

# PROCEEDINGS

OF THE

## Cambridge Antiquarian Society,

27 OCTOBER, 1913—25 MAY 1914

WITH

### Communications

MADE TO THE SOCIETY

MICHAELMAS TERM, 1913 AND  
LENT AND EASTER TERMS 1914.

No. LXVI.

BEING THE EIGHTEENTH VOLUME.

(TWELFTH VOLUME OF THE NEW SERIES.)



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1915

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# CAMBRIDGE ANTIQUARIAN SOCIETY.

## RECENT PUBLICATIONS.

[*A Complete Catalogue can be had on application.*]

*Proceedings Lent and Easter Terms 1911-12. 7s. 6d. net.*

Lent Term. With Communications, No. LXII. pp. 61—115.  
Plates V—X and other illustrations.

Forster, R. H., M.A., Excavations at Corstopitum (n. p.). James, M. R., Litt.D., F.B.A., Earliest Inventory of Corpus Christi College. Johns, Rev. C. H. W., Litt.D., Debt of Europe to the Ancient East (n. p.). Moir, J. Reid, Palaeolithic Workshop of mid-palaeolithic age at Ipswich (n. p.). Myers, C. S., M.D., Sc.D., Primitive Music (n. p.). Seward, Professor A. C., F.R.S., Churches of Gothland. Walker, Rev. F. G., M.A., Roman Pottery Kilns at Horningsea (to be printed later). Wyatt, A. J., M.A., Anglo-Saxon Riddles (n. p.).

Easter Term. With Communications, No. LXIII. pp. 117—  
200. Plates XI—XIII and other illustrations.

Brindley, H. H., M.A., Fishing boats in a window of 1557 in Auppegard church, Normandy. Duckworth, W. L. H., M.D., Sc.D., Report on Human Bones from Roman and Saxon Site in Grange Road, Cambridge. Duckworth, W. L. H., M.D., Sc.D., Report on some Human remains from Hyning, Westmorland. Gaselee, S., M.A., Relic of Samuel Pepys. Palmer, W. M., M.D., College Dons, County Clergy and University Coachmen. Skeat, Professor, Litt.D., F.B.A., Place-Names of Suffolk (this paper is printed in the Society's 8vo. Publications). Smith, Rev. F., Comparative morphology of Scottish and Irish palaeolithic relics (n. p.). Walker, Rev. F. G., M.A., Roman and Saxon remains from Grange Road, Cambridge. Walker, Rev. F. G., M.A., Palaeolithic Flint Implements from Cambridgeshire. Seventy-second Annual General Meeting. Index to Vol. XVI.

Proceedings, 1912-13. Michaelmas Term. With Communications, No. LXIV. pp. 1—70. Plates I—IV and other illustrations.  
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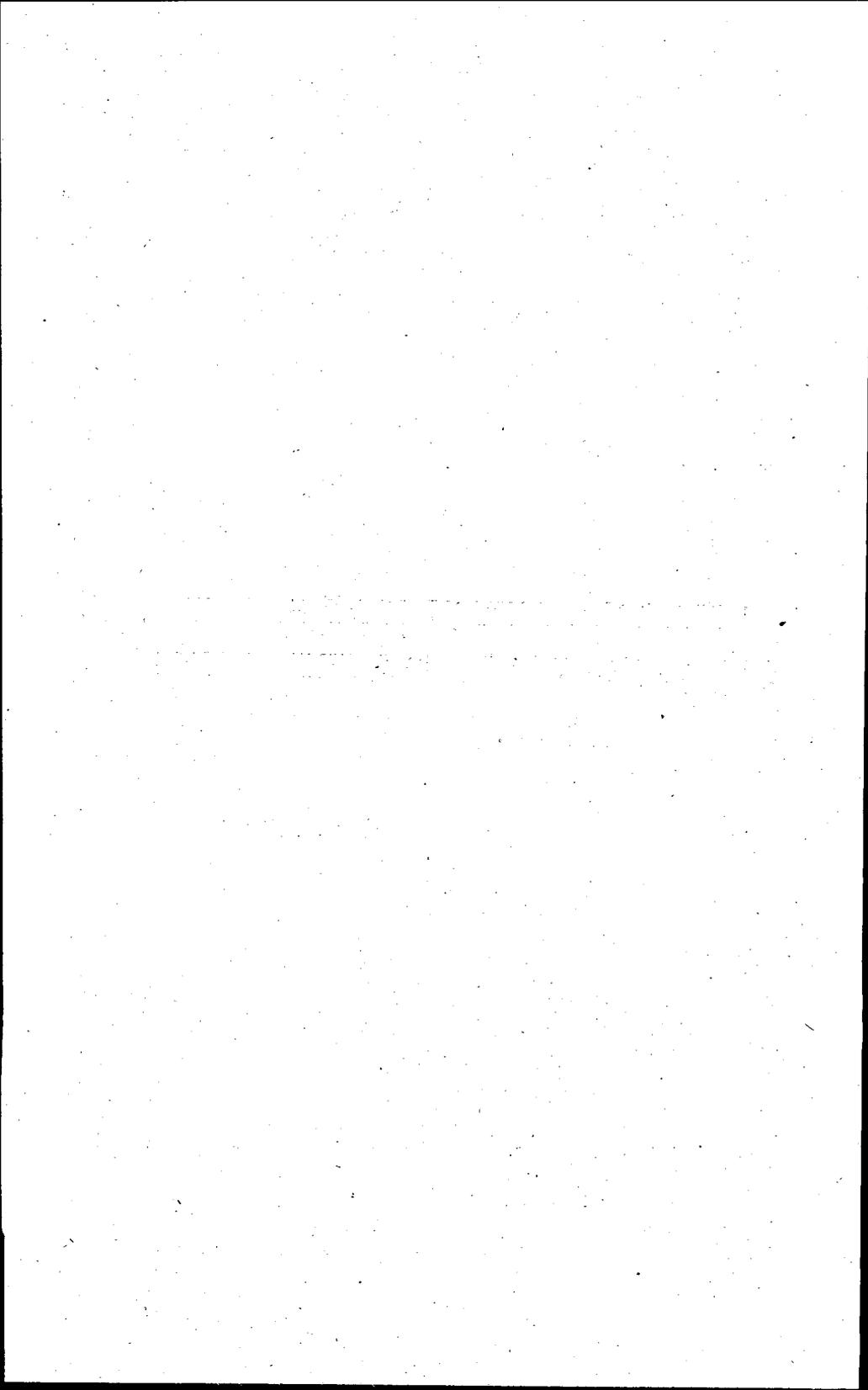
Coulton, G. G., M.A. Some marks and inscriptions in Mediaeval Churches (to be printed later). Hope, W. H. St John, Litt.D., The practical study of Heraldry (n. p.). Landtmann, C., Ph.D., The Religious beliefs and practices of the Kiwai-speaking Papuans (n. p.). Ogilvie, F. F., Recent discoveries at the Great Pyramids (n. p.). Palmer, W. M., M.D., The Reformation of the Cambridge Corporation, July 1662 (to be printed later). Petrie, Prof. W. M. Flinders, D.C.L., F.B.A., A Cemetery of the 1st Dynasty (n. p.). Rivers, W. H. R., M.D., F.R.S., The disappearance of Useful Arts (n. p.). Walker, Rev. F. G., M.A., Roman Pottery Kilns at Horningsea, Cambs. Report for year 1911-12.

Proceedings, 1912-13. Lent and Easter Terms. With Communications, No. LXV. pp. 71—156. Plate V and other illustrations. Price 5s. net.

Abrahams, I., M.A., The Decalogue in Art (n. p.). Bansall, W. H., M.A. (M.B. Edin.), Ely Cathedral (n. p.). Barnes, Very Rev. Monsignor, M.A., The Knights of Malta (n. p.). Benton, Rev. G. Montagu, B.A., A Damask Linen Cloth woven with Sacred Designs and dated 1631. Brindley, H. H., M.A., Mediaeval and Sixteenth Century Ships in English Churches. Bushe-Fox, J. B., Excavations on the Site of the Roman City at Wroxeter in 1912 (n. p.). Duckworth, W. L. H., M.D., Sc.D., Gibraltar in Historic and Prehistoric Times (n. p.). Fletcher, W. M., M.D., Sc.D., More Old Playing Cards found in Cambridge (to be printed later). Forster, R. H., M.A., Excavations at Corstopitum during 1912 (n. p.). Ridgeway, Prof. W. Sc.D., F.B.A., The Image that fell down from Jupiter (n. p.). Valentine-Richards, Rev. A. V., M.A., The History of the Foundress' Cup of Christ's College (n. p.).

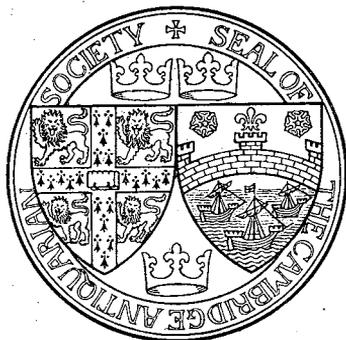
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CAMBRIDGE ANTIQUARIAN SOCIETY  
PROCEEDINGS AND COMMUNICATIONS



PROCEEDINGS  
OF THE  
**Cambridge Antiquarian Society,**  
WITH  
COMMUNICATIONS  
MADE TO THE SOCIETY.

VOL. XVIII.



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VOL. XII.

1913—1914.

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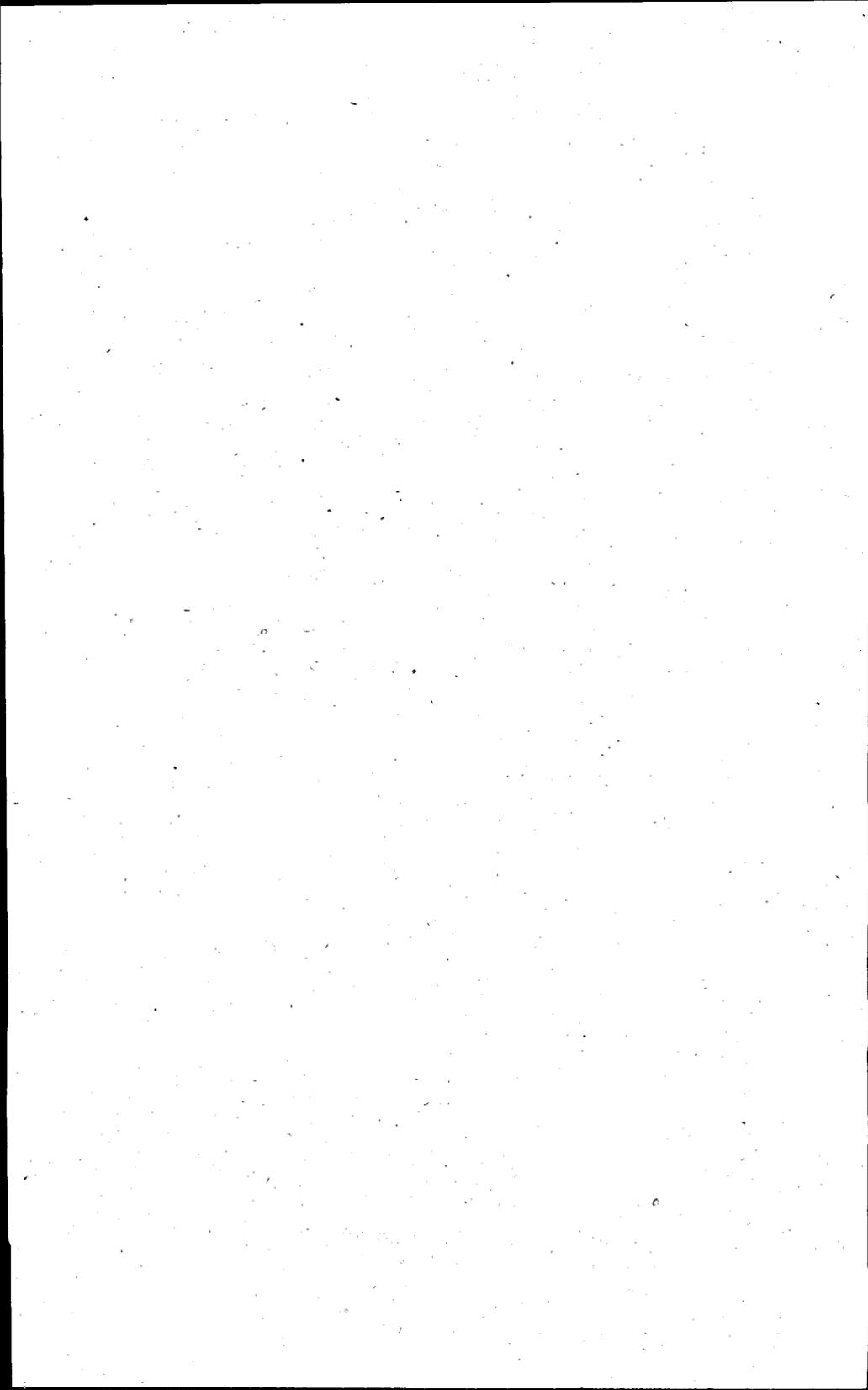
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PROCEEDINGS

OF THE

Cambridge Antiquarian Society ;

WITH

COMMUNICATIONS MADE TO THE SOCIETY

27 OCTOBER, 1913—25 MAY, 1914.

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REPORT OF THE COUNCIL, 1912-13.

The Society has vigorously continued its antiquarian work during the past year.

Nineteen new Members and five Associate Members have been elected, and 33 resignations have been sent in. Three members have been removed by death. Among these was one of the oldest and most active, the Rev. William George Searle, M.A., formerly Fellow of Queens' College. Mr Searle joined the Society on 16th February 1857, was President in 1872-3, and again in 1905-6. He was author of several of the Society's 8vo publications, including "The History of Queens' College" and "The Coins, Tokens, and Medals of the Town, County and University of Cambridge," and contributed numerous papers to the Proceedings. He edited Grace-Book I. He was Honorary Keeper of the Coins in the Fitzwilliam Museum, and promoted Antiquarian research in many other ways.

The Society has suffered a severe loss in the resignation of the Secretaryship by the Rev. F. G. Walker, who has left

Cambridge to undertake the office of Secretary to the Egypt Exploration Fund, and the Council desires to put on record its sense of the great services rendered to the Society by his ability and energy. Mr Walker was appointed Secretary in 1909, and thus held office for four years. Previously to this he had acted as Assistant Secretary for two years. Under his administration the Society attained an unprecedented degree of activity and prosperity. In addition to his Secretarial work he kept a diligent watch on Roman and Prehistoric remains in the Cambridge district, and carried out many successful excavations, accounts of which have appeared in our publications. The Council has elected Mr Walker an Honorary Member of the Society.

On June 1st, 1913, the number of Ordinary Members on the roll of the Society was 400; there were also 36 Associate Members. The number of Honorary Members was 14.

Eighteen meetings were held, at which the average attendance was 83: but this average is reduced to 60 if we omit the lecture by Prof. Flinders Petrie, which as usual attracted an enormous audience—on this occasion eight times the average attendance at the rest of the meetings.

The following communications were made:

- |  |                |
|--|----------------|
| Abrahams, I., "The Decalogue in Art."  | Feb. 10, 1913. |
| Bansall, W. H., "Ely Cathedral."   | Jan. 20, 1913. |
| Barnes, The Very Rev. Monsignor, "The Knights of Malta."                           | Feb. 17, 1913. |
| Brindley, H. H., "Mediaeval and Tudor Ships in English Churches."                  | Jan. 27, 1913. |
| Bushe-Fox, J. B., "Excavations on the site of the Roman City at Wroxeter in 1912." | May 5, 1913.   |
| Coulton, G. G., "Some Marks and Inscriptions in Medieval Churches."                | Dec. 2, 1912.  |
| Duckworth, W. L. H., M.D., D.Sc., "Gibraltar in Historic and Prehistoric Times."   | Feb. 3, 1913.  |
| Fletcher, W. Morley, M.D., "More old Playing Cards found in Cambridge."            | Ap. 28, 1913.  |

- Forster, R. H., "Excavations at Corstopitum during 1912." Feb. 24, 1913.
- Hope, W. H. St John, Litt.D., "The Practical Study of Heraldry." Oct. 28, 1912.
- Landtmann, G., Ph.D. (Helsingfors), "The Religious Beliefs and Practices of the Kiwai-speaking Papuans." Nov. 11, 1912.
- Ogilvie, F. F., "Recent Discoveries at the Great Pyramids." Nov. 18, 1912.
- Palmer, W. M., M.D., "The Reformation of the Corporation of Cambridge, July, 1662." Nov. 25, 1912.
- Petrie, Prof. W. M. Flinders, D.C.L., F.B.A., "A Cemetery of the First Dynasty." Oct. 21, 1912.
- Ridgeway, Prof. W., Sc.D., F.B.A., "The Image that fell down from Jupiter." May 12, 1913.
- Rivers, W. H. R., M.D., F.R.S., "The Disappearance of Useful Arts." Nov. 4, 1912.
- Valentine-Richards, Rev. A. V., "History of The Foundress' Cup at Christ's College." April 28, 1913.

The Society's Collections have been arranged in the first block of the New Museum building, so far as the space at present available will allow. The second block of the building is in process of construction.

The publications of the Society during the year are as under:

Octavo Publication No. XXXVII, "A Calendar of the Feet of Fines for Huntingdonshire," by G. I. Turner, M.A.

Octavo Publication No. XLVI, "Suffolk Place-Names," by the Rev. Prof. W. W. Skeat, Litt.D., F.B.A.

Proceedings and Communications, No. LXIV, Michaelmas Term, 1912.

List of Members, June 1, 1913, with the Laws and a list of publications of the Society.

A very pleasant Excursion was made to Linton on Thursday, 29th of May, 1913. A party of about 70 left Cambridge by the 1.45 train, and was met at Linton by Dr W. M. Palmer, who very kindly acted as leader. Among the places of interest visited were the "Old" and "New" Markets, Ancient

Inns, the Mansion of the Flack family, Linton Task House, the Old Vicarage, the "Millicent Dwelling House," "Chandlers," the Guild-Hall and the Church. Mrs Berney Ficklin very generously provided the party with tea in the beautiful garden of her house, built 1700, on the site of the Priory. (A full account of the Antiquities of Linton, written by Dr Palmer on the occasion of this excursion, was published in the "Cambridge Chronicle" for June 6th, 1913.)

An Excursion to Litlington, attended by about 15 members and friends, was made on Thursday, 12th of June, 1913, for the purpose of inspecting the remains of a Roman Villa lately uncovered by Mr McLaren at the Manor Farm. Several portions of the villa were visible, among which may be mentioned some well-preserved remains of the bath. Litlington Church was also visited. Mr and Mrs McLaren very kindly entertained the party with tea in their garden. On the way home several of the party visited the Cave at Royston.

Mr McLaren intends to continue the excavation of the Villa in the Spring, with assistance of members of this Society. The Council has voted a sum of £10 towards the expenses of the excavation.

The fragment of Barnwell Priory which belongs to the Society was found to be in a dangerous state. The foundations were accordingly made good and the roof renewed, and no further repairs need be expected for many years.

The balance sheet, showing the Society's financial position to December 31, 1912, is published at the end of this Report, which has been unavoidably delayed, owing to the change of Secretary.

Mr F. W. Green attended the Congress of Archaeological Societies on June 26th. An account of the proceedings will be circulated.

The thanks of the Society are presented to Mr Elliot Stock's successor (Mr Robert Scott) for the gift of the *Antiquary*, and to the Society of Architects for the gift of the Society's *Journal*.

## NEW MEMBERS ELECTED 1912-13.

1912. Oct. 14. Rev. John Frank Buxton, M.A.  
 Rev. Magens de Courcy-Ireland, M.A.  
 Lydstone George Norman Langmead.  
 Edward Schroeder Prior, M.A.
- Nov. 4. James Hurst Hayes, M.A.  
 Arthur Edward Clarke.
- Nov. 18. Miss Dorothy Helen Humphery.  
 Arthur Westall Neal.  
 Miss Dorothea Swan.  
 Rev. Henry Aldersey Swann, M.A.  
 Rev. Sir Peile Thompson, Bart., M.A.
- Dec. 2. Gunnar Landtmann, Ph.D. (Helsingfors).  
 George Udney Yule.
1913. Jan. 20. Howard William Cox.  
 Edward Crosby Quiggin, M.A.
- Feb. 3. Miss Mary Ethel Seaton.
- April 28. Rev. Francis Russell Rawes, M.A.  
 Donald Struan Robertson, M.A.
- May 12. Mrs Frances Moore.

## ASSOCIATE MEMBERS 1912-13.

1912. Nov. 18. Mrs Augusta Margaret Swann.  
 Douglas Ralph Overend Priestley.
1913. Jan. 20. Miss Annie Alice Coath.
- May 12. Miss Molly Moore.  
 Edward Lester Roope Linthorne.



CURRENT ACCOUNT, DEPOSIT ACCOUNT.

<i>Receipts.</i>		<i>Payments.</i>	
£ s. d.	£ s. d.	£ s. d.	£ s. d.
To Balance brought forward from 1911	61 13 10	By Balance	114 6 8
„ One Life Member	5 5 0		
„ Transfer from Current Account	45 0 0		
„ Interest allowed by Bank:			
June	1 0 4		
December	1 7 6		
	<u>2 7 10</u>		
	£114 6 8		£114 6 8

EXCAVATION ACCOUNT, CURRENT ACCOUNT

To Balance brought forward from 1911	12 14 4	By Excavations:	23 4 7
„ Subscriptions	17 11 0	Horningssea (Sindall)	6 1 10
		„ (Tams)	
		„ Balance	29 5 7
			<u>19 9</u>
	£30 5 4		£30 5 4

EXCAVATION ACCOUNT, DEPOSIT ACCOUNT.

To Balance brought forward from 1911	15 12 6	By Balance	16 0 0
„ Interest allowed by Bank:			
June	3 9		
December	3 9		
	<u>7 6</u>		
	£16 0 0		£16 0 0

CAPITAL ACCOUNT.

The Capital Account of the Society consists of the following Investments:

- £420 Great Eastern Railway 4 per cent. Debenture Stock.
- £118. 4s. 10d. New Zealand 3½ per cent. Inscribed Stock.

Audited, and found to agree with the Bank Pass Books and Vouchers, shewing Balances as follows:—

	£ s. d.	£ s. d.	£ s. d.
On Current Account			191 16 9
Less Cheques not presented:		201 0 8	
Hattersley	1 0 0		
Clay	8 3 11	9 3 11	
Current Account, Deposit Account			114 6 8
Excavation Account, Current Account			19 9
"    "    Deposit			16 0 0
			<u>£323 3 2</u>

(Signed)

J. B. PEACE  
G. BRIMLEY BOWES } *Auditors.*

24 February 1913.

## ORDINARY MEETINGS.

Monday, 27 October, 1913.

Mr E. H. MINNS, President, in the Chair.

Professor T. MCKENNY HUGHES, M.A., F.R.S., F.S.A., gave a lecture, illustrated with many specimens both natural and worked by man, on

FLINTS.

Printed at page 26.

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Monday, 3 November, 1913.

Mr E. H. MINNS, President, in the Chair.

Professor W. M. FLINDERS PETRIE, F.R.S., F.S.A., F.B.A., gave a lecture, illustrated with lantern slides, on

THE INCOMING OF THE DYNASTIC EGYPTIANS.

Not printed.

---

Monday, 10 November, 1913.

Mr E. H. MINNS, President, in the Chair.

Dr RAFAEL KARSTEN, of the University of Helsingfors, gave a lecture, illustrated with lantern slides, on

SOCIAL CUSTOMS OF THE CHACO INDIANS OF SOUTH AMERICA.

Not printed.

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Monday, 17 November, 1913.

Mr E. H. MINNS, President, in the Chair.

I. ABRAHAMS, M.A., read a paper, illustrated with lantern slides, on

LES NEUF PREUX, OR THE NINE WORTHIES, AS  
ILLUSTRATED IN MEDIAEVAL BOOKS AND PICTURES.

Not printed.

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Monday, 24 November, 1913.

Mr ROBERT BOWES in the Chair.

Professor E. S. PRIOR, M.A., F.S.A., A.R.A., read a paper, illustrated with lantern slides, on

THE STONE OF MEDIAEVAL BUILDING.

Not printed.

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Monday, 26 January, 1914.

Mr E. H. MINNS, President, in the Chair.

ARTHUR GARDNER, M.A., F.S.A., read a paper, illustrated with lantern slides, on

THE SCULPTURE OF THE GOTHIC RENAISSANCE IN  
ITALY.

Not printed.

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Monday, 2 February, 1914.

Mr E. H. MINNS, President, in the Chair.

A. E. LEE, M.A., read a paper, illustrated with lantern slides, on

WROUGHT IRON GATES OF THE 17TH AND 18TH  
CENTURIES IN CAMBRIDGE AND ELSEWHERE.

Not printed.

---

Monday, 9 February, 1914.

Mr E. H. MINNS, President, in the Chair.

GEORGES ROTH (Agrégé de l'Université de Paris) gave a lecture in French, illustrated with lantern slides, on

LE ROI SOLEIL : LA VIE À LA COUR DE LOUIS XIV.

Not printed.

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Monday, 16 February, 1914.

Professor RIDGEWAY, Sc.D., F.B.A., in the Chair.

The Rev. Dom ETHELBERT HORNE, O.S.B., read a paper, illustrated with lantern slides, on

ANCIENT SCRATCH DIALS ON ENGLISH CHURCHES.

Not printed.

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Monday, 23 February, 1914.

Mr E. H. MINNS, President, in the Chair.

The following papers, illustrated with lantern slides, were read:

By H. H. BRINDLEY, M.A., on

SHIPS IN THE CAMBRIDGE "LIFE OF THE CONFESSOR."

Printed at page 67.

By the Rev. G. MONTAGU BENTON, B.A., on

CERTAIN CARVINGS IN SAFFRON WALDEN CHURCH<sup>1</sup>.

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<sup>1</sup> Printed in the *Transactions of the Essex Archaeological Society*, Vol. XIII, Part 4.

Monday, 4 May, 1914.

Mr E. H. MINNS, President, in the Chair.

H. R. HALL, M.A., F.S.A., gave a lecture, illustrated with lantern slides, on

THE DISCOVERY AND EXCAVATION OF THE TEMPLE OF  
MENTU-HOTEP AT DÊR-EL-BAHRI.

Not printed.

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Monday, 11 May, 1914.

Mr E. H. MINNS, President, in the Chair.

J. B. BUSHE-FOX, M.A., gave a lecture, illustrated with lantern slides, on

EXCAVATIONS OF THE ROMAN CITY AT WROXETER  
IN 1913.

Not printed.

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Monday, 18 May, 1914.

Mr E. H. MINNS, President, in the Chair.

Many objects of interest were exhibited and described by several members of the Society. (Open Meeting.)

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SEVENTY-FOURTH ANNUAL GENERAL MEETING.

Monday, 25 May, 1914.

Mr E. H. MINNS, President, in the Chair.

The Officers of the Society were elected for the ensuing year. (See list on next page.)

The Rev. H. P. STOKES, LL.D., F.S.A., read a paper, illustrated with maps, plans, pictures and lantern slides, on

CAMBRIDGE OUTSIDE BARNWELL GATE.

To be printed in the 8vo. Publications.

## OFFICERS ELECTED FOR 1914—1915.

## PRESIDENT.

ELLIS HOVELL MINNS, M.A., Pembroke College.

## VICE-PRESIDENTS.

HAROLD HULME BRINDLEY, M.A., St John's College.

Rev. HENRY PAINE STOKES, LL.D., F.S.A., Corpus Christi College.

WILLIAM RIDGEWAY, Sc.D., F.B.A., Gonville and Caius College,  
*Disney Professor of Archaeology.*

## NEW MEMBERS OF COUNCIL.

ALFRED CORT HADDON, Sc.D., F.R.S., Christ's College.

FREDERICK WILLIAM GREEN, M.A., Jesus College.

WYNFRID LAURENCE HENRY DUCKWORTH, M.D., Sc.D., Jesus  
College.

## TREASURER.

HERBERT FLACK BIRD, 30, *Panton Street.*

## SECRETARY AND EDITOR OF PUBLICATIONS.

FRANK JAMES ALLEN, M.D., St John's College. 8, *Halifax Road.*

## EXCURSION SECRETARY.

MANSFIELD DUVAL FORBES, Clare College.

## MORE OLD PLAYING CARDS FOUND IN CAMBRIDGE.

By W. M. FLETCHER, M.D., Sc.D., Fellow of Trinity College.

(Read April 23rd, 1913.)

In a previous communication to the Society (19 Feb. 1906, Proceedings, No. XLVII, p. 454), I described some Elizabethan or early 17th century playing cards found during repairs to a staircase in the Great Court of Trinity College. More recently the whole of the South range of the Great Court, built from 1594 to 1597, and the Bishop's Hostel, built in 1670, have been repaired internally, and during the removal of the old floors and ceilings many cards and fragments of cards were found, of which some seem to be important enough to deserve permanent record.

In the Bishop's Hostel ten or a dozen cards whole or fragmentary were found in various parts of the building. These were all 18th century or later in date and need not be further described.

In the range of buildings, on the South side of the Great Court, containing five staircases exclusive of the Queen's Tower, more than thirty cards from at least nine different packs were found in whole or part, and of these twenty at least were certainly earlier in date than 1650. It must be presumed that the cards and fragments of cards so rescued from the rough operations of the workmen, after escape from the attacks of mice and of damp, represent only a small proportion of the whole number originally buried in the structure of the buildings, and I find it difficult to explain by what means so many cards should have come to their hiding places. There is no reason to suppose that Trinity College is, or was, more permeated by playing cards than other ancient buildings. I hope to describe in this paper some other very interesting 16th or 17th century cards found lately during the destruction of an old house in

Cambridge. During the recent reconstruction of the Master's Lodge at Christ's College two or three 16th or 17th century cards, unluckily without court cards, were found<sup>1</sup>. In the British Museum, again, there are fifty-three cards from four different packs<sup>2</sup>, described as being "found about 1750 behind some wainscoating in a house at Cambridge undergoing repairs." Perhaps antiquarians in Cambridge have been more diligent than those elsewhere, for it is the fact that at the British Museum these Cambridge cards are the only examples in the whole national collection, of cards used or made in England earlier than the Restoration. These, with those to be described now, or described in my last paper, are so far as I know the only English cards of the Elizabethan era in existence, or at least recorded. All readers of the half dozen or so of books<sup>3</sup> which have been written on the history of playing cards must have been struck by the absence of information about early forms of English cards. Anyone curious to know what the cards were like that Shakespeare might have played with, or the court of James I used in the Trinity Lodge, will refer to these works in vain.

I am inclined to think that the discovery of playing cards is to be expected on the demolition of any ancient house. That the discovery is as a matter of fact relatively so rare, must be due to the almost incredible apathy of the house-breaker in the presence of discovered trifles. The difficulty of persuading, or successfully bribing, a labourer to preserve unusual objects found amongst his rubbish, is very astonishing upon a first experience of it, but its reality will be almost painfully familiar to members of this Society, and I need not stay to illustrate it.

#### I. *Cards from the Great Court of Trinity College.*

In my previous communication I described some cards found in the other, North, side of the Great Court, derived from two packs. I showed that both were of Norman (Rouen) design.

<sup>1</sup> Sayle, "Cambridge Fragments," *The Library*, Oct. 1911, p. 17.

<sup>2</sup> Willshire's *Catalogue*, pp. 116—117, F. 50—F. 53 inclusive.

<sup>3</sup> e.g. those (in English) by Singer (1816), Chatto (1848), Taylor (1865), "Cavendish" (1879), van Rensselaer (1893) and others.

The cards of the first pack represented were closely similar to cards known to have been made by Pierre Maréchal, who worked at Rouen in 1567. Those of the second pack bore the name "Nicolas Beniere," a name famous as that of a family, or a succession, of *cartiers* working at Rouen for a century at least, from 1550 to 1650. And I pointed out at the same time that our English pack of cards, which has been maintained by a very conservative tradition almost unchanged in design from the 16th century to the present day, is directly derived, not from the cards of other French centres of cardmaking, but from those of Rouen. The cards more recently found and now to be described give added support to this view.

(1) Two cards.  $85 \times 46$  mm. Each 4-fold, both in excellent condition. Seven of *Spades*, King of *Diamonds*. The King is cut close at the top edge and so measures  $82 \times 46$  mm. It is very probably, but not certainly, from the same pack as the seven.

These were found on staircase L, M, or N, in 1908. (Plate I, Figure 2.)

This King of *Diamonds* is almost identical in design with that of the sheet of cards by Pierre Maréchal in the Departmental Archives at Rouen, and it belonged no doubt to a pack closely similar to that from which came the King of *Spades* found on the other side of the court and previously described. Maréchal worked at Rouen in 1567. A comparison of this King with the King of *Diamonds* in the modern pack will shew a detailed resemblance, which gains of course in completeness if a single headed pack of a generation ago is available.

(2) Three cards.  $88 \times 54$  mm. 4-fold. King of *Diamonds*, fairly well preserved, bearing the initials I. P. on a plain shield at the left border near the bottom. Queen of *Spades* and four of *Diamonds* both fragmentary. Found on staircase Q in 1910.

These cards in every recognisable point are of the Rouen type. The King is closely similar in design to the smaller King of *Diamonds* just mentioned. The initials I. P. are doubtless those of an unknown Rouen *cartier*, or of an English

imitator. Knaves of this pack, or at least the Knave of Clubs, would almost certainly have borne the full name of their maker, and it is very unlucky that none were found.

(3) Two plain cards of different packs found also on Q staircase, Ten of *Spades* 86 × 45 mm., and Four of *Diamonds* 90 × 57 mm. Doubtless 17th century.

We now come to the most important find of all.

(4) Two cards. 87 × 54 mm. 4-fold. Plain backs. Knave of *Clubs* in very good condition, the maker's name "Stiven Bricket," on a scroll behind the knave's legs. King of *Hearts*, injured and discoloured. From staircase L, M, or N (1908). (Plate I, Figure 1.)

These cards are of the purest Rouen type. The Knave of Clubs, similar in every important feature to the Knave by Nicolas Beniere figured in my previous paper, is almost identical with that of the Pierre Maréchal pack at Rouen. The Knave of Clubs according to French custom (enforced by an ordinance of Louis XIII in 1613) bore the full name and device of the maker. In this Knave we have the full name, but as in that of Pierre Maréchal there is no device, unless the four-petalled rosette between the legs (given also by Maréchal) be one. The chief interest of this card is in the obviously English name of "Stiven Bricket": so far as I am aware this is the first name of an Elizabethan or Jacobean cardmaker made known to us, and perhaps this is the only existing and recorded card of that period which has an English origin. I have spoken previously of the importation of Rouen cards to England in the 16th century, and of the migration of Rouen *cartiers* to England for the avoidance of the Normandy export tax. The astonishingly close similarity in detail of this Knave of Clubs to that of the Beniere or Maréchal cards, shews that Stephen Brickett, as I suppose he would now be called, either closely copied the imported Rouen cards or even acquired a set of Rouen blocks and added his own name. In any case we have here another and decisive demonstration of the Norman origin of English playing cards.

(5) Seven cards. 86—87 mm. × 47—48 mm. 3-fold. Plain backs. All in good condition, but browned. Of *Hearts*, Ace, eight and four; of *Clubs*, Queen, six and four; of *Diamonds*, Knave only. Found on staircase Q, in 1910. (Plate I, Figures 3 and 4.)

These cards are quite unlike those of the type exported from Rouen to England, and I have not yet found any record of similar cards elsewhere. In point of design they might be assigned to the earlier part of the 16th century, though the design may well have lasted for a century or more. These particular cards are presumably not earlier than 1597, the date of the building in which they were buried. I am inclined to think that they represent cards of the Low Countries, brought perhaps to Cambridge by some student from abroad. They may have been made in France and possibly even in Rouen itself, which had a very large export trade and exported, as we shall see, special types of cards to different countries according to the needs or supposed tastes of their customers. Of all cards found hitherto in Trinity College, these are the only ones, without exception, which do not belong to the common type exported from Rouen to England. Whether they came from abroad or whether again they represent a spontaneous English creation, their type is extinct and has no counterpart in the national English pack.

Lastly may be mentioned some cards of later date.

(6) Eight cards. 95 × 64 mm. 4-fold. Plain backs. No court cards. On the back of the two of hearts is written "For Mr William Orde, at Trinity College, Cambridge." Its four corners are cut off and it appears to have been used as a label. Found in room 3, staircase M.

From their size and character these appear to be 18th or early 19th century cards. Their actual approximate date is given by Mr Orde's name—for William Orde was admitted a Pensioner in 1758. It is odd that there should be found another example in the Great Court of a playing card being used as a label or to bear a message. In my earlier papers I described two instances of this, and the facts point to a former



1.



2.



3.



4.

customary use of cards in this way. Mr Orde's friends can hardly have allowed him to mark the back of one card merely to shew his ownership of the pack, yet if the inscribed card only came to him as a label, it is unexplained why seven other cards apparently of the same pack were found with it<sup>1</sup>.

In addition to these a few more modern cards, most being later than 1875, were found in various places.

## II. *Cards from an old house in Cambridge.*

By the kindness of the Rev. F. G. Walker, your Secretary, I am allowed to describe here some early cards found recently upon the demolition of an old house in Cambridge. A workman collected a few of these from among the rubbish as toys for his children; of these some or all were given to another workman for a pot of beer, and from him they came ultimately to Mr Walker.

(5) Fifteen cards. 85 × 46 mm. 4-fold. Backs plain. Several are much damaged. Of Hearts, the King, Queen, Knave, ten, four and three; of Diamonds, the Knave and four; of Clubs, the Queen, nine and four; of Spades, the Queen, ten, nine and ace.

These cards do not call for detailed description, for they belong to a type already represented both in Paris and in London. They are identical in design with the cards preserved in the Bibliothèque Nationale bearing the name of the card-

<sup>1</sup> Lady Dorothy Neville in *Under Five Reigns*, London, Methuen & Co., 1910, pp. 320—321, says that "visiting cards, it is probably not generally known, originated from ordinary playing cards, which were used as such as late as the close of the eighteenth century. A proof of this is that when, some time ago, certain repairs were being made at a house in Dean St, Soho, a few playing cards with names written on the back were found behind a marble chimney piece. One of the cards in question was inscribed 'Isaac Newton' and the house had been the residence of his father-in-law, Hogarth, in one of whose pictures of *Marriage à la mode*—Plate IV—several 'playing card' visiting cards may be seen lying on the floor on the right-hand side of the picture, one of them inscribed, 'Count Basset begs to no how Lady Squander slept last night.' As time went on specially devised visiting cards, with somewhat ornate calligraphy took the place of playing cards, and these in time developed into the small and simple pieces of pasteboard in use today."

maker Charles Dubois, and they are identical also with the cards seen in two cardmaker's sheets, not cut up into separate cards, which are in the British Museum. These two sheets bear the names of the makers, Robert Besniere and Nicholas Besniere respectively (Willshire's *Catalogue*, p. 114, F. 46). Unluckily, of the cards found in Cambridge, the Knaves of Clubs and Spades are lost and therefore no maker's name is preserved. The Besnieres, like Charles Dubois, were Rouen cardmakers, though these cards are entirely dissimilar in all important points of design from what we have already recognised as the type of Rouen cards exported to England, adopted here nationally, and maintained for three centuries in the design of the English pack.

The court cards bear the names of various historical and legendary personages. This circumstance again sharply distinguishes them from our Rouen-English cards, which have never borne names. Since these names are different from those more generally found in French cards they may be given here :

	<i>Kings</i>	<i>Queens</i>	<i>Knaves</i>
<i>Hearts</i>	Jullius Cezar	Helene	Siprien Roman
<i>Spades</i>	David	Bersabee	(maker's name)
<i>Diamonds</i>	Charles	Lucesse	Capitaine Metely
<i>Clubs</i>	Hector	Pentasee	Capitaine Vallante

The Dubois cards at Paris are described by Lacroix<sup>1</sup> as French cards of the beginning of the 16th century, and there is no doubt that their design is characteristic of that time. It does not however follow, in the absence of other evidence, that they are not to be placed many years later, for the long persistence of types is a constant phenomenon in the history of cardmaking. According again to Lacroix<sup>2</sup> "vers l'époque de la bataille de Pavis, et de la captivité du roi, l'influence des modes espagnoles et italiennes gagne le jeu de cartes. On remarque que le valet de pique, qui offre le nom seul du cartier

<sup>1</sup> Paul Lacroix, *Mœurs, Usages et Costumes au Moyen-Age et à l'époque de la Renaissance*, Paris 1874, 4th edit. p. 245. (The King of Spades and Queen of Hearts are figured at p. 255.)

<sup>2</sup> *ibid.* *Les Arts au Moyen Age et à l'époque de la Renaissance*. Paris, 2nd edit. pp. 245, 246. (The Knave of Spades is figured at p. 243.)

ressemble à Charles-Quint" [reference to figure shewing the Knave of Spades by Charles Dubois]. This fancied resemblance seen in a particular card of a particular pack is as untrustworthy as this author's sweeping and quite unsupported statement that Spanish and Italian fashions affected French cardmakers generally in the 16th century. Both may be dismissed as fantasies. In point of fact Charles Dubois was a Rouen card-maker of about 1659, and probably the cards actually figured by Lacroix were made nearly at that time, though with equal probability they represent a definite Rouen tradition of uncertain age, adopted by more than one Rouen *cartier*. These Dubois cards at Paris are reproduced in a coloured plate Vol. I, p. 102 in Mons. D'Allemagne's sumptuous work<sup>1</sup>.

Indeed, as we have seen, the similar cards in sheets at the British Museum bear the Rouen maker's name Besniere. Of the two sheets there, one is printed from the block in black outline only, ready for colouring; the other is printed, coloured, and ready for cutting up into separate cards. The plain sheet is by Robert Besniere, as the scroll on the Knave of Spades shews, and the initials R. B. within a small shield on the Knave of Clubs. This shield is shewn in the Dubois cards, but according to D'Allemagne's illustrations it bears no initials. The coloured sheet similarly bears the name Nicolas Besniere and the initials N. B. Both are assigned by Willshire to the period 1525-50 during which one of the *cartiers* called Robert Besniere worked at Rouen. From the exact similarity of the two sheets, and their close association, they may be supposed to be contemporaneous, and it would seem to be more reasonable to assign them to a period 1640-1650 when we know that both a Robert and a Nicolas Besniere were working simultaneously at Rouen. But so many *cartiers* called Besniere or Beniere worked at Rouen between 1550 and 1650 that a final decision is difficult.

In assigning so early a date as 1525-50 to these cards, Dr Willshire simply follows the lead, and almost the language, of Lacroix. He says confidently that "the influence of Spanish and Italian types may be seen here in the designs" as though

<sup>1</sup> Henry-René D'Allemagne, *Les Cartes à Jouer*. 2 vols. Paris 1906.

such influence had existed and was well known, and he attributes the cards "to the second quarter of the sixteenth century, or to about the time of the battle of Pavia, fought in the early part of 1525, near that town, between the French and the Imperialists: The former were defeated, and their King, François Premier, after fighting with great valour, was obliged at last to surrender himself a prisoner." Dr Willshire does not venture to explain why Rouen cardmakers should choose to commemorate for many years afterwards the French defeat at Pavia, by adopting a southern or an Imperial design, and by placing (as he does not notice) the double headed Imperial eagle on the shield borne by the King of Hearts. The King of Diamonds indeed shews a shield in which the Imperial arms actually impale those of France Modern. We have seen that the Paris Dubois cards are most probably to be placed near 1650, and this is an additional reason for assigning the British Museum Besnieres cards to 1650 as we have done already on other grounds. At all events they are far enough removed from the Battle of Pavia.

D'Allemagne in illustrating and describing the Dubois cards at Paris makes no reference to Willshire's view, or to the British Museum sheets, of whose existence he was probably unaware. He suggests that these cards were a special type made by Rouen cardmakers—and this agrees with the fact that the Besnieres also made them—and that they were probably destined for the Germanic countries, and so accounts for the special nature of the design and the presence of the Imperial eagle. "Au surplus," he says, "les valets eux-mêmes ont une allure tant soit peu germanique qui vient à l'appui de notre supposition<sup>1</sup>." Certainly the "allure" of all these figures cut by French wood-engravers, if we are to depend upon it at all, we may just as easily suppose with D'Allemagne to be Germanic, as with Lacroix to be Spanish or Italian. For my own part I am not able to see that they are other than French.

D'Allemagne's view that this type of Rouen cards was specially manufactured for export to Germanic countries has much stronger support,—which he forgets to claim,—and this

<sup>1</sup> *loc. cit.* p. 102.

is to be found in the existence at Paris of a pack based in every detail upon these Rouen cards, and known to have been made by one Nicolas Bodet, at Brussels, in about 1750. He reproduces these (vol. II, p. 459) and well remarks that they provide a striking instance of the impossibility of dating cards when unsigned, so similar are these to the Dubois cards of at least a century earlier. These Brussels cards bear the same mythical and historical names on their Kings, Queens and Knaves.

It may be right to suppose with D'Allemagne that the Imperial eagle was added to these cards by the Rouen makers in compliment to their customers abroad<sup>1</sup>. But indeed a much simpler explanation may be offered to account for the armorial eagle here. It is borne by the King of Hearts, in these cards named "Julius Caesar," and by the King of Diamonds, called "Charles" for Charlemagne, and to both an Imperial symbol is obviously appropriate. It is curious that it should not have been noticed by D'Allemagne that the sign of the Imperial eagle is by no means confined to this type of exported Rouen cards. It is indeed almost uncommon not to find it in one shape or another borne by a King in French packs made at various centres and in different centuries. It occurs once alone, and twice impaled by France Modern, in the cards at Paris assigned to the end of the 15th century, figured by Merlin<sup>2</sup> on the Kings named Charlemagne and Julius Caesar respectively, and it occurs on part of the dress and elsewhere in at least one of the Kings in no less than nineteen of the packs figured by D'Allemagne, of dates ranging from the 15th to the end of the 18th century, and representing the designs of almost all the chief centres of French cardmaking. Among these the crowned eagle is almost always found somewhere in the design for the King of Hearts, who is almost always named Charles, bears an

<sup>1</sup> Another instance, from a different branch of wood-engraving, of the association of the Austrian and Bourbon arms, also probably for the purposes of international trade, may be seen on the title page of *Eyn neue künstlich moetdelboech* printed by Peter Quentel at Cologne in 1530, where the double headed eagle appears under an imperial crown side by side with the three fleur-de-lis of France Modern under a royal crown.

<sup>2</sup> Merlin, *Origine des Cartes à jouer*. Paris 1869. Plate G.

orb and sceptre, and represents Charlemagne. It is seen occasionally also associated with a King of other suits, and in several instances may be seen in the case of a Knave.

There is abundant evidence of the enormous manufacture of cards at Rouen for export to foreign countries from the 16th century onwards. In 1585 letters patent reduced the duty on exported cards from Rouen for Spain, Flanders, and England, to 8 deniers, on those for Portugal to 6 deniers, and on those for Switzerland to 3 deniers<sup>1</sup>. In 1701 a petition to the Syndics of Commerce by the Rouen *cartiers* speaks of Rouen as exporting more cards than all the other towns of France together, and of the reputation of Rouen cards as well known in Spain, Sweden, Muscovy, Switzerland, Denmark, England, Scotland and above all in Flanders<sup>2</sup>.

As we should expect, the cards made at Rouen for export to foreign countries were adapted in design by the cardmakers to suit the special requirements or tastes of their customers abroad in particular foreign markets. For Spain, the Spanish suit marks of swords, sticks, cups, and coins were added in place of the French marks, though the designs remained strongly Rouennais. D'Allemagne (II, p. 116) figures such a pack made by Jehan Vumier in 1508. To Flanders we have seen that cards like those made by the Benieres and Dubois were sent, and of these the type subsisted unchanged at least long enough to appear in the cards of home manufacture at Brussels as late as 1750. In these cards mythical and historical names were given to the court characters, and the names are different from those common in cards made and used in France. The examples of these found in Cambridge and the subject of these remarks, were brought here, it is most easily supposed, by a student or traveller from the Low Countries, or they may have been re-exported to King's Lynn.

For direct export to England, lastly, another special design was made at Rouen, and this again has been illustrated by the other cards found in Cambridge. These imported cards settled

<sup>1</sup> *Memoriaux de la Cour des Aides de Normandie* 1585 (D'Allemagne, II, p. 118).

<sup>2</sup> D'Allemagne, *loc. cit.*

for us the character of our national pack, and no indigenous English designs, if there have been any, have at any time seriously challenged the supremacy of the Rouen type. For England the Rouen *cartiers* decided—or their customers here decided—that mythical and historical names for the court cards were unsuitable, and we have accordingly never had them. It would be interesting to know what reasons determined this omission, or determined any of the other features of the cards made for England, but this question is one which is not very likely now to be answered.

## FLINTS.

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(Read October 27th, 1913.)

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*Introduction.*

THE interest of this subject arises of course from the use of flint by men of almost every race and age for domestic purposes and for implements of war and the chase.

What I propose to do in this communication is to give a short sketch of the mode of formation and destruction of flint so as to suggest some limits within which we may speculate as to whether certain examples are the work of man or of nature. I do not now discuss the geological age of the deposits in which

they have been found except so far as is necessary to understand the nomenclatures referred to.

So long ago as 1868 I brought the subject before the Soc. Antiq. London by exhibiting a large collection of natural and artificially dressed flints and reading a paper in which I explained the bearing of the collection in these words: "It has often been urged as an objection to our receiving worked flints as evidence of the existence of man, that even those who are familiar with the forms which are to be referred to nature, and with those also which, from their association, are undoubtedly the work of art, are frequently unable to determine whether a given specimen should be referred to the one or the other. The objectors very reasonably ask if only your most skilful archaeologists can form an opinion on the subject, and even they are often obliged to leave it in doubt, may not special combinations of the fortuitous circumstances which produced the doubtful forms, give even those more highly finished weapons about which all archaeologists are agreed? Their difficulty is increased by the occurrence of forms which might be referred entirely to nature, under circumstances where we must in all probability account for their presence by supposing they were brought there by man; as, for instance, in the bone caves, where a large number of relics are found, similar in every respect to those produced by natural causes, but which, from other evidence, we believe were, if not fabricated, at any rate introduced into their present position by man. It becomes, therefore, a point of considerable interest to inquire what are the forms into which flint naturally breaks up, and what the kind of evidence from which we would infer that individual specimens should be referred to human agency.

"Seeing, then, that nature might produce many forms similar to some of those that we feel sure, from other evidence, were fashioned by man, it is interesting to inquire how far those more highly finished forms which, from the evidence of design exhibited by them we now, without hesitation, refer to human agency, were suggested by simpler forms to be referred to fortuitous fracture. We might expect, *a priori*, that any primæval race who would require stone implements would first

use such forms as they found suited to their purpose. Then selecting those which most nearly approached these, they would by a few rude blows, remove irregular projections, and adapt them to their purpose. But it is highly improbable that they would first attack a large block of stone, and chip it into some ideal form not suggested by previous experience.

"The collection which I have made is intended chiefly to illustrate this point."

This paper was published in abstract in the *Proc. Soc. Antiq. London*, Vol. iv. p. 95, and in full in the *Geological and Natural History Repertory*, No. 34, May 1, 1868, p. 126, with illustrations of the mode of formation of the bulb of percussion as part of a double cone<sup>1</sup>, etc. In the same year I exhibited the collection at a Soirée of the Geological Society and then gave it to the Museum of the Geological Survey in Jermyn Street, where it has remained concealed ever since. But I think it throws great light on the question which has again assumed importance, namely the discrimination between naturally and artificially chipped flints.

I do not publish any illustrative figures with this paper, for one reason because it would require too many to enable the reader to follow step by step the line of reasoning which I offer, and also because I exhibit in the Sedgwick Museum the series of specimens upon which I base my arguments, and thirdly and principally because drawings or even photographs of such things as eoliths can rarely be relied upon to convey a true impression of the object represented, and altogether fail to give any idea of the small differences in the condition of the surface, colour, etc., upon which the experienced collector of flints chiefly relies.

Anyone who has tried to make flint implements or has had much to do with flints must have had it forced upon him that some pieces do not lend themselves to the object he aims at producing, and that nature furnishes forms in outline like those known as implements, and also in certain circumstances chips them accidentally in the same way as man does designedly.

<sup>1</sup> For "cone in cone" read "cone on cone," i.e. a cone truncated by another broader cone. The expression cone in cone refers to a different structure.

Those therefore who would carefully criticise the evidence upon which they are asked to admit the existence of man, or of what some call man's precursors, in deposits of a more remote antiquity than has hitherto been assigned to his remains, should make themselves familiar with the natural forms and varieties of flint, whether due to the original mode of formation or produced by fracture or weathering or by both. And as the weathering of flints is largely dependent upon their texture and structure, and these are due to their mode of formation, it will be well to consider this first.

Papers on the making and unmaking of flints by Prof. T. Rupert Jones<sup>1</sup> and Prof. Judd<sup>2</sup> may be consulted with advantage.

#### *Formation of Flint.*

There was once a great controversy as to whether flints were sponges and other organisms replaced by silica as the chalk was being deposited or were due to the replacement at some later time of portions of the chalk which accidentally contained sponges and other fossils. Bowerbank and Toulmin Smith in the desire to support their respective views have left us a valuable collection of observations and illustrations.

If water under pressure will hold more carbonic acid<sup>3</sup> and more rapidly carry off carbonate of lime in the form of a bicarbonate, and water at a high temperature will carry silica in solution, we have a simple explanation of how portions of the chalk can be replaced by flint; for pressure and temperature are greater at the depths to which we know the chalk has been depressed. This is certainly a *vera causa* but not the only one. Why certain parts of the calcareous rock are replaced and not others depends upon local conditions, such as the presence of organic matter, and chemical reactions which

<sup>1</sup> "On Quartz and some other forms of Silica." *Proc. Geol. Assoc.* Vol. iv. p. 349.

<sup>2</sup> "The unmaking of flints." *Ib.* Vol. x. p. 219.

<sup>3</sup> See Report Scientific Exploration of the deep sea in H.M. Surveying Vessel Porcupine 1869 by Carpenter, George Jeffreys and Wyville Thomson. *Proc. R. Soc.* No. 121, 1870, p. 397.

are not always apparent. A useful note on the mode of formation of flint will be found in the paper on the genesis of flint by the Rev. A. Irving<sup>1</sup>.

We learn from a more extensive examination of the rock that the flint was not formed during the deposition of the chalk but long afterwards, when the chalk had been consolidated and uplifted and joints and faults had been produced in it; for some flint, known as tabular flint, occurs by replacement of the chalk on either side of a joint or fault, and these tabular masses retain the mark of the original crack.

Another proof that the chalk was jointed before the formation of the flint is furnished by the specimens (See Pew II., Shelf 1) in which the flint seems to have been fractured and re-cemented. When however we examine some of these more closely we see that the pieces do not fit one another, and we must suppose that there are some pieces missing, for it would be impossible to build up an ordinary tuberous flint with what appear to have been the original pieces. But no such missing pieces are found and the rock never shows evidence of any such a process. What we do see however, when we find a flint of this kind *in place*, is that the divisions between the apparently separate pieces of flint coincide with joints or faults in the chalk, and the silica which has replaced a portion of the chalk was arrested in its progress by these divisional planes and had spread between two joints before it could cross the joint into the adjoining block. An illustration may sometimes be seen in the flags under Trinity Library. In certain states of the weather the damp discolours portions of a flag, but does not for some time get across the joint between the flags so that the edge of the stain is longer on one flag than on the next.

The ordinary tuberous flint occurs along the beds, sometimes uniting to form an irregular but almost continuous layer six to ten inches thick<sup>2</sup>. When a mass of tabular flint happens to traverse tuberous flints the two often coalesce in such a manner as to indicate contemporaneous formation, and some-

<sup>1</sup> Brit. Assoc. Birmingham, 1913. Rept. Section C. *Geol. Mag.*, Oct, 1913.

<sup>2</sup> *Mem. Geol. Survey*, Vol. iv. p. 95.

times the growth of a tuberous flint seems to have started again after a period of cessation of growth<sup>1</sup>.

There is a great deal more flint in any one of the beds in which tuberous flints occur than could be accounted for by the silica present in the organisms found directly connected with it; but, if we suppose that it is derived from other sources such as the sponge spicules scattered through a great thickness of chalk, dissolved out of one part and precipitated in another, there is no great difficulty about it.

This being so, we cannot feel sure that the source of the silica was all within the chalk, or that part of the chalk in which it is now found, for it is on that supposition difficult to explain why the flint is confined to the upper beds and not common to the lower parts which were most deeply depressed. Moreover we find in the lowest Tertiary beds shells wholly replaced by silica, which shows that silica travelled freely in solution in the beds overlying the chalk after its upheaval, jointing and denudation. In other and often much older formations also we find a more or less pure flint to which the name of chert is conventionally given.

There is considerable difference in the forms assumed by the tuberous flints depending upon varieties of structure in the chalk which it has replaced. About Balsham we find a large proportion of small flints fluted and pointed and sometimes twisted. In Kent the layer of massive irregular lumpy flint mentioned above occurs at one definite horizon for miles<sup>2</sup>.

On the coast of Norfolk a very curious formation may be seen on the shore near Sheringham<sup>3</sup>. Infiltration seems to have occurred along a series of vertical holes in such a manner that cylindrical masses of flint are formed one above the other for a considerable depth. These are sometimes as much as four feet in diameter, the walls being from a few inches to a foot in thickness. The idea that they are due to sponges (akin to the existing "Neptune's Cup") is shown to be untenable

<sup>1</sup> Cf. Cayeux, "L'étude micrographique des terrains sédimentaire," p. 362.

<sup>2</sup> *Mem. Geol. Survey*, Vol. iv. p. 95.

<sup>3</sup> Woodward, H. B., *Mem. Geol. Survey*, "Geology of Country round Norwich," 1881. *Mem. Geol. Survey*, "Cretaceous Rocks of Britain," Vol. iii. p. 260.

by their having a hole right through, by some of them consisting of two cylinders one within the other but separated by several inches of chalk, and by none of them showing sponge structure, though of course they contain scattered spicules as does the surrounding chalk. The larger "paramoudras" are almost always broken into pieces, which however lie in their original relative position. An amusing explanation of their name was given to me by Sir Charles Lyell. Dr Buckland observing some of them in a quarry asked the men what they were called, when one of the workmen, willing to oblige a gentleman, invented a sonorous word on the spur of the moment—"We call them paramoudras, Sir." This went into Dr Buckland's notebook, and has been accepted as the name of these objects ever since.

There are also large cup-shaped sponges, of which one is exhibited in Pew II. W, Wall case.

The flint near Cambridge and Brandon is brittle when first extracted, but when it has got rid of the "quarry water" it is black, homogeneous, and tenacious. Further north, as in most of the flint bearing beds of the Norfolk coast, it is mottled grey and white of unequal texture and tenacity. Some flints more readily break into flat, others into curved pieces. Some seem to be irregularly jointed.

This explains the preference for the flint of certain localities among the primeval flint-using folk. They well knew and regularly visited the places where the flints which best suited their purpose could be obtained.

The outlines of the masses of flint in the chalk are in most cases sharply defined, but sometimes, especially in the chalk of the northern parts of East Anglia and in Yorkshire, we find that the silica has only partially replaced the chalk and occurs either in alternations of thin bands or pervades the whole lump interstitially, so that there are parts, especially on the margin of the flint, in which there is much carbonate of lime in the flint which is then of a lighter colour and in the destructive processes of weathering this part most readily becomes changed by the solution of the carbonate of lime in it.

*Fracture of Flint.*

Of no less importance than the building up or formation of flints is their mode of fracture and weathering which is, as stated above, largely dependent upon their texture and structure and this in turn upon their mode of formation.

In the Chalk the flints once formed are comparatively safe except where volcanic action or recent movements have altered, crushed and shattered them, but when they are scattered over the surface, or occur in superficial deposits, they are exposed to all sorts of influences which modify them in form, condition of surface, colour, brittleness, and other characters.

For our present enquiry the fracture of flint is of greatest interest. P<sup>ew</sup> II. W, Shelf 2. If we strike an ordinary homogeneous flint with a hard pebble or round-headed hammer, the two bodies, owing to their elasticity, are compressed and come in contact over a small discoidal surface. The flint, pressed in and shattered, breaks in flakes so thin that the edges may be regarded as leaving a curved surface, which, when the shattered part has been removed by the weather, appears as a shallow basin, while a conical nipple with an apex of  $110^\circ$  often remains under the discoidal area when the action of the weather has not entirely removed this portion also.

As the result of these processes we commonly find on the face of dressed flints, in church walls for instance, a number of small circular bruises with concentric rings or pits and a small nipple, central and symmetrical, or lateral and oblique, according to the direction of the blow. Or it may be the whole of the bruised flint has been flaked and weathered out, leaving a shallow basin-like depression. This is the explanation of the "pitted flints" which we find scattered about the surface of the ground. These flints have received repeated small blows and have been subsequently exposed to the action of the weather.

If, however, the blow be sufficiently strong to break up the flint, and we might regard the action of the hammer as punching out a portion of the flint, then the nipple described above "behaves with" the hammer and drives out a conical mass which if prolonged would have an apex of  $30^\circ$ , so that the

result is a long narrow cone truncated by a short broad cone with a more or less sharply defined shoulder between the two. This shoulder is often repeated in clear steps or obscure undulations all along the length of the narrow cone, producing what is known as conchoidal fracture, and, where circumstances offer a shorter or easier way, the break flies along it, producing an endless variety of recurved and plate-edge forms. Explanatory figures of these were given in the paper quoted above<sup>1</sup>. If the blow be delivered on the margin of a flint a slice only of the cone on cone or double cone is struck off, producing a flake, a part of the truncating cone being seen in the "bulb of percussion," some of the small discoidal surface of contact between the two elastic bodies being generally apparent. The direction in which the blow has been delivered is shown by the outward curve of the conchoidal fracture.

Another mode of fracture of flint is by the expansion and contraction due to changes of temperature and moisture. A common result of this is seen in the crackly surface and hackly fracture of flints which have been baked in lime kilns or in burning weeds.

Where however this process has been less violent, as in the case of flints exposed only to sunshine and frost and rain, we often find a tendency to tear along curved planes so as eventually to loosen lenticular pieces. These however do not show a bulb of percussion and rarely any marked conchoidal fracture, but assume shapes which, when subjected to accidental blows along their edge in the surface soil or on the shore, approach and have probably often suggested forms made and used by man.

#### *The Weathering of Flint.*

The colour and patina produced on the surface of flint by weathering is commonly appealed to as a proof of the genuineness of implements, and is therefore a point of some importance in considering the evidence for the occurrence of human remains in any deposit.

<sup>1</sup> *Geological Repertory*, No. 34, May 1, 1868, pp. 128—131.

Ordinary flint consists of two kinds of silica, one less soluble and the other more soluble. When the more soluble, sometimes from analogy spoken of as the colloidal part, is removed, the remainder, having interstitial spaces left, reflects the light which the homogeneous mass absorbed, and the flint is white as snow and powdery and light as chalk (Pew II. W, Shelf 1). This is well seen in some of the pebbles in the Tertiary beds of Barton and elsewhere, and may be produced artificially by boiling flint in a strong solution of caustic soda<sup>1</sup>.

There are also flints the surface of which is whitened by the reflecting faces due to innumerable small cracks, but neither does that furnish us with a sufficient explanation of the surface condition of the flints which whiten most of our gravelly soils in East Anglia.

There may be a solution of a portion of the exterior, and there may be innumerable small tension cracks, but, though these may prepare the way for other changes, they will not by themselves explain the polished white or yellow film that coats our surface and gravel flints. We must refer the matter back to the chemists and ask them whether there is not some process of hydration which changes the outside of the amorphous glassy flint.

In this connection we may refer also to the wonderful polish induced in some cases on flints in gravel or clay, which makes them shine as if dipped in a thin varnish of transparent chalcedony.

The colour and patina produced by the weathering of the surface of flint is undoubtedly of importance in considering the evidence for the occurrence of human remains in any deposit. In the case of large implements it has much force, but in the case of arrow heads and other small instruments even the white colour and patina may be obtained by making the instrument out of a thin flake from the exterior of a deeply weathered stone and giving the patina by polishing.

<sup>1</sup> Hill, Wm., *Proc. Geol. Assoc.* Vol. xxii. 1911, p. 61.

*Flint Implements.*

Having made ourselves familiar with the forms and textures of flints, arising out of their mode of formation, and studied their natural susceptibilities in respect of fracture and weathering, let us now examine some of those shaped by man for various purposes and endeavour to arrive at some method of discrimination between them and those due to natural agencies.

This is a question to which no one can give a certain answer in every case. There are some in which the experienced eye at once recognises design, and there are some which the trained observer recognises as identical with what are commonly produced by nature, but there remain a number which, as Sir John Evans used to say, must be carried to a suspense account—which may be unfinished instruments rejected as misfits, or the results of combinations of natural accidental operations such as I have been describing. Let us now take a few groups of naturally shaped flints.

*Figure Forms.*

First there are those which are called "Figure Forms." M. Boucher de Perthes<sup>1</sup> was the first to call serious attention to these. He was the man who in 1857 announced the discovery of palaeolithic implements in the valley of the Somme; and it is often said in reply to those who criticise adversely the evidence upon which a more remote antiquity is now claimed for man than had been previously supposed, that the same thing was done in the case of Boucher de Perthes' discoveries. But the rejoinder is obvious. Had Boucher de Perthes not supported a correct theory by bad evidence the acceptance of his views would not have been so long retarded. We cannot in science give a bill of indemnity for false reasoning though it was in support of a suggestion which afterwards turned out to be true.

Boucher de Perthes thought that there were flints which from the accident of their mode of formation and weathering bore a resemblance to figures of the whole or part of animals

<sup>1</sup> *Antiquités Celtiques et Antédiluviennes*, 1847, 1861.

and that some of these, though not wholly fashioned by man, were selected by him and often chipped here and there to improve the likeness.

The small perforated bead-like sponge *Coccinopora globularis*, though a natural form, was supposed by some to have been collected and used in a necklace or armlet from the occurrence of large numbers in a small area. But other fossils, such as "The Devil's Toe-nail," are more abundant in certain gravel pits, owing to that part of the gravel being derived directly or indirectly from the original deposit in which those fossils were most abundant. With the greater chances of finding a resemblance offered by the lower animals we may expect to find some even closer likenesses.

The collection which I exhibited on the occasion of reading this paper is I think a *reductio ad absurdum* of such fancies. The only thing I could do beyond calling your attention to it is to point out some particular cases in which the mode of growth of the stone is obvious. These specimens will be found exhibited in the Sedgwick Museum, Pew II. W, Shelf 1 B, and can be studied at leisure.

There are several flints resembling legs, one a full-sized rather gouty foot. There is a skull slightly distorted and the head and face of a man with a prominent aquiline nose, a small figure of a woman or doll. These are all accidental developments of tuberous flints. Among those resembling the lower animals there is the head of a small dog on a stand, the head being a tuberous flint with which the stand, a piece of tabular flint, has coalesced (see above p. 30). An eagle perched on a rock is produced in the same way. Sheep are represented in one case, even the texture of the wool being given by the pitted surface of the flint (see p. 33).

I found in the Museum a specimen on which some unknown humorist of long ago had written "supposed to be the hardened heart of Pharaoh."

An interesting result of difference of texture in the original chalk is seen in certain banded flints. Bands of colour are produced by infiltration of water either carrying a metallic oxide in solution or altering matter already existing in the rock.

The manner in which some of these effects have been produced in the Northamptonshire ironstone has been discussed by Professor Judd. The "Moughton Whetstones" under Ingleborough offer good examples of the rounding off of the corners so that the central nucleus is spherical or egg-shaped. Flint lends itself very readily to this action, and being sometimes of diverse texture owing to imbedded organisms or differences in the chalk which has been replaced, we find infiltration irregularly arrested or controlled. Where an organism has affected the porosity of the flint, though the organic structure has ceased to be apparent, we sometimes find a portion of the flint banded, with a sharply defined outline to the banded part. Sometimes the banded area is an elongated cylindrical figure with regular curved bands due to infiltration crossing it like the septa in an orthoceras. In these cases we have a figure the outline of which has been determined by an organism, while the conspicuous markings have nothing to do with it but are due to infiltration and chemical action subsequent to the disappearance of the organism.

The bands resulting from these processes have often very different powers of resistance to weathering owing to the mineral changes which have been set up, and we often find on a flint whose outline has been determined by an organism and whose banding has been produced by infiltration, a corrugated surface subsequently produced by weathering and we get an accidental resemblance to the pupa of an insect or even to a trilobite (Pew II., A 6).

But most of the flints which have an accidental resemblance to forms of living creatures or other natural objects are due to the irregular development of the ordinary tuberous flint modified occasionally when it has replaced a part of the chalk affected by joints or irregularities of texture, or is a combination of tabular and tuberous flint.

Yet these, under the title of "Figure Forms," are being again seriously regarded by some as evidence of man's choice, and, when a little chipped as if to improve the likeness, of man's handiwork<sup>1</sup>.

<sup>1</sup> W. M. Newton, *Journ. Brit. Archaeol. Assoc.* March 1913; *Geol. Mag.* Vol. x. Sept. 1913, p. 424.

The criticism of such inferences is based upon the lines of inquiry into the natural modes of formation, modification and destruction of flints which I have endeavoured to lay before you. They are but accidental likenesses such as you find in potatoes, artichokes, the finger-and-toe in roots, in the damp stains on a wall or the forms of clouds. I exhibit (Pew II., A 6) a placid camel's head, a weasel with its upcurved back, a lumpy whale :

HAM. Do you see yonder cloud, that's almost in shape of a camel?

POL. By the mass, and 'tis like a camel, indeed.

HAM. Methinks it is like a weasel.

POL. It is backed like a weasel.

HAM. Or, like a whale?

POL. Very like a whale.

*Hamlet, Act III. Sc. ii.*

There Hamlet and Polonius left their fanciful similitudes in the ever-changing clouds, but nowadays the equally fanciful recognition of shapes of man and beast among the innumerable forms accidentally assumed by flint is again finding favour.

That out of the millions of flints that I have seen I should have been able to pick up one here and one there which has an accidental resemblance to a man or beast or plant is not so strange.

#### *Chipped and Flaked Flints.*

Such-suggestions are interesting and amusing, but they do not lead directly to further inferences of great importance.

Not so the supposed recognition of human work on flints found in the deposits of our high plateaux or taken out of Glacial Deposits or the base of the Red Crag.

On that recognition and at present on that alone we depend for the inference that man or an implement-making precursor of man lived in the remote ages to which those deposits are assigned—for the character and the provenance of the human bones said to have been found in some of them are still matters of controversy. I am prepared to admit that the Suffolk Bone Bed, or Norfolk Stone Bed, i.e. the Basement Bed of the Red Crag, is of much later date than would be implied by bracketing

it with the lower Pliocene beds rather than with the overlying deposits of the encroaching Glacial Sea. But that is unimportant for our present enquiry.

It is improbable *a priori* that man existed when the Red Crag Sea was creeping over the sinking area on which the Suffolk Bone Bed is seen to rest or that he can have dropped implements in Norfolk and Suffolk in Glacial times, whether we believe that sea-borne ice or a Scandinavian ice-sheet was the agent of deposition.

However that may be, with the exception of some unsettled cases of doubtful bones said to have been found in deposits of uncertain age, the whole theory of man's existence in the several ages to which the deposits are assigned depends upon the recognition of design and man's handiwork upon certain flints found in those beds.

If nature produces forms identical with those, *cadit quaestio*. We have only to prove the particular negative to overthrow the universal affirmative that all such flints must have been fashioned by man.

#### *Forgeries.*

Any one who has taken pains to make flint implements himself knows well that the flints of certain areas lend themselves more readily than others to the process of manufacture, and also, if he wants any peculiar forms he soon learns that they are more apt to occur as the result of the weathering of flint of exceptional structure and texture and, may be, of limited distribution. This is the kind of experience which makes one receive with great suspicion the argument that because a considerable number of flints fractured into certain similar forms occur in one deposit or locality they must be referred to a separate race and age.

For instance, the Norfolk flint is very apt to break into curved fragments. Among these adze-shaped, beaked, and rostro-carinate forms are common. What wonder, then, that we should find a few of these in the basement bed of the Red Crag, a deposit which represents the sweepings of the old land surface where this very kind of flint was being broken up.

To enable us to form an opinion as to whether any particular examples can be taken as showing evidence of man's work it is obviously desirable not only to make ourselves familiar with the mode of formation, fracture, and weathering of flint, but also to examine carefully all available examples of the behaviour of flints during the process of trying to fashion one into an implement. For this purpose skilfully made forgeries are especially useful.

There is a very large number of forgeries in public and private museums, and I have thought it worth while to make a collection of such in order if possible to be able to distinguish them from the genuine implement.

The result of my study has been to enable me now to set aside some implements as certainly genuine and some as undoubtedly forgeries, while some do not show sufficiently distinctive characters to enable me to refer them with confidence to one or the other. Many of those exhibited I know to be forgeries because I made them myself (Pew II., Cabinet d) so that, taking that for granted, I may point out some characters in which they differ from ancient implements on which the condition of the surface has been modified by ages of exposure to the action of the weather and other circumstances.

Referring to my remarks (p. 33) on the fracture of flint, it may be remembered that under the influence of blows, a flint breaks and tears into thin flakes which subsequently are removed by weathering. A newly made implement commonly has, still attached to the flint, some of these small flakes which are often more conspicuous in consequence of the film of air beneath them, whereas in the ancient implement these have been weathered away. Also I explained how a kind of patina was produced on the surface of the flint partly by the removal of some of the more soluble portion, so that the minute interstitial spaces thus produced give rise to innumerable small surfaces, and these reflect the light which is absorbed by the unweathered homogeneous and translucent flint.

The hackly fracture near the edge which is due to repeated blows on or near the same spot is if not removed at any rate much modified by time and weather.

These points are observable also on the highly finished small implements which I exhibit. Some of them are by the celebrated Flint Jack of long ago, who was so successful in taking in collectors. Unfortunately when that imposture was detected many people did away with all the doubtful specimens they possessed and thus destroyed what we should now regard as useful evidence. Other specimens now exhibited (Pew II., Cabinet a, b, c) are by a modern far more skilful hand.

Among these you will notice some which appear to have the light colour and patina of the genuine implement. This, as I have already explained, p. 35, is arrived at by selecting a flint, the exterior of which has been whitened by the weather to a considerable depth, or which, as happens sometimes, has been weathered all through. Such a piece when dressed into the form of an arrow head or larger object has already the colour and easily takes the shine of an implement which has been exposed to the weather for ages.

Some of them I once showed to Sir John Evans, who remarked "These would deceive even the elect." The way to test such specimens is to break them, when it can generally be seen whether the alteration is from the exterior of the finished implement or all through. But this of course spoils the specimen.

Thus the value of a collection of forgeries consists not only in the opportunities it gives for studying the characteristics of freshly fractured surfaces and thus educating the eye and hand to detect forgeries offered as genuine, but also in helping one to understand the *modus operandi* and often in explaining why certain specimens proved in the making to be unsuitable for the purpose intended and were thrown away as misfits. It is however only by persistent efforts to manufacture implements oneself that one becomes familiar with the ways of flint and able in most cases to form an opinion as to whether nature can have produced any specimen submitted to us or whether it must be the work of man.

One of the tests appealed to as proof that a given specimen was really obtained from the gravel deposit in which it was said to have been found was the occurrence of incrustations on

its surface. This incrustation was generally carbonate of lime which it does not take long to precipitate and which may be formed long after the deposition of the bed. One of the forgeries exhibited (Pew II., Cabinet) was dipped in the fine calcareous mud washed down from the Norfolk cliff near Cromer, this soon dried and set, and by removing the superfluous part with a brush we got the "incrustation," left here and there.

#### *Recent.*

The most satisfactory way of approaching a question of this kind is to proceed from the clear and better known examples to the more obscure; and, with this in view, I exhibit a collection of recent implements (Pew II., Table Case a). Modern races of low civilization now use or have recently used implements of various material such as flint and obsidian, as among the North American Indians; glass picked up from wrecks, etc., as on the coast of Tierra del Fuego; igneous rocks, generally basic, more rarely acidic; quartzite; and other rocks of less common occurrence, as fibrolite, varieties of jade, etc., etc.

The study of stone implements of comparatively recent date and the mode of manufacture as recorded by travellers cannot fail to throw much light upon the subject before us. It is a common observation that some races are still in their Stone Age, and when we run our eye over a collection of implements from Australasia (See Pew II., Table Case) we cannot help being struck by the similarity between the forms recently in use there and the polished stone implements of Europe. Or, if we turn to the arrow heads from far Japan, North America, or the Yorkshire Wolds, we have the questions forced upon us, are these distributed in this manner by the migration of peoples, or are they only the result of independent development arising out of similar requirements?—questions easier to ask than to answer. They apply to many forms besides the arrow heads, and offer a useful caution to those who find in such a term as "Aurignacian" for instance, an explanation of the wide distribution of some of the simplest forms of flakes and scrapers.

By studying the uses to which such implements are put in recent times, we learn much that will enable us to draw correct inferences as to the prehistoric specimens.

We may consider these various implements as originally intended for either domestic use, the chase, or war.

Probably most of them were first employed for domestic purposes—for digging up roots, cutting wood, breaking nuts and bones and so on. They were used in the chase, as in the case of the polished stone weapon with which the urus was poleaxed in Burwell Fen (Pew I, II, Wall Case, centre). Some, as the arrow heads, were originally made for the chase. Then they were used in war and modified when necessary.

So the English bill, which was an instrument made for chopping wood, became one of the most effective weapons of the English footsoldier.

Finally, when these early stone weapons had been superseded by metal and an ancient stone axe was picked up here and there, its finish and artificial look struck the finder as a thing to be referred to some mysterious origin, and it was thought to have fallen from the sky and was called by the Greeks *κεραύνια λίθος*<sup>1</sup>; by others, thunderbolt or elf shot.

When we come to enquire how these ancient weapons were hafted, we cannot do better than examine a few recent methods and trace them back as far as we can into prehistoric times (Pew II, Drawers). Here we shall find the polished weapon of the South Sea Islander whipped on to a suitable wooden handle with split withies, or further back in the Lake Dwellings the hatchet mounted in a small piece of Red Deer antler and this set in wood, a method which took off the jar and helped to save the handle from splitting. This and the loss of the valuable axe head was an ever present danger which in the Bronze Age was often guarded against by providing the socketed celt or the palstave with a loop by which it could be attached to the handle.

<sup>1</sup> C. W. King, *Archæol. Journ.* Vol. 25, 1868, "On a Ceraunia of Jade converted into a Gnostic talisman."

*Neolithic.*

Through reproductions in recent times of forms which met the requirements of earlier but not always less civilised man, and through the ages when metal was so little known or so scarce that stone still continued in use, we feel our way back into the obscurity of prehistoric times. No one studying this subject should be without Sir Charles Hercules Read's clear and comprehensive *Guide to the Antiquities of the Stone Age in the British Museum*.

Lord Avebury gave us the useful division of Neolithic and Palaeolithic, to which some now add Eolithic for all forms referred to still earlier ages.

These three groups are of course broken up and will be still further subdivided as time goes on. There is much doubt as to when the Neolithic Age began. When the chisel-shaped instrument first superseded the rounded leaf-shaped form of Palaeolithic man, some inventor saw the advantages of an even cutting edge and found out how to produce it by grinding the end of the stone and finally the whole surface of the implement.

Neolithic implements have generally but not always straight sides. They are often rough dressed, but it is not clear whether this is not only in the case of unfinished specimens.

The essential characters of the Palaeolithic stage are that the implements have curved outlines and are never polished.

The most marked difference between a genuine polished implement and a forgery is that the ancient maker ground the surface to reduce the implement to the general shape required and neglected the small depressions, the margin of which therefore cut the ground surface with a sharply defined line, and the grinding did not appear in the depression.

The modern fabricator almost always not only grinds but polishes the surface of the implement and in the process obliterates the sharp edge of the depressions and gives them a polish similar to that of the general surface of the implement. This is more commonly seen in flint forgeries than in those made of flint; but when attention has been drawn to this point and it

has reached the fabricators, they will easily modify their methods so as to escape detection by this character at any rate.

Rough Neolithic implements as well as earlier types often seem to be suggested by common natural forms, as may be seen in my collection in Jermyn Street referred to above p. 28. This is interesting as showing, or at any rate suggesting, that Neolithic man did not derive all his forms by modification of the previous Palaeolithic types but again started fresh from nature. Nor did he when going back to natural forms take the oval, leaf, or tongue-shaped flints which, being fairly common, seem to have suggested to Palaeolithic man the outlines of the strong and serviceable instruments which we find associated with his remains.

With Neolithic man we find the fauna and flora of the Fens, with Palaeolithic man the fauna and flora of the River Terraces; but I am now dealing with the forms and characters of the flints used by him, and not with the contemporary fauna and flora.

#### *Transition from Palaeolithic to Neolithic.*

General Pitt-Rivers<sup>1</sup> pointed out that the flints scattered broadcast over the ancient flint workings of Cissbury, with which the Grimes Graves flints are identical, yielded forms intermediate between Palaeolithic and Neolithic; and Canon Greenwell<sup>2</sup> arrived at the same conclusion with regard to Grimes Graves; while some have gone further and thrown all the Cissbury and Grimes Graves flints into the Palaeolithic. Any one who examines the large collection which I have brought together and arranged in the Sedgwick Museum will I think be convinced that whether or not some of them may be regarded as similar to, and others only slight modifications of, recognised Palaeolithic types, there are also a large number of

<sup>1</sup> Lane-Fox (afterwards Pitt-Rivers), *Journ. Anth. Inst.* Vol. v. p. 357; *Archaeologia*, Vol. XLII. 1869, p. 53. See also Willett, *E. H. ib.* XLV. 1875 (1880), p. 337.

<sup>2</sup> Greenwell, *Ethn. Soc. Lond.* Vol. II. 1870 (1876), p. 419.

distinctly Neolithic forms, though none are polished. I have already discussed these questions more fully elsewhere<sup>1</sup>.

So much doubt has been thrown upon the authenticity of the solitary greenstone implement brought by the workmen to Canon Greenwell that it cannot be admitted as evidence.

My collection may be taken as fairly typical, seeing that I dug with General Pitt-Rivers at Cissbury and have collected on and about Grimes Graves since long before the ground was so much cleared by collectors.

I have also shown elsewhere<sup>2</sup> that there is sometimes found on the borders of the Fens a thin flat implement in which the sides are straighter than in the typical Palaeolithic specimens and the outline approaches a rectangular form (Pew II., Table Case). This I have suggested may belong to an intermediate stage between Palaeolithic and Neolithic implements.

If further investigation should confirm these views, then the great break between the Palaeolithic and Neolithic Ages would disappear.

I have arranged a row of implements from Grimes Graves and another from Cissbury parallel to the Palaeolithic series from St Acheul, etc., and selected them so as to represent as nearly as possible the various typical Palaeolithic forms, from which it will I think be clear either that the tradition of certain types went on or that in the embryology of a flint implement certain forms were always apt to be first flaked out.

#### *Palaeolithic Caves.*

For our present purpose we may conveniently consider the Palaeolithic stage under two heads:

- (1) The older Alluvial or River Drift, and.
- (2) The Troglodytic or Cave Deposits.

Here I would acknowledge the assistance I received in the arrangement of the specimens from Miles Burkitt, B.A., Trin.

<sup>1</sup> *Proc. Camb. Ant. Soc.* R. xxxvi. May 15, 1876, No. xviii.; Vol. III. No. 4, 1879, p. 26. *Cambridge Review*, Vol. 7, Nov. 11, 1885, p. 66.

<sup>2</sup> "Archaeology and Geography of the Fenland," *Journ. Brit. Archaeol. Assoc.* Dec. 1899, p. 10.

Coll., who is now carrying his researches into a wider field, and has recently brought some of the results of his work before us in clear and admirably illustrated lectures.

It seems to be pretty well established that the cave men are generally later than the men of the river terraces and the men whose remains occur on the plateaux<sup>1</sup>. There is no great break between them, and some river drift types are still found in the older caves. Caves have been occupied by man and the lower animals through all time; and cave deposits, except where disturbed by interments, burrowing animals, occasional floods, etc., are generally preserved as originally laid down.

A small series from the Palaeolithic caves of the South of France is exhibited in the Museum, Pew II., Table Case, west side, a, b, c, d.

These were collected before the cave deposits had been worked out, and before so many people had visited the localities with a view to selecting good specimens of what they considered typical of the place and age.

Moreover, they were all collected when travelling with either Sir Charles Lyell, Sir John Evans, or Professor Prestwich, while many other experts of our own country as well as foreigners joined them and gave me the benefit of their advice and guidance. So I claim for this collection some little personal value and interest.

If it be true that the mode of fracture of flints depends upon characters which vary much locally, it is clear that classifications based upon the length of flakes, the curvature of the faces and the colour and condition of the surface must be received with caution. Yet it may well be that certain races in various ages for some reason, perhaps only because the flint which occurred near them lent itself to certain forms, preferred one or other of the different types and took trouble to obtain the material from which they could most easily be produced.

If now we turn to the specimens we shall have an opportunity of forming an opinion as to how far these remarks are justified.

<sup>1</sup> *Arch. Journ.* : *Proc. R. Arch. Inst.* Vol. LXIX, No. 274, 2nd Ser. Vol. XIX. No. 2, pp. 205—214.

Let us take first what has generally been considered the oldest cave deposit, namely that of Le Moustier. The overlap of the older Palaeolithic and the Troglodytic is seen in the Cave of Le Moustier, from which I exhibit implements of the older type, though I must admit that some of them are not above suspicion. (Pew I., Table Case).

Le Moustier is characterised by the occurrence in it of the mammoth and of leaf-shaped implements resembling those of St Acheul, while certain other forms of dressed flint are of such frequent occurrence as to be regarded as distinctive. The most common of these are rough rhomboidal forms with one corner more carefully trimmed for use, and also one known as a side-scraper or *racloir*, i.e. a half-moon-shaped instrument with the curved outer margin chipped to an edge; though both of these occur also in other caves to which a later age has been assigned, as shown in the collection Pew I., Table Case a, b, c, d. The flakes are small and thick and many of them are developed into rough scrapers of the type now referred to as Aurignacian, but a fine core which I obtained myself in the cave of Le Moustier shows that long flakes like those now called Magdalenian have been struck off it.

The disappearance of the mammoth and the appearance of reindeer has been held to coincide with changes in the character of the remains of every-day domestic life of the cave dwellers. Accordingly Laugerie Haute and Laugerie Basse have been pointed out as belonging to a later date. Laugerie Haute and Laugerie Basse seem to have dropped out of notice, and between Le Moustier and La Madeleine are now intercalated Aurignac and Solutré, the former marked by the prevalence of a thick short instrument showing every gradation from a conical core to a scraper; while the Cave of La Madeleine, occurring close by, was regarded as the newest of the four and was supposed to owe its different characters to gradual development of fashion and habits, by lapse of time and change in opportunities. The similarities, however, will be seen to be much greater than the differences and to be far more important; for the recognition of an ever increasing number of stages based on evidence obtained from far separated stations is regarded by many as somewhat

hasty. Our confidence in the judgment of some of the observers is much weakened by the boldness with which they introduce glacial epochs in Palaeolithic or even Neolithic times to explain or accentuate changes in the succession of human events.

M. Commont<sup>1</sup> accepting some of the numerous schemes of subdivision of the Glacial Epoch in our more northern latitudes has the following judicious remarks upon their application to France.

“La vallée de la Somme n'a pas été soumise directement aux influences glaciaires. Mais il n'est pas douteux que la formation des différentes terrasses (en relation elles-mêmes avec les plages soulevées du littoral et dépendant du déplacement du niveau de la mer) est en corrélation étroite avec les époques glaciaires n'ayant été marquées dans notre région que par des périodes plus humides ayant occasionné un ruissellement plus intense et un surcreusement des vallées.”

What he really infers is that there were earth movements and changes of sea-level during the formation of some of the valley deposits of the north of France, and he suggests that the earlier of these may have coincided with glacial conditions in countries much further north.

In the Sedgwick Museum these cave specimens are arranged as in the case of the other Palaeolithic implements, in rows. The top row contains specimens from Le Moustier. The second row specimens from the Laugeries, almost all of which are from Laugerie Haute, as from Laugerie Basse. I obtained hardly anything except bones worked and unworked. In the third row are the objects from La Madeleine; below which are small groups of specimens from other caves.

If now we run our eye, not from right to left along the contents of each separate cave, but from the top to the bottom of each column, we shall see the succession from the older forms of Le Moustier, by the intermediate series of the two Laugeries and Les Eyzies, down to the newer types of La Madeleine; while specimens from Lourdes and Sorde are placed as nearly as possible in their proper order. Space did not allow of the

<sup>1</sup> *Op. cit.* p. 252.

display of the bones and bone instruments alongside of the stone, but they can be studied in adjoining cases.

Of course during the long ages of occupation many caves saw a succession of inhabitants who differed may be in race and habits, while climatal changes were going on and the fauna of the country was changing too, and this has been observed in some caves. It is difficult to explain or realise at all how there could be such differences between different caves. Why did not the Mousterian folk for instance, when they came, occupy and leave their mark in every available cave in the district?

Near by may be seen various collections and specimens which illustrate different parts of the subject. There is a large series (Pew II.) of specimens of local interest. These have been picked up on the surface of the ground or procured from workmen or given to me by friends. They rarely have any association which would enable me to assign an age to them, and therefore they are merely grouped according to their form in order to facilitate comparison.

Among them there are two flint flakes from a tribulum near Smyrna where it was recently seen in use for breaking up the ears of corn and separating the grain.

Sir John Evans in his work on the Stone Implements of Great Britain<sup>1</sup>, that wonderful monument of knowledge and careful research, has discussed the origin of the innumerable flakes used "semper, ubique et ab omnibus," and describes (p. 257) the tribulum as possibly accounting for their presence in such large numbers in certain localities.

The flakes from the Smyrna tribulum are highly polished on several faces—by use as I was told. I have placed with them a small collection of flakes from our own district, but none of ours are polished. If the chipping of the end of a flake producing the form known as a scraper flake was sometimes produced by use, we ought to be able to detect some relation between the character of the chipping and the mode of insertion and use of the flakes.

The wide-spread use of such an implement to-day strengthens

<sup>1</sup> *The Ancient Stone Implements, Weapons and Ornaments of Great Britain*, by John Evans, Lond. Longmans, Ltd. 1872, p. 2.

the probability of its having been common in this country at one time. My friend, Ivor H. N. Evans, B.A., writes to me that "the Dusuns of N. British Borneo...use a sort of bamboo hurdle with projecting spikes of hard wood on the under surface. This implement is used for harrowing, after the wet rice fields have been ploughed up into a slush with a very primitive type of plough. The hurdle is drawn by a buffalo, and a man stands on it exactly as shown in your sketch. I imagine that, with the excellent substitutes of hard palm wood and bamboo abounding, stone flakes were but little used."

From the analogy of the various saw-like instruments made by modern uncivilized races by setting sharks'-teeth or other sharp cutting material along the edge of wooden blades we may conjecture that there were in ancient times many instruments with flint teeth similarly inserted along the edge.

This might also explain the occurrence of numbers of fragments of flint of approximately the same small size in certain localities all over the world. These are commonly called "Pygmy Flints"<sup>1</sup> (Pew II.). Some of them are chipped along the edge, but whether by design or wear it is difficult to conjecture.

There are also two specimens placed side by side in the same box as they were produced out of his pocket by a game-keeper, who informed me that he had picked them up on the hill above Brandon; the one is a small tanged and barbed flint arrow head, the other an almost identical socketed iron arrow head.

#### *Palaeolithic—River Drift.*

Palaeolithic implements have been classified according to their form, and attempts are being made to establish stages based upon these forms and their supposed order of appearance in time; but in many cases these seem to have a topographical rather than a chronological significance.

The form usually regarded as the oldest of this stage is named Strepian from the Belgian locality Strépy, but that

<sup>1</sup> Gatty, Rev. Reginald.

called Chellean from Chelles in the Valley of the Seine about seven miles above Paris and supposed to be of somewhat later age than that of Strépy, is more important for our present purpose, because it is said to occur in the lower beds of St Acheul, near Amiens, respecting which we have the careful work of Professor Commont to refer to.

Attention has only recently been called to the two varieties of the pointed implements (coup de poing or hand-axe) which have always been obtained in abundance from the gravel pits near Amiens.

The one which is named Chellean is more roughly dressed than the other pointed implement which is said to be found only in the newer part of the deposit and named Acheulian after the well-known locality St Acheul.

In the Chellean type the large flakes taken off it produce a coarsely wavy edge, and the broad end is much thicker though still flattish, while it often happens that much of the cortex or original exterior of the flint is left. Yet it tapers to a fairly fine point with concave or reentrant edges, a form which requires some care in the making.

The Acheulian pointed implement is flatter at the broad end and is much more closely flaked so that the edge is more even and is generally straight or bulging.

It is stated that when remains of animals are found associated with these types of implement in the gravel, the older forms, *Elephas antiquus* and *Rhinoceros merckii*, occur with the Chellean, and the newer forms, *Elephas primigenius* and *Rhinoceros tichorhinus*, with the Acheulian.

But many of these inferences depend largely upon *ex post facto* evidence, and it is not easy to pronounce upon such variable objects as these pointed implements which graduate into one another through every shade of difference, nor to say of each sample whether it should be referred by its form to the rougher or to the more finished group.

Some think that the Chellean was not a more ancient form but only a less well-finished tool chipped out sufficiently to serve some rougher purpose; but, whether the views sketched out above be confirmed or not, the name Chellean may be useful

to distinguish a particular form, which, as may be seen in the series exhibited (Pew I., Table Case e, f, g, h), occurs on almost every Palaeolithic site.

The still older Mesvin, Maffle, and Reutel Stages of Dr A. Rutot belong to the Eolithic.

In East Anglia we have not had many opportunities of studying the sequence of deposits in which various forms of dressed flint might, from the analogy of the observations recently made in France, Belgium and elsewhere on the continent, be expected to occur in chronological order. Most of our specimens have been obtained from gravel diggers who do not notice whether the stone was thrown out from the bottom or fell in from higher beds. Many of them are found on the surface or are ploughed up. We have, however, procured a sufficient number to show that certain forms are more prevalent than others in certain localities, and may arrange them according to the classification of such careful observers as Professor Commont, who says, speaking regretfully of what might have been learned had any competent observer watched the early excavations in the Somme Valley, "Ce serait encore un document susceptible de mettre au point cette question si controversée du niveau stratigraphique des différentes industries. Mais pour cela il nous fallait recueillir l'ensemble des silex mis à jour, et non quelques pièces isolées et choisies<sup>1</sup>."

There is no such thing in East Anglia as a river gravel in which the stones have been rolled into pebbles, but there are plenty of examples of subangular gravels heaped up by the sea. Over large areas where the sea has had time to reduce all irregularities the beach deposit is made up entirely of pebbles, but where a pebble occurs in our river gravels it must have been introduced into it as a pebble.

On examining the subangular gravels of the terraces or plateaux the first thing to be noticed is that the whole mass presents a reddish yellow, mottled appearance owing to the different colour of the fragments of which it is made up, except where bands coinciding with water levels have got uniformly stained by iron oxides. On closer examination the flints are

<sup>1</sup> *L'Anthropologie*, T. XIX: 1908, p. 529.

seen to differ in size, mode of fracture, and condition of surface, and do not resemble the flints derived directly from the chalk, such as are seen in any talus from the Chalk-with-flints or such as the unweathered flints which are found in the Boulder Clay. The flints in the gravel are like those seen all over the surface where they are subjected to fracture and alteration by blows, or by hygrometric, thermometric, and chemical change.

The gravels with all their differences of composition and stratigraphical arrangement are in this respect similar down to the bottom; and in fact what we see is that all the yellow subangular gravels are *arrested surface soils*. They are the winnowings of the superficial deposits which have been shifted along from time to time in spate and flood, but have never been rolled in river or sea for a sufficient time to wear out the characters they acquired when exposed on the surface. It was when they were on the surface that the lenticular flakes were torn out; it was when they were exposed that they had the hackly fracture given them. These characters could not be produced in the deep gravel.

In this kind of gravel flint implements are found, and the implements resemble the other flints in all the characters indicating weather action on the surface of the ground. Here we get the answer to a difficult question; namely, why should all those primeval folk drop implements of every variety into a river bed. The answer is,—they did not. The implements were only swept down with all the other surface debris during storms of rain. Some were oftener and further moved and got more of their angles worn down. Some were only just hurried along and buried once for all.

In this connection it is interesting to note that when a flint has been long lying on the surface of the ground the upper exposed side is weathered white, but the lower face which lies on the soil retains the dark colour of the unweathered flint. We have specimens from Egypt in the collection presented by W. Seton-Karr (Pew II.) which illustrate this. They got broken in two and one half fell one way up and the other half the other way up. Now that the two pieces have been

joined together half of the surface on each side is dark and half light.

The importance of this observation for our present enquiry is that when we find a flint of which one side is whitened and the other retains the original dark colour we know that it is a surface flint, even though we find it now buried in gravel.

The surface from which they all came represented an unknown but vast lapse of time, and the whole period of which we are speaking was one of vicissitudes of climate and weather and more or less extensive and important movements of upheaval and depression.

Therefore, while we welcome all tentative classifications founded on the form of flint implements and receive with an open mind all suggested reference to human agency of forms which we had always considered natural, we must bear in mind how very complex the problem is and how many unknown quantities we are dealing with, and, where proof is impossible, carefully criticise and balance probabilities.

I have arranged a series to illustrate the distribution of the various forms of Palaeolithic implements. Pew I., Table Case.

The top row is all from St. Acheul.

The first two in the row, following them from left to right, are flattened pear-shaped. These represent the Chellean.

The third in the row is the flat, pointed implement in which the edges instead of being concave or reentrant are straight or bulging, and the broad end is not so thick as in the Chellean. This is the type known as Acheulian.

The fourth is the oval form of similar thickness at both ends and uniformly dressed all round the edge (*limande*).

The fifth is slightly curved to the small end which is thin and pointed. This type is generally smaller than the third above mentioned which in other respects it most resembles.

The sixth is the humped-back type which seems to connect this series with some Neolithic forms.

The seventh is a large flake generally dressed on one side only. This very obvious suggestion of a useful instrument offered by a simple natural fracture is in one way or another, and in larger or smaller specimens, common throughout every stage.

The second *row* is from Mildenhall. From this locality and the adjoining district I have obtained a very large number—too large to attempt to display—but which can be seen on application by any who are interested in the subject. As I procured these from gravel diggers and found only a few myself, I have no evidence except that offered by the condition of the specimens as to their exact provenance. It will be seen that the selection, arranged in order from left to right, below that from St Acheul, is almost identical with it.

The third *row* is from the South coast of England and exhibits the same varieties of form. Parallel to these are wave worn specimens of which I found several myself below the Barton Cliffs.

The fourth *row* is from India, where though the material is different the forms are the same, and the fifth *row* is from Africa.

If you look along the *rows* from left to right you will be struck by the variety of distinct forms from each locality and then if you run your eye down, along each column from the top to the bottom you will see that these varieties occur on every well-known site.

This inclines one to be sceptical as to chronological sequences based upon such differences unless the varieties have been found each at one horizon only, in clear sections by competent observers and in a sufficient number of localities to justify the inference.

At the end of this series are a number of specimens illustrative of various points referred to. Among the most interesting are a thick pear-shaped implement from Egypt and from St Acheul, and one almost exactly like them which was said to have been found with two others in Dent, i.e. one of the western dales of Yorkshire.

I may here record that I once found at the bottom of a peat bog on Widdle Fell a large unworn piece of flint apparently fresh from the chalk. It was not *in* the peat but on the clayey soil in a channel between the masses of peat. This I left in the museum of the Geological Survey in Jermyn Street.

Note the specimen from Mildenhall of which one side is dark the other light, showing that it has been long exposed on the surface, and beside it is a broken Egyptian specimen of which one half is dark and the other half which lay the other way up has been bleached: also the small selection of flints which had fallen on to the beach from the Solent gravel capping the Barton Cliff, and had got so rolled in a few hundred yards that on some of them the traces of dressing are hardly recognisable.

There are also some specimens with a twist in the edge. It has been suggested by some that this was intended to facilitate the grip of the instrument during use, while others have offered the impossible explanation that it was to give a rotary motion to the spear to which it was attached.

It seems to me that the explanation is that when you are dressing an implement it is easier to strike the proximal than the distal part of the edge, so that unless care be taken to correct this tendency the right near edge gets more chipped.

#### *Eoliths.*

This is a subject which it is exceedingly difficult to treat satisfactorily except by producing the specimens relied upon as evidence and pointing out the characters supposed to indicate human or natural agency.

The examples of reproductions and the actual specimens from which they were drawn, which I have mentioned above (see Pew I., Wall Case), will I think convince anyone of the importance of this caution.

Personal experience and the impressions derived from it count for a great deal, because there are local differences in the original conditions of formation which have produced varieties of form and texture in different localities. An observer who has gained his experience among the great continuous layers of tuberosus-flint in Kent, and the gravels which cover the surface of the ground there, would be surprised, when he got among the small flints of Balsham, which are like drawn out and twisted bits of dough; while anyone who had worked among the black

flints of Brandon, which ancient and modern flint knappers have sought as most suitable for their purpose, would hardly realise that he was dealing with the same material when he struck the light coloured mottled flint of more northern areas and got among the paramoudras of the Norfolk coast.

Such differences tend to produce different forms among the flints exposed to the action of natural forces on the surface of the ground, or washed from the surface to form deposits of gravel.

"Palaeolithic" includes all the earlier Stone Ages about which we have at present any certain knowledge. But there has long been an eager scrutiny among deposits of more remote ages in the hope of discovering some trace of still earlier man or man's precursor. The material most likely to survive the waste of ages is the almost insoluble flint; and accordingly flints that could be easily held in the hand and showed the scars of blows were collected, and, when a number had been obtained in which groups having a certain similarity to one another could be picked out, these were presented as evidence of intelligence in selection and skill in adaptation and accepted as types of ethnological and chronological significance.

These being regarded as the *most ancient stone* implements then known were called Palaeotoliths. But the superlative, afterwards concealed in the abbreviated form Palaeoliths, was felt to impose an undesirable limitation, and Eolith, only a little less precise in this respect, was adopted and now stands, like the newest of the five houses on the Cornish coast each called "The Last House in England."

M. Rutot distinguishes three subdivisions, which he names after the localities where he obtained the specimens on which he bases the classification, namely Mervin, Maffle, and Reutel. He would probably prefer to have them included in the Palaeolithic bracket.

The term Eolith is convenient enough to indicate briefly that we are talking about all prepalaeolithic or less clearly defined stones which have by anybody been attributed to human workmanship.

These Eoliths are on stratigraphical evidence referred to different ages extending over a vast range of time. Some are

from the Plateau gravel and Middle Glacial of Searles Wood, some from the Suffolk Bone Bed. The age of the deposits in which they are found is not however the question with which I propose to deal now, but only the character of the flints which under the head of Eoliths are referred to the agency of man.

One great difficulty meets us in this enquiry and that is that whereas an immense number of these Eoliths are figured you can seldom from a figure form a correct idea of the form or condition of surface of any such object. In this connection I would call your attention to the drawings of some examples from Ightham and the originals from which the drawings were made. There is one Palaeolith among them (see *Pew I., E. Wall Case*).

If Eoliths are, as I believe, only accidental forms naturally produced by the many forces that are always acting upon surface flints, they must be of every age and every stage of formation, and no difficulty arises as to their occurrence in any association. But, if they are definite types of human work belonging to an earlier and presumably less advanced civilization, then the newer Palaeolithic form should not occur in deposits characterised by numerous Eoliths.

It is generally held that Palaeolithic forms never occur in an undisturbed bed with Eoliths, though they are commonly found together on the surface or in superficial, or in disturbed deposits. If they are found together in the same bed, we must accept one of two hypotheses; either the Palaeolithic implement has got into the deposit with the Eoliths by some subsequent disturbance of the deposit, a question which I have recently discussed<sup>1</sup>, or the deposit must be of the age of the newest object found in it. If we are told that a certain deposit is of Roman date from the occurrence of coins of Vespasian, etc., in it, and we afterwards find a coin of Elizabeth in the same undisturbed layer, we must assign the deposit to the later date, and so the stratigraphical evidence for the great antiquity of that lot of specimens fails.

Referring now to the series which I collected on the Plateau above Salisbury in company with Mr Blackmore, whose

<sup>1</sup> *Proc. Roy. Arch. Inst.* Vol. xix. p. 205.

courtesy in helping me to appreciate the evidence I take this opportunity of acknowledging, I must confess that to my eye these specimens are ordinary subangular flints broken by surface accidents of every kind but showing no uniformity in the direction, intensity, or apparent object of the blows. I cannot imagine how flints could lie about on the ground with animals trampling on them and crushing them against one another; with hot sun and moisture and frost contracting, expanding, bursting them, and in more recent times with agricultural implements striking against them and knocking them against one another, without exhibiting traces of the treatment they had received in fractures of every kind especially along the thinner parts and the edges likely from the form of the fragment to be most exposed. Moreover they are too common; they cover the ground and occur all through thick beds of gravel. You can obtain them everywhere, not as you might Palaeolithic or Neolithic implements, one here and one there, except where we are obviously on a station, such as Grimes Graves, where they were made. These Eoliths you can get by the cartload.

You can see similar forms, where fresh flints have been shot in heaps for road making, or if you follow the steam roller or the cart wheel. You find them battered on every shore, stained in every gravel pit and weathered all over the surface of the ground. You could pick up in time a series of almost any form that fancy might suggest. I long ago invited the Philosophical Society of Cambridge to consider the evidence upon which these stones were referred to human agency<sup>1</sup>.

Stone instruments have always been and are still used by man. They differ somewhat, but not so much as one might expect, according to the material available. Obsidian and chert have many of the good qualities of flint. Quartzite and basic igneous rocks are tough and tenacious and have been used for many of the rougher classes of implement, but flint is the most commonly available in our part of the world, and practically what we have first to seek is some method of discrimination between those pieces of flint which owe their

<sup>1</sup> *Camb. Phil. Soc.* March 9, 1896.

character to man's handiwork and those which *may have been* produced by natural agencies. We ask :

(1) Is there evidence of design in the treatment of the specimen ?

(2) Are there no natural operations producing similar results ?

*Flints Naturally Flaked and Chipped on the Norfolk Coast.*

It is not only the outline of the stones which is relied upon as evidence of man's work. It is pointed out that some are chipped in such a way as to suggest or prove that these flints have been dressed with the intention of producing an instrument designed for a definite object, and those who question this inference are challenged to show similar results due to the operations of nature.

I think we can hardly take a more fair example in order to bring this question to the test of observation than we get from an examination of the action of the waves upon the same type of flint upon the corresponding shore at the present day.

I need not dwell long upon the action of the waves in lifting stones and hurling them against the cliffs and shore. Every pebble tells of this; for if you examine a flint pebble closely you will find that it is covered with small bruises, indicated by concentric rings, and showing that it is not only by the push and drag of the waves rubbing them down that they become pebbles, but also by blows hard enough to initiate the bulb of percussion which I have described above.

In storms these pebbles are lifted high into the coil of the wave so as to be often landed on a promenade or ledge of rock, or they are dashed against other stones on the shore. All the stones on a shingly shore show traces of this battering. No matter whether nature or man wields the hammer, the results are the same.

But we are asked what is there on the shore to hold a piece of flint in the same position as that in which a man would hold it so that it may get chipped along one edge while

the rest of the flint is untouched, and then sometimes shift it so as to expose another edge to the waves.

This can be perfectly well seen along the coast, say from Sheringham to Trimmingham in Norfolk.

First of all there is the shore deposit of mixed gravel among which angular flints are seen tightly wedged, and these are found to be chipped along the exposed edge.

Then there is the Cromer Till, a remarkable tough tenacious sandy clay in which there are many angular flints; and these are not infrequently found with an edge exposed, which gets chipped according to the direction of the principal wave action.

Besides that there are beds of sand and gravel cemented hard by iron oxides and full of angular flints. These in like manner are held as in a vice and presented at various angles to the impinging pebbles. I exhibit specimens of all of these (Pew II. B, d), some with the imbedded and chipped flint in place.

In our enquiries into the earlier traces of man's handiwork three questions naturally present themselves:

(1) What is the age of the beds in which the traces are found?

(2) Is the chipping certainly contemporaneous with the formation of the beds in which the flints are found?

(3) Is it undoubtedly the work of man?

1. When such good geologists and experienced observers as Sir Joseph Prestwich and Sir Ray Lankester, to select the two protagonists, agree in the contention that such remains have been found in the Plateaux gravels and the Suffolk Bone Bed respectively, formations to which they have each paid special attention, one must have very strong proofs to the contrary to justify scepticism, and I must say that having had considerable opportunities for forming an opinion on this point, I agree with them as to the age of the beds, only premising that some of those beds have undergone disturbances subsequent to their deposition, which must affect the answer to the second question.

2. This question I have discussed elsewhere<sup>1</sup>, and I came to the conclusion that the occurrence of Palaeolithic implements in the Plateau gravel was due to the infolding of the surface soil and of portions of the underlying deposits owing to the solution of the chalk and chalky drift below them.

3. The question plainly stated is this. Certain flints occur in deposits of earlier date than any in which on evidence other than these flints we have proofs of man's existence. These flints are either suggestive of selection or have a number of pieces knocked off so as to produce what is regarded as a serviceable instrument; and the question is, were these struck off by man or by some natural process?

It is to this that I have chiefly tried to lead up in this communication, referring to collections in the Sedgwick Museum which illustrate the points referred to.

Mr Reid Moir has long been trying to test this question by observation and experiment, and has arrived at the conclusion that nature does not produce the forms in question. I must however say that I have failed to arrive at the same conclusion, but find that identical forms are produced under shore conditions which must have been similar to those under which the Suffolk Bone Bed was laid down, and I have by imitating natural processes, produced similar forms.

#### *Guide to the Collection of Flints, etc.*

Although the exact position of specimens in a museum like ours cannot be adhered to for ever, but must necessarily be modified as additions come in and as new furniture is acquired, still it will I believe assist those who wish to study the subject if I explain the arrangement which I have found it possible to carry out so far.

In Pew II., West Wall Case are the specimens showing the formation of flint; above these the specimens illustrating the fracture of flint and its mode of weathering.

<sup>1</sup> *Proc. Roy. Arch. Inst. Arch. Journ.* Vol. LXIX. No. 274; 2nd Ser. Vol. XIX. No. 2, pp. 205—214.

At the far north end of this wall case are natural forms similar in outline to some referred to human agency and also a series showing natural chipping similar to that on artificially produced implements.

On the middle of the lowest shelf are the natural forms simulating figures of men and the lower animals.

The Eoliths are arranged alongside the human bones in Pew I., East Wall Case. The overflow will be found in the drawers below.

Among these we must look for examples of flint which, though apparently naturally produced so far as outline is concerned, are so chipped along the edge as to suggest that they may have been used by man ("utilisés"). Here also we must seek examples of what is meant by implements which show evidence of chipping at a later time than the first dressing ("retouchés").

The Palaeoliths come next the Eoliths, and are continued in the drawers at the bottom of the West Wall Case in Pew I. Those from the Mildenhall district are placed first because I have been able to make such a large collection from that part of the country. Those from the valley of the Somme come next as being from the first place of note for Palaeolithic implements, and also because everyone engaged in their study must first refer to the admirable work of Professor Compton in that district.

In Pew I. in the east side of the Table Case a selection of Palaeoliths is arranged to show the recurrence of similar forms in most of the typical sites. A succession of well-recognised forms is arranged from left to right, and each *row* represents a different locality; so that running the eye down from top to bottom we see in each *column* the best example from each locality of each type our small collection could furnish. I must here repeat the caution I have already given that these are not obtained *in situ* in a section but procured from workmen, and therefore that I have been guided by form alone in the arrangement of this particular series.

On the other side of the case the series is started again by a row from the Mildenhall district and carried down through rows from other localities.

Where there is a little space to spare I have placed some small series bearing upon the question, as for instance the forms intermediate between Palaeolithic and Neolithic from the Fenland; and on the other side of the case the stumpy pear-shaped implements from Africa, St Acheul, and Yorkshire.

In Pew II., Table Case west side, the flints from the Palaeolithic caves may be studied. They are placed in rows from right to left, each row representing a cave; while similar varieties of form are arranged in columns, so that the recurrence of similar forms in different caves can be seen at a glance (see p. 50).

On the other or east side of the Table Case selections of local specimens are grouped according to form, with, where possible, a geographical arrangement also.

As only two out of the sixteen table cases necessary to complete the furniture in the mahogany gallery have yet been supplied, it is impossible to do justice to the collections; but this sketch will help students and others to consult the series now described. The sculptured bones and casts from the caves are in small glazed oak boxes at the end of the Table Case in Pew II. Recent and Neolithic implements and specimens of doubtful age are arranged in the drawers in the Wall Case, east side of Pew II.

SHIPS IN THE CAMBRIDGE "LIFE OF THE  
CONFESSOR."

By H. H. BRINDLEY, M.A., St John's College.

(Read February 23rd, 1914.)

"La Estoire de Seint Aedward le Rei" (MS. EE. iii. 59) in the University Library, Cambridge, is a work written in Norman-French and dedicated to Eleanor of Provence, Queen of King Henry III. The author is unknown; he was probably someone connected with the Abbey of Westminster. The work consists of 33 parchment leaves written in triple columns, and every page except the first has at its head a miniature, usually in two compartments. In the centre is a rubrick description of the miniature in verse. The miniatures were drawn by the author, and the work may be dated c. 1245. These notes are taken from Luard's "Lives of Edward the Confessor," published in 1858, in which the text and a translation are printed. The miniatures have never been reproduced, with the exception of one which illustrates the "History" in Luard's work. These beautifully drawn pictures are thus not generally known, and I may be permitted to bring to the notice of the Society those which illustrate ships and boats. These are ten in number, but one of them is almost entirely defaced and so is not reproduced.

In previous communications I have laid stress on the great difficulties which face the nautical archaeologist in respect of many features in both hull and rigging of mediaeval ships; nothing in the nature of a treatise on ship building appeared till the close of the sixteenth century, while the representations of ships on seals and coins, in painted glass, carvings and miniatures show how frequently the artists had very scanty or inaccurate knowledge of ships, for they obviously left out much

that is essential to the working of a ship and they also introduced unworkable features. When we have inventories to refer to it is not always possible to understand the items given, and it is often impossible to reconcile an inventory with a vessel of the kind to which it appears to refer. It is only by comparing all the kinds of information available that we can attempt a reconstruction of the craft in use during the Middle Ages, and the outcome is no more than provisional.

We know, however, that down to the early decades of the fifteenth century the "ship" in common use in northern waters was a comparatively simple vessel fitted with one mast bearing a single sail spread by a yard. (Mediterranean craft had their own evolution; in complexity of construction and rigging they were in advance of those of Northern Europe during the Middle Ages.) But there is much that remains uncertain as regards details, and so the ten drawings of "ships" and boats in the Cambridge Life of the Confessor are of value for comparison with other representations of the time. This is more the case because the pictures are executed so carefully that we have some right to conclude that the artist did his best to represent faithfully sailing vessels as known to him. That he drew the figures of crew and passengers much too large is, of course, the common disregard of proportion of his day, when the persons on board were individually important. It is of interest to note that in mediaeval seals bearing ships the figures of the crew as such are nearly always in proportion, but when a personage such as a saint, bishop, or king is embarked he is a giant figure grotesquely over-weighting his vessel.

The ships in the "Life" do not show anything in the features of hull and rigging previously unknown to us from contemporary work, but they form a useful comparison therewith in regard to details, and thus assist us towards conclusions as to thirteenth century practice. In the following notes the miniatures are taken in their order in the MS., the pagination is that of Luard's edition, the numbers in brackets being those written in pencil by Bradshaw, subsequently to Luard's examination. Unless stated otherwise, all other representations quoted for comparison are thirteenth century work.

Min. XI. p. 12 (8 v). St Edward sails for England. In this picture we see the principal personages on board in the positions conventional in a time when the voyagers were drawn much too large in proportion to their vessel: the steersman, who is as usual the only hooded figure, takes up much space aft the mast, and the passenger for whom the voyage is made is in the bows, while the less important members of the ship's company are crowded amidships. Besides other MSS., the painted glass of the cathedrals of the Île de France gives us many examples of this treatment of the subject. St Edward's ship is of the form familiar to us in representations of the century: though the sheer is fair, the extreme crescent-like form of hull left to us by artists of the succeeding two centuries is barely foreshadowed, as the rise is almost confined to actual bow and stern. The construction is presumably clincher, though the outlines of the planks are single and so do not show the overlapping, but in some miniatures this is clearly indicated by shading or double lines. It is in any case unlikely that vessels as early as the thirteenth century were often built carvel fashion, i.e., with the planks flush. It will be noticed in this and in the other vessels in the MS. the planking is not continued to the extreme ends, which are wide timbers uprising from the keel just as in the Gokstad and other "Viking ships" of a century or more earlier. But if we look at the ships in the Bayeux Tapestry and many other examples down to the fourteenth century we see the planking carried to the extreme ends and therefore hiding the bow and stern timbers to which it is bolted. It is only as ships became larger and the bow became well differentiated from the stern that we always see a heavy stem projecting well forward of the planking. But throughout the intermediate centuries examples of the latter do occur, so it is possible that two methods of constructing bow and stern may have been in vogue side by side. The bow-piece in St Edward's ship is carved as a beast's head, an early fashion which seems to be dying out in the thirteenth century, for examples are not very common (Bodleian Apocalypse [Auct. D. 4. 17], Bibliothèque Nationale Apocalypse [MS. Français 403], which are both English work; seals of Bergen, Dublin and

Lübeck; glass of Auxerre Cathedral). The "mike" or crutch at the stern, to which the backstay is made fast, is a fitting of the century. The only later examples I have found of a mike on the actual bow or stern are in the 1341 seal of Calais (but this may have been copied from the seal of 1228), and in MS. Latin No. 19 in the Rylands Library, which is a mid-fourteenth century Flemish Apocalypse (here again the boat was probably copied from an earlier MS.). The present day mike is mounted on a short spar fitted in the deck and its use is not for making ropes fast but keeping a lowered mast in position—such a mike we see in many modern fishing craft, and I have illustrated a sixteenth century mike of the same kind from the glass of Auppegard Church, Normandy, in the Society's *Proceedings*, xv, 1912, p. 118.

I am indebted to Mr Geoffrey Callender of the Royal Naval College, Osborne, for the sketch (here reproduced on Plate VI) of the bow of Jonah's ship in "Becket's Crown" in Canterbury Cathedral. In this the forestay is led to the mike and the fall of the rope is coiled round it. In The Confessor's ship the backstay is led to the mike and there is a suggestion of a coil being hidden by the steersman's hood. The forestay runs to the carved beast's head, the horns of which look as if they might serve as a mike, though it is not clear how the stay is made fast. A coil of rope thrown over bow or stern is another feature of thirteenth century pictures, thus in all three ships in the Bodleian and Paris Apocalypses the stern carries a mike, and in two of them a coil of rope is thrown over it, though this coil is not the fall of a stay as it is in the Canterbury ship. In view of the connection between Canterbury and Sens it is of interest to notice that the coil thrown over bow or stern occurs four times in the six ships in the twelfth and thirteenth century glass of Sens Cathedral. There is, however, nothing that looks like a mike in the Sens pictures. In the Roll of St Guthlac (B.M., MS. Harl. Y. 6) the fore and back stays of the vessel in which the Saint is voyaging to Crowland are made fast round stem and stern pieces by half-hitches, but there is a short loose end instead of a coil. It seems to have been usual to set up the fore and back stays

by taking turns round the head and stern: two of the ships in Min. LVI of the "Life" are possibly examples of this practice.

The bowsprit is of the same form as in the miniatures of St John sailing to Patmos in the Bodleian and Paris Apocalypses and in the seals of Great Yarmouth, San Sebastian and Wismar. These are among the earliest representations of this spar, which seems to have arisen, at least in northern waters, for carrying a grapnel (probably for making fast to an enemy), the slack line from the bowsprit end, which is shown in all the above examples, being perhaps the grapnel outhaul. That the early bowsprit thus had the function of the cathead of later times is, however, an inference only from pictures of the fifteenth century, in which we see the grapnel in position. It is curious, however, that if the bowsprit did begin as a grapnel support, the latter is not represented in the early pictures. Examples of short bowsprits without any ropes leading to them are found in coins, seals and miniatures of the thirteenth and fourteenth centuries, and in the former we find the earliest instances, e.g., the seal of Elbing, 1242, of the inboard end of the bowsprit used instead of the stem as a make-fast for the forestay. The limits of this paper forbid further discussion of the subject, it can merely be said that we do not know why the bowsprit was often so long when its only obvious use was to take the forestay near its foot, and that the line running from its head to the hull shown in the six instances mentioned above remains unexplained. The early bowsprit had nothing to do with carrying canvas, for it was only in the latter half of the fifteenth century that sprit sails came in. In St Edward's ship the thin lines round the stem are continued round the bowsprit and the arrangement is clearly a make-fast for the spar. We see it also in the seal of Great Yarmouth already referred to, and in the two examples we thus have a very early representation of "gammoning."

The steering oar of St Edward's ship is shown on its proper or "starboard" side, and is kept in position by a ring which is almost always represented in thirteenth century pictures. The steersman is handling the oar by a tiller apparently lashed to

its inboard end. In Min. XXII the tiller is passed through the inboard end of the oar.

We see a similar tiller in the Bodleian and Paris Apocalypses (St John sailing to Patmos). The steering oar is much more commonly shown in thirteenth century representations than a rudder, though the latter was certainly fitted sometimes; the ship on the font of Winchester Cathedral, which is Low Countries work of the twelfth century, and the seals of Elbing (1242), Stavoren (1246), Wismar (1256), Harderwijk (1280) and Danzig (1299) show rudders with tiller much as a modern barge carries. When the rudder generally replaced the steering oar we do not know, but the presence of the latter in English and French seals of the thirteenth and fourteenth centuries contrasted with the rudder shown in fifteen Dutch and German seals of the same period suggests that the rudder was in general use in the Baltic and the estuaries of the great North Sea rivers earlier than in the Channel.

The parrell or sliding collar by which the yard is kept home to the mast is shown as a ring of rope, leather or perhaps iron. It is always of this simple form in thirteenth century representations, as may be seen in the glass of Auxerre, Bourges and Sens Cathedrals as well as in English miniatures. It seems that the neckace of wooden "ribs" and "trucks" which formed the more easily running parrell of later times, i.e., certainly before the end of the fifteenth century, had not been devised in the thirteenth. Halyards seem to have puzzled the artist, for he gives us the choice of six ropes, besides the back stay, aft of the mast. The seaman facing the steersman is apparently getting up the sail, evidently not set fully, by hauling on two of these ropes. The other ropes are probably the result of ignorance, and the artist tells that he was himself no seaman by his omission of lifts and braces, though he shows the latter in two subsequent pictures. The sail is laced to the yard as we nearly always see it in contemporary representations.

The other miniatures may be dealt with more briefly than that of St Edward's Voyage, as they show details in the same way.

Min. XII, p. 13 (9). St Edward landing in England is



Min. XI.



Min. XII.



Min. XVIII.



Min. XIX.

received by the Barons: on the right, his Coronation. Only the forward half of the ship is seen. The sail is loosely furled to the yard. The forestay is made fast round the stem-piece instead of, as in Min. XI, to the carved beast's head. Three stays or other ropes lead down from mast to gunwale. The bowsprit of Min. XI is absent, and the gammoning is replaced by an ornamental band round the stem-piece, a fitting which is also seen in Min. XIX. This band is a very common feature of both bow and stern from the Bayeux Tapestry to the pictures of Matthew Paris. In certain cases these bands look like turns of rope, in others they are flat and may be collars of metal or even only ornamental painted bands. It is possible that their common origin was a seizing of rope by which the planking was strengthened where it ran up into the bow and stern pieces, and if this supposition is correct we seem to have the forerunner of the much discussed "stem-ropes" which appear first in the gold noble of King Edward III and recur on the coinage, seals and painted glass to the close of the sixteenth century. The subject has been dealt with at length in *The Mariner's Mirror* (Journal of the Society for Nautical Research) in various issues from 1911 onwards. The hooded steersman is in Min. XII using a quant either to hold up his vessel or to push her off from the beach, as is the pilot in the Bodleian and Paris Apocalypses after the disembarkation at Patmos. We see a similar quant in Min. XXII and in the hands of Tadwin in the Roll of St Guthlac.

Mins. XVIII, p. 19 (12) and XIX, p. 20 (12 v). The Drowning of the King of Denmark. In the first of the miniatures depicting this event as seen by St Edward in a vision, the King is falling overboard from a small boat by which, as the description says, he was about to board his ship. Of the latter we are shown the stern with its aft or "somercastle." This is the light temporary structure fitted only when the ship was sailing for war, and it is drawn here much as we see it on many seals and in Matthew Paris's pictures: fore and aft castles had not yet become permanent structures built into the hull. In both pictures mikes are shown and on one are slung the knights' shields. In Min. XIX the sail (its braces are shown)

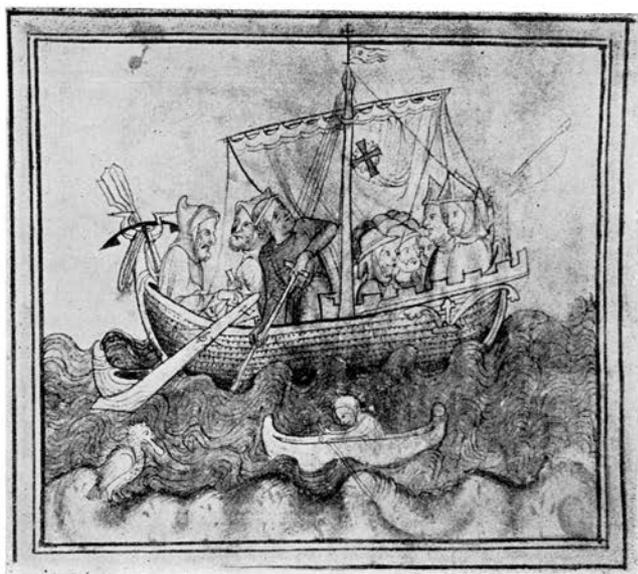
is being got up, and the description tells us that the ship sailed away at once on the loss of the King. In Min. XVIII a priest is saying Mass at Westminster before St Edward (whose figure is not shown in the photograph) and in Min. XIX the latter is seen relating his vision.

Min. XXII, p. 23 (14). The two Bishops sail for Rome. As in Min. XI the principal personages are in the bow, but there is some excuse for Luard's error (*op. cit.*) of stating that they are in the stern. The embattled gunwale in front of the bishops suggests an aft-castle, while the other end of the vessel is bowlike, but the bowsprit, the action of the man with the quant and the steersman and his oar show which end is which. We again see a stern mike, and it is this time used to carry the stern anchor, its cable, and a bundle of what seem to be spears. The ornament under the bow is very curious. The forestay leads to the stem head but no backstay is shown. The details of the mast, yard and sail are much as in Min. XI and XIX, braces are shown.

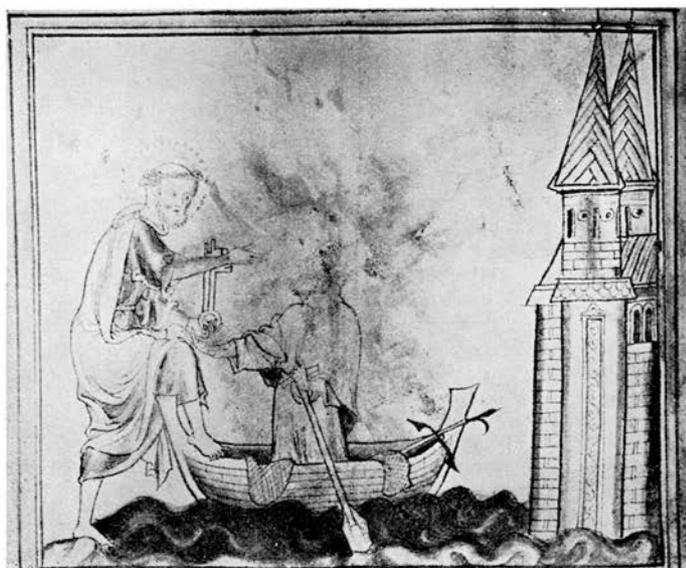
The man vigorously rowing a small boat reminds us so much of the seaman in a boat who is getting up the anchor of St John's ship in the Bodleian and Paris Apocalypses that this part of the picture may well be a copy or the original of the other. A curious error in the Bishops picture is the omission of half a second small boat just on the further side of the steering oar.

Min. XXIX, p. 30 (17 v): St Peter embarks in the fisherman's boat to cross the Thames to Westminster (the fisherman is defaced). Min. XXX, p. 31 (18): this is quite defaced and is not reproduced here; Luard regards it as St Peter landing from the boat and the consecration of the Church. Min. XXXI, p. 32 (18 v): St Peter again in the boat, the fisherman (again defaced) hauling in his net; the Church; and the fisherman presenting the salmon to Bishop Mellitus.

In these three miniatures a small mastless boat is drawn, her build is that usually drawn in the thirteenth century when a "cock" is represented, and it will be noticed that it is really the "ship's" hull reduced. The probability is that in this age there was no great difference in general design between

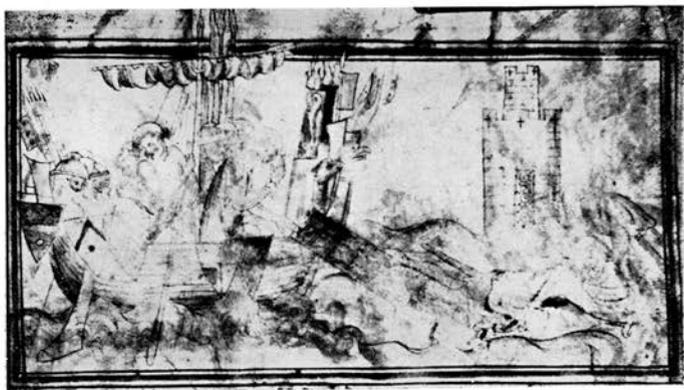


Min. XXII.

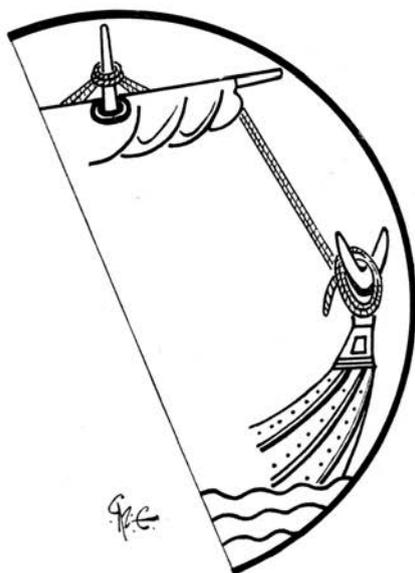


Min. XXIX.





Min. LXII.



Jonah's Ship, glass in "Becket's Crown," Canterbury Cathedral,  
early XIII. century.

large and small craft, though we must take into account the possible tendency of an artist ignorant of ships to make matters easier by magnifying a "cock" when he wished to show us a "ship." At the same time we have to remember that in the thirteenth century there were several, if not many, well defined types of vessels, but no attempt can be made in these notes to decide what kind of "ship" the larger craft in the "Life" should be called. We find in the MSS. of the time "cogs," "round ships," "long ships," "sornakes" and many other designations, but though we gather from the context something of their respective uses we are almost wholly in the dark with regard to the differences of build and rig which distinguished them. The conventional disproportion of passengers to their ship forbids any assistance from the artist towards an interpretation of contemporary records. We must be content to call the larger craft in St Edward's Life "ships." The oars of such a boat as the Thorney fisherman's no doubt worked in thole pins and these are shown in the Paris Apocalypse. The spiked fishing gaff alongside the anchor is interesting.

Min. LVI, p. 57 (31). The landing of Tosti and the defeat of the Earl of Northumberland. This picture shows very little of Tosti's ships. We see the forestay of the nearest one made fast to the stem, and the next has a hook over the gunwale by which apparently the landing ladder is kept in position.

Min. LXII, p. 63 (34). The Landing of William of Normandy and his stumbling. Unfortunately the picture is almost destroyed, and it is reproduced here only because it must originally have shown the fleet in some detail. The nearest ship is apparently of the usual pattern, and at least three others lie behind her; two of them have their bows carved as animal's heads, and we can see "stem-bands" on all. The usual parrell is shown in front of the furled sail of the nearest ship. It will be noticed that though the artist has drawn all his ships alike, he has distinguished between their purposes by surmounting St Edward's and the Bishops' ships' mastheads with a cross and those of Tosti's and Count William's ships with a spear head, while he has painted a cross on the sail of the Bishops' ship.

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