	83.83	78.69
Altitudinal (A)	66.67		63.04	71.26	66.99
Altitudinal (B)			71.20	77.25	74.22
Alveolar			86.73	92.31	89.52
Nasal			46.15	47.73	46.94
Estimated capacity	1301		1407	1287	1332
Facial (Kollmann)			57.14	50.43	53.78
Gonio-zygomatic (Topinard)	80		88.24	77.78	82.01
Length of Femur	424	434 L.	447		435*
Length of Tibia	344		362		353
Length of Humerus		317	313	313	314
Length of Radius		224	235	228	229

Stature estimated from

					Average of four female statures
Femur (diagram)	1610	1630	1653		1626 or 1618
F. + T. (formula)	1556	1573†	1602	1580‡	1577
Humerus (diagram)		1625	1610	1610	1613 or 1600

* one L. femur 434 † from F. only, by formula

‡ from H. + R. by formula

SKULLS NOT ACCOMPANIED BY SKELETONS.

	23	24	25	26	27	28	29	30	31	32	Average
Sex : Male	Adult	Adult	Adult	Adult	Aged	Adult	Adult	Adult	Adult	Adult	
Maximum length	173	167	150 +	192	185	196	177	190	188	182	183
Maximum breadth	155	157		144	137	144	137	145	146	141	147 (9) 145.7 (10)
Maximum circumference	523	510		546	525	548	504	540	545	545	530
Auricular height	126	129		118	118	124	115		117	117	120.5
Basilar height	138	138		136	130	131	127	132	128	124	132
Basal-nasal length	103	100		112	99	98	100		100	100	101.5
Basal-alveolar length	99	87		107	87	95	107		85	101	96
Nasal height	53	41		56	57	44	56		55	54	52
Nasal width	28	21		26	23	25	26		26	24	25
Bizygomatic width	140	132		144	133	135	129		140	139	136.5
Bigonial width	115	126	102	110	92	102	94		102	104	105
Facial height	74	68		76	79	70	75		79	78	75
Indices :											
Cephalic	89.60	94.01		75	74.05	73.47	77.40	76.32	77.66	77.47	79.44
Altitudinal (A)	72.83	77.25		61.46	63.78	63.27	64.97		62.23	64.29	66.26
Altitudinal (B)	79.77	82.63		70.83	70.27	66.84	71.75	69.47	68.09	68.13	71.97
Alveolar	96.12	87		95.54	87.88	96.94	107		85	101	94.56
Nasal	52.83	51.22		46.43	40.35	56.82	46.43		47.27	44.44	48.22
Estimated capacity	1531	1524		1510	1382	1571	1307		1497	1398	1465
Facial (Kollmann)	52.85	51.52		52.77	59.40	51.85	58.14		56.42	56.11	54.88
Gonio-zygomatic (Topinard)	82.14	95.45		76.39	69.17	75.56	72.87		72.86	74.82	77.40
Average of all cephalic indices :	80.23										
" all auricular altitudinal indices :	66.75										
" basi-bregmatic altitudinal indices :	73.19										
" male alveolar indices :	93.37 ; two female : 89.52 ; of all : 92.94										
" all nasal indices :	47.29										
" all facial indices :	53.84										
" male gonio-zygomatic indices :	79.28 ; three female : 82.01										
" male cranial capacities :	1513 ; three female : 1332										

SKULL ASSOCIATED WITH OTHER BONES.

No. 33			
Condition	Well preserved	Facial Length	75
Age	Adult	Bizygomatic breadth	136
Sex	Male ♂	Intergonial breadth	99

Indices :

Greatest length	183	Cephalic	74.86
Breadth	137	Height Index	77.60
B. Bregmatic height	142	Vertical height Index	65.57
Auric. Vert. height	120	Alveolar	88.46
B. Nasionic length	104	Nasal	40.74
B. Alveolar length	92	Kollmann's Facial	55.14
Nasal length	54	Gonio-zygomatic	72.79
Nasal breadth	22		

(Long bones)	Length	Thickness	
		Sagittal	Coronal
Right Femur	422	31	35
Left Femur	424	30	34
Right Tibia	347	36	28
Left Tibia		35	27
Left Humerus	300	Index	88.2
Stature from Femur	1605	R. Femur	88.5
		L. Femur	"
Stature from Tibia	1610	R. Tibia	77.8
Stature from Humerus	1578	L. Tibia	77.2

LONG BONES NOT ASSOCIATED WITH CRANIA,
BUT FORMING SKELETONS.

	Length	Thickness		Length
		Sagittal	Coronal	
Right Tibia	401	36	31	
Left Tibia	403	34	29	
Index	86.1			R. Humerus 305
"	85.3			Stature 1580
Stature	1740			

PART II.

FURTHER REMARKS ON THE HUMAN REMAINS DISINTERRED ON
THE SITE OF THE AUGUSTINIAN PRIORY IN AUGUST, 1908.

BY W. L. H. DUCKWORTH, Sc.D.

Mr Pocock's report is so complete in itself that I propose to submit my comments on the matter with which it deals, in a separate communication.

1. In the first place, these interments were Christian, to judge from the position of several of the skeletons, though in many cases the bones had been disturbed, so that the exact orientation could only be inferred.

2. The site was undoubtedly occupied in former times by the buildings of an Augustinian Friary. The recent excavations brought to light foundations of buildings and portions of walls which can only be associated with a monastic settlement. It is said that as late as 1797, the refectory was still in use (by the Professor of Botany in the University) as a lecture-room. The deed of gift of the site to the University for the purpose of constructing a Botanical Garden some thirty years earlier, described it as "the reputed site" of the Augustinian Priory. The Liber Memorandum of Barnwell Priory records a contract between that house and the "Fratres eremites" of the Augustinian Friary in the parish of St Edward. This record is dated 1290 A.D. and testifies to the presence of the Friars in this place at that early epoch. I mention these records because although they may be familiar enough to some archaeologists, yet the precise evidence upon which is based the statement that this Friary was Augustinian, does not appear to me to be very generally known. I think there can be no doubt as to the accuracy of the account, and yet the references are admittedly meagre. I failed to trace the establishment or existence of this Friary in the records of Dugdale's *Monasticon*, and indeed after a somewhat prolonged search, I cannot adduce other notes than the few detailed above. Probably those who

will describe these excavations from the purely archaeological point of view, can greatly extend this knowledge.

3. These skeletons had been interred in a space limited by walls of which the foundations were exposed. Whether these walls were those of a church or other roofed-in building such as a Chapter-House, or on the other hand those of an open cloister, I am not at present able to state. The most excellent plan appended to this Report is the work of Mr Schneider, under whose supervision the excavations were carried out. The plan suggests that the burials had taken place in a cloister. (It may be noted here that the row of six skeletons, with others at right angles, was discovered subsequently to the preparation of this Report.)

4. The almost complete absence of any remains of coffins, clothing, personal ornaments or insignia is striking and noteworthy. Two very plain copper or brass buckles were found. To these a few crumbling relics of what might have been leather girdles were still adherent. Beyond these, nothing of the kind came to my knowledge. It will be understood that I am speaking of the immediate surroundings of the skeletons. Reference to the diagrammatic section of the site will show that about 2 feet above the skeletons came a zone characterised by the miscellaneous character of its constituents. For it comprised such objects as blocks of clunch, sherds, and bones of domestic animals. All these probably represent accumulations of later dates than those of the interments.

5. Very few of the skeletons had remained absolutely undisturbed. Many bones were associated in the wildest confusion. In some instances, as for example those of specimens Nos. 3, 4, 5, the disturbance was not too great to prevent the correct re-sorting of the bones of adjacent skeletons. Almost precisely identical conditions obtained in the site of the Chapter-House at Durham (cf. Fowler, *Archaeologia*, Vol. 45, 1880, pp. 385—404). But one difference is noteworthy. For at Cambridge, no evidence is forthcoming from this site of any of the bodies having been placed in a more conspicuous position than others, and thus we lack the contrast, so marked at

Durham, between the skeletons of the Bishops, arranged in order and enclosed in stone coffins, and the inextricably tangled remains of individuals of less exalted rank. In some instances, a clear impression was gained that on this Cambridge site, a succession of interments took place, and that when the bones of a skeleton were found, these were rudely and carelessly displaced to make room for the later burial.

6. The discovery of the skeletons of four women and portions of those of two children might at first sight appear inconsistent with the association of this cemetery with the hermit Friars. Be this as it may, I believe that the phenomenon is not unusual, although there seems here no ground for an appeal to the explanation offered for this occurrence in the site of the Chapter-House at Durham (viz. that the English clergy were married).

Nevertheless the presence of female skeletons led me to wonder whether the cemetery might possibly have been at one time connected in some way not with the monastic buildings, but with the church of St Benet.

7. The actual remains have been classified as—

- (a) skeletons with the corresponding crania;
- (b) crania to which no other skeletal parts can be definitely assigned;
- (c) skeletal parts other than skulls, to which the corresponding skulls cannot be definitely assigned;
- (d) miscellaneous bones.

In the following notes I shall deal almost exclusively with groups (a) and (b).

The first group (a) has been shown (cf. Mr Pocock's report) to comprise eighteen male and four female skeletons, more or less perfectly preserved. Mr Pocock has referred to the diversity of type exhibited by this comparatively small group of individuals, especially among the males. I wish to lay much more definite stress upon the occurrence of two quite distinct groups or types of male skeleton. This I submit for illustration, in the first instance by consideration of the trans-

verse diameters of the skulls. If we analyse the numerical values of the cranial breadths by a seriation, employing a modulus of five units, we obtain the following Table (No. I). I may add that I have substituted a seriation of the linear transverse dimensions for one of the cephalic indices, which I employed at first, since I find that the direct measurement brings out the contrast more clearly than does the ratio.

		2.							
		9.							
		12.							
		13.							
		16.	3.		8.				
1.		26.	10.		15.				
5.		28.	11.		19.				4.
27.		30.	14.		23.		17.		6.
29.		32.	31.		25.		24.		7.
140.		145.	150.		155.		160.		165.

millimetres

TABLE I. Seriation of the cranial width (in mm.) of the crania from the site of the Augustinian Friary at Cambridge. The position of Nos. 4, 6, and 7 (at the upper limit of the seriation) is to be contrasted with that of Nos. 1, 5, 27, 29 at the lower limit. The Arabic numerals (up to 32) are those of the crania.

I think it is clear that in this series of skeletons we can contrast one "extreme" group, represented by Nos. 1, 5, 27, and 29 at one (the numerically lower) end of the scale, with a second "extreme" group, represented by Nos. 4, 6 and 7 (and very possibly No. 15 and No. 17 should be associated with these) at the other (numerically higher) end; while both the extreme groups may be contrasted with the intermediate and more numerous one. If we consider the two "extreme" groups, we may enquire whether they are distinguished from one another by other characters than that (viz. the cranial breadth) which has just led to their recognition. The answer to this enquiry is quite definite in respect of two most important anthropometric characters, viz. stature and cranial capacity. The contrast may be exhibited in the following manner.

stature is most clearly demarcated, for this seriation reveals a much more distinct gap between these and the intermediate group than can be demonstrated between the latter and the other group, viz. that with crania of smaller capacity, and smaller breadth, associated with bodies of shorter stature.

It cannot be too impressively stated that the appearance of these tall men with broad skulls is quite peculiar here. It has been shown recently, that probability leads to the expectation of taller stature being accompanied by relatively narrower heads if the tall and short individuals compared come from the same stock (cf. W. Johannsen, "Über Dolichocephalie und Brachycephalie," *Archiv für Rassen- und Gesellschafts-Biologie*, 1907). We have therefore to enquire whether our tall men have crania which are not only absolutely but relatively broad, and the examination of the measurements shows that such is indeed the case. The crania of the tall men are on the whole absolutely shorter than those of the short men. Therefore we may argue that these are not merely tall and short individuals of the same stock.

We find thus that our collection presents us with a group of individuals sharply demarcated from their associates and characterised as just described. It may be added that not only are the crania large and round, but they are massive and square-jawed: not only are the limb bones long, but they are stout and heavy, bearing traces of the attachments of powerful muscles. They are contrasted in all these features with the majority of the remainder, indeed with all save two, viz. Nos. 8 and 18. To these cases I shall subsequently return.

It is now time to state that such collections as can be justifiably compared with this (whereby I mean collections of skeletons that have been unearthed on the sites of religious houses), present very commonly this same phenomenon of contrast, and in exactly the same sense as regards cranial dimensions; while what little evidence exists in reference to stature, at least does not belie the foregoing statement. The first series that I shall take for comparative purposes is that of the skeletons mentioned incidentally in an earlier paragraph, as those from the site of the Chapter-House at Durham. Nine

skeletons are here available for comparison in respect both of cranial breadth and of stature.

The second series is of the eleven crania from the Carmelite cemetery in Bristol, described by Dr Beddoe in the *Journal of the Royal Anthropological Institute* (Vol. 37, July—Dec. 1907). Most unfortunately, no measurements of the accompanying limb bones are given.

The third series is again short, viz. that of five crania of mediaeval ecclesiastics at Bury St Edmunds. The data provided by Professor Macalister in his report (1903, unpublished) include estimates of the corresponding stature in each case, and of the cranial capacity (mean value, 1726 c.c., a high figure) in three of the five crania.

The fourth series is a small one of three crania from Barnwell Abbey near Cambridge, interesting in this connexion as an Augustinian house. But only cranial dimensions are here available for comparative purposes. In all these instances we are dealing with males.

Further evidence of the same kind is provided by Huxley in an account (cf. Huxley and Laing, *Prehistoric remains of Caithness*, p. 116) of a skull from a monasterial burying-ground in Dublin, and finally by the description of a skeleton exhumed in St David's Cathedral. The latter skeleton, supposed to be that of Bishop Gower, was distinguished by great size and the possession of a large and round skull. Indeed, the very name of a famous bishop of Lincoln may be recalled in this connexion.

The results are embodied in Tables IV and V, and of these Table IV is simply an enlargement or extension of Table I, the extension comprising the three series just mentioned. The general result is to confirm the propositions already submitted, viz. that in comparable instances, the same broad type of cranium makes its appearance, and secondly, that these broad crania are associated with skeletons of stature above the average. As is well known, the individuals at Durham falling into this category have been reliably identified with three celebrated Bishops of that diocese (viz. Flambard, Geoffrey Rufus, and Richard of Kellawe), all having died before the end of the fourteenth century. As our interest is here directed

We are thus brought to a fresh domain of this enquiry. Granted that our Cambridge "find" contains such types as have been described, can we proceed further with the task of identification? If we deal with the tall broad-headed individuals first, we shall find that reference to other researches

		E3				
		E2				
		1				
		2				
		4				
		6		E6		
		9		B		
E5		10		11		
3		13		15		
5		16		FL		
14		17		G		7
18		K		xx		Roman
xxiii		xvi		xxi	E4	B
165		170		175	180	180*

centimetres

* Modern average male stature.

TABLE V. Seriation of the statures (in cm.) calculated for the individuals found on the site of the Augustinian Friary at Cambridge, together with data for other skeletons found in comparable circumstances. The Arabic numerals are those of the Augustinian skeletons at Cambridge. Roman numerals indicate early mediaeval ecclesiastics at Durham Cathedral. "FL," "G," "K," indicate Durham Bishops of the Norman period (FL. = Flambard). "B." represents the skeleton in Canterbury Cathedral ascribed to Thomas à Becket. "Roman" is a skeleton found in York and referable to the period of Roman occupation. "E2" &c. are the statures assigned to the skeletons of mediaeval ecclesiastics at Bury St Edmunds examined in 1903 by Professor Macalister. The average modern English stature (male) is 1712 mm.

shows that the comparable examples have been claimed as foreign immigrant ecclesiastics. In some instances, as at Durham, these persons of commanding physique occupied positions of authority, and it is well known that to fill such

positions in ecclesiastical centres, foreigners of distinction were often called in.

The Durham series has been appealed to by several writers for a demonstration of the distinction between the Norman ecclesiastic in high authority and the native brethren or servitors of lowlier rank. If the objection be raised that at Cambridge our tall broad-headed men are distinguished by no special circumstances of interment, the difficulty may be eluded by the suggestion that, in some cases at least, not only the Abbots but others of the community may have migrated from abroad.

But after all, the recognition of these individuals as aliens, whether in high authority or otherwise, merely removes the answer in one degree. For if their exotic origin be granted, the endeavour to ascertain their relations in a previous environment still remains. On this subject I appealed for assistance to our great authority Dr John Beddoe. The letter written by Dr Beddoe in answer to my enquiry is so concise and explicit that it may be fitly reproduced in extenso here.

"The Augustinian order was I believe founded at Avignon, the neighbourhood of which city would not answer your desire: but a little further to the north, and in the probable track of spread of monastic influence, lies a region which may well do so, and which possessed some great and famous monasteries, though I doubt whether any of them were Augustinian. Burgundy and Franche Comté, especially the Doubs, Côte d'or, Jura, Haute Saône and Haute Marne, have about the highest statures in France (Topinard, *Anthropologie* 482—3) and the average head-breadth index over 86 in the living conscript.

You know probably, the curious difference in cranial index between old English canons of Durham and the Norman or French bishops there.

The great stature of the original Burgundians is mentioned by Sidonius Apollinaris: but they were doubtless longheaded; but this characteristic was swamped by mixture with the previous inhabitants, as was also, to a less extent, the fair complexion of the invaders."

We may thus, arguing from such evidence, regard our Cambridge series as representative of the members of a religious community consisting mainly of men of local origin, among whom were a certain number of foreigners and probably immigrants from a region occupied by the descendants of the ancient Burgundians.

But I wish to point out that whatever may be the correctness of this method of explaining the differences observed at Durham and perhaps elsewhere, in the present instance we are involved in a wilderness of surmise, owing to the paucity of records. And it is necessary to point out another and very different way of looking at the whole problem. If we start again with our small select group of tall broad-headed men, we shall not be long in recognising that the characters of some examples reproduce with faithful accuracy those commonly claimed by authors as distinctive of the men of the Bronze Period in this country (as exemplified by the Gristhorpe and Cowlam crania). That particular type is supposed with reason to have been replaced to a large extent, but it is not supposed to have disappeared entirely. To quote Dr Beddoe (*Races of Britain*, 1885, p. 17) "Certain it is that the British bronze type is found frequently—I should say with disproportionate frequency—among our best as well as our ablest and strongest men."

Moreover, the "Bronze Age" type is said to be quite indistinguishable from a certain Danish type first met with in the island tumuli, and named from a locality whence striking examples were procured, the Borreby type. Further, the Borreby type has apparently persisted in Denmark, even down to the present day, as may be seen on reference to the latest data relative to Danish ethnology [*Meddelelser om Danmarks Antropologi*. I Bind, I Afdeling, pp. 131, 132 and 167 et seq. cf. Dr Steensby's Summary (in English)].

In a district brought so thoroughly under Danish influence as Cambridgeshire in the early middle ages, it would not be surprising if examples of this type should occur locally, as a residue of Danish immigrants of the Borreby type at a comparatively early period.

If we review these facts we see that the tall broad-headed men may thus be referred to a stock either of

- (a) British Bronze Age type.
- (b) Early Danish immigrants of the Borreby type.
- (c) Later immigrants from a more southern region, perhaps Normandy or perhaps Burgundy: these being the ecclesiastics who settled or founded the Augustinian Friary in Cambridge.

I have dealt with this point at length, not wishing to adopt the somewhat easy course of invoking a foreign element without criticism. Having done so, and having regard to the whole of the facts at my disposal, I would nevertheless sum up in favour of the foreign-immigration theory set forth under (c) above. This I do in view of the following considerations. In the first place, we have a very close analogy with the conditions at Durham, where the outstanding type can be confidently referred to the foreign element represented by the Bishops. In the second place (and in spite of Dr Beddoe's dictum, *v. supra*, p. 32), I consider the proportion of these very broad-headed men in the Cambridge series too great to be provided by the local mediaeval population, which (although it doubtless contained individuals of the Bronze Age type) was yet, on the whole, characterised by a very large majority of individuals with distinctly-narrow heads. This difference in proportion is illustrated by Tables VI and VII, which require no further elucidation here.

TABLE VI.

Cranial Breadth-Index exceeds 81 in 32·4 % of mediaeval crania from the following monastic sites : viz.

		Total no. of examples
Cambridge :	Augustinians	27
Bristol :	Carmelites	11
"	St Werburgh	31
Bury St Edmunds		5

Cranial Breadth-Index exceeds 81 in *only* 33 % of modern Englishmen (cf. Dr Beddoe's measurements).

In order to adopt the explanation outlined in paragraphs (a) or (b) above, the proportion of very broad heads ought not to be different in collections of crania from monastic sites and in those from other mediaeval sites, whereas Table VII gives reason to believe that monastic sites generally if not always provide a higher proportion of very broad-headed individuals.

If we turn to the remainder of our specimens, we shall find some reason (especially in view of cranial breadth and stature) for associating Nos. 15 and 17 with the tall broad-headed men about whom so much has been written. They are placed however, and comparatively speaking, so much nearer the main group in the seriation given in Table III, that I do not venture to claim more than a very small amount of support from their

TABLE VII.

MALE CRANIA.

Total No.	Provenance	Parietal Width 155 mm. or more		Parietal Width 160 mm. or more	
		Absolute number	Per cent.	Absolute number	Per cent.
56	Round Barrows ¹ (Bronze Age)	17	30.3 (56)	5	9 (56)
324	Hythe Ossuary ² (Mediaeval)	5	1.41 (424)	2	.47 (424)
100	Rothwell Ossuary ³ (Mediaeval)	1		0	
424					
11	Carmelites (Bristol)	1	22.3 (54)	1	11.1 (54)
3	Durham Ecclesiastics	2		1	
3	Barnwell Abbey Cambridge	1		0	
32	Augustinian Friary Cambridge	6		3	
5	Bury St Edmunds (Chapter-House)	2		1	
54					

characters. No. 8 again must be mentioned, but is excluded from the extreme broad-headed group by reason of its comparatively small cranial breadth (151) and measure of capacity. Again, No. 18 might appear, when judged by the cephalic

¹ From Thurnam. *Memoirs of the Anthropological Society*, Vol. III, p. 48.

² Parsons. *Journal of the Royal Anthropological Institute*, 1909.

³ Parsons. Kindly communicated by the author in advance of publication in the *Journal of the Royal Anthropological Institute*, 1910.

index denoting a high degree of brachycephaly (87.79), to claim association with this group. But the cranial breadth, and more definitely still, the cranial capacity and stature absolutely preclude such an association. This specimen represents a type recognised already by Rolleston [cf. *British Barrows*, pp. 662, 663, or *Scientific Papers and Addresses*, Vol. I, p. 261].

Of the other skeletons with crania, only Nos. 1, 5 and 9 will be here mentioned, in order to state that they provide characters regarded as especially diagnostic of the Neolithic or Long Barrow inhabitants of Britain, who are found here mingled with the other types.

It is remarkable that the typical "Reihengräber" cranium is not represented here. The nearest example is No. 9, but the cranial breadth is too great to enable the identification to be made.

The female crania are too few in number to enable the observer to submit any general propositions concerning them. The form tends to the broad rather than the narrow type, and here again we meet with a feature of female crania unearthed on monastic sites. Crania from Barnwell Abbey and St Rhadegund's Nunnery support this statement. The present series appears closely similar to the seven specimens of mediaeval date, from the church of St Werburgh in Bristol (described in the *Proceedings of the Archaeological Society of Bristol and Gloucestershire* by Dr Beddoe in 1878-79). They thus provide support for the view already expressed in connexion with the remains of the men.

SKELETONS FROM THE SITE OF THE AUGUSTINIAN FRIARY. ANATOMICAL NOTES.

1. In several instances, the lines of muscular attachment to the limb bones are extraordinarily distinct. Of this condition, the skeleton No. 17 provides a good example and in particular the "soleal line" of the tibia is very prominent. In No. 16 the "linea aspera" of the femur is similarly distinct.

2. Skeleton No. 14 provides two distinctive characters, inasmuch as the os innominatum has the distinctive sexual characters of the male bone very strongly developed; and again the "bowing" or curvature of the bones (radius and ulna) of the forearm present a condition unusual in human skeletons, characteristic of the fore-limb bones of anthropoid apes, and found occasionally in skeletons of individuals of lowly race such as the Tasmanian aborigines. No. 22 (female) provides an admirable demonstration of the typical female characters of the os innominatum.

3. A female skeleton (No. 21) has femora in which the angle between the axis of the neck and that of the shaft is unusually wide. This is a character bringing the particular bones into contrast with normal female femora, and approximating them to the male type.

4. No less than three mandibles (Nos. 13, 18, 28) show signs of the root of the canine tooth having been double. This anomaly is very rare in modern mandibles of whatever provenance. Its frequency in mandibles of early or prehistoric date in England has been commented on by Rolleston in his report on the skeletons from British barrows (cf. Greenwell and Rolleston, *British Barrows*, p. 706). The significance of the anomaly remains quite obscure.

5. Several skeletons provide evidence of disease. In one case much ossific deposit has occurred around the axis vertebra (odontoid process) and in another specimen the patella is remarkably emarginate (cf. Kempson, *Journal of Anatomy and Physiology*, Vol. xxxvi, p. 419).

6. The advanced age of several individuals is further denoted by the discovery of the thyroid and cricoid "cartilages" of the larynx in a condition of ossification which has led to their preservation, whereas if cartilaginous, all traces would have disappeared. The large size of the ossified cartilages accords with that of the associated bones.

*Note to be appended to Mr SCHNEIDER'S Plan of the
Excavations.*

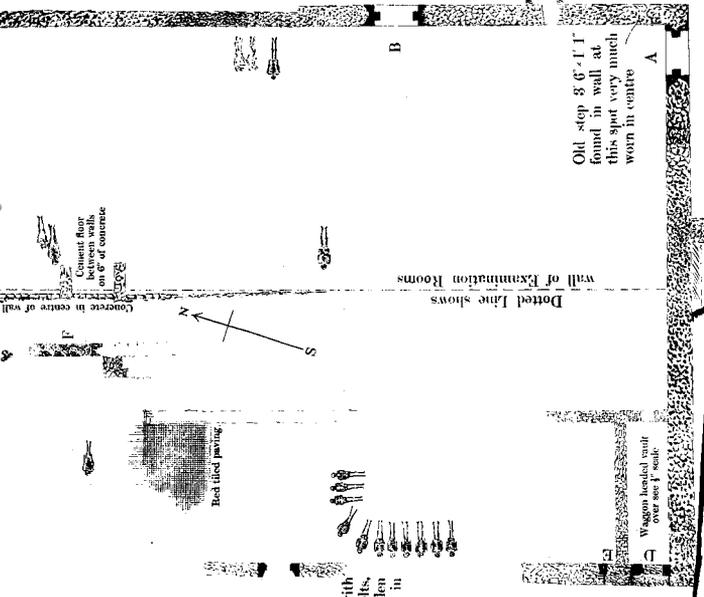
The skeletons described in this Report were discovered at the eastern end of the site: very few remnants of attire were found here. In the autumn of 1909 further excavations were commenced to the west of those just mentioned, and more skeletons including six in a row with a few at right angles to them (as shown on the Plan) came to light. With these, several buckles and remnants of clothing were found. The characters of these later discoveries will be summarised in a Supplementary Report.

SITE PLAN OF
 NEW EXAMINATION ROOMS AND
 LECTURE ROOMS SHOWING FOUNDATIONS, ETC.
 OF OLD FRIARY, DISCOVERED DURING
 RECENT EXCAVATIONS.



MESSRS MORTLOCK'S PROPERTY

Note. Bottom of walls 9' 3" from existing Examination Floor level



These stones are Clunch the moulded surface entirely pitted, but the surface is well preserved owing to their being filled in with brick and stonework

The 4 moulded courses are in hard stone similar to Barnack flag

Concrete floor between walls one or two courses of distance

Centre in centre of wall

Arch in Church

Bank of Earth covering Vault etc.

Skeletons of Friars, found with brass buckles, leather belts, and fragments of woollen habits, now deposited in Archaeological Museum

Back filled paving

Wagon headed vault over see F vault

Old brick and stone walls

MINERALOGY

CAVEYDISH LABORATORY

Section of Barnack Rag stones dug out of old walls at F

Section through arch E

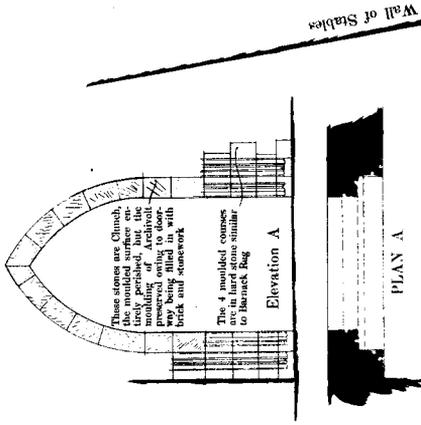
Elevation at D

Elevation at E

Plan at C

Plan at D

Plan at E



The stonework to these jambs is similar to that at A

Wall of Stables

Elevation at D

Elevation at E

Plan at C

Plan at D

Plan at E

OBSERVATIONS ON 100 SCHOOL-BOYS AT ALHAMA
DE ARAGÓN, SPAIN.

By W. L. H. DUCKWORTH, M.D., Sc.D.

Alhama de Aragón is situated at the southern limit of the province of Aragón, and is actually about midway between Saragossa and Madrid. The railway has but recently traversed this region, so that the population has been but little affected hitherto. The general aspect of the landscape is of a type common in Spain to the south of the Ebro valley. Near Alhama de Aragón the general view is of ranges of limestone hills, and often elevated plateaux are seen: broad undulating tracts of land intervene between the various groups of hills, which rarely exceed 1500 feet in height, and are often much lower. The hilly parts are almost devoid of vegetation in September; probably at no time are they well covered. But in certain parts of the lowlands irrigation is practised, and trees, shrubs and herbs abound. The chief stream in this region is the Jalón: this was very low in September 1909, and such water as was present passed down sluggishly; the water is thick, muddy and of a bright terra cotta tint. Abundant mineral springs provide an alternative source of clear but often hot water. All these features are met with in most parts of Aragón.

The population is mainly agricultural. Shepherds tend flocks of sheep or herds of goats in the hills, and the very numerous caves in the weathered limestone crags afford shelter from the extremes of heat and cold. (If any prehistoric strongholds exist in these hills, they are hard to detect without minute search. But the hill-country closely resembles that in S.-E. Spain where the brothers Siret have discovered so many Bronze Age settlements.) In the areas of irrigation, cereals

(especially maize) are cultivated: fruit trees are not so prominent as in the Ebro valley. Vineyards occupy the positions intermediate between the desert uplands and the "huertas" or oases. Near Alhama several marble quarries are now being worked. But on the whole, the conditions of existence are comparatively primitive, so that the locality is a favourable one for observations of the kind now to be set forth in detail.

I had the opportunity of visiting the boys' school at Alhama de Aragón, and measured the head of every boy, making a few other observations on complexion, etc. The total number of individuals was 100: the mean age was $8\frac{1}{2}$ years, ranging from 3 to 13. The parents of all were domiciled in Alhama, and were in most cases Aragonese by long descent. I have appended with the measurements a list of the names of individuals. With regard to the general results of my observations, I may at once state that the local types do not include a large proportion of any element capable of description as "negroid" or even any that might be ascribed to a "Moorish" stock, if thereby we mean a swarthy or sub-negroid type. Yet contrasts do occur, and in the photographs submitted herewith some of these are illustrated. In three pairs of individuals (Figs. 1—6 incl.), a more swarthy type, with coarser features, is contrasted with a fairer type. In one pair at least (Nos. 34 and 57), the darker individual is also characterised by prognathism and a long "cylindrical" head: the corresponding skull must be very like those which I have noticed frequently in a collection of modern crania of Sardinians, the description of which I am preparing for publication. The general physique is rather inferior to what one would observe in rural British districts, but superior to that met with by me in Crete, where I measured a number of school-boys. In the following pages I have used the data from the latter series for comparative purposes.

I now turn to the observations made under the various headings as follows:

Hair. The following table of percentage results exhibits the distribution of various tints of hair-colour according to my judgment:



No. 57 (profile)

FIG. 1.

No. 34 (profile)



No. 52 (profile)

FIG. 3.

No. 54 (profile)



No. 82 (profile)

FIG. 5.

No. 72 (profile)

Figs. 1, 2. Two boys at Alhama de Aragón.

No. 57 (in series). Jesús Lázaro, age 10. Head: (L.) 190, (Br.) 139, (B. I.) 73.2. Slightly freckled. Hair: straight, light-brown. Eyes: dark-brown.

No. 34. Armando Santander, age 10. Head: (L.) 185, (Br.) 138, (B. I.) 74.6. Dark skin. Hair: straight, dark-brown. Eyes: dark-brown. Face prognathous. Head "cylindrical."

Figs. 3, 4. Two boys at Alhama de Aragón.

No. 52. Isidro Latorre, age 8. Head: (L.) 186, (Br.) 135, (B. I.) 72.6. Skin pale. Hair: straight, medium-brown. Eyes: "hazel."

No. 54. Esteban Tello, age 7. Head: (L.) 174, (Br.) 141, (B. I.) 81. Negroid complexion. Hair: straight, jet-black. Eyes: darkest-brown or "black."



No. 57 (full-face)



No. 34 (full-face)

FIG. 2.



No. 52 (full-face)

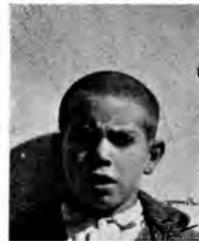


No. 54 (full-face)

FIG. 4.



No. 82 (full-face)



No. 72 (full-face)

FIG. 6.

Figs. 5, 6. Two boys at Alhama de Aragón.

No. 82. Virgilio Hernando (F. Aragonese, M. Castilian), age 7. Head: (L.) 177, (Br.) 132, (B. I.) 74.6. Skin fair. Hair: straight, "chestnut" or "light"-brown. Eyes: very distinctly light-blue.

No. 72. Germán Jagüé, age 6. Head: (L.) 188, (Br.) 132, (B. I.) 70.2. Skin pallid or sallow. Hair: straight, "medium-brown." Eyes: almost hazel. As in No. 34 (Fig. 1) the occiput is greatly projected backwards.

Hair-colour in school-boys at Alhama de Aragón.

Very fair	3	%	(Mean age 7 years).
Fair	6	"	(" " 8.6 ")
Light-brown	18	"	(" " 8.2 ")
Medium-brown ...	30		
Dark-brown	34		
Jet-black.....	8	"	(Mean age 9.3 years).
Red	1		
	<u>100</u>		" (Mean age 8.5 years).

Very fair or fair hair is not only associated with grey or grey-blue eyes, but also with eyes of hazel, medium-brown or even dark-brown tint, though the latter coincidence occurred but once. In practically all the instances of individuals with hair lighter than dark-brown (or jet-black) the eye-brows and eye-lashes are darker than the scalp-hair. And again, the lashes are darker than the brow-hair. So that in an individual with hair of medium-brown tint the sequence in darkness of pigmentation would be: eye-lashes darkest, then eye-brows, then scalp-hair. Further, dark brown eyes not infrequently accompanied hair of medium-brown tint, when this sequence of depth of pigmentation would be carried a stage further to include the eye-colour, which was darkest of all.

On the other hand, eyes of a distinct blue tint may be shaded by almost black lashes; the brows and scalp-hair being also very dark.

In general the depth of pigmentation is not so great as might have been expected; and, indeed, my impression on arrival in Aragón from the Basque provinces was to the effect that, in the Basque provinces, brunette traits are more marked and frequent than in Aragón. In the latter province, the combination of blue eyes with "chestnut" hair seems to me much more frequent.

In examining the foregoing table of percentages, the influence of age is suggested by the comparison of the mean ages in different groups. The mean age in years of the fairest haired individuals is either below, or only just above, the mean

age for all. But on the other hand, the older boys have darker hair.

Most of the boys were remarkably pallid considering the season of the year and the climate of Aragón. Three or four were slightly freckled, the red-haired boy distinctly so. This red-haired boy was rather of the fairer type, with bright complexion, than of the dull type. The latter was seen by me in one instance at Tudela: and a young woman at Saragossa had the dull-red "Venetian" type of hair.

Most of the boys at Alhama de Aragón seemed to have straight hair (95.07%), but the closeness of the cutting of the hair minimises the value of this observation. Certainly no case of black curly hair occurred.

Eye-colour. The intermediate tints are most common, as may be gathered from the table appended.

Eye-colour (%) &c., in School-boys at Alhama de Aragón.

Blue	3.02...	Average age, 6.66 yrs.)		per cent.	Av. age
Grey	7.06...	" " 7.4 "	} Lightest eyes...	13.1...	7.14
Greenish-grey ...	3.02...	" " 7 "			
Light-brown.....	1.00...	" " 12 "	} Medium eyes...	46.5...	8.98
"Hazel"	27.30...	" " 8.56 "			
Medium-brown...	18.20...	" " 9.45 "			
Dark-brown	39.40...	" " 8.3 "	} Darkest eyes ...	40.4...	8.27
Very dark-brown	1.00...	" " 7 "			
	<u>100.00</u>				

The increase in depth of pigmentation, with increasing age, is not so distinct in the eyes as in the hair. The association of eye-colour with hair-colour has been mentioned in the preceding paragraph.

Head-length. The mean value of this dimension in 100 boys is 178.1 mm. The difficulty usually encountered in recording the maximum length of the head in boys was present here. It consists in the fact that the maximum length is really between a point *above* the glabella, and an occipital point. Later on, when after puberty the frontal sinuses are fully developed, the maximum length is between glabellar and occipital points. For the sake of a more accurate comparison

with data for adults, I have recorded the maximum glabello-occipital diameter.

The corresponding mean diameter in a series of seven adult male heads is 193.1 mm., an increase of 15 mm.; the gradual increase in magnitude of this dimension is exhibited in the following table:

Mean value (in mm.) of the maximum glabello-occipital diameter of the head in Aragonese school-boys and adults.

- | | | |
|-----|---|-------|
| (a) | In boys of 5 to 6 yrs (18 examples) | 176.3 |
| (b) | In whole series (100 examples)..... | 178.1 |
| (c) | In boys of 12 to 13 yrs (12 examples) | 179.5 |
| (d) | In adults (7 examples) | 193.1 |

From these figures it is clear that from the age of 5 years to that of 12 years this diameter increases wonderfully little, whereas after puberty the increase is very great, five times as much as in the earlier period. The influence of the frontal sinuses here has been previously remarked. In a report on the same dimensions in Cretan school-boys (which I hope to publish shortly) I have prepared a similar comparison which shows that, in the Cretan head, the increase progresses at a more uniform rate than seems to obtain among these young Aragonese.

Head-breadth. The mean value of this dimension in 100 boys is 138.2 mm. If a comparison of the mean values of this dimension be instituted, we obtain the following results:

Mean value (in mm.) of the maximum cephalic breadth in Aragonese school-boys and adults.

- | | | |
|-----|---|-----------|
| (a) | In boys of 5 to 6 years (18 examples) | 137 mm. |
| (b) | In the whole series (100 examples) | 138.2 mm. |
| (c) | In boys of 12 to 13 years (12 examples) ... | 138.1 mm. |
| (d) | In adults (7 examples) | 145.3 mm. |

And here again, if we take Class (c) as representing the middle period (between the extremes of infancy and maturity), we see that in the seven earlier years this dimension is almost

stationary in point of growth; whereas a very notable increase occurs during and after puberty. Again, also, my Cretan observations exhibit greater precocity in that island, than in Aragón.

Cephalic Index. In this paragraph care must be taken to avoid confusion between the data recorded for *heads* and those for *crania*. The distinction is not always clearly drawn, as may be noted in connexion with the work of even so practised an observer as Professor Flinders Petrie (cf. *Journal of the Royal Anthropological Institute*, Vol. xxxi, 1901, p. 248).

The mean value of the cephalic index of 100 boys is 77·6. The seven adult heads measured furnish a mean value of 75·2. Evidently the variation both in length and breadth will account for the discrepancy observed.

The following table exhibits the mean values at various ages :

*Mean value of the breadth index of the head
in Aragonese school-boys and adults.*

(a)	In boys of 5 yrs to 6 yrs (18 examples)	77·7
(b)	In the whole series (100 examples).....	77·6
(c)	In boys of 12 yrs to 13 yrs (12 examples) ...	76·9
(d)	In adults (7 examples).....	75·2

The diminution in the numerical expression is principally due to the great antero-posterior extension remarked after puberty.

In regard to the comparison of our data with those on record for this part of Spain, it may now be mentioned that, according to Deniker (*Assoen. franç. pour l'avancement des Sciences, Congrès de S. Étienne, 1897, reprint, p. 19*) quoting Oloriz, the mean cephalic index for Aragón is 77·4. The seven adult males measured by me thus provide figures below that mean value, which however coincides with the mean provided by the school-boys at Alhama. But from a study of Oloriz' records it is clear that a good deal of local variability exists.

With the view of elucidating the variability of the cephalic dimensions and index in the school-boys of Alhama, I have calculated some of the constants employed by Professor Karl Pearson in statistical investigations of this kind. The values

obtained are set forth in the table following. For comparative purposes I have added the corresponding data from other sets of measurements either made by myself (as on the school-boys of Crete) or published by others in anthropological journals.

Dimension	Age (Mean)	No. of Examples	Mean*	Prob. error of Mean	σ	C
Head-Length :						
Aragonese school-boys	8.5	100	178	.354	5.25	2.95
Cretan school-boys	9.9	79	173	.508	6.67	3.85
Head-Breadth :						
Aragonese school-boys	8.5	100	138	.285	4.23	3.07
Cretan school-boys	9.9	79	140	.38	6.65	4.75
Cephalic Index (on living) :						
Aragonese school-boys	8.5	100	78	.189	2.81	3.6
Cretan school-boys	9.9	79	81	.36	4.8	5.92
British boys (Beddoe)	16	200	78	.128	2.70	3.46
American school-boys	9	135	80	.22	3.74	4.675
" "	5 to 13	1003	79	.073	3.44	4.3

* The nearest whole number is taken in each instance; thus 178 is taken not 178.1 which is the actual value for the head-length.

From this table it will be inferred that in respect of head-length the Aragonese boys, with a longer absolute diameter of this kind, are less variable than the school-boys observed in Crete. In respect of cephalic breadth, the Aragonese school-boys are again less variable, though the mean value of this dimension is less than the corresponding figure for the Cretan school-boys.

The table of the cephalic indices is more extensive. From this we see that the variability in Aragón is about the same as in this country, if we admit the comparison of youths of 16 years (British) with school-boys of varying age in Aragón.

The only other comparable data I have been able to work out on similar lines up to the time of writing, are derived from a statistical account of the anthropometry of school-children in Worcester, Mass., U.S.A., and published by Dr West in the *Archiv für Anthropologie* (1894, Bd. 22, pp. 13 et seq.). This yields data for no less than 1003 individuals between the ages

of 5 and 13 years; therefore quite comparable with the data for Alhama de Aragón. The mean cephalic index is slightly higher in the American boys (of parentage with mixed European origin), the variability is also greater than in my Aragonese series, but the much greater number of observations in the total has determined a higher degree of accuracy; this is reflected by the smaller figure for the "probable error" of the mean. My measurements in Crete reveal a greater variability among the Cretan school-boys than among those of Alhama, but it must be remarked that the number of observations in Crete is smaller, and the range of age more extensive. Both factors contribute to the production of a standard deviation (σ) indicative of greater variability.

Lastly, I am tempted to add a note on the comparison of my series of data for the cephalic index in the school-boys of Alhama, with data placed on record by other observers (*a*) in the case of 81 modern male crania in Andalusia, and (*b*) in that of 23 prehistoric male crania from the south-east of Spain (Murcia). The values of the means of these two series must be modified in order to provide a more direct comparison with the first set, since in the two last instances crania, and not heads, were measured. The conventional correction has been added to the proper figures in the table following:

Provenance	Dimension	No. of Examples	Mean* of Mean	Prob. Error of Mean	σ	C
Aragonese school-boys	Cephalic Index	100	78 (77.6)	.189	2.81	3.6
Andalusian males, modern: adults (crania)†	" "	81	75.85 (=77.85 on head)	.27	3.56	4.7
Andalusian &c. (Murcia) males, prehistoric: adults (crania)‡	" "	23	75.9 (=77.9 on head)	.408	2.9	3.8

* Cf. footnote to the preceding table.

† Cf. Medina y Barras, *Ann. de la Soc. Española de Hist. Nat.* T. xxvii, Univ. Lib., MC. 7. 127, p. 8.

‡ Cf. Siret, *Les premiers âges etc.*

In this we see a close similarity in the mean values of the character (cephalic index) throughout the table: and it is seen that the school-boys exhibit variability in a less degree than in

either series brought into the comparison. Herein we find, I believe, some of the advantage in making as many observations as possible within a limited area. This condition was fulfilled in my own investigation, but from the nature of the case, could not be complied with in either of the other two.

I. LIST OF NAMES.

10 José Recalde	45 Antonio Garcia
11 Pascual Moros	46 Maisimo García
12 Carmelo Arcos	47 Vicente Moros
13 José Munilla	48 Angel Martinez
14 Tomás Menes	49 Julián Arcos
15 José Penilla	50 Joaquin Vela
16 Pedro Martini	51 Gonzalo Herranez
17 José Retrián	52 Isidro Latorre
18 Antonio Marruedo	53 Felix Pinilla
19 Frederico Recalde	54 Esteban Tello
20 Cesar Sebastian	55 Domingo Dominguez
21 Elias Colás	56 Leon Arana
22 Pascual Sobrino	57 Jesús Lázaro
23 Felipe Bueno	58 Andres Moros
24 Antonio Moros	59 Bonifacio Marco
25 Ramon de la Fuente	60 José Ignacio Matos
26 Santos Martinez	61 Epifanio Munoz
27 Antonio Torres	62 J. Vicente Gómez
28 José Blasco	63 Ambrozio Agnar
29 Manuel Lacasta	64 Domingo Marruedo
30 José Tarodo	65 Pedro Esteban
31 Manuel Mateo	66 Romon Martinez
32 Antonio Gil	67 Santiago Bueno (or ? Bruno)
33 Patricio Dominguez	68 Antonio Guajardo
34 Armando Santander	69 Pascual Vicioso
35 Leoncio Arcos	70 Luis Marco
36 Manuel Vicioso	71 Luis Marsol
37 Manuel García	72 Germán Jagüé
38 Felice Latorre	73 Antonio Blanco
39 José Corrales	74 José Gil
40 Manuel Gállego	75 Pascual Morez Monge
41 Ramon Parral	76 Luis Polo
42 José Frances Diez	77 Luciano Parral
43 Laurentino Caraso	78 Antonio Pinilla
44 José Ducé	79 Antonio Moros

80	Gonzalo Arcos	95	Nicolas Coruago
81	Clemente Reguilme	96	Fernando Caraballos
82	Vergilio Hernando	97	Angel Diez
83	Angel Laguna	98	Juan Vicioso
84	Enrique Martinez	99	Carlos de la Fuente
85	Innocencio Esteban	100	Antonio Moretón
86	José Maria Casado	101	Lorenzo Gil
87	Crescencio Vocioso	102	Miguel Morales
88	Juan Palacín	103	Joaquin Colás
89	Timoteo Enquita	104	Marcos Lorrio
90	Julio Moros	105	Antonio Tarodo
91	Ricardo Rubio	106	Isid Duce
92	Antonio Bebrían	107	Fermín García
93	Manuel Gaspar	108	Felipe Duce
94	Candido Bartolome	109	Adriano Cortel

II. MEASUREMENTS.

No.	Age	H. L.*	H. B.†	B. I.‡	No.	Age	H. L.*	H. B.†	B. I.‡
10	13	186	143	76.9	30	11	175	139	79.4
11	13	175	141	80.6	31	10	181	139	76.8
12	11	177	142	80.2	32	12	183	132	72.1
13	12	185	140	75.7	33	9	181	141	77.9
14	12	175	134	76.6	34	10	185	138	74.6
15	12	187	135	72.2	35	11	175	136	77.7
16	10	181	135	74.6	36*	9	181	136	75.1
17	12	184	134	72.8	37	12	168	142	84.5
18	12	178	136	76.4	38	10	177	140	79.1
19	11	188	149	79.3	39	9	180	143	79.4
20	12	168	138	82.1	40	8	167	142	85.0
21	12	176	136	77.3	41	11	174	141	81.0
22	11	179	139	77.7	42	9	177	140	79.1
23	12	190	146	76.8	43	10	180	143	79.4
24	9	176	133	75.6	44	11	186	143	76.9
25	8	173	132	76.3	45	10	178	142	79.8
26	8	175	132	75.4	46	11	176	140	79.5
27	8	175	134	76.6	47	8	177	142	80.2
28	9	181	145	80.1	48	7	176	141	80.1
29	10	173	132	76.3	49	7	171	137	80.1

* H. L. indicates maximum cephalic length, from the glabella.

† H. B. indicates maximum parietal width.

‡ B. I. indicates cephalic index, calculated from H. L. and H. B.

MEASUREMENTS (*continued*).

No.	Age	H. L.*	H. B.†	B. I.‡	No.	Age	H. L.*	H. B.†	B. I.‡
50	9	178	139	78.1	80	7	172	142	82.6
51	8	174	141	81.0	81	9	178	137	77.0
52	8	186	135	72.6	82	7	177	132	74.6
53	7	185	136	73.5	83	6	171	137	80.1
54	7	174	141	81.0	84	6	180	144	80.0
55	10	176	144	81.8	85	7	175	140	80.0
56	11	186	142	76.3	86	6	176	147	83.5
57	10	190	139	73.2	87	7	187	133	71.1
58	10	176	135	76.7	88	7	181	140	77.3
59	9	176	139	79.0	89	7	176	135	76.7
60	8	182	139	76.4	90	7	178	134	75.3
61	8	177	140	79.1	91	6	177	135	76.3
62	9	181	143	79.0	92	6	178	140	78.7
63	9	175	139	79.4	93	7	169	132	78.1
64	7	174	134	77.0	94	7	171	137	80.1
65	7	173	132	76.3	95	6	174	138	79.3
66	6	180	141	78.3	96	5	167	136	81.4
67	7	184	150	81.5	97	6	172	137	79.7
68	7	177	146	82.5	98	6	187	138	73.8
69	7	181	141	77.9	99	6	177	133	75.1
70	6	178	136	76.4	100	5	173	136	78.6
71	8	183	144	78.7	101	5	170	129	75.9
72	6	188	132	70.2	102	5	179	142	79.3
73	8	174	135	77.6	103	7	182	140	76.9
74	7	180	132	73.3	104	7	176	135	76.7
75	7	182	140	76.9	105	6	176	132	75.0
76	8	182	136	74.7	106	11	185	140	75.7
77	8	173	134	77.5	107	11	181	140	77.3
78	7	187	138	73.8	108	9	178	136	76.4
79	8	175	132	75.4	109	3	171	134	78.4

* H. L. indicates maximum cephalic length, from the glabella.

† H. B. indicates maximum parietal width.

‡ B. I. indicates cephalic index, calculated from H. L. and H. B.

ADULTS.

Antonio Perez	1	25	190	146	76.8	
Rafael Lopez	2	62	187	140	74.9	
Carlos Marco	3	26	187	137	73.3	Blue eyes
Mariano Agneto	6	?	200	148	74.0	
Lucas Lapeña	7	?	197	154	78.2	
Pablo Gascon	8	?	201	149	74.1	
Severino Corrales	9	?	190	143	75.3	

* Shepherds at Alhama.

Monday, 25 October, 1909.

The Rev. Dr STOKES, President, in the Chair.

The Report for the year 1908-9 was presented to the Society and passed.

REPORT.

A LARGE addition to the list of members, an increase of eighty per cent. in the average attendances at meetings, and other favourable circumstances, permit the history of the Society during the past year to be summed up in one word—progress.

Eight members have retired during the year in consequence of leaving England or the near neighbourhood of Cambridge.

Five members have been lost to us through death. Among those who have thus passed away the Council desires to commemorate with great regret the Rev. Canon Appleton, Master of Selwyn College, and Mr William Milner Fawcett, whose long connexion of forty-five years with the Society, and his active and useful work for it, make his decease a severe loss to us. He bequeathed to the Society about eighty volumes of Archaeological works, which have been placed in the Library of the Museum of Archaeology.

To counterbalance the thirteen members thus withdrawn from the Society eighty-six new members have been elected.

On 1st October, 1908, the Society numbered 299 members; now there are 372 names upon the roll.

Two additions to Law III have been made in order to facilitate the increase of members, and, because the Society is so closely connected with the University, to permit undergraduates to take advantage of the educational work done by it.

Twenty-one meetings have been held during the past Session, with an average attendance of 81 persons. This clearly points out that the plan of holding weekly meetings instead of fortnightly ones during term, has roused a corresponding increase in the interest taken by members in the Society's work.

The following communications were made :

- F. J. Allen, M.D.: *Church Towers of Cambridgeshire.* Feb. 22, 1909.
- C. P. Allix: *An Ancestor's escape from France after the Revocation of the Edict of Nantes.* May 10, 1909.
- Prof. Sir R. S. Ball: *Ancient and Modern Views of the Constitution of the Milky Way.* Mar. 1, 1909.
- Francis Bond: *How the English Parish Church grew.* Oct. 27, 1908.
- F. Bligh Bond: *Screens of Cambridgeshire Churches.* Nov. 30, 1908.
- R. Bowes: *The Zodiac Club.* May 31, 1909.
- H. M. Chadwick: *Runic Inscriptions.* May 3, 1909.
- W. L. H. Duckworth, Sc.D.: *Notes on Corsica: (a) The discovery of a megalithic site near Ponte Leccia, (b) The men of the Niolo and Ascò districts.* May 24, 1909.
- J. E. Foster: *The connection of Chesterton Vicarage with the Abbey of Vercelli.* Feb. 15, 1909.
- G. J. Gray: *The Shops at the West End of Great St Mary's Church, Cambridge.* May 10, 1909.
- W. H. St John Hope: *The loss of King John's baggage-train in the Well-stream in Oct. 1216.* Nov. 16, 1908.
- John Peile, Litt.D., the Master of Christ's College: *On four MS. books of accounts kept by Joseph Mead, B.D., Fellow of Christ's College, with his pupils between 1614 and 1633.* May 24, 1909.
- Prof. W. M. Flinders Petrie: *Discoveries at Memphis.* Oct. 19, 1908.
- Prof. E. J. Rapson: *Early Indian History illustrated with coins and inscriptions.* Jan. 25, 1909.
- W. B. Redfern: *Ancient Footgear.* May 17, 1909.
- Prof. Ridgeway: *Origin of the Turkish Crescent.* Nov. 23, 1908.
- W. H. R. Rivers, M.D.: *The Secret Societies of the Banks' Islands.* Mar. 8, 1909.
- W. H. D. Rouse, Litt.D.: *Modern Greece.* Nov. 2, 1908.
- Rev. Prof. W. W. Skeat: *On the corruption of old English names.* Nov. 9, 1908.

Reginald A. Smith: *Santon Downham Hoard of Metal.*

Feb. 1, 1909.

Rev. Dr Stokes: *Early University Property.* Feb. 15, 1909.

Rev. F. G. Walker: *Comberton Maze and the origin of Mazes.*

Feb. 8, 1909.

Rev. F. G. Walker: *Greek Coins and Syrian Arrowhead from a Roman Cemetery at Godmanchester.* May 24, 1909.

Again ample time has been devoted to the main object for which the Society was founded, namely, the study of East Anglian archaeology, since eleven out of the twenty-two papers read related to Cambridge and the Eastern counties.

This year will see the commencement of the first block of the new Museum of Archaeology and Ethnology. This much-desired event has been brought about by the unwearied efforts on the part of the Curator, Baron A. von Hügel, and through the continued generosity of members of the Foster family, aided by a grant of £1000 from the unassigned portion of the Benefaction Fund of the University. An energetic movement ought now to be made in order to secure the building of the two other blocks of the Museum within a reasonable time.

Some dozen or more portraits have been added to the Society's collection of portraits of distinguished persons connected with the County, University, and Borough. The Secretary begs members to bear in mind this valuable section of the Society's work, and to aid him in obtaining portraits of notable persons in any durable form.

Excavations have been carried out by the Secretary at Barton. The Roman road, which ran from Cambridge Castle to Barton, was uncovered last winter and a careful plan made of its section where it crosses a field called Bull's Close, a little to the north-east of the church.

A tumulus at Barton was also excavated, through the courtesy of the Mercers' Company of London. The mound was levelled some fifty years ago, and it was only by appealing to the recollections of old inhabitants of the village that the site could be located. It stood in the field, a few yards to the south-east of the point where the Bridle-path from Grant-

chester emerges on the high road to Cambridge. A round patch of very dark brown earth, about eight yards in diameter, was discovered at a distance of three feet below surface level. A few human bones and fragments of Niedermendig lava millstones and coarse pottery, together with two pieces of bronze, rusted out of all shape and recognition, were the only objects found in this dark earth. Though the pieces of millstone point to a Roman origin of the tumulus yet, considering the indeterminate character of the rest of the evidence, of themselves they are not sufficient to fix a date.

During August, by the courtesy of the Master of Christ's College, three tumuli called the 'Arms Hills,' situated to the north of the village of Bourn, were also opened by the Secretary. A report of this excavation will be laid before the Society.

An appeal, published herewith in Appendix No. I, has been issued by the Council to members, and to others interested in original research, for the forming of an Excavation Fund.

It is earnestly hoped a generous response will be made to this appeal in order that this most important branch of antiquarian work may be fittingly carried on by the Society. The ideal to be aimed at is the accumulation of a sum sufficient to provide an income of £50 to be spent in excavating the many sites in the County awaiting serious investigation.

In the meantime a sum of £50 should be raised by subscription each year for this purpose.

The Secretary, aided by donations from a few members of the University and by a grant from the Society's funds, has been able to restore, according to its original plan, the ancient village maze at Comberton, which had become almost obliterated. The maze is now protected by an iron fence, which will permanently preserve this interesting relic of bygone times.

This year the publications have been five in number:

By W. D. Carøe, M.A. *King's Hostel*. Quarto. New Series, No. 2.

The three terminal parts of the thirteenth volume of *Proceedings*, containing the Transactions and Communications for the Session 1908-9.

The List of Members, Rules, Report, etc., for 1909.

The thanks of the Society are again due to Mr J. W. Clark, Sir H. G. Fordham, Mr J. E. Foster, and others for providing blocks and illustrations for their papers.

Four excursions have been made during the past year.

On 22nd October, 1908, 45 members drove or cycled to Madingley Hall, where Colonel Harding conducted them over the house, which he has so carefully and conservatively restored, and afterwards very kindly entertained the party to tea.

On 10th December, 1908, a pleasant afternoon was spent by 52 members in visiting some of the old buildings in Cambridge. The 'Old Abbey,' Barnwell, a seventeenth century house; the 'Cellarer's Checker,' the only existing portion of Barnwell Priory; the 'Vicarages' on Mount Pleasant, situated on the edge of the old rampart of the Castle enclosure; the 'School of Pythagoras,' which was never a school, and had nothing to do with Pythagoras, but is a good example of a twelfth century dwelling house; the 'True Blue Inn,' in Sidney Street; and a small house off Market Hill, belonging to Messrs Macintosh and Son, which contains some fine oak carving, were the places visited.

On 18th February, 1909, the Master of Magdalene kindly entertained a party of 65 members in the College Hall. Mr J. W. Clark gave an interesting account of the College Buildings from their foundation. Professor T. McKenny Hughes addressed the meeting on the old Castle fortifications in the College grounds. The Pepysian Library was thrown open to the visitors who inspected its valuable books and documents under the guidance of Mr S. Gaselee, the Librarian.

On 13th May, 1909, an excursion of some 40 miles was made by motor omnibus. Wimpole Hall, the residence of our member, Viscount Clifden, was the first place visited; Guilden Morden Church with its remarkable parclose screen; Ashwell Church, where there are such interesting '*graffiti*' of the middle fourteenth century—one an outline sketch of old St Paul's Cathedral, London—were inspected in due course; and lastly Royston Cave, which contains curious carvings of Plantagenet times. Thirty-seven members formed the party.

The excursion to Thaxted Church and Horham Hall,

arranged for 5th August, could not take place owing to the absence of so many members from Cambridge on that date; it has been postponed until next July.

The balance sheet showing the Society's financial position to 31st December, 1908, is published with this report.

It discloses a deficit of £87. 6s. 2d.

This was caused by bringing the publications of the Society up to date, whereby the cost of the *Proceedings* for two years was paid out of one year's income; this, together with the loss incurred in connexion with the exhibition of the Society's collection of Portraits and the large payments for excavation work, account for the amount. None of these causes will operate in the future. The finances of the Society have been placed on a sound footing, and thanks to the larger income at its disposal, owing to the great increase in the number of members, the Council have no reason to anticipate a deficit in the future.

The Society regrets, owing to the reasons given above, that it has not been able to grant so large a sum as usual to the Museum of Archaeology for the purchase of local objects: a list of those bought this year is given in Appendix II.

Mr A. Gray and the Secretary attended the Congress of Archaeological Societies held at Burlington House on 7th July. An account of the proceedings will be circulated.

Sir H. G. Fordham attended, as a delegate from the Society, the 76th Session of the 'Congrès Archéologique de France' held at Avignon during the last week in May.

The thanks of the Society are presented to Mr Elliot Stock for the gift of the *Antiquary*.

The changes in the Council have been more numerous than usual. Dr Venn has retired from the Presidency after holding office for two years, and the Rev. Dr Stokes has been chosen to succeed him. Mr J. E. Foster succeeded to the vacancy caused by the death of Mr W. M. Fawcett, and Colonel Harding and Dr Guillemard have filled the places caused by the retirement of Mr F. J. H. Jenkinson and Dr Allen.

Dr Venn has consented to represent the Society on the Antiquarian Committee.

APPENDIX I.

EXCAVATION FUND APPEAL

The Council, after due consideration of the matter, believe the best interests of the Cambridge Antiquarian Society will be served by conducting each year some excavations upon the many relics of bygone ages to be found in the County.

It has, therefore, determined to appeal to members, and to others interested in original research, for support in raising a fund for carrying out this most valuable work.

It is impossible to meet the cost of such investigations out of current income, since the scope of the Society's undertakings is widening, causing thereby greater demands upon its ordinary resources.

During the past year 75 members have been added to the Society's roll, a goodly proportion of whom have joined in consequence of the interest aroused by the recent excavations at Barton, Lord's Bridge and Cherryhinton.

This fact shows that the Society, as well as archaeological research, will benefit by the adoption of this course of action.

It is scarcely necessary to point out the value of excavations in elucidating the past history of the County.

The exploration of the various tumuli scattered over Newmarket Heath, and elsewhere within our borders, will help to fix the boundaries of the ancient peoples who inhabited this part of East Anglia, and to mark the limits reached by earlier invasions, before the Roman conquest ended those incursions for some 200 or 300 years.

The War Ditches near Cherryhinton have been explored only partially; at least two-thirds of the circle of the camp remains untouched, as well as the cemetery belonging to this pre-Roman settlement. Rich finds ought to be the reward of patient investigation on this site.

The ford way at Hauxton Mill of the ancient road, which ran from the Ermine Street near Old North Road Station, along the ridge of Chapel Hill, through Hauxton to Red Cross, should yield to the careful digger many objects of the Celtic, Roman, and Saxon ages.

Two tumuli and what appears to be an early fortification near Fen Drayton, await the explorer's hands.

Caxton Moats, with ditches 60 feet wide, are an unexplained puzzle to antiquaries.

The curious earthmarks at the field called 'Bullocks Haste' near Cottenham, undisturbed grassland since Roman times, and other sites near by, deserve more attention than they have hitherto received, for this is a most important centre for study of the Roman occupation.

For the investigation of these, and many other such places, and for excavation work on localities, which though undiscovered as yet, become known as year by year goes by, funds are imperatively needed.

The Cambridge Antiquarian Society, holding such a position as it does, and numbering now nearly 400 members, ought to spend at least £50 each year on original research.

The Council makes this appeal in the confident hope that a generous response on the part of its members and others will enable it to do its share in solving the many archaeological problems remaining in Cambridgeshire.

APPENDIX II.

PURCHASES BY THE CURATOR OF THE MUSEUM OF
ARCHAEOLOGY AND ETHNOLOGY WITH GRANTS
FROM THE COUNCIL.

PREHISTORIC.

STONE.

RIVER-DRIFT IMPLEMENTS.

Five, of various typical forms, Mildenhall, S.*

CELTS.

Three chipped: one wide, boldly chipped, with convex faces and rounded cutting edge, showing at the butt-end a portion of the original crust of the flint nodule (6''·6 × 2''·8), Lakenheath, S.; one narrow, straight-sided, with rounded butt and cutting edge (4''·4 × 1''·5), Landwade, C.; and one flat, elongate, carefully shaped and finely chipped, tapering from the partially ground, wide, rounded cutting-edge, to the pointed butt (5''·3 × 1''·8), Mundford, N.; and

One ground (of greenstone): thick, with flattened sides, wide, curved cutting edge and tapering truncated butt (3''·4 × 2''·5), Eriswell, S.

ADZES.

Six roughly chipped: three with wide uneven cutting edges and pointed butts, one larger (4''·6 × 2''·3), Croxton, N.; and two smaller (3''·8 × 1''·6 and 3''·4 × 2''·2), West Tofts and Cranwich, N.; one small, triangular (of chert), with faces ground flat (2''·8 × 2''·1), Burnt Fen, C.; and two flat, one longer, oblong, with square cutting edge (3''·4 × 1''·8), Whittington, N.; and one, very small, triangular, with roughly cusped cutting edge (2''·4 × 1''·4), Barton Mills, Mildenhall, S.; and

One of fine workmanship, slightly curved, with convex back and pointed butt, the lower part, with square cutting edge, finely ground (3''·4 × 1''·4), Mildenhall, S.

PICKS.

Three: two larger, with one end pointed, the other shaped into a rounded cutting edge (5''·3 × 1''·5 and 4''·8 × 1''·3), Croxton, N., and Kenny Hill, Mildenhall, S.; and one smaller, with heavily ridged back of the 'fabricator' type (4''·3 × 1''·3), Cranwich, N.

CHISELS.

One, with straight, sharp sides, ridged faces, truncated butt, and finely ground, rounded cutting-edge (3''·6 × 1''·0), Undley, S.

FABRICATORS.

Seven, representative of the flat and the ridged forms, Suffolk and Norfolk.

* The letters C., S. and N., printed after the names of places, indicate the counties of Cambridgeshire, Suffolk and Norfolk.

DAGGERS.

The upper part of a wide-bladed, leaf-shaped dagger, finely chipped, of cloudy flint (width 2''-2), Lakenheath, S.

KNIVES.

Five: one wide, curved, thin, with both flat faces chipped, a portion of one edge missing (5''-2 x 1''-6), Undley, S.; and four pointed oval (two elongated), chipped of flakes, with carefully trimmed edges (2''-1 x 1''-3''-6 x 1''), Suffolk and Norfolk.

BORERS.

Eight of various sizes and forms, Suffolk and Norfolk.

SCRAPERS:

Four: one triangular, finely chipped (1''-8 x 1''-4), Icklingham, S.; two 'side' scrapers, one, very rough, dumb-bell shaped, showing a pair of lateral cusps (2''-7 x 2''-1), Cranwich, N.; and one flat, roughly triangular (2''-1 x 2''), Elvedon, S.

WHET-STONES.

One oblong, bearing a large countersunk perforation at one end, and showing a deep groove on one of its flat faces (2''-1 x 1''-5), Lakenheath, S.

ARROW-HEADS.

Tanged and barbed.

Six, Suffolk: three of triangular form with small tangs and barbs, including one small with a longer and a shorter barb (1'' x 0''-7), Icklingham, S.; and three broad, with curved sides and stout tangs, including one with slightly serrated edges (0''-8 x 0''-8), Wrangford, S.; and

One, thick, triangular, with pointed tangs and barbs (1''-4 x 0''-9), Charlbury, Oxon.

Tanged.

One roughly chipped, elongate, with pointed tang and prominent shoulders (1''-5 x 0''-6), Elvedon, S.

Leaf-shaped.

Five: one, thin, with elongate base (2'' x 0''-6), Elvedon, S.; and four, narrow, with rounded bases, two oval (1''-5 x 0''-7 and 1''-1 x 0''-6), Mildenhall, S.; and two wide (1''-1 x 0''-8 and 1''-1 x 0''-7), Mildenhall and Eriswell, S.

Lozenge-shaped.

One of exceptionally fine workmanship, with one flat, and one slightly convex face, the sharp shoulders being placed considerably below the centre (1''-9 x 1''), Mildenhall, S.

Triangular.

Five, Suffolk: two thick with convex faces, finely chipped, including one unusually small example (0''-9 x 0''-8), Mildenhall, S.; two roughly chipped, one with slightly cusped, and one with chisel-edged, expanding base (1''-5 x 1''-4 and 1''-3 x 1''-2), Cavenham and Eriswell, S.; and one large 'tongue-shaped' with slightly cusped base, showing unusual chipping (1''-5 x 1''-4), Lakenheat^u, S.

JAVELIN-HEADS.

Tanged and barbed.

One elongate, with straight sides, and one flat and one convex face, one barb missing ($2''\cdot 2 \times 1''\cdot 2$), Mildenhall, S.

Leaf-shaped.

One broad, roughly chipped, with rounded base ($2''\cdot 4 \times 1''\cdot 3$), Kilverstone, N.

* * * In the above list some duplicates and implements of unknown use have not been included.

BRONZE.

A large spear-head, elongate, leaf-shaped; in unusually fine state of preservation, with very prominent keeled mid-rib; the marginal bead of the rounded wings forming a pair of loops above the socket which is missing ($9''\cdot 8 \times 2''$).

Two socketed celts, square-sided, single-looped, with bold rim-moulding and slightly expanding cutting-edge, decorated on either face with three vertical beads ($3''\cdot 1 \times 1''\cdot 8$ and $2''\cdot 4 \times 1''\cdot 5$), Lakenheath, S.

Two palstaves with expanding, sharply curved cutting edges: one decorated, on either face, below the deep stop-ridge with a fluted, shield-shaped depression and a central ridge ($6''\cdot 2 \times 2''\cdot 3$), Sleaford, Lincs.; and one with very slight, curved stop-ridge showing a very large shield-shaped depression, the marginal beading of which is prolonged into a faint central ridge ($5''\cdot 4 \times 2''\cdot 4$), Croydon, C.; 1907.

Fragments of bronze objects, viz.: pieces of a decorated celt; lower portion of a palstave with peculiar ornamentation; fragment of a sword blade (?); and five small lumps of a rough metal, Lakenheath, S.

ROMAN.

A finely moulded, harp-shaped fibula of bronze. The stout rounded bow, with bold central beading, expands into an oval trumpet-shaped head, which hides the spring of the straight pin and has attached a large loop with slide. The bow terminates in a flat-headed knob, and bears a wide, solid, catch-plate (l. $2''\cdot 1$), Thoday Street, Mill Road, Cambridge, 1900.

Two bronze pins: one plain, with flat, nail-shaped head (l. $2''\cdot 3$); and one bearing ornate grooving (imperfect) (? Roman), Lakenheath, S., 1908.

A bronze finger-ring (open on one side): the flat band showing a pattern of raised rings divided by vertical grooves (? Saxon), Wangford, S.

A bronze needle, with diamond-shaped head and triangular point (l. $3''\cdot 2$) (? Roman), Elvedon, S., 1908.

An iron latch key with heart-shaped bow, square-sided stem, and spade-shaped ward-plate bearing a cruciform perforation (l. $2''\cdot 8$), Wimpole, C.

MEDIÆVAL AND LATER.

A flat, annular, bronze-gilt brooch, the face engraved with a running scroll, the back with quatrefoils (d. $1''\cdot 2$), 15th century. Haslingfield, C.

Two bronze buckles, viz.: annular, with central bar, of Tudor-rose design (d. $1''\cdot 7$), Coldham Lane, Cambridge, 1908; and one coarsely moulded in lacquered brass ($1''\cdot 5 \times 2''\cdot 4$), ? for harness, 18th century. Babraham, C.

A pair of wafering-irons: the ends, forming the moulds (d. 5") consist of thick flat discs incised, respectively, with a flying bird holding a berried branch (dove and olive branch), and a floral, eight-rayed star (l. 28"-8), 17th century. Formerly used for making wafering cakes for 'Mothering' or Mid-Lent Sunday. Bury St Edmunds.

An iron spur, 17th century. Tadlow, C., 1908.

Two iron horse-hoof picks, one with turned wooden handle. St Albans.

A D-shaped padlock of iron, ? 18th century. Rougham, S.

Ten iron keys of various sizes: four showing three varieties of web, ranging from the 14th to the 16th century. Cambridge and Suffolk (various localities); and six of the 17th century: five showing the evolution of the modern cusped bow, Haslingfield, C.; and one, a massive chest key, Croydon, C.

Two watch-keys, of cut steel, with double jointed stems and oval bows (full l. 1"-6). Haslingfield, C.

A steel dog-couple, with ornate bar (l. 5"-8), 17th century. Rougham, S.

A combination implement, of iron, comprising hammer, hatchet and pick, with long fluted flanges for attachment to handle (l. 5"-8). ? Armourer's tool, 16th—17th century. Cambridge.

A clasp pruning-knife, with horn handle, inscribed: 'AYAD OGD' (l. 4"-7). Haslingfield, C.

A pair of iron compasses with faceted knob and arms (points missing) (l. 4"-6). Fleet ditch, London.

A pair of ornate iron nut-crackers (l. 4"-4), 17th century. Haslingfield, C.

An ornate flat-iron rest (steel), with wooden handle. Milton, C.

Five pairs of steel candle-snuffers of various patterns and a pair of lamp-snuffers. Cambridgeshire and Suffolk.

A globular jug of red, brown-glazed clay, with grooved bow-handle (10"-3 x 8"-5). Market Street, Cambridge, 1908.

Two fragments of carved oak tracery from a 15th century screen. Suffolk.

APPENDIX III.

THE CAMBRIDGE PHOTOGRAPHIC RECORD REPORT, 1909.

The Secretary, having been extremely busy during the past year, has not been able to collect any new prints for the Record. He has, however, taken a number of negatives, and several have been taken by other workers, from which prints will be obtained in the near future. He hopes to arrange for an exhibition some time during the winter.

NEW MEMBERS ELECTED 1908-9.

1908. Oct. 21. Israel Abrahams, M.A.
 Henry Arburn Chapman, M.A.
 Rev. John Griffith Cheshire, M.A.
 Sidney Carlyle Cockerell, M.A.
 William Drake Coplestone, M.A.
 Rev. Stuart Alexander Donaldson, B.D.
 Rev. Theodore Harber Hennessy, M.A.
 Denys Lawlor Huddleston.
 Miss Hilda Percy Humphery.
 Miss Eglantine Jebb.
 George Arthur Johnson.
 Arthur William Newton, M.A.
 Augustus Scobell Orlebar, M.A. (Oxon.).
 John Styche Palmer.
 Mrs Hilda Routh.
 Miss Katherine Charlotte Swan.
 Rev. Thomas Smith Toolis, B.A.
 Mrs Ellen Mary Walker.
 Rev. Evelyn Young, M.A.
- Nov. 4. Devonshire, Victor Christian William, Duke of.
 Miss Margaret Lois Garrett.
 Mrs Mary Anne Clover.
 Miss Mary Clover.
 Mrs Edith Myers.
- Nov. 18. Henry Campion Apthorpe.
 †Rev. Charles Henry Brocklebank, M.A.
 Arthur Deck.
 Rev. Frederick William Doxat.
 Mrs Winifred Dykes.
 Very Rev. Monsignor Edmond Nolan, M.A.
 Miss Rosa Pratt.
- Dec. 2. Miss Catherine Susan Barrett.
 Oscar Browning, M.A.
 Robert Townley Caldwell, M.A., LL.M.
 Mrs Elizabeth Alice Graham.
 John Charles William Graham, M.D.

1909. Jan. 20. Frederick George Meeson Beck, M.A.
 John Clay, M.A.
 Miss Blanche Athena Clough.
 Julian Julian, B.E.
 Alexander Macintosh.
 George Owen Palmer.
 George Stace.
- Feb. 3. Edward Bullough, M.A.
 Arthur Bernard Cook, M.A.
 Edward Beldam Diver.
 Herbert Henry Dunn.
 William Arthur Fenton.
 Walter Gardiner, Sc.D., F.R.S.
 Harold Dexter Hazeltine, M.A., Dr.Jur. (Berlin).
 Stephen Goodwin Howard.
 George Douglas Cochrane Newton, M.A.
 Mrs Julia Letitia Newton.
 †Thomas Henry Riches, M.A.
 William Farrow Taylor.
 Rev. Alfred Holloway Walker, M.A.
 Mrs Amy Afflick Webber.
 Mowbray Frederick Vivian James Arthur Webber.
- Feb. 17. Arthur Bull.
 Charles Welldon Ellison.
 †Percy George Cunliffe Foster.
 Rev. Richard Henry Malden, M.A.
 William Halse Rivers Rivers, M.D.
- Mar. 3. Ernest George Besant.
 Mrs Jessie Hopkins.
 Alexander Paul Macalister, F.R.I.B.A.
 Mrs Clara Dorothea Rackham.
 Mrs Zilpah Catherine Scruby.
 Rev. Charles Francis Townley, M.A.
 Mrs Edith Mary Weatherhead.
- Mar. 15. Henry Elliott Dixon, M.A.
 Mrs Julia Ekin.
 Rev. Henry Henman, M.A.
 Ernest Saville Peck, M.A.
 James Christian Simpson, M.D.
 Mrs Margaret Simpson.
- April 28. Mrs Jessie Niven Skinner.

1909. May 12. Mrs Mary Caroline Hughes.
Charles Pearmain Porter.
- May 26. James Drummond Anderson, M.A.
Miss Agnes Bell Collier.
- June 7. Frederick Lauceley Clarke.
Allick Page Dixon.
Sidney French.
Percy John Hall.

ASSOCIATE MEMBER.

- Feb. 3. Boyce Mackay Scobie Mackenzie.

Memo. :—The adverse balance of £87. 6s. 2d. agrees with the Bank Pass Books as follows :—

	£	s.	d.	£	s.	d.
Cheques drawn since 31st December, 1908				233	14	8
Less balance at Bank on Current Account	136	7	0			
Cheque not presented* (F. J. Allen)			8			6
	<hr/>					
Balance at Bank on Deposit Account	135	18	6			
	<hr/>					
				146	8	6
	<hr/>					
				87	6	2

* Now presented and in Bank Book.

(Signed) J. B. P.
G. K.

Dr VENN delivered the following address on retiring from the office of President.

I OWE an apology to the members of our Society for my unavoidable absence on the opening day, and I owe thanks to my successor as President for kindly allowing me to inflict upon you that "Address" which the traditions of the office, and, still more, the directions of our Secretary, have enjoined upon me.

The Report, which our Secretary, the Rev. F. G. Walker, has just read, will have given you a clear appreciation of what has been done—so far as others are concerned—in the way of lectures, papers, exhibitions, excavations, excursions, and so forth, during the last year. But there was one aspect of our activity which he could not lay before you, and that was what he has done himself. As every one familiar with our work is well aware, we owe a great deal to his incessant activity, painstaking accuracy, and enterprize in securing the cooperation of not a few famous specialists in various departments of Archaeology and Anthropology. What we owe to him in the way of increase of our numbers—and, as we have no endowment, our power for good depends almost entirely on the number of our subscribers—is patent to all. He has brought in fresh adherents from far and wide. In language familiar in the naval days of old, the "Press" has never been so hot since the time of the late Mr Lewis, when scores of us were dragged out of our hiding places and compelled into a service in which I hope we have loyally tried to do our duty.

I feel pretty sure that you will all agree with me that whatever we may have achieved in the way of our legitimate functions; those namely of exploring antiquities in general, and especially those of our own neighbourhood: whatever papers we may have read and whatever excursions we may have taken: there is one event which will prominently mark the year 1909. It simply consists in the fact that we have received some £5000 in gifts—principally from the members of one generous family—for starting the long-hoped-for, but latterly almost despaired of, Museum. Some persons may

hastily suppose that such an accession as this raises us at once from beggary to affluence. I need hardly tell you that this is not so, and that nothing within the range of the most sanguine vision is ever likely to absolve us, or any other right-thinking department in our impoverished University, from the paramount duty of asking for more. But it ought, I think, if one may so put it, to change the *tone* of our beggary. Hitherto this has been almost whining and abject, the feeble cry of the neglected: now it may become hopeful and almost confident. Let us become sturdy beggars.

A late Vice-Chancellor remarked, some four or five years ago, that the walls of the existing receptacle—we can hardly call it a museum—were positively bulging under the pressure of their contents. Happily the retaining membrane has proved tough enough to resist the pressure so far, but such resistance cannot be expected to last much longer. As you are all aware, the contents of a museum possess the well-known property of a gas, namely that of unlimited expansibility. Reduce the pressure in any degree and the volume of the contents will at once expand in like proportion. Now the present pressure is tremendous, as every visitor knows, so that we certainly need not look forward to empty shelves in the immediate future, as the result of the new buildings. And we have also to reckon with our energetic and enthusiastic curator. If I know anything of him he will soon succeed in the reproduction of a state, if not of actual congestion, at any rate of repletion. Seriously speaking, any extension of space to which we can see our way in the immediate future will be none too large for the orderly display of the existent collection. And if we are to receive new accessions—and there are many classes of objects which if we do not get soon we probably shall not get at all—we must keep an eye to the future. In these cases the maxim holds good that to him that hath shall be given. It is to the large and well-arranged collection that fresh additions are given; and if our Museum is to take the place it ought to occupy in the country; we must see to it that the completion of the buildings is not long delayed.

As to the range of our work, as displayed in our *Proceedings*, we are of course specialists. Cambridge students have produced,

both in old and recent times, many profound and exhaustive historical works. Our aim is humbler. As a Cambridge Antiquarian Society we do not venture into those deep waters. All that we do, if I may so say, is to splash about a little in some of the shallow pools which border that vast ocean of Antiquity in which they are accustomed, like Leviathan, to take their sport.

In this department a good deal of very interesting and important work has been accomplished during the last two years. This is fully described in the report of our Secretary which has just been read. So I will not repeat. But I should just like to draw your attention to one or two contributions, as these have to some extent broken fresh ground. Mr A. Gray, of Jesus College, has happily inaugurated the re-introduction of our Quarto publications by an admirable paper on the "Dual Origin of Cambridge." He has traced its early history, political and municipal; and has incidentally added not a little to what we have already learned from Professor T. McKenny Hughes as to the process by which our town gradually emerged—so far, indeed, as it has yet done so—from the surrounding swamp. Dr Stokes, our present President, has accumulated—from University, college, and municipal sources—a mass of information about the houses and their inhabitants, which in mediaeval times were to be found along the borders of the present Trumpington Road.

As to papers dealing with subjects outside our local range, there are two comparatively recent contributions which I am sure will be fresh in the minds of all. I allude, as you will suppose, to the discourse by Professor Flinders Petrie—whom we are delighted to welcome again next week—on his recent discoveries at Memphis: and to the learned and enthusiastic description of the character and customs of his own beloved Province of Brittany which M. Le Braz gave us this time last year. Papers of this kind are a delightful intrusion into our ordinary routine work.

There is one department of local research about which I should like to say a few words in conclusion, as I have happened of late to feel a special interest in it.

It is true that the work does not now, strictly speaking,

belong to our Society, since we have ceased to be responsible for the Luard memorial series.

I am sure, however, that most of our members will sympathize with the undertaking, and some of you may be able to encourage and assist in its extension.

It has long seemed to me to be a serious reproach to our University that no available catalogue is kept of the names of former alumni. In this respect we might, so far as the original records are concerned, learn a lesson from many a city company or ancient municipality; and, so far as recent attempts to recover and compile such a catalogue are concerned, from many a grammar school.

In a University the natural test of citizenship is of course *graduation*. Yet, strange to say, till the very recent publication of the first three of the early Grace Books there was no printed list of the degrees previous to 1659. This was first published in 1787. Even now, for the 120 years before 1659 we have no resource but the MS. list in the Registry, originally compiled by Dr Richardson, and revised and extended by Mr Romilly. Useful, or rather indispensable, as this is, it contains very many errors and omissions; the confusion caused by variations in the spelling of the names is very serious. The successive degrees of the same man often appear under various renderings, and not a few of the names almost defy recognition.

So far as concerns degrees. But we must remember that a large number—in fact not far from one-third, of those whom we are bound to recognize as sons of our Alma Mater—never took any degree. Some even of our most famous men are included in this category. It is obvious, therefore, that a complete list of matriculations is urgently desirable. At present no such list exists before 1850. There are, of course, the original entries in the books at the Registry, but till the other day these were not even indexed; so that the enquiry, whether any given name was to be found amongst them, involved an almost hopelessly tedious search, unless the date could be nearly assigned. But worse than this. The matriculation lists are themselves very deficient. During the 120 years in question many hundreds—perhaps several thousands—of

students entered our various colleges, who, for one reason or another never presented themselves for matriculation nor proceeded to a degree. Of course these are not men of what may be termed the specially academic type; but for that very reason they include a considerable proportion of those whose fame lies in the direction of politics, social distinction, or letters. Take but one instance. Every one knows that Oliver Cromwell was a Cambridge man. He is universally regarded as one of the most famous of the sons of Sidney Sussex. It will surprise many people to learn that no merely official University list would recognize his presence, for he neither graduated nor matriculated. And, as just remarked, there are many hundreds of less famous men in the same position.

This state of things, I am happy to say, is now being remedied. Thanks to the enterprize of the Syndics of the Press an effort is being made to compile a complete list of all "Cambridge men" from 1544 downwards. This is founded, of course, on the matriculations in the old books at the Registry; these being supplemented, where missing, by reference to the original "prelectors" lists as supplied by the colleges. To complete the deficiencies of the University records the admission registers of all the colleges have been searched, and such information as they can supply has been incorporated. Finally, the MS. lists of degrees are being verified and completed by appeal to the original Grace Books.

The task, as at present undertaken, comprises the period 1544 to 1659. It is hoped that this will be completed within about a year from now. When this is done, we shall for the first time be in possession of a list, reference to which will show at once, with approximate completeness and accuracy, whether any given person is or is not to be enrolled amongst the roll of Cambridge students.

F. BLIGH BOND, F.R.I.B.A. read a paper, illustrated with lantern slides and original drawings on

THE RECENT EXCAVATIONS AT GLASTONBURY ABBEY.

Tuesday, 2 November, 1909.

The Rev. Dr STOKES, President, in the Chair.

Professor W. M. FLINDERS PETRIE, D.C.L. F. Brit. Acad.,
delivered a lecture, illustrated with lantern slides, on

THE PALACE OF APRIES, MEMPHIS.

Monday, 10 November, 1909.

The Rev. Dr STOKES, President, in the Chair.

The Ven. Archdeacon CUNNINGHAM, D.D., F. Brit. Acad.,
made a communication on

THE PROBLEM AS TO THE CHANGES IN THE COURSE
OF THE CAM SINCE ROMAN TIMES.

WE are all accustomed to attempt to read the history of a parish church from the building itself, and to note the evidence which is furnished by the fabric as to the various stages of its growth; and there is a not unnatural feeling that it may be possible to apply a similar method to the story of the fens, and to discriminate the later modifications from the natural course of the rivers. To some extent this is feasible; the great channels which convey the main stream of the waters of the Ouse from Earith to Denver are obviously artificial, and such a name as Old Bedford River gives at any rate a suggestion as to the century when these works were carried out. But mere superficial examination will carry us but a very little way: during the last eighteen hundred years great works have been undertaken again and again; the courses which the rivers have taken at different times, and the drains and lodes which have been cut, have left their mark on the face of the country; but they have in many cases ceased to serve their original purpose. They do not now tell us why they were made, or who made them; some of them were doubtless intended to facilitate navigation, some to prevent flooding, and some to render the soil more workable: but in no case do they tell their own story. The works that remain are an extraordinary monument of human labour, but they do not by themselves enable us to say who expended that labour, and what precise object they had in view. The whole affair is so complex, that I may say at once I do not make a pretence of having solved any part of

the problem, but that I only wish to lay before the Society some considerations which should be taken into account in trying to state it. Concentrating our attention on the main course of the rivers, and especially of the Cam, can we distinguish what is artificial, and get any idea of the natural course of the river as it was in Roman times?

From the early part of the seventeenth century, when the work of draining the Great Level of the Fens was taken up by the Bedford family with the view of improving their Thorney estate, there are very complete records, and hence we may go back and take the reign of James I as our starting-point. The condition of the Fens at that time is set before us clearly in Sir William Dugdale's great history of *Imbanking*; he made elaborate collections, and was careful to take a tour through the district personally in 1657, while he was writing his book. Curiously enough that diary was not included in Hamper's *Life of Dugdale*, though it contains a good deal of interesting information as to the antiquities he noted and the crops he passed. He was particularly interested in recent improvements. There was a fair plantation of onions, pease and hempe between Willingham and Earith; near Burwell he came on "fruit trees of all sorts and garden stuffe, likewise woad"; more to our purpose perhaps is his mention of the destructive floods at Wisbech in November, 1613. But it is a pity that the journal of so great a man written in his own hand, should have been left in oblivion among the Lansdowne MSS. in the British Museum¹. Elaborate as his work on embanking is, Dugdale did not by any means make use of all the material he had collected, which has been preserved among the *Harl.* MSS.² The very accurate survey of the Fens, which was made (possibly) by Hayward in July, 1605, is invaluable to the student of rural economy in Cambridgeshire. It gives a detailed description and rough valuation of the Fens in their "drowned" state, when they afforded pasturage in summer. Great herds of milch kin appear to have existed in many of the villages; at Soham there were three of 700 each. In fact, there is a great deal of material for obtaining detailed knowledge of the Fens as they

¹ Lansd. mss. 722.

² *Harl.* mss. 5011.

were in 1600: map I. may be taken to represent the state of affairs then existing, except that the great lakes, Whittlesea Mere, Ramsey Mere, Stretham Mere, Soham Mere and others are not marked; they are not needed in connexion with a discussion as to the probable course of the rivers.

I. *The Historical Line of Argument.* The information in regard to the history of the Fens which has been put on record has been so carefully collected by Dugdale that it is unnecessary to do more than summarise his results; so far as I know they have never been seriously called in question.

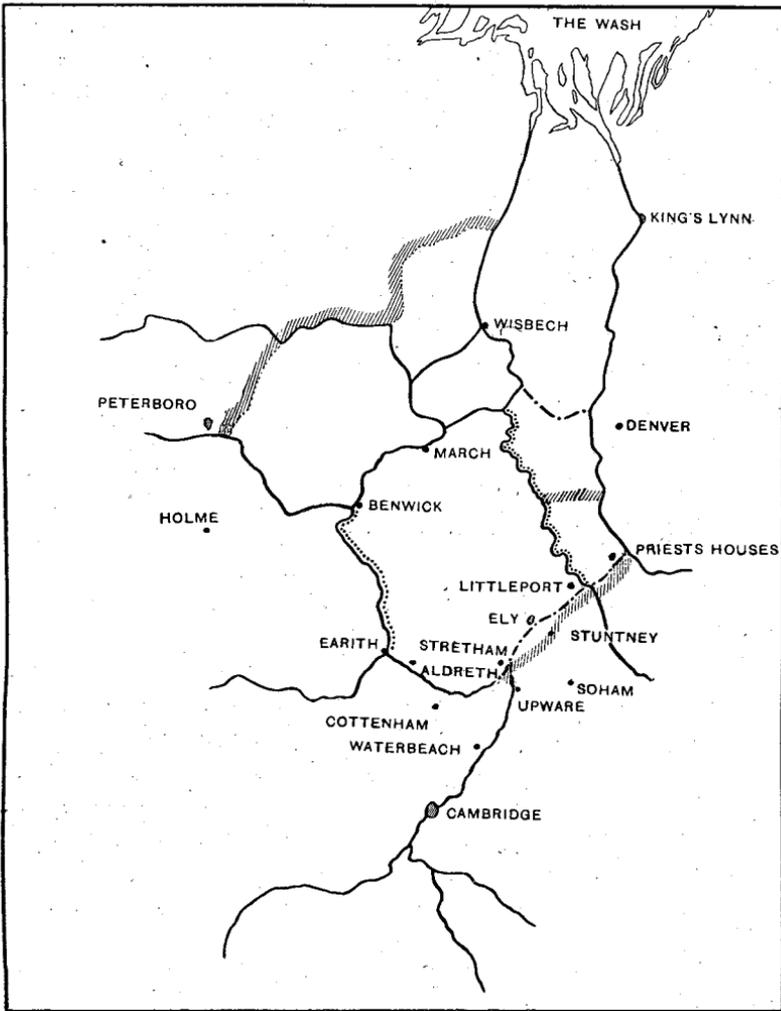
Dugdale insists that the channel of the Ouse, as we call it, which runs from Littleport to Priests Houses is artificial, and that the original course of the southern branch of the Ouse, along with the Cam, was from Littleport by Welney and Outwell to Wisbech; while the northern branch ran by Benwick and March to Outwell and Wisbech¹. According to him the whole of the Ouse and the Cam formerly discharged themselves into the sea at Wisbech, whereas they now discharge at Lynn. Hobart and the Commissioners who tried to deal with the "drowned" land by a large scheme under James I, found that all the old drains had been cut with a view to carrying the water towards Wisbech, and that they were practically useless for assisting to convey water rapidly to the sea at Lynn.

It is probable that this change began in 1236², when there was a great storm at Wisbech. The outfall to the sea was blocked up, and despite the opposition of some persons who (1292) desired by means of dams to force back the rivers to go by Wisbech³, it seemed necessary to accept the inevitable, and to facilitate the course of the water to Lynn. A new channel was formed from Upwell to Denver, while the south branch of the Ouse was carried from Littleport to Priests Houses. At all events the practice of navigation by Upwell and Denver was firmly established in 1302 and complaint was made of an interruption to traffic, which had rendered it necessary for

¹ Badeslade, *Lynn*, p. 72, Hayward's Map. Sir Wm. Dugdale, *Imbanking*, pp. 175, 372.

² Holinshed, *Chronicle* II. 380.

³ Wm. Watson, *Wisbech*, 25, 29.



----- New channels opened.
----- Old channels silted up.

The boundaries of the Isle of Ely are shown by the rivers and hatching.

MAP I. Changes in the Cambridgeshire Rivers after the stoppage of the outfall at Wisbech in 1236.

boats coming from Holme to go round by the Welney river and Littleport on their way to Lynn, one of the new channels having been stopped while the other was available; both had been in common use before this date. It appears that these channels were made some time in the thirteenth century, and that the blocking of the outfall at Wisbech, presumably about 1236, had initiated a series of very considerable changes. Among other results, it would seem that the waters of the Nene were held up to such an extent that they began to force their way, in the reverse direction, along the channel of the Ouse from Benwick to Earith¹. The old course of this West Water, as it was formerly called, is now completely silted up, but it can be traced along the boundary between Huntingdonshire and the Isle of Ely. The continuous lines on the map show the course of the rivers Ouse and Cam, as they probably ran² before the outfall at Wisbech was stopped up; the channels which have silted up are distinguished by dots, and the broken lines mark the new channels.

Here in passing we may note one curious problem which arises from conflicting evidence. For more than two centuries after 1236, Wisbech seems to have been cut off from the main routes of internal trade and to have had its access to the sea much interfered with. If it had sunk into insignificance, like Winchelsea or Cley, there need have been no cause for surprise; however, the church and cellarage give evidence of its having been a flourishing place, and the records of Holy Trinity Guild, of which the first accounts date from 1379, with the menu of the Feast in 1460 and the evidence of the augmentation of the establishment in 1475, show that there was a body of prosperous merchants there. There may have been communications by the Nene and the Welland, but there was very little trading communication between the Bishop's port and the episcopal city.

II. *Geographical and Archaeological Evidence.* It may, perhaps, be taken for granted that the English settlers who formed villages and carried on tillage and pasturage, would

¹ Badeslade, *Navigation of Lynn*, p. 6.

² On the course from Earith and Upware to Ely, see below, pp. 81, 84.

accept physical obstacles to communication as natural boundaries. They could not conveniently pasture their cattle in common and work their land collectively, if it was intersected by a river. Where the large channel of a river cuts across a parish, there is reason to believe that the water-course is artificial, and of later date than the English settlement. The present course of the Cam or of the Ouse cuts across the parishes of Waterbeach, Wicken, Stretham, Ely and Littleport, and it is hardly conceivable that the water of the rivers ran along its present channels in the sixth century. The question remains, if the rivers did not take their present course, how did the earlier channels run? There are two possible alternatives, and the water of the Cam probably flowed first in one, and afterwards in the other.

An old river course has been traced by Mr Cole Ambrose along the line of the boundary between Ely and Stuntney, about three quarters of a mile south of the present Ouse; and the quantity of remains that has been dug up, renders it practically certain that the Romans had a quay at Stuntney. This channel has long been completely silted up, and it may be difficult to get evidence to show the approximate date at which it became impracticable for navigation.

There was also in historic times another channel along which the main body of the water of the Cam appears to have been conveyed. There is much evidence which goes to show that at one time it must have turned, about Clayhithe or Upware, and flowed past Cottenham and Aldreth to join the Ouse at Earith and proceed by way of Benwick to Wisbech. This implies that the water in the Old West River from Aldreth to Earith would flow in the opposite direction from that which it has taken for many hundred years, but as there is no fall to speak of, this is not a serious difficulty¹. The tradition that the water had taken this course was put on record by Dugdale. "The river of Grant passing from Beche to

¹ The flow of the brooks, from Longstanton and Westwick that fall into the Ouse and West River rather favours this view as to the natural course of the water. There are many careful remarks on the direction taken by the brooks and rills of the district in the account of the Fens in the British Museum *Harl. mss.* 5011.

Char Fen in Cottenham and so into the Ouse was diverted and by a straight course turned down by another branch of the same river to Harrimere, where it loseth the name¹." Evidence based on local observation has been recently adduced in support of this opinion by Mr Arthur Bull².

We have thus evidence of the existence of two alternative routes for the Cam in the Waterbeach and Stretham district, besides that which it takes at present. It is reasonable to suppose that the course of which a traditional knowledge had survived is the more recent of the two, and that, after the channel at Stuntney had begun to silt up, the course was diverted from Upware towards Aldreth and Earith. If the river took this course at the time of the English settlement, there is, on the face of it, little difficulty about the boundaries either of the various parishes or of the Isle of Ely³—though the precise course of the channels in this region both natural and artificial ought to be thoroughly examined. The line of the river, whatever it may have been, was mentioned as a well established boundary in 1274. In stating the range of the rights of warren attached to Cambridge Castle the jurors in the *Hundred Rolls*⁴ trace the line from the Castle at Cambridge along the Huntingdon Road and thence by Belsar's Hill to the river; and then by the great bank to 'Squasslode,' and then by the great bank to Cambridge again. 'Squasslode' has been apparently an insoluble puzzle, as no name at all approximating to it has been preserved. The very interesting papers and maps which have been recently discovered at Stretham have given a clue. I am indebted to the Rev. Evelyn Young for pointing out the Wash Lode⁵ as marked on this map, which, through the kindness of the Rev. S. S. Stitt, I am able to show to the meeting. In so far as this line of argument is sound, we are forced to entertain the somewhat startling opinion that no

¹ Dugdale, *Imbanking*, p. 373.

² *Transactions of Ely and Hunts. Arch. Soc.* I. 49.

³ The boundaries as defined in 974 A.D. have remained unaltered, Bentham, *Ely*, p. 79.

⁴ *Rot. Hund.* II. 407, 452.

⁵ West Water and Wash Lode are both mentioned in the description of the Fens in *Harl. mss.* 5011.

main river flowed past Ely in the early middle ages, though it is of course quite probable that it would, like Holme and Reach, be served with lodes—one from Littleport to Turbetsea, and perhaps another from Stretham Mere to Ely. After the outfall at Wisbech was damaged in 1236, if not before, a channel from Earith and Upwell would be needed to take the water by the Ouse and the Cam towards Lynn.

It is worth while to notice in passing that this view is quite consistent with the historical information we possess as to the communication with Ely in the period before the Norman Conquest. We are apt to think of Cnut as rowing past Ely, and suddenly determining to go and hear the monks sing: but Thomas of Ely describes him as on his way to Ely to keep the Feast of the Purification, and his song amounts to no more than that he urged the rowers to hurry on when he heard the monks singing.

It also appears that a lode would serve for the conveyance of S. Eltheldreda's stone coffin from Cambridge; and one which stopped at Turbetsea would render the story of the translation of S. Wihtburgha¹ intelligible, which it hardly is if there had been communication by water all the way to Ely.

There is, moreover, one small piece of historical evidence, which is not only congruent with, but confirmatory of, the opinion as to the course of the river which is suggested by geographical considerations. After the great draining of the Fens, there was much difficulty in many parishes in defining the pasture rights of each village, especially in cases where two or more parishes had intercommoned. It is interesting to notice that precisely similar difficulties had arisen as early as 1298 between Waterbeach and Stretham, the parishes of which the boundaries would be apt to be confused if the old waterway was disused, and a new channel was opened up and enlarged. Mr. Young has found among the Stretham papers an award, by William de Luda, Bishop of Ely, by which the limits of Stretham and Waterbeach respectively are carefully defined. From its form it appears to be a new definition and not an inquisition in which the jurors testified what the boundaries had been.

¹ Bentham, *Ely*, 77.

At all events there was, at the close of the thirteenth century, some uncertainty about the boundaries of the areas which would be affected by the suggested change in the main channels¹.

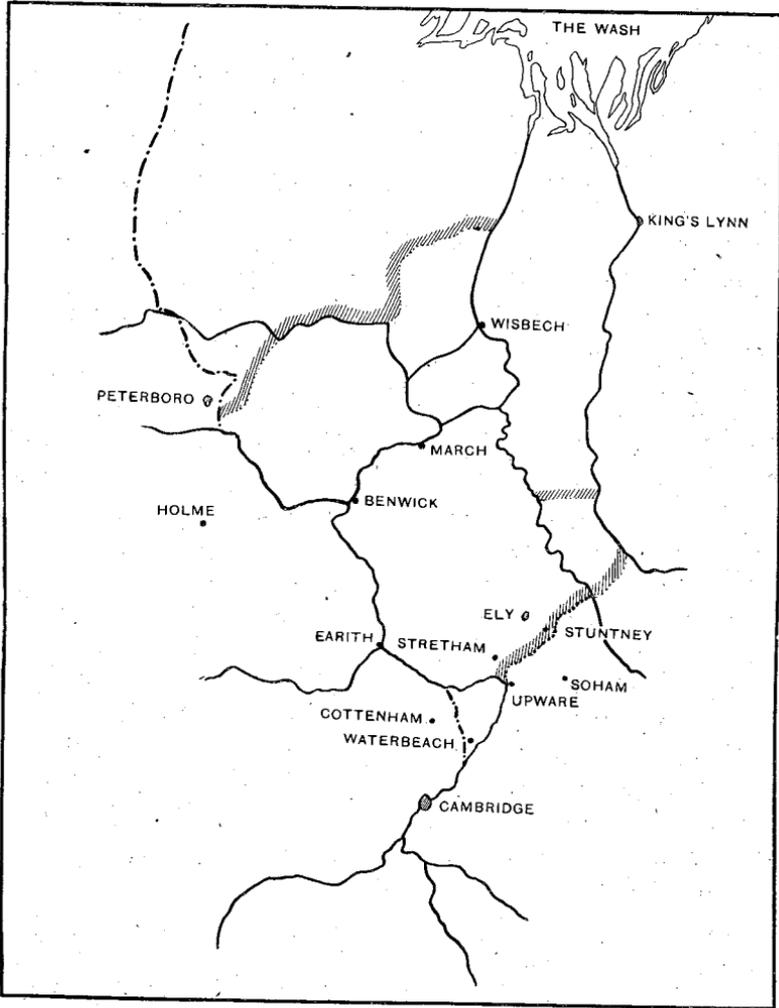
III. *Roman Navigation.* The question as to the probable condition of the south of the Isle of Ely, in Roman times and the succeeding centuries up to the Norman Conquest, is beset with difficulties, and it would be desirable that the observations and inferences of the eighteenth century surveyors should be checked and corrected. There can, however, be little doubt that the communication by road between Cambridge and Ely was interrupted by flooding of some kind. The key to the solution of the problem is, I believe, likely to be found by concentrating attention on the silting up of the channels of the Cam at Stuntney and of the Ouse between Earith and Benwick. I would venture to suggest, as an hypothesis which serves to combine the conflicting evidence into a consecutive story, that the Stuntney channel was silted up during the period of Roman occupation, that the water of the Cam then forced its way, by Stretham Mere to Aldreth and Earith to connect with the Ouse, and that the Romans subsequently set themselves to improve the navigation by this new course. They certainly undertook military works in the fen district², and made a great sea wall, and they would find it advantageous to get facilities for traffic by water such as they had made in the Low Countries³. It is not clear indeed that they attempted to navigate the Wash, or had any ports either at Wisbech or Lynn, but Stukeley⁴ affirms that they had a great system of internal communication in Lincolnshire—the Car Dyke—and this was apparently linked up so as to give access to the Cambridgeshire waterways. By the Nene it was possible to get to the Ouse; and the Cambridge-

¹ Similar difficulties arose in regard to Ramsey, *Cartulary* (R. S.), i. 215, iii. 40, 42.

² Herodian, *Ab excessu divi Marci*, iii. xiv. 5, 6. Compare also Tacitus, *Agricola*, xxxi.

³ Tacitus, *Annals*, xi. 20.

⁴ *Iter. Cur.* 7. Callis, *Reading on Sewers*, p. 101, condemns it as more ancient than profitable, on the assumption that it was made for draining (1622). That subject is very fully discussed by the Rev. C. H. Evelyn White in a Paper in the *Hunts. and Cambs. Archaeological Society's Transactions*, Vol. i. part 1. 55.



MAP II. Cambridgeshire Rivers in Roman times.

shire Car Dyke is at least suggestive of a canal, which cut off a corner and gave direct communication with the high land of Cambridge, which has been from time immemorial an excellent corn growing country¹. Before the drainage was carried out there was doubtless a greater head of water in the rivers than at present, and they were more easily available for water carriage; such places as Chesterford, Barrington, Swaffham and Clayhithe, where Roman remains are found, would all be accessible by water; till within the present generation the practice of conveying corn by water from Horningsea survived; and what was the cheapest mode of carriage in the nineteenth century, may well have proved convenient in the third. The broken lines on map II mark waterways which may be most probably attributed to the Romans: these waterways continued to be utilised for traffic at the time of the Norman Conquest²; but it seems unlikely that such elaborate engineering works were undertaken by any of the Anglo-Saxon kings. The suppositions, (1) that the Cam flowed from Upware by Stuntney to Littleport, till about 200 A.D., that it was then blocked and forced to find its way by Aldreth to join the Ouse at Earith and continued to take this course—assisted by Roman canalisation—for a thousand years; and (2), that after 1236, the bed of the Ouse at Benwick began to be stopped and the Ouse was diverted to its present course in the Looder Delfe³ to join the Cam, seem worth offering tentatively as an hypothesis, that is admittedly unproved, but that may nevertheless be worth consideration, since it appears to be in accordance with the facts as at present known.

Professor HUGHES pointed out that all speculation as to the former course of the rivers in the fenland must take account of the two great sources of supply. Besides the rain which falls on the area, the water all comes from the springs issuing from the base of the receding escarpment of the chalk on the east and the waters collected in the impervious basin of the Ouse on the west. The rivers Wissey, Brandon and Lark modify

¹ Stukeley, *Palaeog. Brit.* No. II. 37, 38.

² *Laws of King Edward the Confessor*, also *Domesday Book*, I. 298 b.

³ Looder Delfe or Lorder Delfe is the name given in Hondius' map of 1632 to what is now known as the West Water; and this latter name was then used for the old branch of the Ouse from Earith to Benwick.

the outline on the east, and on the west the Nene and some other smaller streams must be taken account of. But the drainage of the Fens has always been through a net-work of natural, and later of artificial, channels having such a small fall to the north that they have been continually modified, and the direction of the current even reversed, by the outfalls being suddenly destroyed in storm or choked by gradual silting up. In the Backs of the Colleges we see a good example of the sort of thing that has been happening. Sometimes when the locks are closed the stream is seen flowing up towards Queens', and if Trinity bridge were blocked the water would find its way through the net-work of ditches by Queens', King's and Clare and get into the river again opposite Trinity Library, or even down the Bin Brook.

Many of the ditches are part of old river courses, and, in borings in the paddocks, other and deeper channels have been found. That is an example of what the Fen drainage is and has been. Though peat has levelled up the surface there is no part of the Fens which has not been traversed by river channels. Some of the more permanent and important have left such a mark on the geographical features that we can feel certain that they have run where we now see them throughout the period with which we are now dealing, though more or less of the fenland water may at one time or another have been caught by them. The Ely river is one of these. You can see that there is a shore line along the east side of Ely. It was for the water carriage and protecting river that Ely was placed there.

It is very interesting to enquire why and when the courses were anywhere artificially or naturally modified, and he joined in thanking Dr CUNNINGHAM for the suggestive paper which he had given them.

The Rev. F. G. WALKER remarked it had been proved by excavations that the Romans had built the embankment, called "the Wall," which passed through the villages of Walpole, Walton and Walsoken. This was evidently constructed along the shore of the Wash in order to keep the sea from encroaching on the land.

Judging from the plain traces of Roman occupation, which he had found during various small excavations along the banks of the Car-Dyke and in its bed, he had come to the conclusion that the Romans had dug this canal, 60 feet wide, in order to regulate the flow of flood-water coming from upper reaches of the rivers which run into the low-lying district we call the Fens.

This Car-Dyke is traceable from Waterbeach to Lock-spit Hall on the West River; thence to Benwick the course of the old river was utilised. From Benwick to a point just east of Peterborough, and thence on by Bourn, in Lincolnshire, to Tattershall it can still be followed.

In its course it cuts across every river flowing into the Wash, from the Cam at Waterbeach to the Witham at Tattershall. Though its probable primary use was the regulation of the flood-water, it would also have been used for the purposes of traffic.

Monday, 15 November, 1909.

Professor RIDGEWAY, Sc.D., F. Brit. Acad., Vice-President,
in the Chair.

The following rule, passed by the Council at its meeting on
10 November, 1909, was read :

“That at the meetings of the Society, non-members,
other than undergraduate members of the University,
unless accompanied by the member introducing them,
must show a card of admission.”

F. W. GREEN, M.A., Assistant Director of the Fitzwilliam
Museum, delivered a lecture on

WESTERN OASES IN EGYPT AND THEIR ANTIQUITIES.

Monday, 22 November, 1909.

The Rev. Dr STOKES, President, in the Chair.

The Rev. J. G. CHESHIRE, M.A., read a paper, illustrated
with lantern slides, on

WILLIAM DOWSING'S DESTRUCTIONS IN
CAMBRIDGESHIRE.



Photograph by Palmer Clarke, Cambridge

The Ship in the windows of King's College Chapel, Cambridge

Monday, 29 November, 1909.

The Rev. Dr STOKES, President, in the Chair.

The following communication, illustrated with lantern slides, was made.

THE SHIP IN THE WINDOWS OF KING'S COLLEGE
CHAPEL, CAMBRIDGE.

By H. H. BRINDLEY, M.A., and ALAN H. MOORE, B.A.

THE subject of the picture occupying the lower divisions of the two left-hand lights of the third window on the south side (counting from west) in King's College Chapel is St Paul saying farewell at Miletus. The scheme of the painting is as follows:—the lower portion is occupied by St Paul speaking to a great group of kneeling and sorrowing persons, the right upper portion shows us a massive castle on a sea-beach, while in the left upper portion, beyond the head of St Paul, we see a rocky cliff with a little vegetation, then a bay with a ship at anchor, a rowing-boat between ship and beach, and in the left background a high rocky hill. It is with the part of the painting containing the ship that we are concerned—that is, with the upper left-hand quarter of the whole picture, and in the description to follow this is treated as a picture by itself.

The ship is the most prominent feature of the painting, and she is portrayed with much wealth of detail. As we should expect for the age when the painting was made, she is a contemporary vessel: the unknown artist has given us a ship of his own day such as he may well have seen many times in the Port of London or at Antwerp, for we are told that of those responsible for the execution of the windows, two at least were Flemings. But whether English or from the Low Countries, he has left us a vessel stately and beautiful in herself and representative of an age whose naval architecture,

at least as regards northern practice, is known to us in detail only by very few trustworthy pictures and certain inventories of men-of-war. That there exists still unedited material of much value in Paris, Madrid and Holland can hardly be doubted, but even the far-reaching and scholarly labours of Jal, which culminated in his *Glossaire Nautique* of 1848, a work whose merit and importance have never been approached, failed in many directions to do more than point out the scantiness of the records of sixteenth century naval architecture.

The naval archaeology of this period is thus beset with difficulties. As an example may be mentioned the famous *Henri Grace de Dieu* of which some representation or other is familiar to most of us. This great ship was *sui generis* and before her time, indeed in some respects even a freak. She has been too often quoted as a type of the men-of-war of her day, which she certainly was not. Of the several portraits of her the best known are the one at Greenwich showing her under full sail, and the one in the Hampton Court painting of King Henry VIII embarking at Dover in 1520. Among the various manuscripts relating to her, some of which have been printed, there are two inventories, both at the Record Office, of which one has been printed by Mr M. Oppenheim in his valuable *History of the Administration of the Royal Navy and of Merchant Shipping in relation to the Navy*, vol. I., 1509-1660. The two inventories agree in most respects, but save as regards the number of masts and yards the pictures of the ship do not agree with them. The historical value of the pictures is therefore small. Thus so detailed a representation as St Paul's ship demands careful examination with the hope that light may be thrown on one or more of the many matters in doubt concerning the naval architecture of her age.

The Provost of King's College, himself the historian of the Chapel windows, informs us that he knows of no attempt to describe St Paul's ship in detail. On such a description we now venture.

The painting is unfortunately imperfect in certain places, for portions of the original glass have been replaced by small

irregular pieces without any attempt to reproduce thereon the presumably damaged parts of the picture. Though happily these renewals are too small to mar the general effect of the painting when seen from the floor, they create gaps in the ship's rigging which leave doubtful the identification of certain ropes and forbid any conclusions of value in the case of a few others. The renewals have affected the picture in six different places as below:—

(a) The starboard side of the foreyard is missing, save for a short piece close to the mast: the glass showing this short piece appears to be the original glass reset a little too low.

(b) The starboard yard arm (extreme outer end) of the main yard is missing.

(c) The upper part of the main topmast and the whole of the starboard side of the main topsail yard are missing.

(d) The midships part of the hull below the waist has several small pieces of glass inserted.

(e) The left-hand side of the foreground has small pieces of glass inserted, which somewhat deface the mass of rocks or low cliff occupying this part of the picture.

(f) The right-hand side of the base has been treated similarly, but very fortunately the repairs fall short of the small boat between ship and shore. It is therefore seen that the picture has at some time suffered serious damage, and the knowledge of how it should be restored has now passed from us for ever. We can only rejoice that so much remains unharmed and that the technical loss is not greater than it is.

The ship, which is speaking strictly a barque, as she carries no mizzen top, is depicted as seen from a little abaft her starboard quarter; thus the hull is somewhat foreshortened. She rides very high out of the water, and even making allowance for the foreshortening; this immense freeboard and the great height of her lower masts give an impression of crankiness. She is somewhat high even for a ship of an age when vessels were built with great freeboard for their length, judging by modern standards. It seems not unlikely that

the exaggeration in height was forced upon the artist, anxious to make the ship the prominent feature of the painting, by the narrowness of the window-light. Probably also to assist this object he omitted the bowsprit, save for its short inboard portion. The absence of this spar and its gear, we venture to think, is unfortunate in an artistic sense, and is to be much regretted as it deprives us of knowing how the bowsprit would have been rigged, while we should like to see more of certain gear which is cut short by the window-frame on its way to this spar.

The ship has her sails furled and is evidently at anchor or moored. For this her portside ground-tackle must be employed, as her starboard anchor is fished (i.e. made fast with its shank horizontal) to the ship's side by its cable, which we see bowsed through the hawse-hole so as to bring the stock hard up to the fore channels, and by a "shank painter" leading over the gunwale of the waist from a large ring at the crown of the anchor, a practice of old standing at this ship's day. In the relative proportions of this ring and the flukes to the other parts of the anchor, as well as in the angle of the arms to the stock, the painter has not been very careful, as is so commonly the case in drawings of the period.

Lying alongside the waist is an empty boat, which is evidently the ship's "great boat" or "boat," while in the boat either making for or away from the ship we may recognise her small boat or "cock" ("cokke," "cok," etc. of MSS.). As in *King Lear*:

"The fishermen, that walk upon the beach,
Appear like mice; and yond tall anchoring bark,
Diminish'd to her cock; her cock, a buoy
Almost too small for sight."

Act IV., Sc. 6.

This boat has two oars a side, but we do not see who are handling them. Moreover it is difficult to feel confident as to which way the boat is going, for we see her end on, and there is little guidance as to whether her stem or stern is towards us. From the subject of the whole picture we should expect

the ship's master had just sent off the cock to take St Paul aboard, and indeed the end of her we see might well be the stem, while the carefully painted beardless face looking towards us suggests a man in the bows ready to step ashore. But close to him there is another man, with a beard, whose face we see in profile, seated crossways and nearer to us than the oars. This suggests that the two persons are in the stern-sheets, and therefore that the boat is pulling away from us. We must leave this not very important matter in doubt.

THE HULL. The form of hull is early in certain particulars and calls to mind the prints of Flemish ships of about 1480 reproduced by M. de la Roncière in his *Histoire de la Marine Française* and certain ships of the fifteenth century among the German and Flemish prints at the British Museum.

Such vessels must have been uncomfortable in a sea-way: a replica of the *Santa Maria*, the largest of Columbus' three vessels on his first voyage, was built in 1893 at the arsenal of Carraca from such contemporary data as were available. In the following year she was sailed across the Atlantic over the course taken by Columbus. The voyage occupied thirty-six days, while the best speed was less than seven knots. The vessel pitched horribly, and the sufferings of her crew appear to have been extreme. We see in St Paul's ship great sheer in combination with deep waist, high forecastle and poop. As far as we have accurate knowledge of the proportions of these parts, the artist seems to have preserved them in the general exaggeration of height which we have said above appears to have been forced upon him by the shape of the window-light. The great longitudinal "walings" or "rubbing streaks" of the period are very evident. The absence of a gabled shed on the poop and of a projecting gallery on the stern rather points to the artist having a small type of ship in mind, a supposition which is supported by the shortness of the mizzen mast and certain other features.

THE SPARS. The ship carries

(a) Bowsprit. Of this very little is seen, only the short inboard part of it, so that we do not see anything of the sprit-sail yard such a vessel would carry.

(b) Fore mast with Foreyard, Fore topmast with Fore topsail yard. The Fore topmast carries a small flag or pendant.

(c) Main mast with Mainyard, Main topmast with Main topsail yard.

As mentioned above, both fore and main lower masts are very taunt, in accordance with the general exaggeration of height. Both have the round saucer-like tops characteristic of the man-of-war of King Henry VIII's time and later.

From the maintop of St Paul's ship project two immense javelins or spears. This arming of the tops is a common feature of drawings of the period.

In our painted ship the fore mast rakes aft a little and the main mast a good deal. In ships of this time the fore mast usually raked forward while the main mast was stepped vertically, so it appears probable this was the effect really intended by the artist. The fore topmast is parallel with the fore mast, but the main topmast has its stay set up so tautly that it has an obvious forward rake. Both topmasts are small, as they were at this period; topmasts of length equal to or exceeding that of the lower masts were not seen before the seventeenth century. The topmasts are clearly stepped forward of the lower mast heads, and if the picture is a faithful representation, it is here of value as assisting to settle the great doubt whether the practice of the early sixteenth century was to step the topmasts forward of or abaft the lower masts.

(d) Mizzen mast and Mizzen yard. The mizzen mast is small relatively to the other masts, which suggests that we are looking at a vessel of the lesser kind. We now arrive at the first omission of importance. There is no outlygger (also "outlikker," "outlicker" and "outlooker" of MSS.). This was a spar, projecting from the stern, to which the sheet of the mizzen (sail) was led, and therefore the same kind of spar as the bumkin (boomkin) of certain rigs of small craft of the present day. As she is, if we look on her as a real ship, and not as a picture on glass, St Paul's ship could not have set her mizzen.

This point is illustrated by fig. 1, which is an attempt to represent St Paul's ship broadside on, with the outlygger and

mizzen sheet introduced. The stem, bowsprit and spritsail yard are also shown, while the parts of the foreyard, main and main topsail yards lost in the painting have been restored. The bowsprit rigging is shown as far as it may be inferred from the ropes which pass out of the picture and obviously lead to that spar. Beyond this the additions to the rigging are slight. These are the continuing of certain ropes which stop short in the picture, as far as we are able to decide on their lead, and the introduction of the rigging of the other side, where only that of one side is shown in the painting. One portion of the rigging about which there is doubt has been left incomplete. The shrouds of the port side have been omitted for the sake of clearness.

EXPLANATION OF FIG. 1.

SPARS AND SAILS.

- A Bowsprit. Very little of this spar is shown in the window. Its length in the diagram is largely conjectural, but is probably approximately correct. In Anthony's mss. (circa 1540) the bowsprit is represented as being longer than that of this picture.
- B The spritsail yard with the spritsail furled. This yard and sail are not shown at all in the window, but nearly all ships carried them at this period. The gear consisted of halyard or tye, braces, and sheets, but exactly how they were fitted is unknown. At anchor the yard was not left across, but was stowed in the head.
- C Fore mast.
- D Foreyard and forecourse.
- E Foretop.
- F Fore topmast.
- G Fore topsail yard and sail.
- H Main mast.
- I Mainyard and maincourse.
- K Maintop.
- L Main topmast.
- M Main topsail yard and sail.
- N Mizzen mast.
- O Mizzen yard and mizzen.
- P Outlieker. In the window this spar is omitted. It was not universal, but is here represented, because this ship would not be able to set her mizzen without it.

STANDING RIGGING.

- I Fore shrouds.
- II Main shrouds. The three foremost of these, which are represented without

deadeyes, are discussed in the text. It may be that the artist intended them to belong to the port side, and that the maker of the window did not rightly interpret his design.

III Mizzen shrouds.

IV Fore topmast shrouds.

V Main topmast shrouds.

VI Main "puttocks" (probably), the futtock shrouds of later times.

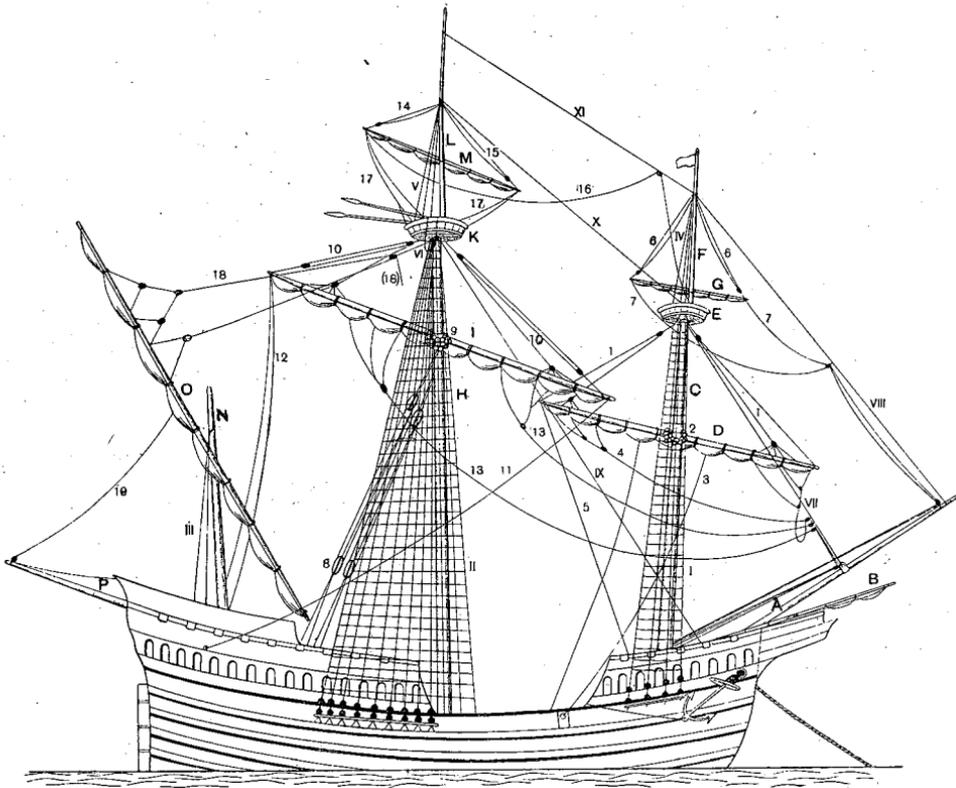


Fig. 1.

VII Forestay.

VIII Fore topmast stay.

IX Mainstay.

X Main topmast stay.

XI Flagstaff stay, or perhaps it would have been called the maintopgallant stay.

RUNNING RIGGING.

- 1, 1 Fore lifts.
- 2 Fore parrell.
- 3 Starboard foresheet. (The port foresheet is shown in the diagram for the sake of symmetry.)
- 4 Port forebowline. (The starboard fore yardarm being lost in the window, the bowline, if it was shown, has gone with it. It is restored in the diagram.)
- 5 An unexplained rope.
- 6, 6 Fore topsail lifts.
- 7, 7 Foretop bowlines.
- 8 Drynges (probably).
- 9 Main parrell.
- 10, 10 Main lifts.
- 11 Starboard mainbrace.
- 12 Two ropes. Perhaps one is the mainbrace, or perhaps the mainbrace is represented in two parts, in which case the starboard mainbrace has one part omitted.
- 13, 13 Main bowlines. Whether they are correctly represented in the diagram as leading to the forestay is uncertain, but from the way they are shown in the window it is not clear where else they could lead, except the steeve of the bowsprit were most extreme.
- 14 Port main topsail lift.
- 15 Shown here as the starboard main topsail lift, but the matter is not clear from an injury to the window. (See figs. 3, 4 and text.)
- 16 Probably the port maintop bowline (see figs. 3 and 4). The fairlead on the flagstaff stay is not shown in the window, but what is shown is meaningless. The starboard maintop bowline is omitted or lost in the window and is not restored in the diagram, that confusion may be avoided in this difficult region.
- 17, 17 Probably, main topsail 'yard ropes,' braces being absent (but see figs. 3 and 4).
- 18 Mizzen lift. The fall ending in space (18) makes it impossible to be certain as to the lead of this rope.
- 19 Mizzen sheet. Probably omitted in the window, though a rope which appears to lead from the port main yardarm may really be the mizzen sheet.

All the yards are pointed to the wind and lie almost fore and aft. The lower yards are not hoisted right up. The fore topsail yard is lowered, while the main topsail yard is half-mast high ("half-mast" does not necessarily mean half-way up the mast). Among the directions for getting under way in *The Seaman's Grammar* (1653), which is an enlarged edition of John Smith's *Accidence, or the Pathway to Experience*

necessary to all Young Seamen (1626), we find "Hoise your sails half-mast high." And they are thus in St Paul's ship.

The unknown author of *The Complaynt of Scotland*, which was published in 1549, in his exact and spirited description of a ship getting under way, tells us "Then the master cryit, top your topinellis, hail on your topsail scheitis, vire your liftaris and your topsail trossis and heise the top sail hear," the last command seeming to mean, "haul the yard right up," or "chock-a-block" as the phrase now is, from the previous position of "half-mast." (The text is quoted from Sir James A. H. Murray's edition, p. 41.)

THE STANDING RIGGING. Of this we see:—

(a) Fore rigging. There are four shrouds on the side (starboard) nearer to us, and they lead to deadeyes (two to each shroud, with lanyards between the two) on channels outboard. Four shrouds are also seen on the port side.

(b) Main rigging. As was the custom in the sixteenth century, we find the main mast much more heavily stayed than the fore mast, which was usually smaller in comparison with the main mast than in this painted ship. There seem to be twelve shrouds on the starboard side, but the leading of the window makes it somewhat difficult to be certain of this. If twelve is the number, the forward three shrouds are made fast to the ship's side and not to deadeyes. The remaining nine lead to deadeyes (two to each shroud, with lanyards between the two) on channels placed outboard rather lower down than the fore channels. Whether fitting some of the shrouds without deadeyes was customary or merely a fancy of the artist we are unable to say. But there is evidence that at the close of the fifteenth century there were several methods of setting up the shrouds, so it is possible that we have here a combination of two of the methods, and that this combination was sometimes practised. The presence of ratlines on the three forward ropes shows that they were intended for shrouds. It is however possible that these three ropes were intended by the artist for port side shrouds and that a window painter brought them down to the starboard side in error. That the ship is a small one is again suggested here, for both

her fore and main shrouds are few compared with those of large men-of-war, at least of 1495-1498. In the *Naval Accounts and Inventories* for those years, which have been edited by Mr M. Oppenheim for the Navy Records Society and which supply most of the available detailed information as to the rigging of the time, we find that the *Governor* and the *Mary of the Tower* had six shrouds a side for the fore mast and sixteen and fourteen respectively a side for the main mast. In her possession of channels and "dedemeneyne" (dead-eyes) "S. Paul's ship" is well up to date, for this method of setting up was adopted in the English Navy only in the decade succeeding 1485, so far as the Inventories may be trusted. Whether it was common abroad before this time sufficient evidence is lacking, though a Flemish carrack of perhaps 1480, reproduced by M. de la Roncière (*Histoire de la Marine Française*, II, 1900, p. 221), has channels and deadeyes.

Till 1485 it was the practice to make fast at least the fore shrouds inboard, though possibly the main shrouds were often led to channels before that time. In the Flemish carrack above mentioned there are deadeyes (two to each shroud, with lanyards between the two) fitted to all fore, main and mizzen shrouds. There are fourteen main shrouds a side and of these the aft ten have their deadeyes on a "chain-wale," the lower deadeyes of the four forward shrouds being chained to the ship's side. This difference in the mode of making fast a small number of the forward main shrouds is a parallel with S. Paul's ship, and suggests that it was not an uncommon practice to fit the main shrouds in two sets.

Both fore and main shrouds have ratlines from the gunwale to the tops. Through fading or, more probably, chipping off of the paint, certain portions of the shrouds and their ratlines have vanished. This is the case in particular near the tops and half-way up the main shrouds. Moreover, the ratlines are absent from most of the length of the three forward main shrouds, though the latter are quite distinct, which leaves a doubt whether the ratlines were completely inserted by the painter in this place. It is noticeable that it is these same

three shrouds which are made fast without deadeyes. The shrouds, and especially the ratlines of the fore mast, have been put in with a thicker brush than those of the main mast, and by a less even hand.

(c) The Mizzen mast has two shrouds on each side. These have no ratlines and are made fast inboard.

(d) Forestay and Fore Topmast Stay. Neither of these is seen completely, partly because they lead to the bowsprit and partly because they enter places where, as already mentioned, new glass has been inserted.

(e) Mainstay. This leads to just forward of the fore mast and presumably is intended to make fast to the deck. Making this stay fast to the bowsprit was of later date. Main Topmast Stay. This leads to the foremast head: its upper portion is lost in the repairs in which the main topmast has so largely disappeared.

(f) Other parts of the standing rigging:—

From under the flag at the fore topmast head we see the beginning of a rope which must have led from the vanished main topmast head. The rest of this rope is lost in the repairs to this region. It is clearly a piece of standing rigging, for from it there lead down two short lengths of running rigging we shall discuss later on. Thus the standing piece is like a main topgallant stay, though it could not be called by this name, as the ship carries no topgallant masts, which were not common, at any rate in small vessels, till a later day. This stay is somewhat of a puzzle together with the ropes running down from it.

No "sweftyng tackles" ("swifterns" of later times) are shown. These were tackles inboard of the shrouds, which they assisted in preventing the masts from "straying." They were regularly fitted in larger vessels but not so often in small ones; thus their omission is further evidence that we are looking at a small ship.

The rope of the period was certainly poor, and its weakness was recognised in the abundant and heavy standing rigging.

Neither does the ship carry "crowfeet" or "cranelines," which were complicated tackles acting as backstays to the

masts. It is, however, not certain if these additional supports were employed in King Henry VIII's reign.

THE RUNNING RIGGING.

(a) The Bowsprit. The spritsail yard does not come within the limits of the picture.

(b) The Foreyard and its gear. No halyards or tyes are shown. These hoisted the yard and ran close to the mast, so their omission might be expected.

The Lifts are shown. Their details are not quite clear, but they seem similar to the main lifts, which will be noticed later.

The Fore Parrell is indicated by a slight thickening where the yard crosses the mast. (Parrells were of various kinds, but were all essentially bands which kept the yard against the mast. A common form was a kind of necklace of "ribs" and "trucks"—pieces of wood strung on a rope. "Ribs and trucks" survives as an expression for trifles in East Anglia.)

The Fore Braces are not shown. It is uncertain how the forebraces led at this period—no picture is satisfactory as to details. There is little doubt, however, that they led to well forward on the mainstay, in two parts, one part being made fast thereto, while the other was brought to the forecastle. All we can say is that this was the arrangement in Queen Elizabeth's reign, and from the number of blocks mentioned in the Inventories it seems probable that in the time of King Henry VIII their lead was the same.

The Starboard Foresheet is shown, leading from the sail furler under the yard to a hole in the ship's side just abaft of the break of the forecastle. The Port Foresheet is omitted.

The Port Fore Bowline, with two bridles, is shown, but not the starboard one.

The Fore Tacks are not shown. These led forward, perhaps to the beak head, but whether quite so far forward is uncertain.

The following piece of gear we cannot explain. This is a single rope from the port foreyard arm on which a man on the forecastle is hauling. Perhaps this rope should be continued above the yard arm to the maintop.

(c) The Fore Topsail Yard and its gear.

No Halyards are shown. These would not be prominent in an actual ship.

The Fore Topsail Lifts, in two parts, are shown.

The Fore Topsail Braces are not shown. How these led at the time of the picture is uncertain (see under "Fore Braces"), but later on they were brought to the main topmast stay. At the end of the fifteenth century they were not always fitted in small ships, and so their omission here may be intentional.

The Fore Topsail Sheets are not shown. These might easily be forgotten in a picture. It may have been the practice to unbend them in harbour, but in a ship about to proceed to sea one would expect to see them bent.

The Foretop Bowlines. These appear to be represented by a rope leading forward and downward from the starboard yard arm and by one, of which a portion of the lead is not visible, leading forward and downward from the port yard arm. But against these ropes being the bowlines we see no bridles on them, and also the ropes come from rather far out along the yard for bowlines.

(d) The Mainyard and its gear. At this time the mainyard was hoisted with halyards, tyes and gears, which last were an assemblage of tackles. None of these are shown with certainty, though we see two large tackles leading down abaft the mainyard, but they come to the mast at the wrong place for any hoisting gear. It is possible, however, that their position is a window-painter's error. Perhaps these tackles are not halyards represented faultily, but are really "drynges," which we find in inventories of the time. What drynges really were has been much debated. It is possible that they were tackles for setting up the parrell and trusses. St Paul's ship carries a main parrell of the necklace type—it is drawn very carefully—and the two tackles which look like halyards appear to be connected with this parrell. Hence they may be drynges and not halyards. On the other hand they may be truss tackles instead of parrell tackles. But, when all is said, we do not know whether drynges were parrell tackles or truss tackles. A point in favour of the two doubtful tackles in the

painting being drynges is that the inventories usually mention the latter in pairs. But we cannot arrive at any satisfactory conclusion.

The Main Lifts are shown in at least two parts, but in this connexion we find another obscurity. Inboard of the lifts and somewhat separated from them comes a rope ending in a "crowfoot" to the yard. As this rope is drawn as though it had a strain upon it, it may be part of the lift. If this is not so it may be the "martnetts," which were leechlines bent to the leech of the sail by crowfeet. There seems, however, no sure evidence of martnetts before Queen Elizabeth's reign, and in pictures in which there is no doubt about their presence they are always shown hanging slack from the yard (see fig. 2), while the gear under discussion is taut. In the present picture there are traces of a similar fitting at the port foreyard arm.

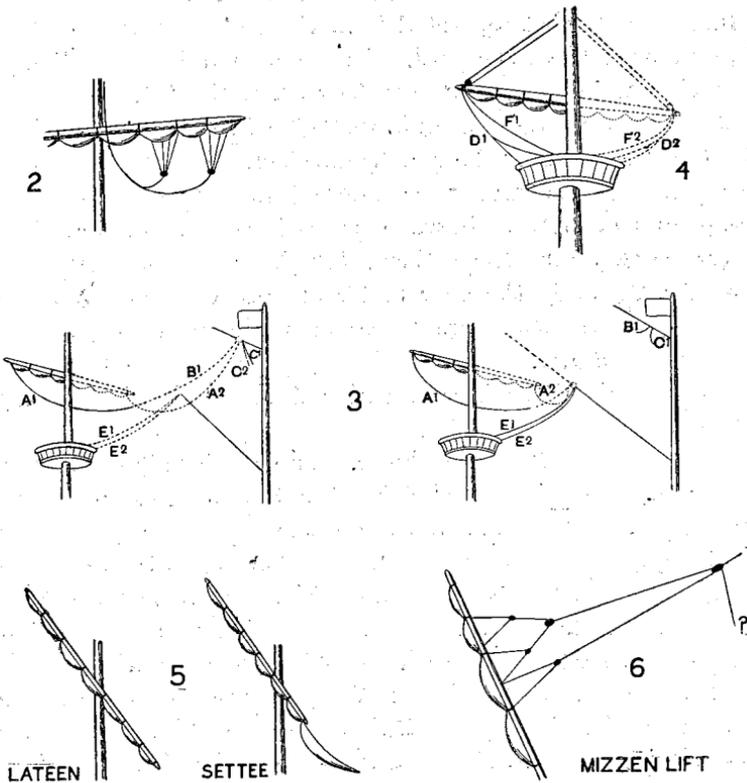
The Main Parrell, as mentioned above, is shown very clearly.

The Main Braces are shown. The starboard brace is in one part, while in actual ships the braces were usually in two parts. The main brace on the port side presents a difficulty. From the yard arm come two ropes, the inner one of which leads to the poop and is clearly a brace; the outer one seems to be the same as a rope which leads from below the mizzen yard to the poop. If this is the case the brace is in two parts, but its block on the yard arm is omitted. On the other hand it is possible that the rope below the mizzen is really the mizzen sheet, in which case the short length of rope from the port yard arm outside that which is certainly a brace remains unexplained, though it may be a portion of an imperfect representation of the brace in two parts.

The Main Sheets are not shown. These we should expect to see, as they were very prominent ropes. It is possible that the artist intended for the main sheets the ropes we have identified above as the main braces, the window-painter having put them too far out along the yard.

The Main Bowlines are seen. They lead towards the bowsprit, and so of course are not shown entirely. We have

no exact information as to their lead at this period, and so our regret that the artist omitted the bowsprit again finds expression. The main bowlines have the same number of bridles as the fore bowlines.



Figs. 2 to 6.

The Main Tacks are not shown.

Furling gear. We may observe here that, save for the occasional mention of a brail, the Inventories contain no gear for hauling up a sail to its yard, the purpose of brails and also of the buntlines, clewlines and leechlines of later times. It is noteworthy, in the scarcity of pictures of the time showing details, that the painting has nothing of such furling gear.

(e) The Main Topsail Yard and its gear.

The Main Topsail Halyards are not shown (see "Fore Topsail Halyards" above)

The port Main Topsail Lift is shown in two parts. The starboard one has vanished in the repairs which destroyed the starboard yard arm, for most likely it was once in the picture.

The remaining gear of the main topsail yard is a puzzle. From the port yard arm comes a rope which is led to the main topmast stay (A1 in fig. 3). Presumably, if the starboard yard arm had not vanished from the picture, we should see a similar rope (A2) leading from it. From the main topmast stay back to the maintop come two more ropes, E1 and E2. Now are these two the same ropes as A1 and the presumed A2, which may be the maintop bowlines? But if A1 is a bowline, the same criticisms apply to it as to the foretop bowlines. On the other hand, is A1 really continuous with B1 and B1 continuous with C1, two ropes led to the stay which is apparently fitted like a main topgallant stay and which we have already discussed? We should indeed expect the maintop bowline to lead to the main topmast stay, so it is not improbable that this bowline is here led to the additional main topmast stay which the artist has introduced. But if this is the case, what are E1 and E2? Perhaps they are part of the fore topsail braces, the rest being omitted. But if this is the case such a lead is at variance with what appears to have been the practice of the time, viz., that fore topsail braces led from the main topmast stay to the forecastle. Or again, is A1 a brace led forward? We doubt this, for we know of no such leading for this brace. By leading a brace forward valuable support to the yard when the ship is under canvas would be sacrificed. Though much has been lost by the repairs in this part of the picture, we are inclined to believe that the window painter mixed things up. In fig. 1 (16) A1 and B1 are represented as the port maintop bowline, with its fall led to the foretop.

The main topsail yard has another set of gear which is very baffling. This is disposed as follows:—from the port yard arm come two ropes, both of which appear to lead into the main-

top. These are D1 and F1 in fig. 4. The outboard rope (D1) splits into two. Now it is possible that the two ropes E1 and E2 of fig. 3 discussed above, which appear to come from the main topmast stay, really lead from the vanished starboard yard arm and have nothing to do with the stay. If this is so, one of them might be a "yard rope," i.e., a single rope employed during this period when the yard was not thought big enough to demand a brace, and we are dealing with a rather small vessel. This would account for F1 of fig. 4, but leave D1 a mystery. It was a most unfortunate accident which deprived the ship of the starboard side of the main topsail yard.

Under the maintop are four bights of rope. We do not know what they represent. They may be for the same purpose as the "puttocks" ("futtock shrouds" of a later day), viz., to provide a means of getting into the top from below; or, if the top had a "lubber's hole" at this time, to give foothold for reaching the inside of the top through its floor. On the other hand, these bights of rope may be intended for crane lines. Contemporary pictures often show a kind of davit or crane projecting over the side of the top, and through this fitting is rove a rope ("craneline" of MSS.) to which buckets or bundles are attached. This gear was for hoisting spears, stones and other projectiles to the men in the tops, and also ammunition for the small cannon (which were sometimes true quickfirers) not infrequently placed in the tops. This hoisting gear seems to have been abolished early in the seventeenth century, as the tops came to be manned by marines with small firearms, the ammunition for which was carried on the persons of the men. But with the revival of the fighting-top for carrying light guns we see the davit and its hoisting-rope again, and they continued to be a regular fitting of the modern man-of-war till about ten years ago, when guns again disappeared from the tops. In the *Complaynt of Scotland* (edit. cit. p. 41) we read how the master commanded: "Every quartar master til his auen quartar. Boitis man, bayr stanis and lyme pottis ful of lyme in the craklene pokis to the top, and paueis veil the top vitht pauesis and mantillis." (We are indebted to Mr Morton Nance for calling our attention to the

above passage.) The "craklene pokis" were the craneline pokes or bags for hoisting ammunition. We much doubt, however, if the bights of rope under the maintop of St Paul's ship are intended for crane lines, as no "crane" is fitted in the top, while in pictures of the period the gear is depicted very uniformly and never in the manner seen here. The foretop is without these bights of rope.

(f) The Mizzen Yard and its gear. The sail is furled beneath the yard, which comes so low to the poop that there can be no sail beyond it. Thus the sail is a lateen and not a settee (see fig. 5).

The Mizzen Halyards are not shown.

A "Crowfoot" or spreading arrangement of tackles which acted as a mizzen lift is shown, and close inspection reveals that it is rigged as in fig. 6. This lift is led to the main mast under the top.

A rope which may be a sheet can be seen leading apparently from the furled sail to the tafferel, but this rope we have referred to above in describing the main braces as possibly part of the port main brace. Again, if the rope is the mizzen sheet it is unusual in being a single rope: we should expect to see it in two parts with a block on the clew of the sail. Matters are in this portion of the picture rather vague, because of the absence of the outlygger or spar projecting from the stern, to which the mizzen sheet led. This omission we have mentioned already, and need only say here that, while outlyggers were usual, they were not universal; nevertheless, the ship we are describing could not have set her mizzen without this spar, as the sail is too large to be spread by a sheet which leads only to the tafferel.

The above description has been written from the excellent photograph which the Provost has caused to be made of the ship, and partly from the window itself seen through a glass. It is too high from the Chapel floor for satisfactory examination by the unaided eye. It is possible, however, that some of the ropes which are incomplete might be traced further by close examination of the glass. Though there is no doubt that, while the photograph reproduces all that is at all obvious, it

is possible that where ropes seem wanting there may be here and there faintly coloured fragments which would assist in clearing up some of the doubtful points.

The colouring of the ship is conventional; the hull is light brown or buff, while the masts and other spars are almost golden, the furled sails being white. These colours against the blue of the sea and of the heavy canopy of clouds overhead give a very beautiful effect.

We may mention here that the absence of external decoration of the hull is in accord with the ship being a small one. At this time there was but little ornamentation even in large vessels like the *Henri Grace de Dieu*, though some of the great ships of the early sixteenth century had "pavesses" (painted wood shields) placed along the sides, as well as hangings of "say," and up aloft many "gittons" (forked pendants), "standardes" and "stremers." Lavish decoration of the hull with gilded and painted carvings was a feature of the succeeding century.

In describing the painted ship of King's College Chapel it has been a little difficult always to bear in mind that she is a painted one, and that therefore she cannot sail nor can her gear be put to use. Thus we fear we have here and there expected too much from her designer. But the general impression we have is that she was originally drawn by a man who understood the uses of the various fittings and ropes, while the actual painter or painters did not. The mistakes and omissions in this picture seem to us on the whole those that a nautically ignorant though capable artist makes, the artist in this case being the copyist of a drawing which was better than his reproduction. All this is, however, supposition, as we believe it is not known to what extent the windows were actually painted by their designers or executed by other artists from drawings supplied to them.

The ship is of a type which came in about 1490 and lasted for a century as far as rig is concerned. She may quite well be called an English ship: there is at least nothing to show she is not, though it would require more information than is now available to point to any feature of her hull or rig which would mark her out as a vessel hailing from England, France

or the Low Countries in particular. We know next to nothing of the differences between ships of the northern nations of this age, but it is unlikely they were marked. We have already stated that in certain features the hull is rather early, but certainly of a design built to as late as 1500. The smallness of the topsails and the apparent absence of true braces suggest early in King Henry VIII's reign. Still, we see nothing against putting the date of the ship as 1520, but bearing in mind the possibility of an artist's omissions it would be difficult to prove error in calling her a ship of 1580. This last suggestion need not be considered seriously, as it appears certain that all the Chapel windows were finished by 1540, and perhaps even some years earlier. There exist only two or three trustworthy drawings and only one set of Inventories (of English men-of-war) for the few years on either side of 1515, so that St Paul's ship is, we feel, as useful in helping the archaeologist as is the archaeologist in his attempt to elucidate her. But then again we come back to the questions of how far her designer was qualified for his work and what kind of ship he sought to represent. On this we think that he was very fairly qualified and that his workmen have not given us his best. Nevertheless he has left us a ship of a type which was modern in his day, and his painting should have mention in any history of naval architecture of the period 1490 to 1590, a period in which there were but few changes, of which changes trustworthy records by either pencil or pen are unfortunately very scanty.

For all information of a general kind about the painting we are indebted to the Provost's account of the Chapel windows which forms the Appendix to Mr C. R. Fay's *King's College, Cambridge*, and to Dr James himself for kindly giving us assistance on certain points.

It is unfortunate that the many beautiful models of ships at Greenwich Hospital, at South Kensington, in the Museum of the Royal United Service Institution, in the Musée de Marine at the Louvre and in the Naval Museum at The Hague are of very little value as guides to the details of rigging, for hardly any are contemporary, but have been made from old

pictures by naval pensioners and others, mostly in the last two centuries, who have persistently embodied in the models the rigging practice of their own day. As regards the hulls they are useful, but taken as a whole museum models of old ships are full of anachronisms.

The following works may be mentioned as sources of information on the ships of the fifteenth to the seventeenth centuries and modern forms of the gear they carried. We have to thank Mr L. G. C. Laughton for kindly assisting us in making this bibliography.

- xvth Century (first half and reign of Queen Elizabeth). Naval Inventories preserved at the Record Office. These have not yet been printed.
1549. *The Complaynt of Scotland*. The edition quoted in this paper is that of Sir James A. H. Murray, published by the Early English Text Society, 1872. The detailed account pp. 40-42 of a galeasse getting under way has considerable historical value.
1586. WAGANAER, LUCAS. *Speculum Nauticum* (Leyden). A work on pilotage, with incidental remarks on ships, translated into English by Anthony Ashley in 1588.
1599. BOURNE, WILLIAM. *De Const der Zee Vaerd*t (Amsterdam).
1601. ROMANO, BARTOLOMEO CRESCENTIO. *Nautica Mediterranea*. With plates.
1626. SMITH, JOHN, Governor of Virginia. *An Accidence, or the Path-way to Experience necessary for all young Seamen* (London). In 1653 a useful enlarged edition was published under the title of *The Seaman's Grammar*, and in 1691 a third edition, *The Seaman's Grammar and Dictionary*, appeared. This was improved by the addition of a treatise on gunnery. Smith's short book of 1626 was the first, or at least a very early one, professing to teach seamanship.
1629. FURTTENBACH, J. *Architectura Navalis das ist von dem Schiff* (Ulm). With plates.
1643. FOURNIER, GEORGES. *Hydrographie* (Paris). With plates.
1644. MAINWYRING, SIR HENRY. *The Seaman's Dictionary* (London). This very useful book commences with "The State of a Christian lively set forth by the Allegory of a Ship under Saile." It was written about twenty years before its publication.
1660. HAYWARD, EDWARD. *The sizes and lengths of Riggings of all his Majestie's Ships and Frigates*.
1676. MILLER, THOMAS. *The Compleat Modellist*. A second edition appeared in 1684.
1677. BOND, HENRY. *The Boatswain's Art*.

1678. BUSHNELL, EDMUND. *The Complete Shipwright*. This is the fourth edition.
1685. BOTELER, CAPT. NATHANIEL. *Six dialogues about sea services between an High Admiral and a Captain at Sea* (London). This was a venture by a bookseller, Moses Pitt, and it contains a dedication to Pepys by him. The original ms. is in the British Museum. The printed book is fairly complete, but contains blunders owing to lack of a competent editor.
1695. ALLARD, C. *Nieuwe Hollandse Scheepsbouw, waar in Vertoond word een volmaakt Schip* (Amsterdam).
1695. NARBOROUGH, SIR JOHN. *The Mariner's Jewell*.
1704. BOND, HENRY. *The Art of apparelling and fitting any Ship*.
1711. SUTHERLAND, WILLIAM. *The Shipbuilder's Assistant*. This is useful for showing the changes since John 'Smith's time.
1715. *Introduzione all' Arte Nautico de Piloti, etc., sopra il mare* (Venezia). A work on navigation, but containing a large plate of a full-rigged ship with all parts of the rigging named.
1736. AUBIN, —. *Dictionnaire de la Marine* (Amsterdam). 2nd edit. This was also published in Dutch.
1747. DU MONCEAU, H. *Traité de la fabrique des manoeuvres pour les Vaisseaux ou l'art de la corderie perfectionné* (Paris, Imprimerie Royale).
1769. FALCONER, WILLIAM. *An Universal Dictionary of the Marine* (London). This is the best English work of its kind. There were many subsequent editions.
- 1800-2. CHARNOCK, JOHN. *An History of Marine Architecture* (London). 3 vols. Chiefly of use for information concerning hulls.
1840. JAL, A. *Archéologie Navale* (Paris). This is a very learned and suggestive work.
1848. JAL, A. *Glossaire Nautique* (Paris). The classical work on naval archaeology.
1851. FINCHAM, JOHN. *History of Naval Architecture*.
1890. LESLIE, R. C. *Old Sea Wings, Ways and Words in the days of Oak and Hemp* (London).
1891. ARENHOLD, L. *Die historische Entwicklung der Schiffstypen* (Kiel). This work has good plates.
- 1894 onward. Volumes of the Navy Records Society.
1896. DE LA RONCIÈRE, CHARLES. *Histoire de la Marine Française*. Tome I (Paris). Also tome II (1900) and tome III (1906). This work contains reproductions of prints of fifteenth and sixteenth century vessels from the Bibliothèque Nationale and other sources, and also gives descriptions of ships.
1896. OPPENHEIM, M. *A History of the Administration of the Navy and of Merchant Shipping in relation to the Navy*. Vol. I, 1509-1660 (London).

1896. OPPENHEIM, M. *Naval Accounts and Inventories of the Reign of Henry VII, 1485-8 and 1495-7*. Navy Records Society, vol. VIII.
1899. CORBETT, JULIAN S. *Drake and the Tudor Navy* (London). Contains much information on hulls, tonnage and armament of Elizabethan ships, as well as reproductions of pictures from Visscher's Series and Anthony's Rolls.
1902. OPPENHEIM, M. "The Tudor Navy" in F. P. Barnard's *Companion to English History [Middle Ages]* (Oxford).
1906. ARENHOLD, L. *Die allmähliche Entwicklung des Segelschiffes der Römerzeit bis zur Zeit der Dampfer* (Berlin).
1906. MASEFIELD, JOHN. *On the Spanish Main* (London). This contains a chapter on sixteenth century ships with reproductions of contemporary prints.
1906. HOLMES, SIR GEORGE C. V. *Ancient and Modern Ships*. Board of Education publication.
- 1906-7. WHALL, J. B. Reproductions of pictures of Ancient Ships. *Yachting Monthly Magazine*.
1907. "The Evolution of the Ship." *Nautical Magazine*. May—July 1907 (Glasgow).
1909. CHATTERTON, E. K. *Sailing ships and their Story* (London). The last four works are useful for the illustrations they give of fifteenth century and later ships.
1909. MOORE, ALAN H. "The Ship, A.D. 1485." *United Service Magazine*, March, 1909.
- "The Ship, 1495-1515." *Loc. cit.*, November, 1909.

The Print Room of the British Museum and the Département des Estampes of the Bibliothèque Nationale, Paris, contain many pictures of fifteenth and sixteenth century vessels of much historical value, which still remain unedited, while Visscher's series of prints, published in Holland about 1589, to illustrate the Armada campaign, and the pictures in Anthony's Rolls at Magdalene College must also be mentioned as sources of information on the ships of their time.

The Rev. Professor W. W. SKEAT, Litt.D., F. Brit. Acad., then read a paper on

GRANTCHESTER AND CAMBRIDGE.

A LITTLE more than twelve years ago, I read a paper at a meeting of the London Philological Society (May 7, 1897), in which I drew attention, for the first time, to the fact that the curious and extraordinary forms of spelling which are so conspicuous in MSS. of the thirteenth century can all be explained by the simple consideration that they must have been written out, not by native scribes, but by scribes who were familiar with Anglo-French, and spelt the English words phonetically, from a French point of view. I again drew attention to a similar phenomenon on May 3, 1901, in a paper entitled *The Influence of Anglo-French pronunciation upon Modern English*; and yet again, in my *Notes on English Etymology*, published in the same year; in my preface to *Havelok*, in 1902; and in my preface to the *Proverbs of Alfred*, in 1907. I also made considerable use of similar methods of explanation in my books on the *Place-names of Cambridgeshire, Bedfordshire, Huntingdonshire, and Hertfordshire*. And now quite recently I have received from the author, Mr R. E. Zachrisson, who is a Swede, and hails from the University of Lund, a very remarkable pamphlet entitled *A Contribution to the Study of Anglo-Norman Influence on English Place-names*, published at Lund, 1909, in which he has subjected my views to a very searching examination, conducted according to strictly phonetic laws, and his conclusions are thus stated in his introductory remarks. "Hitherto the influence which Anglo-Norman may have exercised on English place-names has not been made the subject of any serious philological investigations. Only some special question in connexion with it has occasionally received some attention. Editors of several early records containing

place-names may have pointed out some 'curiously corrupted forms,' but it has not occurred to many that this corruption may reflect an Anglo-Norman adaptation, may be an attempt to express phonetically the various changes which many English place-names necessarily underwent in the speech of the Normans. In his above-mentioned works [meaning the *Place-names of Beds., Cambs. and Herts.*, there being no allusion to the *Place-names of Hunts.*] Professor Skeat has paid due regard to the possibility of French influence. In our opinion he considerably over-estimates this influence, and above all does not seem to make any clear distinction between the changes which are due to dialectal sound-development and those caused by French influence."

I am not careful to make any reply to what is here said. I will only say that I have not had occasion to deal with English place-names generally, and have merely attempted to solve such examples as came readily to hand. And I gather from another sentence in the author's introduction that, speaking broadly, he endorses many of my views. "Monographies," he says, "exist only for a few counties. Among these we have to note in the first place three works by Prof. Skeat (the *Place-names of Cambs., Herts., and Beds.*) which may well be said to form a new era in the history of English place-names study."

I beg leave, in return, to draw attention to this remarkable work, in which the author has taken a broad yet minute survey of the subject, and gives his solutions of at least 700 place-names, in a large number of different counties. It may safely be said that no future worker can afford to neglect Mr Zachrisson's investigations; and further, that he has made considerable additions to our knowledge of this subject, which is only now beginning to be scientifically understood. Surely this is worth knowing, and must be of considerable interest to many. I am conscious of doing a service to the Cambridge Antiquarian Society by drawing attention to this publication.

There is, at any rate, one point which we can hardly afford to neglect, as it comes home to us all at once. We here find clear proof that the Grantacaestir mentioned by Beda. is not

Grantchester, but Cambridge; and conversely, that the name of the village is practically modern, and that its old name was not Grantchester at all. As far as our older history is concerned, there never was but *one* real Grantchester, and that is the famous place of which we are all so proud.

It is best to take the case of the village first, and to show that its present name is surprisingly modern, and most probably arose from the blundering of some dictatorial pedant. It is by no means the only instance in which a place-name has been deliberately altered, in modern times, to suit a passing whim, or for the sake of brevity. There is the well-known case of Hull in Yorkshire, which is a mere abbreviation of Kingston-upon-Hull, where Hull is not the name of the town, but of the stream that here joins the Humber. Hull is merely a variant of *holl*, explained in the *English Dialect Dictionary* and in the *New English Dictionary* to mean a hollow place, an excavation, a ditch, a moat; and the Rev. J. Tickell, in his *History of Kingston-upon-Hull*, written in 1796, explains that the Old Hull and the New Hull were both originally ditches or sewers. In Pigot's map of Yorkshire, dated 1831, the name of the place is simply Kingston. Not far to the west of Hull, there is a place called Kirk Ella. I forget now the exact older form of the name, but I remember discovering that it has nothing to do with a *kirk*, nor yet with *Ella*. Within the last few years, a place in Essex, called Ugley, has been politely turned into Oakley, because Ugley was confused with a certain modern English adjective. Yet the name was quite harmless; the *Ug-* represents the Norse name *Uggr*, as in Ugborough; and *ley* is the common suffix that means "a field." There is a place in Hants. once called Lydshelf, but now called Litchfield, by a strange confusion with the name of a place in Staffordshire where there is a fine cathedral. This is not a recondite fact. The present incumbent is an old friend and pupil of mine, who very soon discovered the old name; and he tells me that the *shelf*, or long ridge, from which the place was named, is a most conspicuous object. All this helps to show that if the name of Grantchester is modern, there is nothing very unusual about the fact, and it is easy to

understand that it was renamed after the famous historical Grantchester which is now called Cambridge.

Please to observe that the present name of the village contains an *h* after the *c*. Next go back a little in the course of time, and try to discover that *h* if you can; and you will not find it a very easy matter. Every now and then it might possibly occur, because the influence of the old name of Cambridge and of a certain quotation from Beda has always been a possible, perhaps a potent factor; but certainly the commonest form of the village-name is Granceter, with no *h* and even with no *s*. In the *Proceedings* of our Society for 1904, we find Mr Fordham's admirable lecture on the Maps of Cambridgeshire, and a few specimens are given. In Camden's map of 1617, at p. 113, we find Granceter; and the same in 1626, at p. 116. But in 1701, at p. 129, we come to Granchester at last, with only one *t*. In the sixteenth century, I find both Granceter (or something like it) and Grancester; but the form without *s* is the commoner, and the *h* does not appear. There are two good examples in Prof. Mayor's edition of *Baker's History of St John's*; in 1587, we find Graundcetour (vol. I, p. 427); and in 1557, Grauncester (vol. I, p. 382). In the *Valor Ecclesiasticus* (temp. Henry VIII), vol. II, p. 226, there is mention of "Chesturton et Gransiter," and an interesting allusion to "Gransiter mylles," i.e. mills. I have purposely given these rather late instances first, in order to show that the form always appears without an *h* down to the sixteenth century and even later; and having thus prepared the way, I give a series of earlier spellings.

There is nothing to show that the village is much older than the Norman Conquest. The earliest known spelling is really that in the *Inquisitio Comitatus Cantabrigiensis*, A.D. 1080, where it appears as Grenteseta. The spelling in Domesday Book, a few years later, is Granteseta, which is preferable. These French spellings represent an A.-S. form Grantā-sētan, where *sētan* is the nom. pl. of *sēta*, a settler; so that Grantā-sētan meant "settlers by the Grantā." In 1199 the form is Grantesete¹, where the final *-a* has become *-e*, of course fully

¹ Alicia de Grantesete; *Rotulæ Curiae Regis*, ed. Sir F. Palgrave, 1835.

pronounced as a separate syllable. After 1200, the final *te* in *Grante* is frequently dropped, though I have found it (see below) in 1271, 1284, and even as late as 1327. But the usual form is trisyllabic, with the final *-e* fully pronounced, as in *Granzete* (1285), where *z* is written for *ts*, as usual¹; *Gransete* (1302)²; *Graunsete* (1310-1 and 1322-3)³; *Gransete* (1311-2)⁴; *Grauntsete* (1330)⁴; *Gransete* (1331 and 1347)⁵; *Graunsete* (1428)⁶. Unfortunately, the Old English word *sætan*, later *sēte*, must have gone out of use, and could hardly have been understood in the thirteenth century. By that time the sound of *s* before *e* was often expressed, in the French manner, by *c*, as in the modern words *centre*, *century*, *certain*, *cessation*; hence a fashion set in of writing *-cete* for *-sete*. This occurs as early as 1271, in *Grantecete* (*Inq. p. Mortem*); *Grantecete*, in 1284 (*F. A.* 137); *Grancete*, in 1304 (*Inq. p. M.*); *Grantecete*, in 1327 (*Inq. p. M.*, vol. II); *Grancete*, in 1335 (*Ipm.* II), and in 1398-9 (*Ipm.* III), and even as late as 1425 (*Ipm.* IV). In the thirteenth century, the final *-e* began to drop off, and was by some entirely neglected, so that we begin to find the reduced form *Granset*, as in the *Testa de Nevill* (temp. Henry III and Edward I); *Granteset*, in the same; *Grenteshet*, with a curious mispronunciation of the *s* as *sh*, in 1210 (*Red Book of the Exchequer*); and the name Alicia de Graunsett in 1331, in the *Patent Rolls*⁷. But there were others who, instead of dropping the final *-e*, absolutely identified the dissyllabic *-cete* (pronounced something like the modern English *setter*) with the much better known suffix *-ceter* which represented the pronunciation of the form which was also frequently written *-cester*, as in Worcester, Leicester, and the rest.

But before I can proceed, I am afraid that I shall have to explain that such spellings as Worcester and Leicester are

¹ *Inquisitiones post Mortem*, vol. I. Also denoted by *Inq. p. M.*, or *Ipm.*

² *Feudal Aids*, 146. Also denoted by *F.A.*

³ *Inq. p. M.*, vol. I.

⁴ *Calendarium Rotulorum Chartarum*.

⁵ *Inq. p. M.*, vol. II.

⁶ *Feudal Aids*, 194.

⁷ *Calendarium Rotulorum Patentium in Turri Londinensi* (1802).

deceitful, and contradict the evidence. They suggest that we pronounce the *s* that happens to be written before the *t*, though we have clear evidence, in the case of Exeter, written Execestre in the Domesday Book, to show that we do not. One of the most interesting passages in Mr Zachrisson's book is one at p. 73, where he shows that, although names of this class are now usually spelt with a final *-cester*, which is in fact merely pedantic, they were often spelt phonetically in former times *without* the *s*, for the simple reason that the *s* was not really sounded. In the case of Worcester and Leicester, the *s*-sound that meets the ear is really that which is written *ce*, though the *e* is not sounded. We might denote this by writing the names as Worce'ter, Leice'ter, or Wo's'ter, Leis'ter. Mr Zachrisson gives a large number of spellings, from various writers and documents, to support this contention. Thus Layamon has Glocetere, Leycetere; Robert of Gloucester has Excetre, Gloucetre, Leicetre, Wircetre; the *Index to the Charters* in the British Museum has Glousetre, and the poem of William of Palerne has Glouseter. Capgrave has Excetir, Glouceter, Cicetir, Leycetir, Wycetir, Bysseter; the *Paston Letters* have Worceter and Worseter; and other similar spellings are found even in the sixteenth century, when the silly mania for inserting useless letters so far prevailed that we now have to insert a *b* into *doubt* and *debt*, and a *c* into *victuals* and *scent*.

The result really was this; that when the ending *-cete* in Grancete was confused with the ending *-ceter* (which was a common phonetic spelling of that which we now write as *-cester*), the change really amounted to no more than the addition of an *r* at the end of the word; the resulting form being really Granceter, as it very often actually appears. But it made a good deal of difference all the same. It definitely preserved the original dissyllabic pronunciation of *-set-e*, and entirely stopped the tendency to reduce it to *-set*, which had actually set in, and was quite regular; just as we have reduced the A.-S. Sumersætan to the modern Somerset. Mr Zachrisson shows that the same suffix occurs also in Whisson-set, Norfolk. Besides that, this added *r* definitely identified the suffix, though

by help of a false etymology, with the suffix seen in Worcester and Leicester, ultimately due to the A.-S. fem. sb. *ceaster*, which did not really, as is so commonly supposed, represent the Latin *castrum*, but rather the Latin plural form *castra*. The A.-S. form was feminine, because *castra* was taken to be a feminine singular. There are many examples, in French etymology, of a like change of gender.

The net result was that, after the addition of *r* to the end of the name, we find two sets of forms, one ending in *-cestre* or *-cester*, and the other in *-ceter*, *-cetour*; the earliest date for the added *r* being after 1300. Examples are: Grauntcestr', 1327-30, *Patent Rolls*; Antonio de Grancester, 1348, *Annals of Gonville and Caius College*, ed. J. Venn, p. 2; Grancestre, 1373, *Inq. p. M.*, vol. II; Grancestr', 1426, *Inq. p. M.*, vol. IV; Grauntester, error for Grauncester, 1436, *id.*; Grancestour, 1457, *id.*; Grauncester, 1549, *Index to Charters*; Grauncester, 1557, Baker's *Hist. of St John's*, I. 382; Grancester, *Magna Britannia*, I, 267 (1720). Without the *s* we find Graunceter, fifteenth century, *Catalogue of Ancient Deeds*; Grawnceter, Graundeceter, sixteenth century, *id.*; Gransiter, *Valor Ecclesiasticus*, II, 226 (temp. Henry VIII); Graundcetour, 1587, Baker, I, 427; Granceter, maps of 1617 and 1626. But I find no example, down to this last date, of the use of *ch*, which is apparently later than 1630 at the earliest.

I now give, in a brief form, a sufficient account of the chronology of the spellings.

(1) With the suffix *-seta*, *-sete*, 1080-1428; spelt *-cete*, 1271-1425.

(2) With the final *-e* lost; spelt *-set*, *-shet*, *-sett*, 1210(?) - 1331.

(3) With added *r*; spelt *-ceter*, *-cetour*, *-siter*, 1300(?) - 1626.

(4) With *s* before the *t*; spelt *-cestre*, *-cester*, 1327-1720.

(5) With *ch* for *c*; Granchester, 1701.

I have entered thus minutely into particulars in order to make it quite clear, even to such as are not accustomed to deal with dated examples, that it is quite impossible to connect the old form Grantacaestir mentioned by Beda, who died in

735, with the Middle English Grauntecestre, which cannot be found before 1300; and still less, with the modern Grantchester. When once this impossible equation has been set aside, we can contemplate, with freedom from all bias and prejudice, the true meaning of Beda's words.

The famous passage occurs in Beda's *Ecclesiastical History*, bk. iv., c. 19. I quote from the edition by Mayor and Lumby, p. 128:—"uenerunt ad ciuitatulam quamdam desolatam non procul inde sitam, quae lingua Anglorum Grantacaestir uocatur; et mox inuenerunt iuxta muros ciuitatis locellum de marmore albo pulcherrime factum," etc. The story is that the abbess Sexburh, who had succeeded her sister Ætheldr̄yth at Ely, had taken her predecessor's bones out of the wooden coffin, 16 years after burial, and was seeking for a new coffin in which to place them. To quote from the translation by Dr Giles, "She ordered some of the brothers to provide a stone to make a coffin of. They accordingly went on board ship, because the country of Ely is on every side encompassed with the sea or marshes, and has no large stones, and came to a small abandoned city, not far from thence, which in the language of the English is called Granta-caestir; and presently, near the city walls, they found a white marble coffin, most beautifully wrought, and neatly covered with a lid of the same sort of stone." Dr Giles adds in a note, very justly:—"the coffin found here was a relic of ancient Roman art." Is it not clear that this Granta-caestir is obviously the same word as the British *Caer-grant*, mentioned in § 7 of the history by Nennius, written at an uncertain but very early date? The words are identical, and both mean "Roman town beside the Granta." Where else but at Cambridge can we look for the site of an old Roman town beside the Granta, which, though deserted in the seventh century, could still furnish a fine specimen of old Roman art, exquisitely wrought and made of pure white marble? Notice in particular the mention of the city walls; the coffin was found "iuxta muros ciuitatis." It is amusing to find how Dr Giles has changed his mind as to this. In his translation of Beda, in 1859, he tells us that the place meant is "Grantchester, near Cambridge"; but, in 1875,

in his translation of Nennius, he had found out the truth, and says that Caergrant is "Grantchester, *now* Cambridge." It just makes all the difference.

The fact is, that we can trace Beda's name at later dates. There is a charter printed by Kemble, No. 563, and dated 970, which is written partly in Latin and partly in Anglo-Saxon. The English portion is good and valuable, but the Latin portion is of doubtful authenticity. The former refers explicitly to Beda's story, and to the white marble coffin; the latter is chiefly remarkable for containing the expression "in prouincia Grantaceaster," meaning the county of Cambridge or Cambridgeshire. There is no reason against such a use of the phrase; and, luckily, it is confirmed by a charter of Edward the Confessor, No. 907, in which Norfolk is called "comitatus Northfolc," Suffolk is called "comitatus Sudfolc," and Cambridgeshire is called "comitatus Grantecestriae," which is as much as to say Grantchester-shire.

In Chapter 3 of the Anglo-Saxon life of St Guthlac, there is a reference to "the city [*cestre*] which is named Granteceaster." Next, in an Anglo-Norman poem by Gaimar, who lived in the time of William Rufus and narrates his death, we find, at l. 1605, a description of the kingdom of the Southumbrians, which (he says) included Lincolnshire, Rutland, Huntingdonshire, and "la meite de Grantcestre," literally, "the half of Grantchester," where it is obvious that Grantchester is equivalent to Grantchester-shire, i.e. Cambridgeshire. And lastly, as Mr Zachrisson notes on p. 81, the whole matter is settled by Henry of Huntingdon, who has:—"Kair-Grant, id est, Granteceastria, quae modo dicitur Cantebri-gia"; see *Monumenta Historica Britannica*, p. 692. In other words, Caergrant and Granta-caestir and Cantabrigia are merely varying names of one and the same place; as every one knew in the year 1150.

It is curious that this is not really new. Not only did Dr Giles say this in 1875, but it was clearly perceived nearly a century ago. Mr G. Dyer, who wrote a *History of Cambridge* in 1814, refers to the above passage and understands it rightly. Henry of Huntingdon died about 1155, and this is the last we hear of Granteceastria. This old name of Cambridge, and

afterwards of Cambridgeshire, utterly died out at least 150 years before the notion of turning Grantesete into Granceter arose. The reason is obvious enough; for by the ninth century a permanent bridge had been built over the Granta, and the newer name Grantebrycg appears in the A.-S. Chronicle under the date 875, and has lasted ever since. The old name Granta-caestir lingered for a time as a name for the county, but was naturally superseded by the new name Grantabrycg-scir, which occurs as early as 1010¹. Having thus become useless both as a name for the town and a name for the county, it is certain that it would never have been heard of again, but for the curious accident that a village-name which ought to have become Granset (conformably with Somers-set and Dor-set) had its name perverted in the fourteenth century by scribes who confused the suffix *-sete* with the *-ceter* which was frequently written *-cestre* and was known to represent the Latin *castrā*. The modern Grantchester owes its name solely to a false identification and to popular etymology.

I beg leave to append a word of warning. To make a false identification may seem a small matter, but it is absolutely amazing to observe how far from the truth a man may travel, when he is once out of his way. A *History of Cambridgeshire* appeared in 1753, written by Mr E. Carter². He was persuaded that Grantacaestir meant the village of Grantchester, but he saw at the same time that it had once denoted a place of some importance, and rushed to the conclusion that it was once a place of immense size. With his own words staring him in the face—that Grantchester was named from the river Granta—he proceeds to declare that the true sense of Grantchester was the “grand” or great city. “How far (he says) this city extended itself is uncertain; some say it not only reached Grantbridge, now corruptly called Cambridge, but northward beyond the castle....About the year of Christ 700,

¹ *Place-names of Cambs.*, p. 29. Our town-bridge is, in one respect, the most celebrated in England, since it is the only one that has given a name to a shire. Among the shire-names we find no less than five fords, viz. Bedford, Hereford, Hertford, Oxford, and Stafford.

² I quote from the reprint of 1819.

it were a doubt (says a learned author) whether this city and the town of Cambridge were not united, or a part or member to that city; or if it was not one continued city, is a great uncertainty. Yet it may be thought, that while this city flourished, Cambridge had but small reputation; and that after the destruction of this city, Cambridge began to flourish, and grow out of the ruins thereof. That whatever was spoken by ancient historians before, or immediately after the coming of the Saxons, must be intended of this city of Grantchester; but after the ruin thereof, must necessarily be meant of, and attributed to Grantbridge or Cambridge, where now the town and university is seated [*sic*]; though some will have it that the university was first placed in this city, and afterwards translated to Grantbridge." I may add, parenthetically, that the "learned author" whom Carter followed was Dr Caius.

It is easy to reduce all this strange farrago to plain sense by remembering two facts. The first is that Sigeberht, king of the East Angles, had nothing whatever to do with the founding of our university, in spite of the boastful, but mendacious affirmation made in our Commemoration of Benefactors; for there was nothing here that could be called a university till long after the Norman Conquest. The other is that, whatever ruin befell the old Grantchester, there is no doubt that Cambridge flourished in its stead; not because it was "translated" from one place to another, but rather because, like the celebrated phoenix, it arose once more, with renewed vigour, from its own ashes.

The net result is most satisfactory, as the past history of Cambridge now becomes quite clear. It was called Granta-brycg or Granta-bridge in the ninth century, after the bridge had been first built. In the eighth century, however, it was called Grantacaestir; and such must have been its name also when St Ætheldryth founded a monastery at Ely. And this name was merely the English form of the British Caergrant, a name which indicates a Roman origin.

Professor Hughes, in responding to the invitation of the President to propose the vote of thanks to the author for this very interesting Communication, which they had just listened to, said that he had always

appealed to Dr Skeat in such philological subjects, and that it was not the first time that they had had the use and origin of the word Chester brought before them¹.

There were, however, some other questions incidentally raised on which he would ask for further information. If the name of Grantchester owed its present form to a late pedantic assimilation of the Saxon word GRANSET to Grantacaestre the name of Cambridge which was indirectly derived from the Roman form, what was the name of Grantchester in Roman times? There were, he thought, almost as many traces of Roman occupation around Grantchester as there were around Cambridge—was Grantchester then deserted between the times of the Romanised British and the early English occupiers of the site, so that no inhabitants were left to hand on the ancient name? It seemed to him that a correct understanding of the archaeology of Grantchester was of the greatest importance in all attempts to explain the early history of Cambridge, and they were much indebted to Dr Skeat for laying so clearly before them the evidence to be derived from the names.

¹ See *Proc. Camb. Ant. Soc.*, Nov. 26, 1894, p. 26.

Monday, 6 December, 1909.

Dr VENN, Member of the Council, in the Chair.

The following communications were made:

(1) The Rev. Dr STOKES, President, read a paper, illustrated with lantern slides, maps and plans, on

THE OLD MILLS OF CAMBRIDGE¹.

◦ (2) Sir GEORGE FORDHAM read the following papers:

(a) AN ITINERARY OF THE SIXTEENTH CENTURY,
"LE GUIDE DES CHEMINS D'ANGLETERRE," JEAN
BERNARD, PARIS, 1579.

(b) JOHN CARY, ENGRAVER AND MAPSELLER
(fl. 1769-1836).

¹ This paper will be published in the *Proceedings* for Easter Term, 1910.

CAMBRIDGE ANTIQUARIAN SOCIETY.

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