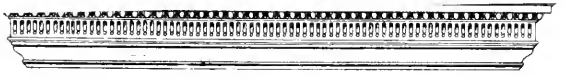

THE

ESSEX NATURALIST:

BEING THE

Journal of the Essex Field Club.

EDITED BY

WILLIAM COLE,

Honorary Secretary.

VOLUME VIII.

JANUARY—DECEMBER, 1894.

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PUBLISHED BY THE CLUB, BUCKHURST HILL, ESSEX
E. DURRANT & CO., 95, HIGH STREET, CHELMSFORD.

1894.

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I come to the wild.
Fold closely, O Nature!
Thine arms round thy child.

To thee only God granted
A heart ever new—
To all always open,
To all always true."

MATTHEW ARNOLD: Switzerland."

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In a Letter to "The Times," August, 31st, 1891.

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NOS. 1-5, VOL. VIII.] *Price 3s.* [JAN.-MAY, 1894.

The Essex Naturalist:

BEING THE

JOURNAL

OF THE

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[Title and Index to Vol. VII. will be published with next part.]

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PUBLISHED BY THE CLUB, BUCKHURST HILL, ESSEX.

E. DURRANT & CO., 90, HIGH STREET, CHELMSFORD.

Ent. Stationers' Hall.] Published June, 1894.

COMMUNICATIONS *and* ADVERTISEMENTS *should be addressed :—*

The Editor of "THE ESSEX NATURALIST,"

7, Knighton Villas, Buckhurst Hill, Essex

THE ESSEX FIELD CLUB.

(*Founded January 10th*, 1880.)

With which is incorporated "The Essex and Chelmsford Museum," established October 7th, 1828.]

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THE

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Journal of the Essex Field Club

FOR 1894.

A PROVISIONAL LIST OF THE MARINE ALGÆ OF ESSEX, AND THE ADJACENT COAST.

By E. A. L. BATTERS, B.A., LL.B., F.L.S.

THE low flat sea board of the county of Essex, deeply indented by shallow creeks, and extending for a distance of close on one hundred miles,[1] is fringed with desolate expanses of mud, alternating with stretches of shifting sand or loose shingle, where few, if any, natural rocks capable of affording a stable anchorage for Algæ are to be seen, even at the times of lowest tides. Few sea-weeds, and these of the commoner kinds, were all that could be expected to grow on such a coast, and consequently botanists have bestowed little or no attention on the Marine Algæ of the county. As was to be expected, therefore, the sources from which a list of the Marine Algæ of Essex could be compiled are "few and far between." The Rev. John Ray, in his "Synopsis Methodica Stirpium Britannicarum," 1690, mentions a few Essex Algæ, but it is not always easy to recognise from Ray's names the plants he intended to describe, and in many cases it was only by an examination of the collection of plants ("Herb. Sloane," vol. cxiv., in Brit. Mus.), made by Ray's contemporary, the Rev. Adam Buddle, and which had been named from the third edition of the "Synopsis," that I was able to identify some of the species. A few—very few—Essex localities in Greville's "Algæ Britannicæ," Harvey's "Phycologia Britannica," and Grattann's

1 As the crow flies the distance is hardly more than forty miles, but by following the indentations of the coast this is considerably more than doubled.

"British Marine Algæ," added to the notes scattered through the volumes of THE ESSEX NATURALIST, complete the published records of the Marine Algæ of the county.

The present list is principally based on the important collection of "Seaweeds of Harwich and District," gathered by Mr. G. P. Hope, and presented by him to the Museum of the Essex Field Club. This valuable collection contains about 230 separate specimens belonging to 59 genera and 81 species. The specimens are well preserved and neatly mounted on cardboard, and in most cases are accompanied by drawings of magnified portions of the frond or fructification. It is well to note, however, that most of these drawings have been copied from Harvey's "Phycologia Britannica," and may, in some cases I fear, be a source of confusion: for instance, the drawing accompanying the specimen of *Ceramium flabelligerum* is taken from Harvey's figures of *Ceramium acanthonotum* ("Phyc. Brit.," plate cxl., figs. 3 and 4), the species to which Mr. Hope supposed his plant to belong. Where the drawings have been made from the plants themselves they are useful in identifying the species, besides being ornamental, and add greatly to the interest of the collection.

In addition to the Hope collection, I have examined a collection of Marine Algæ from Felixstowe,[2] made by Mr. G. Massee, who very kindly placed them at my disposal. I have also examined the Herbarium of the British Museum for Essex localities, but without much success. I have to thank Mr. T. H. Buffham for kindly furnishing me with the Essex localities from his collection, and Mr. W. Cole for placing his Essex specimens at my disposal. A careful search through my own Herbarium and note-books has resulted in adding between twenty and thirty species, not included in any of the other collections, to the list of Essex Marine Algæ.

So far as is known at present, the marine flora of Essex consists of 152 species, included in 93 genera, and is marked as much by the absence of many species common and abundant elsewhere as by the presence of a few which are very rarely met with on the shores of our islands. As examples of the latter class, *Ectocarpus erectus*, *Phyllitis filiformis*, *Scinaia furcellata*, and *Grateloupia filicina* may be mentioned, while as examples of the former *Calothrix confervicola*,

2 The records of localities of Essex Marine Algæ are so scanty, and Essex specimens in public Herbaria so few, that I have thought it advisable to include in this list species which grow a short distance beyond the boundaries of the county of Essex, more especially those found at Felixstowe, which is at least within the jurisdiction of the Harwich Harbour Board. This, I think, is allowable in dealing with a marine flora of a county where most of the Algæ found are water-borne.

Desmarestia aculeata, *Dictyosiphon foeniculaceus*, *D. hippuroides*, *Asperococcus echinatus*, *Sphacelaria cirrhosa*, *Chordaria flagelliformis*, *Leathesia difformis*, *Laminaria digitata*, *Saccorhiza bulbosa*, *Pelvetia canaliculata*, *Chantransia secundata*, *Gelidium crinale*, *Gigartina mamillosa*, *Callophyllis laciniata*, *Lomentaria clavellosa*, *Nitophyllum punctatum*, *Ceramium echionotum*, *C. acanthonotum*, *C. ciliatum*, and *Polysiphonia fastigiata*, all of them common species, are "conspicuous by their absence" from the flora of Essex. For a moment we might be tempted to think that some at least of these species had been passed by as too common to deserve notice, but when on comparing the Essex marine flora with that of the neighbouring counties of Suffolk and Norfolk we find very many of the same species also missing there, one hardly knows what to think. *Dictyosiphon foeniculaceus*, *D. hippuroides*, *Leathesia difformis*, *Laminaria digitata*, *Saccorhiza bulbosa*, *Gigartina mamillosa*, *Ceramium acanthonotum*, *C. echionotum*, and *C. ciliatum* have not been recorded from the coasts of either Suffolk or Norfolk, while *Pelvetia canaliculata* has been "once found by Mr. Wigg" on the coast of Norfolk, according to Paget,[3] and the only Norfolk locality for *Polysiphonia fastigiata* rests on the very doubtful authority of the Rev. G. Munford.[4]

It is not easy to account for the absence of these species, some of which, *e.g.*, *Laminaria digitata*[5] and *Saccorhiza bulbosa*, are too large to escape the observation of even the most careless collector. Most probably the absence of fixed rocks large enough to form a safe anchorage for their roots accounts for the absence of the large sea-weeds, but one would surely have thought that *Pelvetia canaliculata* and *Gigartina mamillosa* could have subsisted wherever *Fucus vesiculosus* and *Chondrus crispus* were to be found. The absence, too, of *Sphacelaria cirrhosa*, *Polysiphonia fastigiata*, and *Callophyllis laciniata* appears to me most extraordinary. Of course the large amount of sweet water poured into their estuaries by the Thames, Blackwater, Stour, and Orwell must to a great extent modify the marine flora of the county. There can be no doubt, however, that a careful search would result in the discovery of many of the missing species, and also of a large number of brackish water species not yet recorded from Essex.

The marine flora of Essex is southern in its character, as is shown

3 "Sketch of the Natural History of Yarmouth," 1834.

4 Botany, in White's "History and Directory of Norfolk," 1864.

5 The *Fucus digitatus* mentioned by Goodenough and Woodward (Linn. Trans. iii, p. 155 as occurring at Harwich before 1795 was probably a form of *L. saccharina*.

by the presence of such distinctly southern forms as *Grateloupia filicina*, *Scinaia furcellata*, *Cutteria multifida*, and *Taonia atomaria*, while there is no admixture of characteristic northern species,[6] so far as we know.

A list of those species which may, with some degree of probability, be expected to occur on the Essex coast, is given at the end of this paper.

SCHIZOPHYCEÆ, Cohn.

MIXOPHYCEÆ, Stizenb.

Chroococcaceæ, Rab.

GLŒOCAPSA, Näg.

Glœocapsa crepidinum, Thur., "Notes Alg.," i., p. 1. In shallow rock-pools, and also on posts at or a little above high-water mark. Southend, July, 1890, Mrs. T. H. Buffham. Clacton, Jan., 1893, E. A. B.

APHANOCAPSA, Näg.

Aphanocapsa marina, Hansg., in "Foslie Contrib.," i., p. 169. In shallow rock-pools, and on posts at high-water mark, usually mixed with species of *Calothrix* and other small algæ. Clacton, Jan., 1893, E. A. B. Rare.

Chamæsiphonaceæ, Borzi.

DERMOCARPA, Crouan.

Dermocarpa prasina, Bornet, "Notes Alg.," p. 73. On the fronds of *Rhodochorton rothii*. Clacton, Jan., 1893, E. A. B. Not uncommon.

HYELLA, Bornet et Flahault.

Hyella cæspitosa, Born. et Flah., in Morot, "Journal de Botan.," ii., 1888, p. 162. Growing in the substance of old shells. Clacton, Jan., 1893, E. A. B. Rare.

HORMOGONEÆ, Thur.

HOMOCYSTEÆ, Born. et Thur.

Lyngbyeæ, Kütz.

SPIRULINA, Turp.

Spirulina subsalsa, Œrsted. "Beretning om en Excursion til

6 Northern species do not, except very rarely, come further south than the north of Norfolk, where *Ptilota plumosa* has been reported, but on rather doubtful authority, from Cromer. Of course the older records of the occurrence of "*Ptilota plumosa*" on the coast of Devonshire, etc., refers to "*Plumaria elegans*," which was formerly regarded as simply a form of *Ptilota plumosa*.

Trindelen," etc., p. 17, tab. vii., fig. 4. On the muddy banks of the Stour, near Harwich; June, 1885, E. A. B.

OSCILLATORIA, Vaucher.

Oscillatoria corallinæ, Gom., in Morot, "Journ. Bot.," iv., p. 356. On the muddy banks of the Stour, near Harwich; June, 1885, E. A. B.

LYNGBYA, C. Ag.

Lyngbya semi-plena, J. Ag., "Alg. Mar. Med.," p. 11. On rocks and posts near high-water mark. Southend, July, 1890, Mrs. Buffham.

L. æstuarii, Liebman, "Bemerkninger og Tilläg til den danske Algeflora," Kröger's "Tidskrift," 1841, p. 492. On the muddy banks of the Stour and Orwell; June, 1885, E. A. B. Not uncommon.

SYMPLOCA, Kütz.

Symploca hydnoides, Kütz., "Spec. Algar.," p. 272. Rocks at and above high-water mark. Felixstowe, June, 1885, E. A. B. This species is also found on the muddy banks of the Stour and Orwell.

Vaginarieæ, Gomont.

MICROCOLEUS, Desmaz.

Microcoleus chthonoplastes, Thur., "Ess. de Classif. des Nostoc. Ann. des Sc. nat., 6 ser., Bot.," i., p. 378. On the muddy banks of the Stour, and in the shallow pools of the salt marsh between Felixstowe Railway-station and the River.

HETEROCYSTEÆ, Hansg.

Rivulariaceæ, Rabenh.

CALOTHRIX, Ag.

Calothrix scopulorum, Ag., "Syst. Alg.," p. 70. On posts near high-water mark. Clacton, Jan., 1893, E. A. B. This species is usually found growing in company with species of *Enteromorphæ*, *Chætomorphæ*, and other small algæ.

C. pulvinata, Ag., "Syst. Alg.," p. 71. "On stakes near the shore, Osey Island," E. M. Holmes, ESSEX NATURALIST, vol. ii., p. 249.

C. confervicola, Ag., "Syst. Alg.," p. 70. Epiphytic on various small algæ, specially *Ceramium rubrum*. Although this species has not been recorded from the county of Essex, it is almost

certain to occur there, and I have seen specimens from the adjacent county of Suffolk, but without the exact locality being given.

ISACTIS, Thur.

Isactis plana, Thur., "Essai de Classif. Nost.," p. 11. "On old oyster shells in the Blackwater Estuary," E. M. Holmes, ESSEX NATURALIST, vol. ii., p. 249.

RIVULARIA, Ag.

Rivularia atra, Roth., "Cat. Bot.," iii., p. 340. On rocks near high-water mark. Felixstowe, June, 1885, E. A. B. Rare.

Sirosiphoniaceæ, Rabenh.

MASTIGOCOLEUS, Lagerh.

Mastigocoleus testarum, Lag., "Notarisia," 1886, i., p. 65, tab. 1. In old oyster shells from the Blackwater, near Maldon. E. A. B.

Nostoceæ, Kütz.

ANABÆNA, Bory.

Anabæna variabilis, Kütz, "Phyc. General," p. 210. On the muddy shores of the Stour, near Harwich, June, 1885, E. A. B. The specimens of this species distributed in Mr. Holmes's valuable "Algæ Britannicæ Rariores Exsiccatæ" are from the above locality.

CHLOROSPERMEÆ, Harv.

Protococcaceæ, Menegh.

CHLOROCHYTRIUM, Cohn.

Chlorochytrium inclusum, Kjellm., "N. I. Algfl.," p. 392, tab. 31, figs. 8–17. Parasitic in the fronds of *Dilsea edulis*. Harwich, Jan., 1883, G. P. H. I detected a few fronds of this curious parasite in the fronds of some specimens of *Dilsea edulis* collected by Mr. Hope at Harwich.

Ulvaceæ (Ag.), Rke.

MONOSTROMA, Thur.

Monostroma laceratum, Thur., "Note sur Syn. Ulv.," p. 32. Brackish pools, near Maldon; E. A. B.

ENTEROMORPHA, Link.

Enteromorpha ramulosa, Hook, "Brit. Flor.," ii., p. 315.

On posts near high-water mark. Clacton, Jan., 1893, E. A. B. Not uncommon.

E. erecta, J. Ag., "Alg. Syst.," iii., p. 152. Wivenhoe, E. G. Varenne.

E. clathrata, Ag., "Icon. Alg. eur.," No. xvii. Wivenhoe and Maldon, E. G. Varenne; Walton Ferry, G. P. Hope; Clacton, E. A. B.

E. canaliculata, Batt., "List Mar. Alg. Ber.," p. 31. On posts. Clacton, Jan., 1893, E. A. B.

E. percursa, Harv., "Phyc. Brit.," pl. ccclii. Maldon, Wivenhoe, and Mistley, E. G. Varenne; Clacton, E. A. B.

E. compressa, L., "Spec. Plant.," ii., p. 1,163. Walton, E. G. Varenne; estuary of the Orwell and Stour, E. M. Holmes; Walton Creek, G. P. Hope; Clacton, E. A. B.

E. intestinalis, L., "Spec. Plant.," ii., p. 1,163. Blackwater River and Maldon, E. G. Varenne and E. M. Holmes; estuary of the Orwell and Stour, E. M. Holmes; Harwich and Felixstowe, G. P. Hope.

E. linza, J. Ag., "Till. Alg. Syst.," p. 134. Harwich, G. P. Hope.

E. tubulosa, Kütz, "Tab. Phyc.," vi., p. 11. Estuary of the Orwell and Stour, E. M. Holmes. *Vide* ESSEX NATURALIST, vol. iv., p. 171.

E. minima, Näg., in Kütz, "Spec. Alg.," p. 482. On posts near high-water mark. Clacton, Jan., 1893, E. A. B.

ULVA, L.

Ulva lactuca, L., "Spec. Plant.," ii., p. 1,163=*U. latissima*, Harv., "Phyc. Brit." Maldon and Harwich, E. G. Varenne; estuary of the Blackwater, E. M. Holmes; Clacton, E. A. B.; Felixstowe, Walton Ferry, and Harwich, G. P. Hope.

Chætophoraceæ, Wittr.

EPICLADIA, Rke.

Epicladia flustræ, Rke., "Algenfl. der Westl. Ostsee," p. 86. Felixstowe, June, 1885, and Clacton, Jan., 1893, E. A. B.

Confervaceæ, Lagerh.

UROSPORA, Aresch.

Urospora penicilliformis, Aresch., "Obs. Phyc.," ii., p. 4. Clacton, Jan., 1893, E. A. B.

U. flacca, Holm. et Batt., "Ann. Botan.," v., p. 74=*Lyngbya flacca*, Harv., "Phyc. Brit." On muddy cement stone rocks. Felixstowe, May, 1884, G. P. Hope; Clacton, Jan., 1893, E. A. B.; Southend, July, 1890, Mrs. T. H. Buffham. The specimens gathered by Mrs. Buffham at Southend bore microzoospores, as also did those gathered by myself at Clacton.

Cladophoraceæ.

CHÆTOMORPHA, Kütz.

Chætomorpha ærea, Kütz, "Spec. Alg.," p. 379. In shallow pools near high-water mark. Felixstowe, June, 1885, E. A. B. Rare.

C melagonium, Kütz, "Phyc. Germ.," p. 204. Felixstowe, G. P. Hope.

C. linum, Southend, 1844, E. G. Varenne.

C. litorea, Holm. et Batt., "Ann. Bot.," vol. v., p. 74. Walton, 1873, E. G. Varenne.

C. tortuosa, Kütz, "Spec. Alg.," p. 373. Clacton, Jan., 1893, E. A. B. Rare.

RHIZOCLONIUM, Kütz.

Rhizoclonium riparium, Harv., "Phyc. Brit.," pl. 238. Estuary of the Stour and Orwell, June, 1885, E. A. B.

CLADOPHORA, Kütz.

Cladophora rupestris, Kütz, "Phyc. Gener.," p. 270. Southend, 1844, Varenne; on cement stone rock, Felixstowe and Harwich, Hope; between Dovercourt and Harwich, Holmes; Clacton, E. A. B.

C. hutchinsiæ, Kütz, "Phyc. Germ.," p. 210. Harwich and Felixstowe, Hope.

C. utriculosa, Kütz, "Phyc. Gen.," p. 269, f. *lætevirens*, Hauck., "Meeres-alg.," p. 455. Walton, 1845, Varenne; brackish water, Addeiton Fleet, branch of the Horse-shoe creek, Felixstowe, Dovercourt, Hope; estuary of the Blackwater, Holmes.

C glaucescens, Harv., "Phyc. Brit.," pl. 196. Harwich and Felixstowe, Hope. The specimens of this species in Mr. Hope's collection are not at all typical, the whole plant being larger and coarser than is usual in this species. The main stems are from 130 170 m. and the ultimate ramuli about 50m. in diameter; in other

respects the specimens agree fairly well with typical *Cl. glaucescens*. This variation from the ordinary form may be accounted for by the locality where Mr. Hope gathered his specimens, for he notes that they were gathered in a "sluice at high-water covered with 8 feet of salt water, at low water covered with fresh water."

C. fracta, Kütz, "Phyc. Gener.," p. 263. In ditches of brackish water between Felixstowe Railway-station and the River. Not uncommon; in many places plentiful. June, 1885, E. A. B.

C. albida, Kütz, "Phyc. Germ.," p. 240, f. *refracta*, Thur., in Le Jol., "Liste Alg. Mar. Cherb.," p. 60. Felixstowe, Hope; between Harwich and Dovercourt, E. M. Holmes.

C. uncialis, Harv., "Phyc. Brit.," pl. 207. Felixstowe and Harwich, G. Hope.

Bryopsidaceæ, Thur.

BRYOPSIS, Lam.

Bryopsis plumosa, Ag., "Spec. Alg.," i., p. 448. "In a rock pool near the end of Southend Pier," W. H. Grattann, "British Marine Algæ," p. 21; Harwich, Felixstowe, "in pools formed in cement stone with sandy bottom," G. P. H.

Vaucheriaceæ, Damort.

VAUCHERIA, D. C.

Vaucheria sphærospora, Nordst., Algol. Smasaker, in "Bot. Not.," 1879, t. 2. Maldon, "one mile on both sides of the bridge," Prof. Otto Nordstedt. [See E. M. Holmes, Essex Naturalist, vol. i., p. 151.]

FUCOIDEÆ, J. Ag.

Punctariaceæ.

PUNCTARIA, Grev.

Punctaria plantaginea, Grev., "Alg. Brit.," p. 53, t. 9. Harwich, 1876, Varenne.

Ectocarpaceæ.

ECTOCARPUS, Lyngb.

Ectocarpus erectus, Kütz, "Tab. Phyc.," vol. v. On woodwork, in company with species of *Enteromorpha*, *Calothrix*, and other small algæ. Clacton, Jan., 1893, E. A. B. Rare.

E. crouani, Thur., in Le Jol., "Liste," p. 75. Between Harwich and Dovercourt, E. M. Holmes.

E. confervoides, Le Jol., "Alg. Mar. Cherb.," p. 75. Walton Creek, June, 1883, G. Hope; between Harwich and Dovercourt, E. M. Holmes; Clacton, E. A. B.

E. confervoides, Le Jol., *B. subulatus*, Hauck., "Meeres-alg.," p. 331. Harwich, E. M. Holmes.

E. siliculosus, Lyngb., "Hydr. Dan.," p. 131. Harwich, G. P. Hope; Felixstowe, E. A. B.

E. granulosus, Ag., "Spec. Alg.," ii., p. 45. Harwich and Dovercourt, 9/3, 1884, G. P. Hope.

E. tomentosus, Lyngb., "Hydr. Dan.," p. 132, tab. 44A. Harwich and Walton Creek, G. P. Hope.

PYLAIELLA, Bory.

Pylaiella litoralis, Kjellm., "Ectoc.," p. 99=*Ectocarpus litoralis*, "Phyc. Brit." Walton, 1845, E. Varenne; Fort Pier, Harwich, G. P. Hope; between Harwich and Dovercourt, E. M. Holmes; Clacton and Felixstowe, E. A. B.

Elachistaceæ, Rke.

ELACHISTA, Duby.

Elachista fucicola, Aresch., "Alg. Pugill.," p. 235. Maldon, 1867, Varenne; Clacton, Jan., 1893, E. A. B.

Sphacelariaceæ, J. Ag.

SPHACELARIA, Lyngb.

Sphacelaria plumigera, Holmes, "Grevillea," vol. xi., p. 145. Felixstowe, Harwich, Dovercourt, and elsewhere on the Essex coast, G. P. Hope.

STYPOCAULON, Kütz.

Stypocaulon scoparium, Kütz, "Phyc. Gen.," p. 293. Walton, 1845, E. Varenne.

CLADOSTEPHUS, Ag.

Cladostephus verticillatus, Ag., "Syn. Alg. Scan.," p. xxvi. Walton, 1845, Varenne; Felixstowe, Hope.

C. spongiosus, Ag., "Syst. Alg.," p. 168. Felixstowe, G. P. Hope; Harwich, E. M. Holmes.

Myrionemaceæ, Thur.

MYRIONEMA, Grev.

Myrionema strangulans, Grev., "Crypt. Fl.," No. 300. Epiphytic on *Enteromorpha compressa*. Clacton, Jan., 1893, E. A. B.

ASCOCYCLUS, Mag.

Ascocyclus reptans, Rke., "Algenfl. der Westl. Ostsee," p. 44. Epiphytic on *Fucus serratus*. Felixstowe, June, 1893, G. Massee.

Ralfsiaceæ, Farl.

RALFSIA, Berk.

Ralfsia verrucosa, Aresch., "Phyc. Scan.," p 140. Felixstowe, G. P. Hope; Southend, July, 1890, Mrs. T. H. Buffham.

R. clavata, Crouan, "Florule du Finist," p 166. Estuary of the Orwell and Stour, E. M. Holmes.

Scytosiphoneæ, Thur.

PHYLLITIS, Kütz.

Phyllitis filiformis, Batt., "Journ Linn. Soc. Bot.," xviii., p. 456, p. 18. On woodwork near high-water mark. Clacton, Jan., 1893, E. A. B. This species is not uncommon at Clacton. It usually grows in company with *Enteromorpha compressa*, *Calothrix scopulorum*, and other small algæ, forming a fleecy mass on posts, etc., near high-water mark. The Essex plant is somewhat larger than the original specimens from Berwick, but it agrees well with them in all other respects.

SCYTOSIPHON, Ag.

Scytosiphon lomentarius, Endl., "Gen. Plant.," Suppl. iii., p. 25; sec. Bornet, "Alg. Schonsb.," p. 249. Breakwater, Harwich, G. P. Hope.

Chordaceæ, Rke.

CHORDA, Stackhouse.

Chorda filum, Stackh., "Ner. Brit.," Introd. p. xxiv. Harwich Harbour, G. P. Hope.

Laminariaceæ, Ag.

LAMINARIA, Lamour.

Laminaria saccharina, Lamour, "Ess.," p. 22. Harwich, G. P. Hope; Blackwater estuary, E. M. Holmes; Clacton, E. M. Holmes and E. A. B.; Felixstowe, G. Massee. A curious form of this species is found at Clacton, and was plentifully strewn on the beach in January, 1893. The frond, instead of being more or less rugose and bullated in the centre with undulate or curled margins, is perfectly flat and even, like that of *L. digitata*, and the fructification forms an uninterrupted band down the centre of it. I have not seen similar specimens from the South of England, but have gathered the same variety near Berwick. Prof J. G. Agardh, to whom I sent Berwick specimens, thought the plant might belong to a new species, but it seems to me preferable to regard it, at least for the present, as a variety of *L. saccharina*. The Clacton plants grow to a length of several feet, but are seldom more than two inches wide, several specimens in my possession being hardly more than one inch wide, although when entire they were two or three feet long, and bear mature sori. No other species of *Laminaria* has been reported to occur on the Essex coast, and the species of the genus are too conspicuous objects to be overlooked by collectors.

Cutleriaceæ, Thur.

CUTLERIA, Grev.

Cutleria multifida, Grev., "Alg. Brit.," p. 60. Asexual form on cement stone rock, Felixstowe; sexual form washed ashore, Harwich, G. P. Hope. The sexual and asexual plants of this genus are so different in outward form that they have usually been regarded by botanists as belonging to two separate and totally independent genera, the former being named *Cutleria multifida*, the latter *Aglaozonia reptans*. As a result of M. Falkenberg's researches into the development of the *Cutleriaceæ*, it has been proved that the oospore of these algæ does not at once reproduce a *Cutleria*, but a heteromorphous thallus in no way distinguishable from an *Aglaozonia*. The *Zonaria parvula* of Harvey's "Phycologia Britannica," and the *Aglaozonia reptans* of more modern works on British seaweeds, is nothing more than the asexual form of *Cutleria multifida*. The true *Zonaria parvula* of Greville, however, appears to be a really independent species, which produces tetraspores very much like those of *Dictyota*.

Fucaceæ, J. Ag.

FUCUS, L.

Fucus ceranoides, L., "Spec. Plant.," p. 1,158. Blackwater Estuary, E. M. Holmes.

F. vesiculosus, L., "Spec. Plant.," p. 1,158. Walton, 1867, E. G. Varenne; Harwich and Dovercourt, E. M. Holmes; Felixstowe, G. Massee. There is a specimen of this species in Mr. Hope's collection, but without locality.

F. vesiculosus, L., f. *spiralis* (L., "Spec. Plant.," p. 1,159). Blackwater estuary and Orwell and Stour estuary, E. M. Holmes. The Rev. Adam Buddle, who died in 1715, gathered this plant near "Fambridge Ferry in Essex," as is proved by a specimen preserved in his Herbarium ("Herb. Sloane," vol. 114, in the British Museum).

F. vesiculosus, L., f. *battica*, J. Ag., "Spec. Alg.," i., p. 210 (=*F. vesiculosus*, var. *subecostatus*, Essex Naturalist, ii., p. 248). Blackwater Estuary, E. M. Holmes.

F. platycarpus, Thur., in Ann., "Sc. Nat., 3ᵉ serie, 1851," vol. xvi., p. 9, pl. 2. Between Harwich and Dovercourt, E. M. H. There are specimens of this species, gathered some two hundred years ago by the Rev. Adam Buddle "near Fambridge Ferry in Essex," preserved in the Herbarium of the British Museum ("Herb. Sloane," vol. 114, p. 6). The absence of air-vessels in these specimens seems to have attracted the attention of Buddle, who referred them to "*Fucus sive quercus marina latifolia humilis sine vesiculis*," Doody, not to "*Fucus sive alga marina latifolia vulgatissima*," Ray= *Fucus vesiculosus*. There can be very little doubt that the species is still plentiful on the Essex coast as elsewhere in Britain, and has only escaped observation owing to the great resemblance it bears to some varieties of *Fucus vesiculosus*, for which it has no doubt, often been mistaken.

F. serratus, L. "Spec. Plant.," p. 1,158. Walton, 1867, Harwich, 1876, E. G. Varenne; Harwich, G. P. Hope; Dovercourt, E. M. Holmes; Clacton, E. A. B.

ASCOPHYLLUM, Stackh.

Ascophyllum nodosum, Le Jol., "Liste," p. 96. Harwich, G. P. Hope; Blackwater Estuary and Dovercourt, E. M. Holmes; Clacton, E. A. B.

A. nodosum, Le Jol., f. *scorpioides*, Hauck., "Meeres-alg," p. 289. Blackwater Estuary, E. M. Holmes.

HIMANTHALIA, Lyngb.

Himanthalia lorea, Lyngb., "Hydr. Dan.," p. 36, tab. 8. Walton, 1867, E. G. Varenne; Harwich, Felixstowe, G. P. Hope.

HALIDRYS, Lyngb.

Halidrys siliquosa, Lyngb., "Hydr. Dan.," p. 37, tab. 8. Felixstowe, G. P. Hope. It is interesting to note that Ray mentions the occurrence of this species (the "*Fucus angustifolius, vesiculis longis siliquarum æmulis*, narrow-leaved wrack, with pod-like bladders," of his "Synopsis Methodica Stirpium Britannicarum," which first appeared in 1690) at Harwich, near which it is still to be found after a lapse of 200 years.

Dictyotaceæ, Thur.

DICTYOTA, Lamour.

Dictyota dichotoma, Lamour, in "Journ. de Bot.," 1809, t. ii. Walton, 1867, E. G. Varenne; Felixstowe, G. P. Hope.

TAONIA, J. Ag.

Taonia atomaria, J. Ag., "Spec. Alg.," 1, p. 101. Felixstowe, G. P. Hope.

PADINA, Adans.

Padina pavonia, Gaillon, "Dict. d'Hist. Nat.," liii., p. 371. I give this species as an Essex plant on the authority of Ray. In the third edition of his "Synopsis," p. 43, n. 14, speaking of this plant—*Fucus maritimus Gallo pavonis pennas referens*—he says it is found "prope Harwicum." In the Buddle Herbarium there is also a specimen with the note "a me collect. prope Harwicum." I presume that Harwich is the town meant, as on page 4 of the first edition the following sentence: "*In littore Essexiano non procul Harwico*," where there can be no doubt that Harwich is intended, occurs. There is no reason why *Padina* should not grow on the Essex coast, where many other southern species are to be met with.

RHODOPHYCEÆ.

I. BANGIOIDEÆ, Rosenv.

Porphyraceæ (Kütz.), Thur.

PORPHYRA.

Porphyra laciniata, Ag., "Syst. Algar.," p. 190. Maldon, 1867, E. G. Varenne; Harwich, G. P. Hope; Felixstowe, G. Massee; Clacton, E. A. B.

P. vulgaris, Ag., "Aufz." p. 18. Southend, 1844, E. G. Varenne.

P. leucosticta, Thur., in Le Jol., "Liste des Alg. Mar. de Cherbourg," p. 100. Near Harwich, E. M. Holmes.

BANGIA, Lyngb.

Bangia fusco-purpurea, Lyngb., "Hydr. Dan.," p. 63. Harwich, May, 1883; on posts, Felixstowe, June, 1893, G. Massee.

II. FLORIDEÆ.

Chætangiaceæ, Schmitz.

SCINAIA, Bivona.

Scinaia furcellata, Bivona, in "Iride," Palermo, 1822. Cast ashore at Felixstowe after a gale, G. P. Hope. The specimens of this rare British alga in Mr. Hope's collection are in good condition, and do not appear to be the least water-worn; they are attached to fragments of shells, and it is most probable that they were cast ashore from deep water near the place where they were picked up.

Gelidiaceæ, Schmitz.

HARVEYELLA, Schmitz and Rke.

Harveyella mirabilis, Rke., "Algenfl. der Westlichen Ostsee," p. 28. Parasitic on *Rhodomela subfusca* at Clacton, January, 1893, E. A. B.

Gigartinaceæ, Schmitz.

CHONDRUS, Stackh.

Chondrus crispus, Stackh., "Ner. Brit.," p. xxiv. Southend, 1864, E. G. Varenne (and W. H. Grattann, *vide* "Brit. Mar. Alg.," p. 21). Blackwater Estuary, Harwich, Felixstowe, Dovercourt, Clacton, and elsewhere on the Essex coast: Hope, Holmes, Massee.

PHYLLOPHORA, Grev.

Phyllophora rubens, Grev., "Alg. Brit.," p. 135. Felixstowe, Jan., 1883, G. P. Hope; Clacton, Jan., 1893, E. A. B.

P. membranifolia, J. Ag., "Alg. Medit.," p. 93. Harwich, Felixstowe, Dovercourt (9/3/84), G. P. Hope; Clacton, E. A. B.

GYMNOGONGRUS, Mart.

Gymnogongrus griffithsiæ, Mart., "Flor. Brasil.," p. 27. Felixstowe and Dovercourt, G. P. Hope.

G. norvegicus, J. Ag., "Spec. Alg.," ii., p. 320. Felixstowe, G. P. Hope and E. A. B.

AHNFELTIA, Fr.

Ahnfeltia plicata, Fr., "Fl. Scand.," p. 310. The first record of this as an Essex plant is in Ray's "Synopsis," ed. ii., p. 4, where the following passage is to be found: "Alga exigua dichotoma arenacei coloris. Small sandy or amber-coloured wrack. In littore Essexiano non procul Harvico collegit D. Newton prope Walton vicum." Several specimens preserved in the Buddle and Petiver collections ("Herb. Sloane," vols. 114 and 150, Brit. Mus.) prove that *Ahnfeltia plicata* is the species referred to. The plant still grows in the same neighbourhood, for there is a specimen with the note, "On round flints at Felixstowe," in the Hope collection. The plant is also to be met with at Southend and Clacton.

(In a recent paper ("Flora oder Allg. Bot. Zeitung," 1893, heft 5, pp. 368-418) Prof. Schmitz asserts that what have been considered asexual reproductive organs (nemathecia) of *Gymnogongrus griffithsiæ*, *G. norvegicus*, *Phyllophora rubens* and *Ahnfeltia plicata* are really parasitic Florideæ. Of these parasites the following occur in Essex.

ACTINOCOCCUS, Schmitz.

Actinococcus aggregatus, Schmitz, l.c., p. 385. On *G. griffithsiæ*. Felixstowe, G. P. Hope.

Actinococcus peltæformis, Schmitz, l.c., p. 387. On *G. norvegicus*. Felixstowe, E. A. B.

COLACOLEPIS, Schmitz.

Colacolepis incrustans, Schmitz, l.c., p. 417. On *Phyllophora rubens*. Clacton, E. A. B.

STERROCOLAX, Schmitz.

Sterrocolax decipiens, Schmitz, l.c., p. 397. On *Ahnfeltia plicata*. Felixstowe, G. P. Hope.)

Rhodophyllidaceæ, Schmitz.

CYSTOCLONIUM, Kütz.

Cystoclonium purpurasceus, Kütz, "Phyc. Gen.," p. 404. Felixstowe, Feb., 1881, G. P. Hope; near Harwich, June, 1890 E. M. Holmes; Clacton, Feb. 27th, 1893, E. A. B.

CATENELLA, Grev.

Catenella opuntia, Grev., "Alg. Brit.," p. 166, tab. 17. "In the Blackwater at Maldon, Essex, Mr. E. Foster, junior," Greville, "Alg. Brit.," p. 167.

Sphærococcaceæ, Schmitz

GRACILARIA, Grev.

Gracilaria confervoides, Grev., "Alg. Brit.," p. 123. This plant was collected by the Rev. Adam Buddle in Essex more than two hundred years ago, as is proved by specimens preserved in the British Museum ("Herb. Sloane," vol. 114, p. 16, Nos. 1 and 2), which have the following note attached to them: "Fucus purpurascens parvus caule et ramulis seu foliolis teretibus, Ray, 3, 50, 50. A me prope Harwich coll." It still grows there. Walton and Harwich, E. G. Varenne; Estuary of the Orwell and Stour, E. M. Holmes; Felixstowe, G. P. Hope; Clacton, E. A. B.

CALLIBLEPHARIS, Kütz.

Calliblepharis ciliata, Kütz, "Phycol. Gen.," p. 404= *Rhodymenia ciliata*, Grev. Walton, 1845, E. G. Varenne; on cement stone rock, Felixstowe and Harwich, G. P. Hope; between Harwich and Dovercourt, E. M. Holmes; Clacton, E. A. B. In the Buddle Herbarium ("Herb. Sloane," vol. 114, p. 26) there is a specimen of this species, with the following note: "Fucus humilis membranaceus acaulos elegantissimus ruber capillis longis fimbriatus. A me prope Harwich collect." This specimen must have been collected before 1715 (the date of Buddle's death).

Rhodymeniaceæ, Schmitz.

RHODYMENIA, Grev.

Rhodymenia palmata, Grev., "Alg. Brit.," p. 88. Harwich, 1876, E. G. Varenne; Felixstowe, Fort Breakwater, G. P. Hope and G. Massee; Clacton, E. A. B.

PLOCAMIUM, Lyngb.

Plocamium coccineum, Lyngb., "Hydroph. Dan.," p. 39. (*Fucoides rubens varie dissectum*, Ray, "Synopsis," ed. 3, p. 37, 1). "Observed by Mr. Dale[7] in Maldon River over against Tolesbury, Essex," Ray. Walton, 1845, E. G. Varenne; Harwich and Felixstowe, G. P. Hope and G. Massee; Clacton, E. A. B. Both the broad and narrow varieties of this species are to be found on the coast of Essex.

Delesseriaceæ, Schmitz.

NITOPHYLLUM, Grev.

Nitophyllum laceratum,[8] Grev., "Alg. Brit.," p. 83. Walton, 1867, E. G. Varenne; Felixstowe, G. P. Hope and G. Massee; Clacton, E. A. B.

DELESSERIA, Lamour.

Delesseria alata, Lamour, "Ess.," p. 36. There is a specimen of this species in the Buddle Herbarium ("Herb. Sloane," vol. 114, p. 12, No. 3) with this inscription: "Fucus purpureus tenuiter divisus non geniculatus. This was found on the coast of Mersea Island in Essex." The other Essex localities are Harwich, G. P. Hope; Felixstowe, G. Massee; Clacton, E. A. B.

D. hypoglossum, Lamour, "Ess.," p. 36. Felixstowe and Harwich, G. P. Hope and G. Massee.

D. sinuosa, Lamour, "Ess.," p. 124. Felixstowe, G. P. Hope.

HYDROLAPATHUM, Stackh.

Hydrolapathum sanguineum, Stackh., "Tentam.," p. 67. Harwich, G. P. Hope.

Rhodomelaceæ, Schmitz.

BOSTRYCHIA, Montg.

Bostrychia scopioides, Montg., "Cuba. Bot. Crypt.," p. 39. "Shore of Blackwater at Maldon, Mr. E. Forster,[9] Junior,"

7 The Mr. Dale here spoken of is probably the Samuel Dale who died in 1739 (*vide* Britten and Boulger's "Biographical Index," p. 44).

8 This species was described by Gmelin ("Hist. Fuc.," p. 179) in 1768, from a specimen gathered at Harwich ("Locus, Harvici supra lapides").

9 Edward Forster's Herbarium was purchased by Robert Brown and presented to the British Museum. I have, therefore, been able to examine the original specimen mentioned by Greville. It bears the inscription "Blackwater, nearly opposite Maldon, 1793." There is also another Essex specimen of this species in the Herbarium of the British Museum; it was gathered in the same locality by Mr. Bicheno, probably early in the present century.

Greville, "Alg. Brit.," p. 105. "On the lower part of stems of *Spartina stricta*, Wivenhoe, 1873," E. G. Varenne. Cast ashore at Felixstowe, G. P. Hope; Estuary of the Blackwater, 1888, E. M. Holmes.

RHODOMELA.

Rhodomela subfusca, Ag., "Spec. Alg.," i., p. 378. Dovercourt, Harwich, and Felixstowe, G. P. Hope; Clacton, E. A. B.

LAURENCIA, Lamour.

Laurencia cæspitosa, Lamour, "Ess.," p. 43=*L. hybrida*, Lenor. Felixstowe and Landguard Pier, Harwich, G. P. Hope; Blackwater Estuary, E. M. Holmes.

CHONDRIA, Harv.

Chondria dasyphylla, Ag., "Spec. Alg.," p. 350. Blackwater Estuary, E. M. Holmes; Harwich, G. P. Hope; Felixstowe, E. A. B.

POLYSIPHONIA, Grev.

Polysiphonia urceolata, Grev., "Fl. Edin.," p. 309. Harwich Pier, G. P. Hope; Felixstowe, G. Massee.

P. elongata, Harv., in Hook., "Brit. Fl.," ii., p. 333. Blackwater Estuary, E. M. Holmes.

P. atro-rubescens, Grev., "Fl. Edin.," p. 308. "Essex Coast," E. G. Varenne.

P. nigrescens, Grev., Harv. in Hook., "Brit. Fl.," ii., p. 332. Felixstowe, Harwich, River Deben, Fort Breakwater, G. P. Hope.

P. affinis, Moore, in "Ord. Surv., Londonderry," Appendix, p. 11., sec. Harvey. River Deben, G. P. Hope.

BRONGNIARTELLA (Bory.), Schmitz.

Brongniartella byssoides, Bory.=*Polysiphonia byssoides*, "Phyc. Brit.," pl. 284. Walton, 1845, E. G. Varenne; Felixstowe, G. P. Hope.

DASYA, Ag.

Dasya coccinea, Ag., "Spec. Algar.," ii., p. 119. Felixstowe and Harwich, G. P. Hope; Clacton, E. A. B.

Ceramiaceæ.

SPERMOTHAMNION, Aresch.

Spermothamnion turneri, Aresch., "Phyc. Scand.," p. 113. Var *variabile*, J. Ag., "Spec. Algar," ii., p. 24. On the stems of *Furcellaria fastigiata*, Lamour. Clacton, E. A. B. There are some loose specimens of this species in Mr. Hope's collection, but no locality is mentioned.

GRIFFITHSIA, Ag.

Griffithsia setacea, Ag., "Syn. Algar. Scand.," p. xxviii. Walton, 1867, E. G. Varenne; Felixstowe and Harwich, G. P. Hope, E. M. Holmes, and G. Massee; Clacton, E. A. B. This species is very abundant at Felixstowe in some seasons. In June, 1893, Mr. Massee informs me, it was "by far the most abundant weed on the coast."

G. corallina, Ag., "Syn.," p. 28. Dovercourt, August, 1882, T. H. Buffham.

HALURUS, Kütz.

Halurus equisetifolius, Kütz., "Phycol. General.," p. 374. Felixstowe and Harwich, G. P. Hope.

PLEONOSPORIUM, Näg.

Pleonosporium borreri, Näg., "Sitzungsb. d. k. bayer. Akad. d. Wissensch. zu Münschen," 1861, p. 342. Felixstowe Pier (young plants), G. P. Hope.

RHODOCHORTON, Näg.

Rhodochorton rothii, Näg., "Sitzungsb. d. k. bayer. Akad. d. Wissensch. zu Münschen," 1861, ii., p. 358. Dovercourt Pier, "forming a carpet on the steps below low-water mark," G. P. Hope; Clacton, E. A. B.

R. floridulum, Näg., "Sitzungsber. d. k. bayer. Akad. d. Wissensch. zu Münschen," 1861, ii., p. 358. "Below low-water mark, forming carpet to stone steps of Dovercourt Breakwater, June, 1883," G. P. Hope.

CALLITHAMNION, Lyngb.

Callithamnion polyspermum, Ag., "Spec. Alg.," ii., p. 169. Harwich, July, 1882, G. P. Hope.

C. roseum, Ag., "Spec. Alg.," ii., p. 164. Southend, July, 1890, Mrs. T. H. Buffham.

C. corymbosum, Ag., "Spec. Alg.," ii., p. 165. "Floating over the Deben bar from sea, Sept., 1882," G. P. Hope.

PLUMARIA, Schmitz.

Plumaria elegans, Schmitz., in "Flora," 1889, heft. 5. On cement stone rock, Felixstowe and Harwich, G. P. Hope and G. Massee.

ANTITHAMNION, Näg.

Antithamnion plumula, Thur., ap. Le Jolis, "Liste des Alg. Mar. de Cherbourg," p. 112. Estuary of the Orwell and Stour, E. M. Holmes.

CERAMIUM, Lyngb.

Ceramium tenuissimum, J. Ag., "Spec. Alg.," ii., p. 120. Near Harwich, E. M. Holmes.

C. deslongchampsii, Chauv., "Alg. Norm.," No. 83. "Below low-water mark Dovercourt stone pier," and Harwich, G. P. Hope; Southend, July, 1890, Mrs. T. H. Buffham.

C. diaphanum, Roth., "Catal.," iii., p. 154. Cement stone rock, Felixstowe and Harwich, G. P. Hope; Dovercourt, E. A. B.

C. rubrum, Ag., "Syn.," p. 60. Maldon, 1844, Walton, 1867, Harwich, 1888, E. G. Varenne; Felixstowe, G. P. Hope and G. Massee; Clacton, E. A. B.

C. flabelligerum, J. Ag., "Advers.," p. 27. Fort Breakwater, Harwich, G. P. Hope; Felixstowe, E. A. B. Not uncommon.

Grateloupiaceæ.

GRATELOUPIA, Ag.

Grateloupia filicina, Ag., "Spec. Algar.," i., p. 223. Cement rock at half tide, Felixstowe, G. P. Hope.

Dumontiaceæ, Schmitz.

DUMONTIA, Lamour.

Dumontia filiformis, Grev., "Alg. Brit.," p. 165, t. 17. Blackwater Estuary, E. M. Holmes.

DILSEA, Stack.

Dilsea edulis, Schmitz., in "Flora," 1889, p. 453. Harwich, G. P. Hope.

Nemastomaceæ.

FASTIGIARIA, Stackh.

Fastigiaria furcellata, Stackh., "Tentam.," p. 91=*Furcellaria fastigiata*. Walton, 1845, E. G. Varenne; Felixstowe, G. P. Hope; between Harwich and Dovercourt, E. M. Holmes; Clacton, E. A. B.

Rhizophyllidaceæ, Schmitz.

POLYIDES.

Polyides rotundus, Grev., "Alg. Brit.," p. 70. Walton, 1845, E. G. Varenne; Harwich, G. P. Hope; Blackwater Estuary, E. M. Holmes; Clacton, E. A. B.

Squamariaceæ, Schmitz.

CRUORIELLA, Crn.

Cruoriella dubyi, Schmitz, "Flora," 1889, p. 454=*Peyssonellia dubyi*, Crn. Blackwater Estuary, E. M. Holmes.

HILDENBRANDTIA, Nardo.

Hildenbrandtia prototypus, Nardo, in "Isis," 1834, p. 675. Var. *rosea*, Hauck., "Meeres-alg.," p. 39. Blackwater Estuary and Orwell and Stour Estuary, E. M. Holmes; Southend, Mrs. T. H. Buffham; Clacton and Felixstowe, E. A. B.

Corallinaceæ.

MELOBESIA, Lamour.

Melobesia membranacea, Lamour, "Polyp. Flex.," p. 315. On the leaves of *Zostera*, in the Blackwater Estuary, E. M. Holmes; Clacton, E. A. B.

M. corticiformis, Kütz, "Spec. Alg.," p. 696. Between Harwich and Dovercourt, E. M. Holmes; Clacton, E. A. B. On *Fastigiaria*.

M. corallineæ, Crouan, "Florule du Finist.," p. 150. On *Corallines*. Between Harwich and Dovercourt, E. M. Holmes Felixstowe, G. P. Hope.

LITHOPHYLLUM, Philippi.

Lithophyllum lenormandi, Rosan., "Rech.," p. 85. "On pebbles." Blackwater Estuary, E. M. Holmes.

CORALLINA, Lamour.

Corallina officinalis, L., "Fauna Suecica," No. 2,234. Walton, 1867, E. G. Varenne; Felixstowe and Dovercourt, G. P. Hope; between Harwich and Dovercourt, E. M. Holmes; Felixstowe, G Massee; Clacton, E. A. B.

There is a specimen from Felixstowe in Mr. Hope's collection that has been named *Corallina squamata* by that gentleman, but as the attachment is wanting and the specimen otherwise far from typical of *C. squamata*, I prefer to regard it as a variety of *C. officinalis*, although possibly it may really be a form of *C. squamata*.

C. rubens, L., "Syst. Nat.," ed. xii., i., p. 1,304. Harwich, 1876, E. G. Varenne; Dovercourt, G. P. Hope.

C. corniculata, L., "Syst. Nat.," ed. xii., i., p. 1,304. Dovercourt, G. P. Hope.

SPECIES LIKELY TO OCCUR ON ESSEX SHORES.

The following species may be expected to occur on the coast of Essex. Those which, having been found on the shores of the neighbouring counties of Suffolk, Norfolk, or Kent, are most likely to be met with in Essex are distinguished by an asterisk (*).

MYXOPHYCEÆ.

**Dermocarpa schousboei*, Bornet.
Oscillatoria nigroviridis, Thw., and other species of *Oscillatoria*.
**Lyngbya majuscula*, Harv.
Hydrocoleum lyngbyaceum, Kütz
**Calothrix confervicola*, C. Ag.
**C. consociata*, Born. et Flah.
C. æruginea, Thur.
C. crustacea, Thur.
C. fasciculata, Agardh.
Rivularia biasolettiana, Menegh.
Microchæte grisea, Thur.
**Anabæna torulosa*, Lagerh.
Nodularia spumigena, Mert.

CHLOROSPERMEÆ

Pringsheimia scutata, Rke.
Monostroma wittrockii, Born.
M. latissimum, Wittr.
**M. grevillii*, J. Ag.
M. blyttii, Wittr.
**Percursaria percursa*, Rosenv.
Enteromorpha hopkirkii, M'Calla.
E. ralfsii, Harv.
E. crinita, J. Ag.
**E. micrococca*, Kütz.

Entoderma wittrockii, Wille
* *Chætomorpha tortuosa*, Kütz.
C. implexa, Kütz.
* *Cladophora flexuosa*, Griff.
* *C. hirta*, Kütz.
* *C. expansa*, Kütz.
* *C. flavescens*, Kütz.
* *Vaucheria thuretii*, Woron.
Codium tomentosum, Stackh.

FUCOIDEÆ

* *Desmarestia viridis*, Lamour.
* *D. aculeata*, Lamour.
* *D. ligulata*, Lamour.
Dictyosiphon foeniculaceus, Grev.
D. hippuroides, Kütz.
Litosiphon pusillus, Harv.
* *Myriotrichia clavæformis*, Harv.
M. filiformis, Harv.
* *Asperococcus echinatus*, Grev
Ectocarpus terminalis, Kütz
* *E. fasciculatus*, Harv.
* *Arthrocladia villosa*, Duby.
* *Elachista scutulata*, Duby.
E. flaccida, Aresch.
* *Sphacelaria cirrhosa*, Ag.
Stilophora rhizodes, J. Ag.
* *Chordaria flagelliformis*, Ag.
Mesoglœa vermiculata, Le Jol.
* *Castagnea virescens*, Thur.
C. zosteræ, Thur.
Leathesia difformis, Aresch.
Phyllitis zosterifolia, Rke.
P. fascia, Kütz.
Chorda tomentosa, Lyngb.
* *Sporochnus pedunculatus*, Ag.
Pelvetia canaliculata, Dene et Thur
* *Bifurcaria tuberculata*, Stackh.
* *Cystoseira fibrosa*, Ag.
* *Tilopteris mertensii*, Kütz.
Dictyopteris polypodioides, Lamour

FLORIDEÆ.

**Chantransia daviesii*, Thur.
C. virgatula, Thur.
**C. secundata*, Thur.
**Naccaria wigghii*, Endlicher.
**Gelidium corneum*, Lamour.
**G. crinale*, J. Ag.
G. latifolium, Born, et Thur.
Gigartina mamillosa, J. Ag.
**Callophytis laciniata*, Kütz.
**Rhodophyllis bifida*, Kütz.
**Calliblepharis jubata*, Kütz.
**Rhodymenia palmetta*, Grev.
**Lomentaria articulata*, Lyngb.
**L. clavellosa*, Gaill.
**Chylocladia kaliformis*, Hook
C. ovalis, Hook.
**Nitophyllum punctatum*, Grev
**Delesseria ruscifolia*, Lamour.
**Bonnemaisonia asparagoides*, Ag.
Laurencia obtusa, Lamour.
**L. pinnatifida*, Lamour.
**Halopithys pinastroides*, Kütz.
Polysiphonia violacea, Wyatt.
**P. fibrillosa*, Grev.
P. fastigiata, Grev.
P. brodiæi Grev.
P. fruticulosa, Spreng.
**Monospora pedicellata*, Solier.
Callithamnion hookeri, Ag.
Ceramium strictum, Harv.
C. echionotum, J. Ag.
C. acanthonotum, Carm.
C. ciliatum, Ducluz.
**Halarachnion ligulatum*, Ag.
Petrocelis cruenta, J. Ag.
Cruoria pellita, Lyngb.
Melobesia pustulata, Lamour.
Lithothamnion polymorphum, Aresch.

THE ESSEX FIELD CLUB.

Annual Report of the Council for the Year Ended December 31st, 1893.

[*Read and adopted at the Annual Meeting held at Buckhurst Hill, March 31st, 1894.*]

Although the past year has been an unusually active one both on the part of the Club and its officers, and no fewer than fifteen meetings were held, the various works in progress are not yet sufficiently advanced to admit of a complete report, and full details of the roll of membership, the state of the Museum and Library, must be reserved for special reports, which will be placed before the members as soon as possible. On the present occasion the Council proposes giving a sketch only of the several schemes in progress, for the information of the members.

Members.—The roll of members cannot be yet made up, owing partly to the fact that a considerable number of the members of the old Chelmsford Museum Society, admitted as members under the resolutions for amalgamation, not having yet complied with the terms of that resolution relating to the payment of subscriptions, and partly also to a number of members being two years and upwards in arrear. Under the Rules the Council has power to deal with such cases; the matter is now under consideration, and a report from the Treasurer will be laid before the Club in due course.

It is estimated that the effective strength of the Club is about 400, and the Council need not point out that this number is inadequate to provide a sufficient annual income. It is the duty of every member wishing well to the Club to do all in his or her power to increase the roll. The position of the Club, and the important works it is carrying on, justify the expectation that a permanent roll of 600 members should be the minimum, and the Council is confident that a little missionary effort on the part of each member would soon realise this expectation. A Sub-Committee is about to be formed to assist in this work.

Financial.—The financial position of the Club may, upon the whole, be regarded as fairly satisfactory. The General Account still shows a deficiency of income as compared with expenditure, but the adverse balance is being steadily reduced, a diminution of £20 having been effected during the year. The Life Composition Account remains unchanged. The final payment for printing part 2, vol. iv., of the old "Proceedings" leaves the Publishing Account with a balance on the wrong side of some £40. It is much to be regretted that so few copies were applied for. Had the Council anticipated so poor a response, the work would probably have been abandoned, or compressed within much narrower limits. A list of donations paid to the Museum Fund (Chelmsford) up to the present date (March 31st, 1894) is given below.

Publications.—The Essex Naturalist for the year comprises 200 pages, and the volume is, it is submitted, fully up to the preceding ones in its valuable characteristic—namely, the local bearing of the papers and reports published.

Several important papers are already promised for volume viii., but the Editor again solicits help from the main body of the members and their scientific friends. He receives a good deal of friendly criticism, which is healthy and is appreciated, but in many cases a little aid in his difficult task would be more encouraging.

Dr. Laver's work on the "Mammals, Reptiles, and Fishes of Essex" not being ready for the press, has been delayed in publication; but the prospectus

will be issued in the early summer, and, taken in conjunction with Mr. Miller Christy's "Birds of Essex," the work will afford a complete and valuable guide to the vertebrate fauna of the county, and should be welcomed not only by our Essex members, but by naturalists in London and elsewhere. This book will form volume iii. of the "Special Memoir" series, and the "Bibliotheca Essexiensis: a Bibliographical Catalogue of Books, Pamphlets, Maps, etc., relating to the County of Essex," now in preparation for the press, will form volume iv. Full particulars of this last important work, which the Council has resolved to publish, will be given later.

MEETINGS, AND PAPERS CONTRIBUTED.—As stated above, no fewer than fifteen meetings were held during 1893, five being Ordinary Meetings and ten Field Meetings, with or without Ordinary Meetings in the evenings. The places visited were Stratford, Chelmsford, Bromfield, Ilford, Chingford and Sewardstone, Danbury and Maldon, Barking Side and Wanstead, the River Stour and Dedham, Castle Hedingham, the Deneholes at Grays, Boyle's Court and Brentwood, High Beech, Epping Forest, and Loughton.

The Council has especially to thank Mr. Walter Crouch, who acted as Secretary for Field Meetings during the season It is much to be wished that Mr. Crouch would continue to act in this capacity during the coming season.

The especial thanks of the Club are due to Mr. Miller Christy, Mr. Charles Smoothy, Mr. L. Hatton, Mr. and Mrs. Pemberton-Barnes, Mr. and Mrs. Bevington, and Mr. and Mrs. Lescher, for hospitalities afforded to the Club; and the Council also begs to thank the following gentlemen for aid given at the various meetings:—Mr. Chancellor, Prof. Poulton, Col. C. Swinhoe, Mr. Ashmole, Mr. H. W. Monckton, Mr. C. E. Benham, Mr. Chas. A. Wright, Mr. Stannard, Mr. Rowland Cobbold, Mr. A. C. Freeman, Rev. H. A. Lake, Captain Whitmore, Mr. J. E. Harting, Dr. M. C. Cooke, Dr. Wharton, Mr. H. Groves, Mr. J. T. Cunningham, and Mr. John Spiller.

It is unnecessary to refer to the various papers read at the meetings. They are alluded to in the full reports in our Journal; and all of them, together with papers sent direct to the Editor, and a large number of "notes," have been published in vol. vii. of THE ESSEX NATURALIST.

TECHNICAL INSTRUCTION.—The members nominated by the Council to serve upon the Technical Instruction Committee of the Essex County Council, under Sect. i. (2) of the Technical Instruction Act, 1889, and the resolution of the County Council of March 15th, 1892, are the same as last year, with the exception that Mr. G. J. Symons retired, owing to difficulty in attending the meetings. Prof. Charles Stewart, President of the Linnean Society, and one of the hon. members of the Club, was nominated to fill the vacancy, and has been accepted by the County Council. The nominated members are now as follows:—Sir H. E. Roscoe, F.R.S., Prof. R. Meldola, F.R.S., Mr. J. C. Shenstone, Mr. J. Spiller, F.I.C., etc., Mr. F. Chancellor, J.P., F.R.I.B.A., and Prof. Charles Stewart, President L.S., etc.

The assistance, scientific and otherwise, given by these gentlemen to the cause of technical instruction has been most valuable, and the Council has reason to believe that it is highly appreciated.

LIBRARY.—The Library has continued to receive the usual magazines and journals, either in exchange or by purchase, and some valuable donations of books have been made. The Librarians propose to present a full report on

Dr. TREASURER'S ACCOUNT OF INCOME AND EXPENDITURE FOR YEAR ENDED 30TH DECEMBER, 1893. *Cr.*

	£ s. d.	£ s. d.		£ s. d.
To Subscriptions, 1890	0 10 6		By Balance from 1892 (excess of Payments over Receipts)	95 13 10
,, ,, 1891	0 15 0		,, Printing and Illustrating "Essex Naturalist"	52 16 10
,, ,, 1892	22 12 6		,, General Printing and Stationery	23 4 7
,, ,, 1893	163 16 0		,, Postage of "Essex Naturalist," Circulars, Officers' Correspondence, etc.	28 0 0
,, ,, 1894	9 6 0		,, Incidental Expenses	12 15 4
		197 0 0	,, Fire Insurance	2 15 0
,, Entrance Fees		6 16 6	,, Rent of Headquarters (six months)	10 0 0
,, Donation		0 10 6	,, Rent of Museum Premises at Chelmsford (nine months)	18 15 0
,, Sales of Publications		3 1 0	,, Sundry Museum Expenses	5 0 0
,, Balance (excess of Payments over Receipts)		75 10 1	,, Salary of Sub-Curator (three months)	6 10 0
			,, Purchase of Books, etc.	9 4 8
			,, Fees to Lecturers	1 11 6
			,, Hire of Meeting Rooms	3 12 0
			,, Donation to "Owen Memorial Fund	3 3 0
			,, Loss on Field Meetings	9 16 4
		£282 18 1		£282 18 1

LIFE COMPOSITION ACCOUNT.

To Balance from 1892	104 10 6	By Balance to 1894	104 10 6

SPECIAL MEMOIRS PUBLICATION ACCOUNT.

To Macmillan and Co.	0 4 4	By Balance from 1892 (excess of Payments over Receipts)	15 19 0
,, One Copy "Earthquake Report"	0 3 6	,, Balance of Account for Printing "Proceedings," part 2, vol. iv.	25 2 0
,, One Copy "Proceedings," part 2, vol. iv	0 5 0		
,, Balance (excess of Payments over Receipts)	40 8 2		
	£41 1 0		£41 1 0

MUSEUM FUND (CHELMSFORD).

To Balance from 1892	51 16 9	By Balance of Preliminary Expenses	2 15 6
,, Donations paid, 1893	57 12 0	,, Balance in hand	106 13 3
	£109 8 9		£109 8 9

N.B.—It should be noted that the Club possesses very large assets in books, specimens, cabinets, stock of publications, etc., which although valuable cannot easily be estimated in money.

Examined with Vouchers and found correct,

March 29th, 1894.

WALTER CROUCH,
HENRY C. SNELL, } *Auditors.*

the state of the Library, as soon as possible after the books are arranged in the room at Chelmsford, which is now nearly ready for their reception. But the Council cannot allow Mr. Wire's connection with the Library to cease without thanking him for his labours as Librarian during his term of office. Few of the members know of the amount of persistent work required in such an office, and Mr. Wire deserves the cordial thanks of the Club for the active interest he has taken in the Library for many years past.

MUSEUM.—The agreement for immediate amalgamation of the old Chelmsford Museum with the Club having been confirmed at the last annual meeting, on April 15th, 1893, the Curator was enabled to take possession of the premises and its contents in August last, and Mr. Henry Mothersole was appointed by the Council to act as Assistant, at a salary of £26 per annum, giving his services for twenty hours in each week. The Curator found the Museum in such a state of chaos, and so much cleaning, repairs to cases, and fitting up of the room for the library, etc., required to be done, that this work has occupied the whole period, and real museum-work could not be commenced. A considerable number of cases, boxes, etc., have already been purchased, but the sums paid in to the Treasurer on behalf of the Museum Fund (about £160) will be quite insufficient, after deducting the amount spent in printing and advertising, to properly fit the Museum as an exhibition for the general public, and as a store-house of local specimens for the student. The Council makes a strong appeal for further funds. The Curator's estimate for fitting up the rooms at Chelmsford as a home for the Museum, pending the erection of proper premises, was £250, and certainly this sum, at least, will be required.

The contributions hitherto received (31st March, 1894) of members and others for fitting up the rooms at Chelmsford, under the arrangements announced in the last Annual Report (E. N., vol. vii., pp. 70—71), are as follows :—

Donations paid to Museum Fund (Chelmsford) to 31st March, 1894.

	£	s.	d.
William Melles (decd.), *Sewardstone*	50	0	0
T. J. Mann, *Sawbridgeworth*	25	0	0
Benjamin Winstone, *Epping*	10	10	0
Rev. R. E. Bartlett, *Chelmsford*	10	0	0
William Cole, *Buckhurst Hill*	10	0	0
Prof. G. S. Boulger, *Notting Hill*	5	5	0
Rev. E. S. Dewick, *Hyde Park*	5	5	0
John Hilliar, *South Hackney*	5	5	0
Alfred Lockyer, *Wanstead*	5	5	0
Gen. B. R. Branfill, *Billericay*	5	0	0
B. G. Cole, *Buckhurst Hill*	5	0	0
Prof. Raphael Meldola, *Brunswick Square* (first moiety)	5	0	0
Rev. L. N. Prance, *Stapleford Tawney*	5	0	0
H. S. Tabor, *Bocking*	5	0	0
J. C. Shenstone, *Colchester* (first don.)	3	3	0
S. A. Courtauld, *Halstead*	2	2	0
T. V. Holmes, *Greenwich*	2	2	0
Charles Oldham, *Woodford*	2	2	0
R. B. Boswell, *Chingford*	1	1	0
J. A. Clark, *Hackney*	0	10	6
T. F. Mott, *Leicester*	0	10	0
	£163	0	6

Provided sufficient funds are supplied, the temporary fitting up and arrangement of the contents of the Museum will soon be completed, and the Curator is convinced that collections of great interest and considerable scientific importance will rapidly be gathered together. Already some collections of value have been received, and the thanks of the Council are especially due to the following gentlemen for the donations indicated. Mr. Hope's contributions are of great interest—the Marine Algæ have already been catalogued by Mr. Batters, and the Crag fossils will be examined and arranged by an expert as soon as possible:

Principal Donations to the Museum since last Report:

Mr. E. A. Fitch.—Large number of specimens of Galls. in illustration of his paper on the "Galls of Essex," in vol. ii. of the "Transactions" of the Club.

Mr. C. Oldham.—Specimens of Lepidoptera from Epping Forest.

Mr. Chalkley Gould.—Collection of specimens of Woods of the Forest trees.

Mr W. Cole.—Collection of Galls from the Forest district, preserved by the late J. L. English. Also numerous specimens of Essex Plants and Mollusca.

Mr G. P. Hope.—The whole of his collection of Red-Crag Fossils, consisting of several thousand specimens—mostly collected by himself. Also his Herbarium of Marine Algæ from the Harwich district. This collection has been examined and catalogued by Mr. Batters (see *ante*, p. i.).

Also some Mammalian fossils from Walton-Naze, and Bronze Celts from Havering.

Dr. Laver.—As representative of the defunct Colchester Natural History Society, and from himself personally. About 50 cases of birds and animals, mostly from Essex.

Mr. T. Hay Wilson.—Specimens of fragments of glacial rocks from the gravels of the Forest, in illustration of his paper in THE ESSEX NATURALIST. vol. vii., p. 75.

The Council most strongly urges every member, and, indeed, everyone interested in local museums, to aid the Curator by the donation of specimens and the systematic gathering of local forms in their own neighbourhoods. A circular, with directions and information for those proposing to collect, will shortly be issued, and it is hoped that the response to the appeal will be enthusiastic, and, above all, that the efforts of local collectors will be sustained and methodical. The Curator will gladly give all the information in his power to those willing to work in this direction, and in no way can an accurate knowledge of some branches of natural history be acquired than in collecting with judgment and with a definite object in view. In this way not only will the collector be benefited, but the Museum will acquire authentic Essex collections, which in the aggregate will soon be of great interest and importance.

As mentioned above with respect to the Library, as soon as the collections at present in hand are catalogued, the Curator will present to the members a detailed report on the Museum, with an account of the work done and to be accomplished.

EPPING FOREST BRANCH MUSEUM.—This project, which has so long been in the minds of members of the Club, has now been energetically taken up by a local Committee, under the direct sanction of the Council, and there appears to be every probability that it will be carried out to a successful issue. In actively promoting this scheme, the Council and Curator have been actuated not only with the desire of establishing a local collection of more than usual educational importance, but also in the interests of the Club, and the interests of our metro-

politan districts members, that the removal of our main collections to the centre of the county may not weaken the sympathy of such members in the Club's work. The branch Museum at Chingford, if carried into being, will be welcomed by all intelligent visitors to the Forest, and the Council asks for the active support of the metropolitan members to an institution mainly promoted in their interests.

The Council has unanimously recommended Mr. Chancellor's re-election as President for the ensuing year.

In conclusion, the Council may justly congratulate the members on the position the Club has attained, and the extensive and useful programme of work to be carried out during the next few years. The Club only requires an increased membership, and a somewhat greater interest to be taken in its work and progress by the inhabitants of the county generally, to become a really important local institution.

THE EPPING HUNT.

NOTES FROM A "MEMORANDUM AS TO THE RIGHT OF THE CITIZENS OF LONDON TO HUNT IN ITS VICINITY, INCLUDING EPPING FOREST."

THE enlightened liberality of the representatives of the late Mr. Henry Ford Barclay has placed at the disposition of the Council of the Essex Field Club a number of MSS. and printed documents and pamphlets of various kinds, which came into that gentleman's possession when a member of the Epping Forest Commission of 1871, and also as a Verderer of the Forest. The records of the Commission are enshrined in four great folio volumes of a thousand pages each, a copy of which is accessible in the Guildhall Library. And four volumes containing manuscript copies of a mass of documents put in evidence at the time, have recently found their way to the Public Record Office, and are included among the Departmental Records of H.M. Office of Works—a series only accessible, it may be added, under special permit. But the "*Memorandum as to the right of the Citizens of London to hunt in its vicinity, including Epping Forest,*" recently sent to me for examination by the Editor of THE ESSEX NATURALIST, is not, so far as I know, included in either set. Whether it is or is not, a short account of it will, I think, prove a not unwelcome addition to the notes on the Forest which, from time to time, find a place in these pages.

The *Memorandum* in question is rather in the nature of the famous chapter entitled: "Of snakes in Iceland"; for, while

professing to give information as to the rights of the citizens over Epping Forest, it practically furnishes only a confirmation of Mr. Fisher's statement, that no documentary evidence could be found to support the right of hunting in the Forest traditionally held to belong to the Corporation of London, and to have been yearly exercised on the occasion of the Epping Hunt.[1] The *Memorandum* contains extracts from various ancient documents, with translations appended. The earliest is an undated letter, in Saxon, addressed by the Conqueror to Gosfrigth, the Sheriff, and to all the citizens of London, bidding them to take neither hart nor hind, nor game of any sort, on the lands of Lanfranc, the Archbishop, that belonged to his manor of Hergan (Harrow), unless by his command or with his leave.[2] This is followed by an extract from a charter of Henry I., who, in 1101, confirmed to the citizens of London their sporting rights, as enjoyed by their predecessors, in Chiltre (Chiltern), and Middlesex, and Surrey. Rather more than half a century later on, in 1154, Henry II. confirmed his grandfather's confirmation; and subsequently, Richard I., John, and Henry III. followed the example of their predecessors.

The printed *Hundred Rolls* of 1275 are next cited, and there we find a jury of inquisition stating that the citizens might run, with their dogs, at hares, foxes, rabbits, and wild cats (*murilegos*) as far as the bridge of Stanes, and to the gate of the park of Enfield, and to Stratford-le-Bow, and to Waltham Holy Cross—a liberty impeded, however, by the Earl of Cornwall's warren at Isleworth, and that of William de Say at Edmonton; by what authority the jurors find themselves unable to say.[3] A marginal note, in Mr. Barclay's hand, tells us that it was suggested, on one side, that there was, in the bridge of Stanes, an allusion to the Staneway near Colchester To this the other side retorted that such a contention was absurd, and that Staines in Middlesex was evidently meant. In view of the warren at Isleworth, and of the remoteness of Colchester, the latter view seems indisputably correct. Also, as against the City's claim it was urged that deer were not mentioned, and that the boundaries given were eminently calculated to keep the citizens out of the Forest. The City, it is needless to say, interpreted the documents differently, and showed a course of chase right through the Forest

1 W. R. Fisher: "The Forest of Essex," p. 202.
2 Dugdale's "Monasticon," I, Part 3, No. xxxix.
3 Hundred Rolls (1812); pp. 403-423.

from Stratford to Waltham Holy Cross; claiming, at the same time, that Matilda, wife of Henry I., built the bridge at Stratford "with the object of facilitating the access of the citizens of London to the great Forest of Essex, for the enjoyment of their usual recreation of hunting there." This imaginative little gambol forms a tail-piece to the grave citations from public records.

The City's own records are next laid under contribution, and the earliest references to its rights of chase appear to occur during the latter half of the fifteenth century.[4] An extract from its *Journal* (vi., fo. 210A) sets forth a dispute between the City and the Abbot of Stratford, who had forbidden "the Common Hunt" (*communi Venatori*) to hunt upon his lands there. A little later on, the Abbot appeared personally and excused himself; and one John Danyelle, the actual offender, "threw himself upon and submitted himself to the g[race]. . . ." In 1465, two citizens lately "indicted for venison," taken by them in the Forest of Waltham, were to be defended at law at the City's expense.[5]

The entries, so far as the Forest is concerned, here come to an end. The next in date is one of 1501, when the Common Hunt is directed "to burn wood in seething of his hounds' meat at Moregate"[6]; and the next is from a *Journal* of 13 Henry VIII., which gives the oath taken by a recently-elected "Common Hunt," but, though it mentions Surrey, Middlesex, and Chiltern, it is silent as to Essex. Sundry details with regard to the officer known as the Common Hunt are found in an extract dated 1558,[7] when two men were appointed in his room; both had "meate and drynke" in the Lord Mayor's house, 4s. wages, and one livery gown out of the Chamber, for so long as they held office. It was also ordered that, putting away some of their worst hounds, they should thenceforth keep but four couples of harriers and four couples of otter-hounds—the latter they were "to provide with spede." Subsequent entries in various books relate to the feeding and housing of the hounds, and, during Elizabeth's reign, "a kennell of spaniels" was added, with a couple of hawks. In 1598 we find the Mayor and other members of the Corporation hunting "at Havering and other places in the Forest of Waltham."[8] And here, again, a marginal

4 38 Henry VI. (A.D. 1460).

5 There are earlier entries on the Forest Rolls of the presentment of citizens for killing deer in Waltham Forest—*e.g.*, Forest Roll—Chapter House: Box 2, No. 3, m. 20 [17 Edward II.].

6 "Repertory," i., fo. 70.

7 "Repertory," xiv., fo. 3.

8 "Repertory," xxiv., fo. 278B.

note in the MS. tells us that, as against this, it was objected that the hunting was only in a wood belonging to the City, and not over the Forest at large; and that no claim on behalf of the Corporation was ever made at any Justice Seat, when charters of privilege were wont to be put in, enrolled, and allowed.

At the beginning of the seventeenth century Mr. Common Hunt, as he is civically styled, was in a bad way. First he gets an allowance of £20 "in regard of the charge he hath bene at in remedying the annoyance of the stinking smelles at the dogg house, and towards his relief, his house being now visited with the plague." Then the dog-house is found "verie old and ruinous and not fit for habitation." But not much was done, for a year later Mr. Common Hunt complains "that it doth rayne into the rooms of the Dogge house throughout, and that the same will, in short time, fall downe." However, some repairs must have been finally executed, since, in 1687, the house and stable were still standing, though found to be "irreparable"; and the rebuilding them is estimated to cost £300, "after the rate of second-rate building, the house containing 20 ft. by 49 ft." Passing over a few other notices, we come to one, dated 1746, when complaint was made that Mr. Common Hunt did not keep a pack of hounds for the use of the City; and, a few days afterwards, a committee was appointed "to enquire into the nature of his office," etc. The report, dated a month or two later, stated, among other things to be gleaned from the extracts already given, that the remuneration attaching to the office included "a house and garden at the Dog Bar, with a proper kennel . . . with coppers," etc., and a salary and allowances amounting in all to something like £180 a year. It appeared that a gentleman huntsman provided, on occasion, a pack of hounds, and was paid £7 per annum in consideration thereof, as had, it was alleged, been for some time customary. Mr. Common Hunt exhibited a great disinclination to being obliged to keep a pack at his own expense, "the proffits of his office being not sufficient to defray the charge thereof, and the purchase of his place lost [*sic*] him two thousand guineas." In spite of this a hard-hearted committee reported "that a pack of hounds ought to be kept, in order to support this City's antient right of hunting"; and the report, moreover, "was well liked of and agreed to" by the Court.

More than half a century later on, counsel's opinion was sought on the question of abolishing the office of Common Hunt. The

opinion given stated that it was quite within the competence of the Corporation to abolish the office, and, indeed, to resign any or all their franchises; but the inexpediency of such a course was strongly urged, mainly, it seems, on the ground that it would destroy an evidence of the dignity and pre-eminence "of the City of London in times of the remotest antiquity," and a parallel was instituted between the office of Grand Falconer and that under consideration. The Corporation, notwithstanding all this, did finally on July 21st, 1807, pass a resolution abolishing the office of Common Hunt, but the extracts before us afford no information as to what solace was given to the then holder of the office.

Though the Huntsman ceased to exist, the hunting continued. For, in the Minutes of Evidence taken before the Select Committee,[9] and ordered to be printed in 1863, Lieut.-Colonel George Palmer, the then surviving Verderer, said that the Lord Mayor and Aldermen had, to his knowledge, exercised for fifty years the right of hunting and killing a stag once a year; and Mr. Alderman Copeland elsewhere (Question 1,131) spoke of having attended the Easter hunts from 1808 downwards.

With this last entry the *Memorandum* ends. Perhaps the brief account of its contents already given may incite someone interested in the subject of the Epping Hunt to pursue the subject, and to see how much further back it can be traced. For it clearly was already an established custom in 1808; and, if so, mention of it must surely occur in old newspapers or elsewhere. So early as February 12th, 1705, John Wroth, then lord of the manor of Loughton, and a Justice of the Peace, is reported[10] to have committed the Lord Mayor's Foot-huntsman to the custody of a constable for hunting the City's hounds in the Forest. Mr. Common Hunt was thereupon ordered to repair to Mr. Wroth and tender bail. Mr. Wroth, who expressed a desire 'to try the City's right of hunting," bound the huntsman and others over to answer at the next Quarter Sessions for unlawfully hunting in the Forest. It was then thought advisable to bring an action against the constable for assault and imprisonment, but it does not appear that anything further was done in the matter. The records of Quarter Sessions, if still in existence, might throw some additional light on it.

WILLIAM CHAPMAN WALLER.

9 Royal Forests of Essex: 798, p. 25.

10 "Repertory Rawlinson" No. 110, fo. 738 (City Records, as quoted in the *Memorandum*).

ON THE OCCURRENCE OF CREPIDULA FORNICATA, L., OFF THE COAST OF ESSEX.

By WALTER CROUCH, F.Z.S. (*Vice-President*).

[*Read, 24th February, 1894.*]

OF the family Calyptræidæ, so far as I am aware, only one genus and species has hitherto been recorded as occurring in Great Britain; *i. e.*, *Calyptræa sinensis*, of Linnæus. This marine mollusc is, I believe, mainly confined to the Southern coast and Channel Islands. I have taken live specimens off the coast of South Devon, and also near Weymouth, Dorset, where it is fairly common, and generally found attached to stones.

On the 6th of September, 1891, when staying at Brightlingsea, in Essex, I ferried over one morning to Stone Point, St. Osyth, there awaiting some friends who were staying at East Mersea, and had agreed to bring the boat over to the "hard" to fetch me; but the sea was very rough, rolling in from the German Ocean with a S.W. wind, making the estuary of the Rivers Colne and Blackwater choppy and dangerous. They dared not venture, nor would any boatman take me across, so I turned my attention to the shore and surroundings. The previous day I had found *Paludestrina ventrosa* by the thousand in the brackish water of the ditch of the Martello Tower on the Point.

In getting marine species I was not very successful, but I took a quantity of *Truncatella truncatula*, *Lacuna crassior*, and a few *Anomia ephippium*. The former were all on the underside of large stones, and had never before been recorded in Essex.

My surprise was great when on turning over a broken bit of oyster-shell (not a native), on the *Zostera* which abounds here and is rolled in like ropes by the sea, to find attached a *dead* shell of *Crepidula fornicata*, a shell common on the east coast of North America. I remained searching for a long time, picking up and examining every bit of oyster-shell I could see, but could not find another.

From later inquiries I ascertained that at some time young American oysters had been laid down here to fatten, but whether from the east or west coast I could not discover. That fact, however, sufficiently accounted for a non-European shell being found there, and I concluded that it had been brought over attached to the oyster. I was aware that French and Portuguese oysters had often

been laid down, but never before this that American ones were also employed for this purpose.

Having a meeting of the Essex Field Club next day at St. Osyth, and along the sea-wall, I exhibited the shell, and subsequently made a note of it in THE ESSEX NATURALIST (Vol. v., p. 260, Dec., 1891.)

I thought no more about this occurrence until the 4th of March, 1893, when I received a small parcel of marine forms from the Crouch river, taken by John Bacon whilst engaged in the oyster fishery on board a Burnham smack. Amongst the contents, fish, nudibranchs, etc., I found a living example of the same *Crepidula*, which he mentioned in his letter as a "Crow oyster on a *Stone*." It may be well to add that Burnham, close to which these were taken, is about sixteen miles in a straight line from Stone Point, and by sea round the coast of the Dengie Hundred and up the river, over twenty miles. I wrote back at once to Bacon to ask if this was the first shell of the kind he had seen, and requested him to look out for more; to which he replied: "I can remember these for fifteen to twenty years; although I have known them so long they are very scarce. I have caught them in different parts of the Crouch and Roach rivers. I do not know, nor do I think, that any American oysters or spat has ever been laid down in either of our rivers."

Later on he told me that he had heard they were fairly common in the Blackwater; but neither my friend Mr. Fitch, F.L.S., who knows the river well, nor myself, has ever caught it whilst dredging, though we have taken over fifty species of mollusca in that river.

On the 15th of April, Bacon sent me another live specimen, and one to Mr. Fitch; both of these were from oysters at the Ferry layings (Cricksea). My specimen died during the night, but I took it up the next day to the Natural History Museum to show Mr. Edgar A. Smith; and we there took out the animal and put it in spirit. The shell of this is very concave, and rich in colour inside, the septum pure enamel-white; and we then compared it with shells from North America in the Museum, which were practically identical.

When visiting Maldon, later on, Mr. Fitch gave me the other shell. It is larger, flatter, and the inside colour more mottled; and the oyster on which it was found is not a native, but a French one

laid down when about a year old. I have lately (December 14th, 1893) received another shell from Burnham-on-Crouch.

All these shells present considerable variability in shape, size, and colouring, much as the American specimens do, as they adapt themselves to the shape of the object on which they adhere.

I have compared the radula of one of these with the drawing by Troschel, to which it corresponds.

I may add that I received with the last shell a quantity of jelly-like spawn, which is said to be that of the mollusc in question.

It is certainly curious to find living specimens of a North American species on our shores. They have, no doubt, been introduced with oysters, have found conditions favourable for existence in our layings; and may even have propagated their species, although we have at present no certain evidence of this.

On reading some notes upon this subject at a meeting of the Malacological Society of London (*vide* Proc. Mala. Soc., Vol. i., p. 19), on the 14th July last, I was informed by Mr. H. Wallis Kew that some dead shells had been found on the Lincolnshire coast, in 1887-8, by Mr. Arthur Smith of Great Grimsby, who had recorded them in the [Yorkshire] "Naturalist" for 1888, p. 275. Mr. Smith's note is as follows:—

"While searching for specimens on Grimsby Beach, I found a shell which I did not recognise as being British, nor had I found or seen such a shell before. This was in November, 1887. Some weeks after I found another. I sent one to the Natural History Museum at South Kensington. It was kindly returned to me as *Crepidula fornicata*, a native of the east coast of North America, and I was told that it had possibly been thrown out of some ship with ballast, and then washed ashore; but as I continued to find specimens I could scarcely think this to be the case. After making inquiries I have learnt that they are brought from America with the American oysters, which are deposited at Cleethorpes for the use of visitors to this seaside resort in the summer season. As yet I have not found living specimens, although a friend assures me they are often adhering the shells of the oysters when first brought here."

The occurrence of this species is again mentioned by Mr. Kew in his "Shells of the Lincolnshire Coast" ("Naturalist," 1889, pp. 358, 359), and I have since had the opportunity, through his kindness, of seeing the shells which were taken in the Humber.[1]

1 I may add that Mr. H. Wallis Kew, F.Z.S., is the author of a very interesting book published recently, on "The Dispersal of Shells."

THE ESSEX FIELD CLUB.

The 144th Ordinary Meeting,

Saturday, February 3rd, 1894.

The 144th Ordinary Meeting of the Club was held in the Lecture-room of the Grosvenor House, Walthamstow (by the kind permission of the Committee of the Walthamstow School of Science and Art) at 6.30 p.m., Mr. T. V. Holmes, F.G.S., *Vice-President*, in the chair.

Mr. J. H. Dowsing, M.I.C.E., was elected a member.

The Secretary announced some very important gifts to the Museum (which are enumerated in the Report of the Council, page 30), and the cordial thanks of the Club were accorded for these interesting and valuable donations.

Mr. W. Cole exhibited on behalf of Mr. Worthington G. Smith, a photograph of a section in a clay-pit at Caddington Hill, near Dunstable, showing a layer of old flint implements (a "Palæolithic Floor") at a height above O.D. of about 590 feet. Also a photograph of a drawing by Mr. Smith of a Celtic interment in a round tumulus on Dunstable Downs, with skeletons of a woman and child, surrounded by a double or triple row of fossil *Echini*, which must have been collected in Celtic times and put in the grave round the bodies, as shown in the drawing. These observations of Mr. Smith's will be given in his forthcoming book, entitled "Man: The Primeval Savage—His Haunts and Relics from the Hill-tops of Bedfordshire to Blackwall."

Mr. Walter Crouch exhibited the interesting old Sheet Almanack mentioned in his paper on "Astronomy in Wanstead" (*vide* Essex Naturalist, vii., p. 160). In this is shown the alteration of style in 1752, when eleven days, from the 3rd to the 13th September were omitted from the Calendar, so that "ye Month contains but 19 days."

Mr. Crouch also exhibited two specimens of a new *Murex* (*Ocinebra*) from the Mauritius, which had recently been figured and described, with other new forms from that locality, by Mr. G. B. Sowerby, F.L.S., etc., under the specific name of *M. crouchi*, in a paper read before the Malacological Society on the 10th November, 1893 (*vide* Proc. Mala. Soc., vol. i., p. 41). At present only four shells of this small but prettily sculptured species are known: the type, and one of a bright red colour, *var. rufescens*, in the collection of Mr. Crouch, and two in the British Museum collection.

PHOTOGRAPHY AS AN AID IN PHYSICAL AND NATURAL SCIENCE.

[*Abstract.*]

Prof. R. Meldola, F.R.S. (*Vice-President*), then delivered a lecture on the above subject. The lecture was illustrated by a large number of photographic slides shown by the oxy-hydrogen lantern, many of them having been lent to Prof. Meldola by the Secretaries of the British Association Committees established for collecting, and encouraging the production of, Geological and Meteorological Photographs.[1]

Prof. Meldola emphasised the historical fact that science had advanced concurrently with the invention of methods for extending the perceptibility of the senses, instancing the balance, the telescope, the microscope, and the spectroscope

1 The Editor gladly acknowledges his indebtedness to the excellent report of the lecture in "Photography" for the basis of the following abstract.

to show what enormous strides in the study of nature had been made directly a new weapon had been placed in the hands of scientific workers. The object of the present lecture was to show how the photographic plate had within the knowledge of the present generation become an indispensable adjunct to science. The lecturer said that the first successful photographs on silver salts were taken by Daguerre [2] who began his researches independentiy, but afterwards entered into partnership with Joseph Nicéphore Niepce, of Châlons; the latter had previously been taking photographs on metal plates coated with bitumen, a method which endures to this day in photo-mechanical work. Fox-Talbot had also been working independently in England with silver salts upon paper, and his process was made public in this country about the same time that Daguerre's method was made known in France, both of which events occurred in 1839. After the publication of the discoveries of Daguerre and Fox-Talbot, the chemical and optical departments of photography became united. The *camera obscura* is said to have been invented by Porta in the sixteenth or seventeenth century, but perhaps it was known to Roger Bacon in the thirteenth century.

As he intended to speak upon the scientific uses of photography, he would first point out that the camera image, being formed by a lens, is not much limited in size, either in the way of enlargement or reduction. For instance, a lady had just placed in his hands the smallest Johnson's Dictionary in the world; the reading of it had to be done through a magnifying glass. As the little volume was indirectly issued as an advertisement, he would not push it any further. This reduction by means of photography was largely utilised during the siege of Paris by the establishment of the pigeon post; documents and newspapers were photographed on a greatly reduced scale upon collodion films, which were then stripped off the glass, placed in quills, and carried attached to the tail feathers of the birds. When the destination was reached, these missives were projected on to a screen and enlarged, by means of the optical lantern, and anything required from them was taken down by shorthand reporters in the room.

Mr. Meldola said that photography might be used for purposes of fraud, such, for instance, as the representation of ghosts in the so-called "spirit photographs," and he exhibited some pictures on the screen, photographed by one of his students, in which the person acting as ghost had been in position during but a portion

2 In a report of the lecture published in "Photography," I am credited with the statement that Daguerre was the first to introduce silver salts into photography, and this statement is made the subject of an editorial criticism. The writer of the note has, however, fallen into some error or must have misunderstood my remark. That I was aware that Schulze had previously experimented with silver compounds appears from the following extract from my book on "The Chemistry of Photography," which was published in 1889, the lectures forming the subject of the work having been delivered in 1888:—"The first distinct statement as to the darkening of a silver compound being the result of the influence of light was made by a German physician, J. H. Schulze, who in 1727 observed that when a solution of silver in nitric acid was poured on to chalk the precipitate darkened on the side exposed to light," etc. (p. 36).

Again, in a Friday evening discourse delivered at the Royal Institution on May 16th, 1890, I said:—"If the word 'photography' be interpreted literally as writing or inscribing by light, *without any reference to the subsequent permanence of the inscription*, then the person who first intentionally caused a design to be imprinted by light upon a photo-sensitive compound must be regarded as the first photographer. According to Dr. Eder, of Vienna, we must place this experiment to the credit of Johann Heinrich Schulze, the son of a German tailor, who was born in the Duchy of Magdeburg, in Prussia, in 1687, and who died in 1744, after a life of extraordinary activity as a linguist, theologian, physician, and philosopher. In the year 1727, when experimenting on the subject of phosphorescence, Schulze observed that by pouring nitric acid, in which some silver had previously been dissolved, on to chalk, the undissolved earthy residue had acquired the property of darkening on exposure to light. This effect was shown to be due to light, and not to heat. By pasting words cut out in paper on the side of the bottle containing the precipitate, Schulze obtained copies of the letters on the silvered chalk. The German philosopher certainly produced what might be called *a temporary photogram*." Proc. Roy. Inst., vol. xiii., p. 134. I have nothing to add to these extracts; they are amply sufficient to show that I was acquainted with the work of Schulze.—R.M.

of the whole exposure, so that solid objects were seen through the figure in the resulting print.

In astronomical photography, Professor Meldola stated, dry plates are particularly useful, and they are now being employed for an international survey of the heavens. He here exhibited two fine slides by Mr. Isaac Roberts, a pioneer in such work. The one photograph represented a nebula in the constellation of the Little Dog, and the other the Great Nebula in Orion. In these, he pointed out, were also great numbers of stars, and among them some invisible to the human eye, except by the aid of photography. Photography has also revealed the fact that some objects, hitherto classed as stars, and mapped as such, are in reality small nebulæ. These photographs had been taken with a reflector, and not with a lens, with an exposure of four hours, and by using most delicate appliances to enable the telescope to follow accurately the apparent motions of the heavenly bodies without vibration. The exposure given in taking each of the nebulæ was four hours. An American astronomer once spent many years in drawing the Great Nebula in Orion. He next exhibited another photograph, by Mr. Roberts, of a beautiful nebula in Andromeda, which also was taken with a reflector.

Photography might also be used for securing records of natural phenomena. He projected on the screen two slides, representing the river at Wakefield in its ordinary condition, and during the flood of 1892. These, and some other slides, belonged to a committee of the British Association, which is collecting photographs of meteorological phenomena; the slides had been lent to him by Mr. Symons. He exhibited also frost and snow scenes, and said that recently some beautiful photographs of snow crystals have been taken on the Continent. When dealing with cloud photography he described Mr. Clayden's work, and projected specimens on the screen. He also exhibited a striking photograph of the Malvern Hills, the crests only projecting above the mist, which latter seemed rolling onwards like a great sea. Photographs of lightning flashes were then exhibited, one by Mr. Frank Hughes, showing that flashes are not always single, and that several flashes may occur from different parts of a cloud at the same time. He said that lightning flashes are sometimes double, and that separate images are sometimes obtained by moving the camera while the electrical discharge takes place.

Another Committee of the British Association is now using photography in making an ethnographic survey by Mr. Francis Galton's method, to add to the stock of information about race characteristics. Photography is also used in aid of archæology, and sometimes to give evidence relating to disputed points. For instance, various prehistoric temples are supposed to be "oriented," so that the chief altar directly faces the rising sun on the longest day—the summer solstice. The lecturer exhibited a slide of the rising sun at Stonehenge on the longest day of the year, taken from what is assumed to have been the most sacred part. The sun then appeared on the apex of a huge stone, called the Friar's Heel, and chanced on that particular morning to be surrounded by a halo, so as to make a striking picture, seen through the "bridge," if so it may be called, formed by two perpendicular stones in the foreground, between them supporting one huge stone on the top. The lecturer next spoke of the way in which photography is being utilised by the Geological Photographs Committee of the British Association, and showed some slides lent by the Secretary to the Committee, Mr. Jeffs, representing inland erosion by wind and water, the erosion of sea coasts, the formation of caverns, the nature of basaltic formations, and the records of glacial action in former times preserved by certain rocks. He exhibited a photograph of part of

perhaps the oldest forest in existence, belonging to the coal period; it is at Partick, near Glasgow, and the stumps of the trees are still standing as shown in the picture. He also exhibited slides in relation to "physiography," or what the Germans call "Earth knowledge." Some of them illustrated the ways in which rivers cut valleys through both soft earth and hard rocks.

Prof. Meldola then came to the use of photography in physics. He explained the analysis and synthesis of white light, and spoke of the photographing of the spectrum. He exhibited a solar spectrum with plenty of lines in it, which he had taken when associated with Mr. Norman Lockyer some years ago. He also told of Dr. H. W. Vogel's origination of orthochromatic photography in 1874, and how that branch of photography has been extended by the researches of Mr. C. H. Bothamley, technical organiser for the county of Somerset. He dealt with the wave theory of light, the phenomena of interference, and stated that the first scientific use of photography was made in 1803 by Dr. Thomas Young, in photographing Newton's rings at the Royal Institution. Lord Rayleigh has just been photographing interference bands, applying the phenomena to the revealing of the degree of approximation to truth of asserted truly plane glass surfaces. Some of the results, lent to the lecturer by Lord Rayleigh, were exhibited on the screen. The photographs had been taken by pure sodium light, and plates made orthochromatic by ammoniacal cyanin.

The lecturer lastly spoke of the "inductoscript" taken upon photographic plates without light, by the Rev. Professor Smith, of Oxford. Electricity of rapidly alternating current was used; a coin was connected with one terminal, and a sensitised plate with the other, and the coin and plate were brought very near to one another. Then all light being excluded, the current was switched on and was continued for fifteen minutes. At the end of that time the plate was developed, and there was an image of the coin. A striking feature of it was that from every projection in the milling there was a brush of rays, as one sometimes sees depicted round the sun in old paintings. Prints could also be copied by this process. Prof. Meldola said that he could not explain the production of this picture; the thing was not understood, it had yet to be investigated.

The Chairman, Mr. T. V. Holmes, in moving a vote of thanks to the lecturer, remarked that Prof. Meldola was well aware of the extent to which photography was being utilised by the British Association, because he was the Chairman of the Committee of the Corresponding Societies connected with the Association, of which societies the Essex Field Club was one of the chief. He hoped that its members would help to supply the photographs the Association required The value of photography in geology was very considerable, and in two instances which had occurred lately within his own knowledge in Essex, he had regretted the absence of such a truthful record of observation. In surveying the railway cutting between Upminster and Romford for his paper in the ESSEX NATURALIST (vol. vii., p. 1), he had found Boulder-Clay three miles farther south than had previously been known. He had taken several geologists to the spot in order that they might see the evidence of the fact with their own eyes, but a good photograph would have been a sufficient record without further trouble. Again, in the Romford cutting of the same railway, he had seen evidence of the existence of an old river-bed, but a day or two later, when revisiting the spot with some geological friends, the ground had been sloped, and in the absence of photographs all chance of showing his friends what he had seen on former visits had vanished. The river at Wakefield had been favoured in the photograph shown by Prof.

Meldola, for the light so caught it that it made the water look bright ; whereas when he saw it some years ago it was as black as ink ; he hoped that it was better now.

Mr. Andrew Johnston (Chairman of the Essex County Council), in seconding the vote of thanks, said that about 1839 or 1840 he became the possessor of two of the earlier photographs ; one was a portrait of the Pope, and the other a picture of St. Peter's, at Rome. In course of years they grew dusty ; he removed the cover glass from one, rubbed off the dust, and at the same time wiped the picture clean off the plate. The other he presented to a society which preserves ancient photographs.

Mr. John Spiller thought that Prof. Meldola's programme might have been extended to photomicrography, and to some other branches. The use of photography at solar eclipses might have been noticed. He possessed a photograph of the corona, taken during one of the early eclipses by Lord Lindsay, who had given it to him.

The Rev. Mr. Howell had heard that small cameras could be used for some kind of stellar research. Was that so ? He believed that if it were pointed to the north, the stars nearest the pole would describe circular tracks on a sensitive plate during long exposures, and that the more the camera was pointed towards the south, the more did the tracks of the stars approximate on the plate to a straight line. Last year a man taking a shot with a hand camera at the stars was said to have accidentally photographed a meteor as well.

Mr. F. H. Varley, C.E., had hoped that when Prof. Meldola was dealing with interference phenomena, he would have spoken of the photographing of colours, by Prof. Lippmann's process, especially as the lecturer had one of those photographs in his possession. He should also have liked to have heard something of the method of building up pictures resembling the tints of Nature, by the three colour-processes.

Mr. A. P. Wire called attention to a suggestion made in "Photography" some time ago that advantage to all concerned might be gained if the local photographic societies in Essex and the Essex Field Club were to work together in obtaining faithful photographs of natural phenomena and old buildings, etc., for permanent registration.

Mr. W. A. Longmore, President of the Walthamstow Literary and Scientific Institution, spoke of the interest with which he had listened to the lecture, and hoped that more meetings of the kind might be held in Walthamstow.

Prof. Meldola, in reply, said that the British Association Committee recommended the use of orthochromatic plates in geological photography, as furnishing much more striking and valuable pictures than ordinary plates. In reply to Mr. Howell's remarks, he had never seen photographs of stars taken by an ordinary camera, and he thought that nothing would be gained by obtaining streaks of light described by images of their paths across the plate. In the time at his disposal it was clearly impossible to cover the whole ground of the scientific uses of photography, hence the omissions which had been mentioned by some of the speakers. As to Mr. Varley's criticism there was no doubt, he said, that Prof. Lippmann's method was the greatest advance which has ever been made in the photographing of colours, and he had received from him a very beautiful specimen of the solar spectrum. He had lent it, and was therefore unable to bring it to the meeting. Moreover, it would have been difficult to arrange the lantern to project the image by reflected light, which was the way the Lippmann images must be viewed.

The meeting then resolved itself into the usual conversazione, light refreshments being served in an adjoining room.

Meeting in Furtherance of the Proposed Epping Forest Free Local Museum.

February 24th, 1894.

As long ago as December 8th, 1883, a meeting, under the chairmanship of Mr. E. N. Buxton, was held at his house at Buckhurst Hill, to consider a scheme for the establishment in Queen Elizabeth's Lodge, Chingford, of a Public Local Museum of Natural History and Antiquities for the Forest Districts and the County generally (see Report in the "Journal of Proceedings," E.F.C., vol. iv., pp. lxvi.—vii.) The meeting was attended by many taking a strong interest in the Forest, and resolutions in favour of such an institution, and empowering a Committee to appoint a deputation to wait upon the Conservators to solicit their active co-operation in the scheme, in conjunction with the Essex Field Club, were unanimously passed. But unfortunately the Committee appointed was unable to proceed in the matter beyond the preliminary stages owing to the opposition of a high official of the Corporation, who refused to entertain the scheme except under conditions that the Club could not comply with. Although thus checked, the proposal was not forgotten, and recently the Council of the Club made an application to the Epping Forest Committee, submitting a scheme for a local Museum in the Lodge, and asking the Committee to find the capital sum required for cabinets, cases, etc. A reply was received from the City Solicitor saying that the Epping Forest Committee "cannot pledge themselves to allow the Banqueting Room to be used as a permanent Museum, but they are prepared to entertain any application for the temporary housing of loan collections of the kind indicated in the scheme accompanying your letter.' Many local members and residents being very desirous that a Museum for the Forest should be established, determined to act upon this qualified permission, and a small Committee was therefore formed for the purpose of assisting the Council in appealing for funds to furnish cabinets, cases, etc., and then making another application to the Conservators, simply asking for the use of the room and approaches, provision for warming and cleaning of the same, and the services of a caretaker. It was considered that promises of subscriptions of £150 or £200 would justify the Club in again approaching the Epping Forest Committee with a distinct proposal, which the Council had reason to think would be accepted.

An illustrated pamphlet, fully explaining the nature of the proposed Museum, and detailing the kind of specimens to be exhibited, was prepared by the Committee,[1] and a certain amount of support having been promised, a meeting was called, in furtherance of the proposal, in the Banqueting Room of the Lodge (by kind permission of the Superintendent), on Saturday afternoon, February 24th, 1894. The Rev. A. F. Russell was, on the proposal of Mr. C. C. Black, voted to the chair, and there was a good attendance of scientific gentlemen interested in the scheme, of local residents, and members of the club. The company included the following: Professor C. Stewart (Conservator of the Museum of the Royal College of Surgeons, and President of the Linnean Society), Professor R. Meldola, F.R.S., Professor Boulger, F.L.S., F.G.S., Mr. J. E. Harting (Librarian to the Linnean Society, and editor of the "Zoologist"), Mr. Howard Saunders, F.L.S. (author of an "Illustrated Manual of British Birds," and editor of "Yarrell"), Rev. W. T. Dyne, Dr. Shepherd Taylor, Mr. Walter Crouch, Mr. C. C. Black, Rev. W. C. Howell, Rev. W. L. Wilson, Mr. F. H. Varley, Mr. Porter, Mr. G. Day, Mr. A. P.

[1] "An Epping Forest Free Local Museum: a proposal." Buckhurst Hill, 1894.

Wire, Mr. Elliott, Mr. Sauze, Mr. Avery, Mr. Bewers, Dr. Pridie, Mr. W. Cole, Mr. B. G. Cole, Mr. A. Sheldon, Mr. S. Foot, Mr. Bruce Cook, Rev. C. G. Savill, Mr. Cornish, Mr Chatfield, Mr. H. A. Cole, Mrs. Yeates, Miss Bentley, Miss Cole, Miss J. E. Cole, Mr. T. Hay Wilson, and many others.

The Chairman said that the scheme was by no means a new one. Ten years ago several of the gentlemen present that day were invited by Mr. Buxton to go to "Knighton" to talk over a proposal to found a museum in that very room. Various reasons prevented the scheme from being carried out. Most of those reasons had been removed during the last ten years, and at the present time there seemed to be no difficulty in the way. The Epping Forest Committee had given conditional consent for them to use that room—not in perpetuity, but to allow them to place a local museum there. They could at any time withdraw their sanction, but such a thing was not likely to happen if the museum was successful. The people who were specially asked to consider and support this scheme were not the scientific people, but people who might be classed as "open-air naturalists;" they did not pass much time in the laboratory or study in dissecting specimens, but observed these subjects in the open air. This would be the line of study taken up, he thought, by those in the neighbourhood who would support that museum. The museum would be managed by the council of the Essex Field Club, who have also the management of the museum at Chelmsford, and specimens would be continually changed from one museum to the other. Most small museums soon become tiresome from their sameness, but in this museum they hoped to have a constant supply of fresh subjects of interest, so that it would never be dull. If the museum met with a good start, and everything was carried out properly, there would be little fear but that the Epping Forest Committee would give them such support as they could. Mr. Cole had been working very hard in bringing forward this scheme—he had drawn up the proposal and given them the details which were laid before them, and Mr. H. A Cole had furnished them with capital illustrations. The illustrations of Queen Elizabeth's Lodge—both inside and out—were pictures which they would all be glad to keep.

Mr. W. Cole said they proposed to keep the museum entirely local, to represent, from a geological, antiquarian, and natural history point of view, the Epping Forest district; and nothing would be taken into the museum except from that district. They also desired that the specimens should be exhibited in an educational manner, not merely by a series of cabinet specimens, but by specimens having some teaching purpose, and illustrated by drawings, diagrams, maps, and so on. They proposed to take in antiquities, drawings, and paintings, and that the grand staircase should be furnished with movable frames, so that a constantly changing series of drawings and paintings might be received. As to antiquities they already had considerable collections. Two of the most interesting collections they had were the objects obtained during the Club's exploration of the Forest camps. Then they had in their hands at present collections of fungi preserved by Mr. English, and the wild flowers of the Forest, and insects, and illustrations of the work of prehistoric man, both in the Forest and the Lea valley. All these would form interesting exhibits as a commencement, and there would be no difficulty in adding to them as time went on.

Mr. Cole read letters from Sir Wm. Flower, Director of the British Museum of Natural History and Mr. McKenzie, Superintendent of the Forest, who was prevented from being present, but hoped that the meeting would be successful. Sir Wm. Flower wrote:

"I have read with great pleasure and interest the proposal for establishing an Epping Forest Free Local Museum in Queen Elizabeth's Lodge at Chingford, and wish I could attend the meeting to further the object next Saturday, but engagements have made it quite impossible. I wish to urge upon you the desirability of keeping the collection absolutely to local objects, *without any exception*. In a town or county museum, especially if connected with general teaching, an *Educational Museum* requires other than local specimens, but the object is different in this case, and although the Museum ought of course to be arranged *educationally*, if once you open the door to admit specimens not from your own district, as a paragraph in the proposal seems to indicate that you may do, you will never know where to stop."

The Rev. W. T. Dyne said he came forward as representing the local thirst for knowledge, which they hoped these gentlemen were going to satisfy. It seemed to him that this museum would meet a want that had been felt by three classes of people. They who lived in that district felt the want of such a museum and it promised to be of great educational benefit. The people who came down there from London and hovered about the station, and never got farther off —some of them perhaps wished they would go a little farther off—would be encouraged through this museum to explore the Forest. The museum might also be the means of awakening an interest in children's minds in the beauties of nature in the grand woodlands, and to many members of London natural history societies visiting the district such an institution would be very helpful and encouraging. He moved that :—

"*This Meeting is of opinion that it is desirable (with the consent of the Conservators) that a small free Local Museum should be established in Queen Elizabeth's Lodge, and pledges itself to do all in its power to promote the same.*"

Professor C. Stewart cordially seconded the resolution. He felt strongly the very great advantage from many points of view of such a museum as it was intended to found in that antique building. He looked upon it, if properly carried out, as no doubt it would be in the able hands in which it was placed, as something which would supply to many inquiring minds a direct and emphatic answer to such questions as, "What a certain thing was, what its life was, what it fed upon, what its enemies were," etc. There were few more innocent pleasures, and delightful pursuits than natural history carried out in the field. Useful though dissection in laboratories and class-rooms might be, it was in the study of the lives of these creatures that the main educational value and interest lay. He wished most heartily for the success of the scheme, which he thought was well conceived, and there could be little doubt that it would be thoroughly and efficiently carried out.

Mr. J. E. Harting, in the course of his remarks in support of the resolution, said that the aim and object of a local museum such as was proposed to be established was not merely to exhibit rare and so-called curious specimens, but to develop and foster in the minds of all classes of people an intelligent appreciation of the common objects of nature by which they were surrounded, and to provide them *with the means of informing themselves about such objects*. Mr. Harting could not advocate the indiscriminate collecting, nor the conservation in the museum of specimens of all the birds of the Forest, for instance—such specimens would occupy too much space and cost too much money—but collections of invertebrates, such as land and fresh-water shells, with insects, mosses, fungi, etc., were not open to this objection, and could be made interesting and educationally valuable in a high degree. It should be borne in mind, that the more

simple and *economical* the arrangements of a local museum were at the outset, the more steady the rise of interest, the more gradual its progress, and the offers of co-operation in its formation — the *greater* will be the chance of ultimate success. For educational purposes it seemed to him that there could be nothing better than the exhibition of a series of well-selected *types*, supplemented with accurate illustrations, each with a line or two of description such as may be seen in the Mineralogical Gallery of the Natural History Museum. More than this could hardly be attempted, having regard to the size of the building. The selection and arrangement of such types would be best carried out by a *Museum Committee* composed of specialists who, each in his own department, might furnish a simple scheme for an instructive exhibition of such objects as those to which he has devoted particular attention, whether they be geological, botanical, zoological, or archæological. In a comparatively inexpensive way much may be done by means of charts and diagrams suspended on the walls—and the main object in view should be not to show what a mass of material has been collected by those who are directly concerned with the formation of the museum, but to indicate to the visitor what he may expect to discover and examine for himself out of doors—in other words to put him in the way of making original observations. He felt sure that a visitor to the museum so instructed would derive tenfold enjoyment in his future rambles through the Forest.

Prof. Boulger, in reply to some observations made during the afternoon, said that he was sure nothing could be further from their minds than a desire that there should be an extermination of the animals or plants that exist in the Forest at the present time. He did not think there were many things in the Forest that would be in danger of extermination, and the small number of specimens required in the museum, and with which good educational work could be done for the benefit of visitors and residents, could be obtained without any risk of that kind.

Prof. Meldola highly approved of the motion submitted by Mr. Dyne. This idea of a local museum in connection more especially with the Forest district had been often in their minds, and he remembered being present on the occasion to which the Chairman referred when they held a meeting at Mr. Buxton's to consider the scheme. Things had ripened since then, and it seemed to him the opportunity for action had now arrived. On behalf of the Essex Field Club he could assure the meeting that if they met with adequate support they would do their share of the work to make the museum a thoroughgoing success. The institution, as had been pointed out by Sir William Flower, should be strictly a local museum. By so limiting it the best kind of educational work could be accomplished.

Mr. Howard Saunders wished the museum great success. If they had an able curator and a special committee he thought something might be done to assist real students of natural history, and not destroyers, by guiding them to the more interesting parts of the Forest and pointing out some of its more interesting features—more particularly its sylvan features.

The motion was carried by acclamation.

Mr. T. Hay Wilson pointed out that some of the members of the Essex Field Club had already subscribed very liberally towards the museum at Chelmsford, from which they would draw very considerably for their local museum, and it behoved the local residents to support the present scheme. He suggested that a subscription list be at once commenced, so that the local committee might be able to approach the authorities with a definite scheme. They estimated

the sum required to be £300, but it was quite possible to commence with a very much smaller sum, and he thought if the Council of the Field Club had promises to the extent of £100 or £150, they would be safe in approaching the Forest Committee, and offering to commence the work at once. With £100, and the materials they already had, they might go to the Corporation. He moved:—

"*That a Subscription List for the raising of the necessary Funds be at once commenced, so that the Local Committee may be enabled to approach the authorities with the definite scheme.*"

Dr. J. Shephard Taylor seconded the resolution, which was also carried unanimously, and subscriptions of about £30 were promised in the room.

Mr. Cole proposed a vote of thanks to the Epping Forest Committee for the use of the room, and particularly to Mr. McKenzie, who had met them in the very kindest manner. He might say that in addition to what Mr. McKenzie said in his letter, he had promised, if the museum was established, that he would do all in his power to obtain specimens, and see that the place was carried on well.

The Rev. W. L. Wilson seconded the motion, which was carried.

A vote of thanks to the Chairman closed the proceedings.

As most of those present were desirous of attending the Ordinary Meeting of the Club in the evening, the usual "high tea" was served in the Forest Hotel adjoining the Lodge.

The 145th Ordinary Meeting.

Saturday, February 24th, 1894.

The 145th Ordinary Meeting of the Club was held in the Banqueting Room at Queen Elizabeth's Lodge, Prof. Meldola, F.R.S. (*Vice-President*), in the chair.

The Chairman referred to the meeting held that afternoon in connection with the scheme for the Forest Museum, and read the resolutions that had been passed. The scheme had his hearty approval, and he commended it to the support of the members, more especially those on the Metropolitan side of the county. He thought that everyone present would be pleased with the antique room in which they were assembled, and would agree that it could be put to no better or more appropriate use than as a home for a local museum, devoted to the elucidation of the natural history and antiquities of the charming district of Epping Forest, in which they all took so much interest.

In accordance with Rule VII., nominations were made on behalf of the Council of members to serve as officers of the Club for the ensuing year. No other nominations were made. Announcement was also made of vacancies on the Council, and nominations of members to fill the seats in compliance with the Rules. For these see Report of 14th Annual Meeting (*supra* p. 26).

Mr. Walter Crouch was chosen auditor on behalf of the Council, and Mr. H. C. Snell on behalf of the members.

Mr. T. Hay-Wilson exhibited, on behalf of Mr. Bartrip, a remarkably fine nest of *Vespa vulgaris*, usually so difficult to obtain in a perfect condition, as Mr. Elliott remarked, taken about forty years ago at Chingford.

Mr. Wilson also exhibited a remarkably globular stone, found in a gravel-pit about 150 yards S.E. of the Queen Elizabeth's Lodge, which pit he had described in The Essex Naturalist, vol. vii., p. 75. The stone had been thrown up with drift gravel from a depth of nine or ten feet. The authorities at the Guildhall Museum had pronounced the stone to be a "cannon-ball."

Mr. Cole thought that Mr. Wilson's specimen more probably had some connection with the preparation of corn for food, and that it was really the crusher of a quorn.[1] He had obtained some years ago a pestle of apparently the same kind of stone (? Hornblendic Granite or Hornblendic Gneiss), from a few feet below surface at Loughton. This was described and figured by Mr. Worthington Smith in THE ESSEX NATURALIST, vol. ii., p. 4.

Mr. T. V. Holmes, F.G.S., said that the stone looked like a round flint pebble with those curious roughnesses over its surface so common in flints picked up on the seashore. It was very likely, as Mr. Cole had suggested, intended for use as a pestle for grinding. In the gravel-pit where it was found there were no stones like it, and he had no doubt it came from the surface, where it had been buried through the growth of soil by the agency of worms, etc. It seemed to be a perfectly natural stone, and the presumption that it had been used for an artificial purpose depended largely, he thought, on the fact that the gravel of the pit contained no stones at all like it. Had a certain percentage of the stones in the pit resembled it, even approximately, it might well have been originally not on, but in, the gravel, and probably have never been used by man. Being, as it was, utterly unlike any stone *in* the gravel, it was much more probable that it was brought down from elsewhere for some special purpose by human agency. This last supposition, too, leaves the date an open question; while as the surface of the pit was apparently 180 to 190 feet above O.D., a human relic, *in* the gravel, would probably have a truly tremendous antiquity.

Mr. W. Cole exhibited some twigs of Black Currant invested with Scale-insects (a species of *Aspidiotus*), which had occurred in great numbers on the bushes in a garden in Buckhurst Hill.

He also exhibited some specimens of British butterflies and moths, illustrating the phenomena of true Dimorphism, and Seasonal-Dimorphism.

Also some samples of naphthalene, compressed in the form of small cones, with fine metal points inserted, so that the preservative could be easily stuck in insect cases, etc.

Prof. Meldola had heard it stated that naphthalene was liable to cause "grease" in specimens of lepidoptera. It was possible that this might be true, and he should be glad to have the experience of collectors on the point.

Mr. F. H. Varley read a note, "Tenacity of Life in a Gold Fish," and exhibited a coloured drawing he had made in illustration of his remarks. (*Vide* his note on another page.)

Mr. Walter Crouch exhibited some Romano-British pottery which had been found on the 27th January, in the gravel pit on St. Swithin's Farm, Barking Side, about one foot under the surface soil. One is a portion (about one-half) of a small round cinerary urn of red clay with rudely indented pattern. It measures 5⅛ inches in height, the greatest diameter being 6¼ inches, the rim 5⅜, and the base 3 inches. The other, a small black pipkin, nearly perfect, 3 inches high, 4 inches in diameter, the base 2¾ inches. A few other fragments were also unearthed. As already mentioned, when the Club visited the spot on July 1st last year (*vide* ESSEX NATURALIST, vii., pp. 104—7), nothing has been found there since March, 1892; and it is satisfactory again to come upon some relics of early occupation in this high ground.

1 Curiously enough there is a specimen in the collection of stone implements in the Guildhall Museum, labelled "Pounder for preparing grain, roots, etc. Found in Moorfields, 1805." and there is also another specimen from Suffolk.—ED.

Mr. C. Oldham exhibited a box of Forest lepidoptera, including *Euthemonia russula*, and *Zygæna filipendulæ* from Theydon Bois.

Mr. Crouch referred to observations he had made on the sun-spots which had been so prevalent during the last few weeks, and Prof. Meldola remarked how readily observations on sun-spots could be made by using the telescope for projecting the image of the sun on a screen. Sketches could easily thus be traced.

A paper was read "On the occurrence of *Crepidula fornicata*, Linn., off the Coast of Essex," by Mr. Crouch (see p. 36) who exhibited specimens of the *Crepidula* in illustration of his remarks.

Mr. George Day, F.R.M.S., then read a paper on "Some Essex Folk Lore," an abstract of which will be printed in THE ESSEX NATURALIST.

The Chairman thought that the members would welcome Mr. Day's paper on a subject of very considerable interest in connection with beliefs and fancies current in early stages of civilisation, and one which even possessed a distinct scientific value in itself. A long discussion on various points in the paper was carried on by the Chairman, Prof. Boulger, Mr. F. C. Gould, Mr. Wire, Rev. W. C. Howell, Mr. Varley, Mr. Day, and others.

During the discussion Mr. Crouch exhibited, on behalf of Mr. G. E. Pritchett, F.S.A., who had to leave early, a forked hazel branch which had lately been used as a "divining rod" for finding water, and demonstrated the manner in which it had been held by the "water finder," Mr. W. Stone, for the purpose. Mr. Pritchett was present when it was employed in January last at Thremhall Priory, Takeley Street, near Bishop's Stortford, the present residence of Mrs. Archer Houblon. A spring of water was subsequently found at the spot where the rod had bent down, whilst tightly held in the hands of Mr. Stone, who claims thereby to have discovered the exact place. On the second occasion, when the "divining rod" was used by Mr. Stone at Uphall, near Braughing, Herts, last February, Mr. Pritchett was not present. It was held firmly, and when the right spot as supposed was traversed, the "rod" was drawn down, causing one branch of the fork to split. The ground selected was afterwards dug for fifty-five feet, but no water has been found and further search for water at that spot has been abandoned for the present.

A vote of thanks to Mr. Crouch and Mr. Day for their papers concluded the business of the meeting.

THE 14TH ANNUAL GENERAL MEETING AND 146TH ORDINARY MEETING.

Saturday, March 31st, 1894.

THE 14th Annual General Meeting of the Club was held in the Buckhurst Hill Hall, Buckhurst Hill, at six o'clock, the President, Mr. F. Chancellor, in the chair.

Desiring, if possible, to catch an early train back to Chelmsford (in which endeavour he was, unfortunately, not successful), Mr. Chancellor, by consent of the meeting, read his Address before the commencement of the formal business. The subject was "A Sketch of the Development of Architecture in Essex," which was illustrated by a large number of wall-diagrams, specially drawn for the occasion by Mr. Wykeham Chancellor. The address will be printed in full in THE ESSEX NATURALIST.

At the commencement of the formal business, the Secretary read the minutes

of the 13th Annual Meeting and Special Meeting held at Chelmsford on April 15th, 1893 (see ESSEX NATURALIST, vol. vii., p. 78), which were confirmed.

The Report of the Council on the year's work was read and received (see *ante* p. 26).

Mr. Crouch, one of the Auditors, read the Treasurer's Statement of Account, which had been carefully audited by himself and Mr. H. C. Snell, and which was also received and adopted, after some discussion, initiated by Mr. Webb, on the cost of printing the publications of the Club. It was also resolved that the usual statement of assets and liabilities should be omitted in future from the Treasurer's Statement, as being too indefinite. The Club possesses some very valuable assets in books, specimens, cabinets, stock of publications, etc., but it would be very difficult to state the money equivalents of such assets.

For the first time the modifications of Rule VII., passed at the last Annual Meeting, came into operation, no ballot taking place if the number of members nominated to fill the posts of the officers do not exceed the vacancies to be filled.

At the meeting on February 24th last, the following Members of the Council retired under Rule IV., but offered themselves for re-election, and were duly proposed and seconded for election :—Mr. Walter Crouch, F.Z.S., Mr. F. W. Elliott, Mr. Andrew Johnston, J.P., Chairman C.C., and Mr. F. H. Varley, F.R.A.S.

In addition, General Branfill and Mr. C. Oldham wished to retire, owing to inability to attend evening meetings. To fill these two vacancies, Mr. I. Chalkley Gould and Mr. John Spiller, F.I.C., F.C.S., were proposed and seconded.

As officers for the year, the Council nominated the following :—*President*, Mr. F. Chancellor, J.P., F.R.I.B.A. ; *Treasurer*, Mr. A. Lockyer ; *Hon. Secretary*, Mr. W. Cole, F.E.S. ; *Assistant Hon. Sec.*, Mr. B. G. Cole ; *Librarians*, Mr. E. Durrant and Mr. E. A. Simons ; *Hon. Counsel*, Mr. Charles Browne, M.A., F.S.A. ; *Hon Solicitor*, Mr. H. I. Coburn.

No other members having been proposed, the above gentlemen stood elected by Rule VII. as members of the Council and officers for the ensuing year, and were so declared by the Chairman.

[The following therefore constitute the Officers and Council for 1894 :—

PATRON.—H.R.H. the Duke of Connaught and Strathearn, K.G.

PRESIDENT.—Frederic Chancellor, J.P., F.R.I.B.A., &c.

PERMANENT VICE-PRESIDENTS.—(*Under Rule IV.*).—Prof. R. Meldola, F.R.S., F.R.A.S., F.E.S., &c. (*President* 1880-82) ; Prof. G. S. Boulger, F.L.S., F.G.S. (*President* 1883-84) ; T. V. Holmes, F.G.S., M.A.I. (*President*, 1885-87) ; E. A. Fitch, J.P., C.C., F.L.S., F.E.S. (*President* 1888-91) ; Dr. Henry Laver, F.L.S., F.S.A. (*President* 1892).

OTHER MEMBERS OF COUNCIL.—John Avery, C.A. ; Rev. R. E. Bartlett, M.A. ; C. E. Benham ; E. N. Buxton, J.P., Aldmn. C.C., D.L., &c. ; Miller Christy, F.L.S. ; Walter Crouch, F.Z.S. ; Bryan Corcoran ; L. Cranmer-Byng ; George Day, F.R.M.S. ; F. W. Elliott ; A. J. Furbank ; I. Chalkley Gould ; Andrew Johnston, Chm. C.C., J.P., &c. ; Rev. W. C. Howell, M.A. ; Rev. W. S. Lach-Szyrma, M.A. ; Thomas J. Mann ; J. H. Porter ; Right Hon. Lord Rayleigh, F.R.S. ; J. C. Shenstone, F.R.M.S. ; John Spiller, F.I.C., F.C.S. ; J. C. Thresh, D.Sc., M.B. ; F. H. Varley, F.R.A.S. ; T. Hay-Wilson ; Rev. W. L. Wilson, M.A.

HON. TREASURER.—Alfred Lockyer.

HON. SECRETARY AND EDITOR.—William Cole, F.E.S.; ASSISTANT HON. SECRETARY.—B. G. Cole.

HON. LIBRARIANS.—Edmund Durrant and E. A. Simons.

HON. COUNSEL.—Charles Browne, M.A., F.S.A.; HON. SOLICITOR.—H. I. Coburn.]

Mr. Chalkley Gould proposed, and Mr. Crouch seconded, a vote of thanks to the President for his address, which they considered would be a most useful paper when printed in THE ESSEX NATURALIST, for all taking an intelligent interest in the numerous grand relics of ancient architecture in our county.

Mr. Chancellor, in acknowledging the vote of thanks, said that in choosing a subject for his address, it would have been useless compiling an essay on natural history or kindred themes with which he was not specially acquainted; he therefore selected architecture, a subject which he had studied the greater part of his life, and in which he took the greatest interest, more especially from the point of view of mode of construction and ornamentation of the many fine ancient buildings yet remaining in Essex.

Votes of thanks were also passed to the officers, particularly to Mr. Wire, who was retiring from the Librarianship, and this brought the business of the Annual Meeting to a close.

An ORDINARY MEETING (the 146th) was then held, mainly for the purpose of election and proposal of new members. Mr. S. Ernest Linder, B.Sc., and Mr. J. W. Potter were elected members of the Club.

Mr. Oldham exhibited some spring lepidoptera, recently taken in the Forest, including some very dark specimens of *Hybernia leucophearia*; and Mr. W. Cole exhibited some specimens of the large "oil-beetle," *Meloe proscarabæus*, found on Easter Day (March 25th) on the sea-wall, near the "Bowling Green," at East Mersea.

Tea and coffee was served at the close of the meeting, as usual.

THE MANAGEMENT OF EPPING FOREST.

FIELD MEETING IN EPPING FOREST, AND 147TH ORDINARY MEETING.
Saturday, April 28th, 1894.

IT has become a popular and laudable custom for the Club to hold one or more assemblies on the Forest as the season opens out, the woods never looking more lovely and attractive than when the leaves are just unfolding, the hornbeams decorated with the beautiful tassels of flowers, while the hawthorn, broom and gorse bushes are in full blossom, and the voices of the cuckoo and the nightingale are heard in the land.

The meeting on this afternoon was called, not only to view the woods in the beauty of a wonderful spring-tide, but also to enable members and their friends to see and judge for themselves the effects of the thinning operations which have recently been carried on in Monk Woods, Lodge (or Lord's) Bushes, etc., to which so much public attention had been called by numerous letters in "The Times," and other papers.

The members and friends assembled at Theydon Bois Station about half-past three o'clock, and the numbers present during the woodland ramble and the even-

ing meeting could have been little less than 150. Most of the important London and local newspapers were also represented, and some excellent reports have since appeared. Numerous conveyances and private carriages were provided at Theydon, so as to enable the company to travel comfortably from point to point.

The conductors were :—Sir T. Fowell Buxton (*Verderer*), Mr. E. N. Buxton (*Vice-President and Verderer*), Prof. R. Meldola (*Vice-President*), Prof. C. Stewart (*President of the Linnean Society and Hon. Member of the Club*), and the *Hon. Secretaries*, Messrs. William and Benjamin G. Cole. Mr. Angus D. Webster (*Manager of Woods to the Duke of Bedford*) was present as an expert in Forestry, as was also Mr. F. McKenzie (*Superintendent of Epping Forest*), and Prof. W. R. Fisher, of Cooper's Hill College.

The two other verderers, Mr. P. Gellatly and Mr. R. Ellis, were present, and the Epping Forest Committee of the Corporation was officially represented by Mr. J. Salmon (*Chairman*), and *Deputies* W. T. Brown and T. Greenwood, with others.

Among the members and friends who attended the inspection of the woods were the following, and they were received at Theydon by Mr. F. Chancellor (*President*), who was accompanied by Miss L. Chancellor, and the Hon. Secretaries and Treasurer, Mr. A. Lockyer :—Miss Abraham, Miss Allen, Right. Hon. J. Bryce, M.P. (*Chancellor of the Duchy of Lancaster*), Prof. Boulger (*Vice-President*), Mr. J. Barrett, C.C., Mr. and Mrs. Gerald Buxton, Mr. Noel and Miss Buxton, Misses M. and C. Buxton, Misses F. and J. Cole, Mr. H. A. Cole, Mr. R. W. Christy, Dr. W. T. Church, Mr. and Mrs. Bryan Corcoran and Miss Corcoran, Mr. Walter Crouch (*Vice-President*), Mr. A. Double, C.C., and Mr. G. A. Double, Mr. O. Deacon, C.C., Mr. and Mrs. F. W. Elliott, Mr. and Mrs. Finzi, Mrs. Ferry, Mr. J. C. Float, Miss Gibbs, Mr. and Mrs. F. Carruthers Gould, Mr. Bernard Gibson, Dr. Frances Gray, Rev. W. C. Howell, Mr. J. Hilliar, Mr. and Mrs. David Howard, Mr. T. V. Holmes (*Vice-President*) and Mrs. Holmes, Mr. W. D. Holmes and Miss Holmes, Mr. A. B. Hoskings, Mr. S. Johnson and Miss Johnson, Mr. Andrew Johnston (*Chairman, Essex County Council*), Mr. E. Johnston, Rev. T. B. Johnston, Mr. A. Lister, J.P., and Miss Lister, Sir John Lubbock, M.P., and Lady Lubbock, Mr. H. G. Morris, Mr. F. H. Meggy, Mr. J. Mark, Mr. C. Oldham, Rev. L. N. Prance, Mr. G. T. Reid, Sir C. C. Smith, Mr. H. C. Snell, Messrs. R. J. and R. A. C. Sheldon, Mr. H. H. Savage, Mr. and Mrs. Sworder, Mr. John Spiller, Mr. F. W. Spiller and Mr. Spiller, Mr. T. Thompson, Rev. W. L. and Mrs. Wilson, Mr. T Wilson, Mr. H. Wilson (*Hon. Sec. Malvern Field Club*), Mr. T. Hay Wilson, Mr. J. Wheatley, Mr. P. W. Wilson, Sir F. Young (*Chairman, Forest Fund Committee*), and very many others, who were either unknown to the secretaries or who did not enter their names in the signature book.

The first stopping-place was on the right-hand side of the road from Theydon to the "Wake Arms," just opposite Oak Hill (a beautiful tract of twelve and a half acres, restored to the Forest in 1889 by the munificence of Sir Fowell and Mr. E. N. Buxton. See ESSEX NAT., vol. iii., pp. 57-60). Here a short walk was taken into the wood ("Theydon Thickets") where Mr. Buxton called attention to the difference between the condition of the woods on either side of a narrow pathway. On the right hand was a small tract of unthinned coppice, with the trees drawn straight up and branchless owing to overcrowding, and the herbage and undergrowth either dying or dead. On the left, where thinning operations had been carried out, was a beautiful woodland, the trees vigorously throwing out lateral branches, and a fine undergrowth springing up in all directions. Mr. Buxton said that he did not propose to do more than draw attention to the two systems—the visitors could judge for themselves which was the more judicious.

Seats being again taken, the route ran by Jack's Hill, where on the right could be seen the effects of the disastrous fires of a few years back. But happily

nature is repairing the injury, and already the spot is being covered with fine mosses (in which nestle in due season some lovely *Hepaticæ*) and vast numbers of seedling birches are springing up to renew the woodland for the delight of the next generation.

Proceeding along the charming forest road, and at the "Wake Arms" turning to the left down the old Loughton road to Broad Strood Lodge, the company alighted at the entrance to Great Monk Wood, that exquisitely beautiful "bit" of forest scenery, about the operations in which so much angry outcry has been made. Here were a considerable number of tree-trunks, which had been brought to the spot from various parts of the wood for convenience of removal. Sensational pictures had been published of these "fallen monarchs of the wood," apparently under the idea that they had grown and had been felled where they lay! Here Mr. Buxton mounted on a trunk as a rostrum, and directed the special attention of the meeting to the nature of Monk Wood. He said that it was a mistake to suppose that it was a piece of virgin forest. It did not differ in essentials from any other part of the woodlands which had been pollarded. The bulk of the trees had in effect been pollarded up to fifty years ago, and he was told by Mr. Maitland that the wood was formerly divided into ten sections, each of which was pollarded in succession, one leading branch being left on each tree, a necessary practice in dealing thus with beeches. This process was an extremely unlikely one to produce picturesque trees, and in effect it was only those trees which had been distinctly left untouched which could be so described. In addition to these there were many fine unpollarded trees, and others which were extremely tall and drawn up from overcrowding—thin, almost branchless, infested with a blight (allied apparently to the American blight), diseased, and a source of disease. It was these last and a portion of the ugliest of the pollards which had been removed, but only when they were actually doing damage to superior trees. He asked them to remember that it was extremely difficult for any two experts to agree as to the particular trees which should be removed, and he begged them not therefore to criticise individual cases but to consider (1st) whether any should have been removed at all, and (2ndly) whether on the whole the selection had been judiciously made. He called attention to the extreme importance of the question, How will the Forest renew itself? Of this there were good illustrations in Monk Wood. Where old openings existed they would see young groves, here of beeches, there of thorns, and outside the wood of birches. These young growths were of extreme charm in themselves and of immense importance in the economy of the Forest. Mr. Buxton then called attention to that section of the Forest (an example of which they would soon visit) which consisted only of small pollard trees, very thickly grown together, and contended that, in his opinion, the only way to deal with such a tract was to open irregular patches, removing several stems together. It would be found that in such patches after a time, the heather appears, and this or thorn bushes act as nurses and protectors for young forest trees. Finally he asked them not only to use their eyes but their imaginations. There had been too much imagination imported into this controversy, but that was not what he meant. He meant that they should not only see the picture before them but imagine what it would be fifty years hence. To view a wood immediately after it has been thinned was to do something less than justice to the Forest.

In Monk Wood, a very careful examination was made of the parts of the Forest where thinning had been practised, and contrasting them with a few tracts where little or nothing had been done since the place came under the care of

the Conservators. In describing what was seen, it may be well to quote from the report by the editor of "The Essex Times," which is in the main a fair account, and which, appearing in a paper at first strongly inclined to condemn the action of the Conservators, cannot be accused of partiality:—"It was found that a considerable number of trees had been cut down here—some of them trees of no mean size—but it was generally agreed that the thinning actually done had been by no means so rigorous as the outcry in some of the London papers had led people to suppose. And at every stump Mr. Buxton was able to impart to inquirers a full statement of the reasons for choosing to remove that particular tree. In some cases it was obvious that the tree which had been removed had begun to affect injuriously a finely-grown tree near it—or, in one instance at least, two trees. Some had been cut down because they were disseminating disease. And in fact for every considerable tree that had been cut down, there was a good reason to give. But none was given for the denuding of the slopes, which at one time bore a large number of beech saplings; nobody put any questions on this, and it therefore remained unexplained. The saplings on the slopes, the thorns and hornbeams along the course of the rivulet at the bottom, used to lend a peculiar loveliness to this part of the wood. Their removal leaves the view unobstructed right across the valley and into the heart of the wood on the further slope.[1] Doubtless the saplings could not have been left for ever; but a grace has departed from the wood, and we must wait three or four years before we can quite see the effect of the present 'forestal operations.' There were many members of the party who were not disposed to approve what had been done, though they were certainly the minority; and they had their confidence shaken in the next minute or two. By an excellently planned walk the party was taken in the next minute into the thick of a patch of pollard trees, which had been left unthinned. Short, shabby, scrubby, indescribably mean and ugly they were—something like very warty railway sleepers with a shock head of twigs. The contrast was dramatic. From that moment the Conservators' case was won. Other parts of the wood were visited, and everywhere Mr. Buxton gave detailed explanations, as to which it must be sufficient to say that they proved that no tree was cut down without great and careful consideration. But nothing could add to the effect produced by the rapid transformation scene we have just described."

Judging from our own knowledge of the past and present of the woods, and from the remarks of those present, many of whom came to the meeting with minds somewhat biassed by what they had read in the papers, we think that the observations made in the report in "The Essex County Chronicle" very well and truthfully sum up the position: "If we were asked to state the sum and substance of our conclusions upon the examination of the Forest, we should say at once that we think there has scarcely been any justification for the fierce attack which has been made upon the Verderers. It may be that here and there a tree has been cut down which should have been allowed to stand, but it was impossible not to see that on the whole the work of thinning had become highly necessary, has been carried out upon intelligible and sensible principles, and will tend to the preservation, beauty, and public uses of the Forest. At various points *en route* Mr. E. N. Buxton, in his capacity as a verderer, explained what

1 Mr. Buxton informs us that this is a complete misapprehension, no saplings whatever having been removed in Monk Wood, nor any thorns or hornbeams, excepting a small number of pollard hornbeams at the end of the wood towards Bread Street Lodge, and these were all of a very inferior character.—Ed.

had been done and the reasons for it. Putting these speeches together, it would seem that we could not express the position better than by saying that the Verderers have been engaged, for the most part, in removing the 'mildewed' ear in order that he may no longer 'blast his wholesome brother.' There appear to be few parts of the Forest, if any, which are virgin. They have long been subjected to pollarding and to pilfering, with the result that there are a great many unsightly and disfigured trees which are not merely engaged in a struggle for existence among themselves, but are weakening and killing trees of finer growth and greater beauty. . . . Immediately after the thinning, one or two spots certainly looked a little bare, but the near future will cure the crudeness with a growth of heather and thorn. It was stated, and, indeed, demonstrated, that in various places where openings have been made the Forest is renewing itself. Mr. Buxton claimed no more than what is true when he said the Forest in these parts is not only improved for future centuries, but is very beautiful as it is."

Emerging on the outskirts of the wood, felled timber was noticed again, lying in an open space, caused by a forest fire, but which had been illustrated and written about in the papers as a horrid example of reckless clearing. Mr. Buxton said that here he thought the only thing to be done would be to temporarily enclose the space from the cattle in order to give Nature a chance of renewing the woodland from seedlings; but if they did so he predicted that a cry would then be raised in the papers that the Verderers were beginning to enclose the Forest altogether! He begged his hearers to remember his words for future guidance.

The ramble was continued until the "New Road" was reached, at a point where the ugly, straight, and bare "Clay Ride," made by the enclosers, when it was intended to rear in Monk Wood a settlement of modern villas, runs across the Forest by "Sand-pit Plain" to Loughton.[2] Here the carriages were resumed, and as the time at the disposal of the meeting would not permit of the whole of the programme being carried out, orders were given to the drivers to make for Lodge or Lord's Bushes, Buckhurst Hill, which the Verderers very justly claim as an example of the beneficial results of systematised thinning, in the wealth of undergrowth and the healthy appearance of the trees. The place, Mr. Buxton said, had been thinned four times since the wood had been under the control of the Epping Forest Committee, and as one proof of the virtue of the treatment he pointed to the extraordinary luxuriance with which seedling birches were springing up wherever an opening had been made.

In our own knowledge, from being, twenty years ago, a dark, dismal place, doomed to the clutches of the speculative builder, with an experimental tramway, and a broad road (to be bordered with "eligible modern villas"), Lord's Bushes, as now transformed, is one of the most beautiful and luxuriant woods in the Forest, and this in spite of its nearness to a large village, and railway bringing down crowds of excursionists and school children.

Some of the company, including Sir J. Lubbock, Mr. Bryce, Mr. Andrew Johnston, Mr. McKenzie, Mr. Ellis, and Prof. Fisher, had to leave before the evening meeting, but the remainder of the party were driven to the Royal Forest Hotel, at Chingford, where a refreshing high tea awaited them after the fatigues of the afternoon.

2 One improvement most heartily to be desired and strongly recommended to the Conservators would be the obliteration of this grievously ugly "ride." It should be ploughed up and planted, so as to blot out for ever one of the most atrocious projects of vandalism ever conceived in detriment of a noble "open space," even in these dark ages of Epping Forest History, before the dawn of "The Judgment" of Sir George Jessell.—Ed.

Afterwards the 147TH ORDINARY MEETING OF THE CLUB was held in one of the large rooms of the hotel, Mr. F. Chancellor (*President*) in the chair.

Many who had not joined the party in the woods attended the evening meeting, including Mr. Percy Lindley, a voluminous letter-writer on the condition of the Forest, Mr. W. G. S. Smith, late secretary of the "Forest Fund," and Mr. Porter, *Hon. Sec.* of the "Forest Ramblers Club," both of whom had also written strongly on the matter.

After the formal business, Miss M. S. Walker, B.A., and Mr. Wykeham Chancellor, M.A., were elected members of the Club.

The President then called upon Prof. Meldola, F.R.S. (*one of the Permanent Vice-Presidents*).

Prof. Meldola opened the discussion as follows :—

The meeting which has been held this afternoon, for the summoning of which I am partly responsible, has enabled you to see for yourselves the recent forestal operations which have given rise to such a large amount of correspondence in the newspapers. At the outset of this discussion, which I have the honour of opening, let me place upon record the extreme satisfaction with which I greet the spirit which has prompted most of the writers, who have taken up the pen in defence of the ancient Forest, whose beauty was in their opinion being jeopardised. It is a very healthy sign when the public take such a keen interest in our open spaces as has been displayed during the last few weeks in connection with Epping Forest. Whether agreeing or disagreeing with the predominating opinions, I desire to pay this tribute to the public sentiment.

After fourteen years work in the county, and more especially in this district, the Essex Field Club has established a claim to make itself heard in all questions affecting the welfare of the Forest. We have spoken our minds on former occasions; our united action bore fruit eleven years ago, when the Forest was threatened by a railway. Should a similar occasion arise, we shall, I hope, be again prepared to do battle with the aggressor. But we have assembled here on the present occasion, not for the purpose of opposing a railway Bill, not even for the purpose of protesting against a new line of tramway, but with the object of discussing, in an amicable and scientific spirit, the results of this afternoon's ramble through our glorious woodlands, which, as you have seen, still survive in spite of the dismal forebodings of some of the recent critics. We were told in "The Pall Mall Gazette," of April 12th, that unless the operations were stopped "in a few weeks Epping Forest will be a thing of the past"!

The discussion of the management of the Forest is most opportune at the present juncture. We have with us experts whose opinion will carry weight throughout the country. Whatever opinions we may have formed individually, we are all agreed in starting from the common ground that the Forest shall be as natural and as beautiful a tract of country as it can possibly be made. In view of the large amount of adverse criticism which has been passed upon the doings of the Conservators, it seemed to me that the time was ripe for an expression of opinion by the members of the Club. If eleven years ago we took an active part in Forest politics, it is but right that now, after more than a decade of management by the Conservators, we should again raise our voice in fair and unbiassed judgment.

I have been asked to open this discussion, and I do so with all the pleasure that can be derived from a knowledge that we all have the same end in view. I ask you to deal with the question in the same spirit. There are gentlemen present who have in print expressed themselves, more or less forcibly, opposed to

the action of the Conservators, and a large share of the criticism has been born by our esteemed vice-president, Mr. Edward North Buxton, one of the Verderers, who has, in conjunction with his brother Verderers, given you full explanations on the ground. If the explanations which you have heard are not deemed satisfactory by all of you—and in such a gathering as this it is impossible to expect unanimity of opinion—the Verderers are here to give further explanations. The Chairman of the Epping Forest Committee, Mr. James Salmon, is also with us. But in offering criticisms upon the operations of which you have witnessed the results this afternoon, criticisms which I am sure the Verderers will be only too glad to meet, we must never lose sight of the fact that the final aim of these gentlemen, as of the Conservators as a whole, is precisely the same aim as that for which you and we all are contending, viz., the preservation of the Forest in its natural condition.

The opener of a debate is of course expected to state his own views. I have done so already elsewhere in brief ("Times" March 31st) with the effect of diverting some of the fire of the critics on to my own person. Having been charged with inconsistency and with holding contradictory views, I must in justice to myself and to those who coincide in my opinions take the present opportunity of giving a brief explanation to the Essex Field Club as an impartial body. It is to be regretted that the correspondence was allowed to proceed for a certain length, and no opportunity given for a complete explanation in the columns of that leading journal which exerts such a healthful influence upon the public mind. But the Editor of "The Times" no doubt had stronger claims upon his space, and we must be grateful for the publicity which was given to the question, and above all, for the temperate and just summary of the position given in the leading article interpolated (March 30th) in the midst of the correspondence.

And now, with regard to my own views, I am in a better position to declare them than I was a month ago. Five times within the month I have traversed this Forest, and made a critical examination of the districts described as "devastated." I have known the Forest intimately for a quarter of a century; as a lover of its picturesque features—as a disciple of the net and pill-box, as a wanderer through its glades in all seasons, I give way to nobody in my solicitude for its welfare. I state as my deliberate conviction that on the whole a marked improvement is to be seen in the condition of the Forest since the formal dedication by Her Majesty on May 6th, 1882. I state this as the result of my own observation and in the full belief that there are many here ready both to confirm and to combat my statement. Whatever this opinion may be worth I am most particularly anxious to make it known that it is delivered on my individual responsibility, and not in any way as an authoritative official utterance on the part of the Club. We have simply made use of the Club as a scientific organisation for bringing together those whose views, on one side or the other, we desire to hear. I think it right to dwell upon this point because a paragraph has been inserted in some of the papers (*e.g.*, "Morning Leader" April 17th) to the effect that "the founders of the Essex Field Club have—in a communication by one of their members to the Central News—made clear their position in regard to the destruction of Epping Forest." I say that the founders, whoever that may refer to, have never expressed any such opinions as are attributed to them, and that the member in question has made his communication to the Central News without any authority from the Club whatever.

Within my recollection the Forest as a whole has, I venture to think, benefited by the treatment adopted in the past by the Conservators. I will particu-

larly mention Lord's Bushes, which you have seen to-day, because this has been thinned out four times within a period of fourteen years. And I select this also in order to bring out and to emphasize the fact that I am only speaking as an individual member, because one of the correspondents in "The Times," a member of our Club, appeals to this very district as "a frightful example of injudicious and unnecessary clearing." He bases his criticism on an expression of opinion by the editor of "The Gardener's Magazine" ("City Press," Feb. 28th.) I cannot imagine that the editor of that magazine ever knew Lord's Bushes as I knew it twenty years ago. You have been through it to-day, and there are no doubt many residents here who have known it as long as or even longer than I. I hope we shall have the benefit of their candid experience; in legal phraseology "without prejudice."

In expressing general concurrence with the doings of the Conservators, I have no intention of leading you to suppose that no mistakes have been made or that I am prepared to endorse every detail for which they are responsible. But after perusing the correspondence, and after consulting with some of their critics, I am fully persuaded of one thing, and that is that very much has recently been laid on their shoulders for which they are in no way accountable. The paper warfare has been conducted in a manner not altogether fair to that body. I think that some hasty correspondents have attributed to wilful clearing the necessary removal of burnt underwood resulting from accidental or malicious firing. I am equally of opinion that the charge of widening straight rides which are already too wide is based on a hasty examination of the cleared bays or recesses which have been made with the very object of breaking up the unsightly regularity of these straight rides, which were in existence before the present management. But in admitting that mistakes may have been made I contend that they have been, on the whole, unimportant. And after all we have to do with a body of mortals. If they could have managed an area of nearly 6,000 acres (over which cattle are allowed to graze), comprising heaths and bogs, dense groves of stunted pollards which have been hacked about for centuries, gravel expanses which have been scarred by pits, large tracts of cultivated land, which have been rescued for the public,—if they could have dealt with this stretch of country in the course of some fourteen years so as to make it "natural" and give satisfaction to everybody, then indeed would the Conservators have established a claim to be ranked with the Immortals.

Eleven years ago, when little or nothing had been done but the artificialising of certain parts of the Forest, when little or no attempt had been made at restoring natural conditions, and when, to crown all, a railway scheme was projected, we naturally took alarm (Proc. E.F.C., vol. iii., appendix I., p. xxviii.). It was but reasonable to look upon these straws as indicating the direction of the wind. It was then that I made certain statements, which an anonymous correspondent in "The Times" (April 2nd) has done me the honour of quoting as a horrid example of inconsistency. But this critic has conducted the polemic by political rather than by scientific methods. He adopts the very stale stratagem of selecting one or two passages from the paper read in 1883, and confronting them with opinions expressed in connection with the present agitation. He does not inform the public when the said statements were made, neither does he inform them that they had reference to the destruction consequent upon the introduction of a railway with all its concomitants. And he does not do the Conservators the justice of admitting that the "rowdyism" which I then complained of, has been largely suppressed, and in one part of the Forest (opposite the "Rising Sun" Inn) alto-

gether abolished by judicious interference. With this class of correspondent it is difficult to carry on a discussion.[3]

And now where is this glaring inconsistency? I said in 1883 (and I repeat it in 1894, "To the naturalist—and I am sure I may say to the intelligent public generally—such a tract of primitive country is beautiful only so long as Nature is given full sway, and the adjustments which for long ages have been going on slowly and silently under the operation of natural laws remain unchecked and uninterfered with by man." But we all know that this ideal generalised "natural condition" does not exist throughout our Forest. You have seen examples of closely packed trees, crowded together in unshapely masses, with spindle branches stretching straight upwards in hideous lankiness. Nature, far from having been given full sway, has been interfered with for so long a period that it will be very many years before we can hope to see a natural state of affairs restored. As the result of lopping in the past we now have districts from which a large proportion of the trees might still be advantageously removed. I maintain that these features are not natural here because they are the result of man's interference. The policy of the Verderers is to restore and beautify the Forest as far as possible and as rapidly as possible.[4] I take it upon myself to state their case in broad outline because it is from them that we wish rather to hear the detailed explanations of management.

The present agitation has arisen almost entirely in connection with the thinning out of the trees; more especially in Monks Wood. It is not for me to explain technically why thinning is necessary; you can obtain this information from any of our experts. But the atmosphere must be cleared before the discussion of this question can be carried on in a fair manner,—I may add in an intelligible manner to the majority of those present For the correspondence has been conducted in such a strain as to lead the public to suppose that *all* thinning was an act of Vandalism. It is possible that there may be some who hold this view. I, for one, should be very sorry to see the Forest committed to their management. The question before us now is not whether thinning is necessary in our Forest, but whether what has been done in this direction has been done judiciously—whether too many trees and too much undergrowth has been cleared or, on the other hand, whether it is not desirable to have further clearance.[5]

I beg those among you who are not practically familiar with forestal operations not to form an opinion based on your inspection of the present appearance of the thinned districts. You must remember that the Conservators hold this Forest in trust not only for the present, but for the future. And with regard to the Verderers I am fully persuaded of this: that not a single tree has been removed without due consideration—that every trunk which you have seen lying prostrate has been felled for the purpose of giving freedom of growth to other and better trees, to open out vistas for distant views, or to break up the uniform monotony of woodland shade by letting in light for the development of that picturesque undergrowth which in many parts of the Forest is conspicuously absent. I ask you to believe, whether you think that these operations have been

3 The discussion drew from Mr. Percy Lindley the acknowledgment that he wrote the letter referred to.

4 See E. N. Buxton, in "Proc. E.F.C.," Vol. III., Appendix I., p. xviii., *footnote*.

5 Sir John Lubbock, who was with us during the whole afternoon, and who also inspected the more northern parts of the Forest (Theydon Thicket, etc) before the arrival of the party, writes to me as follows: "I write a line to say that I did not see any cases where too much had been cut; on the contrary, the finer trees cannot reach their full beauty unless by degrees even more room is given them. This, however, must, and no doubt will be, done gradually."—R.M.

done to excess or not, that the picturesque and natural appearance of our Forest is the sole object which has been held in view.

From what I have seen, and for whatever my opinion may be worth, I join issue with those who assert that the present policy is destructive of confidence in the existing management. Pending the official report of the experts who have been appointed by the Committee, I appeal to the statements of the Editor of "The Gardener's Magazine," whose opinions are trebly valuable—first, as an expert; secondly, as one of the few fair and temperate critics of the recent operations; and, lastly, because he is in some measure a hostile witness. He says with respect to thinning: "The work in Great Monk Wood, Hawk Wood, and Lord's Bushes was entered upon with the object of giving more room for promising young trees and fine old pollards in those parts of the Forest, and a more laudable object in connection with forest management could not well be conceived. It is of course desirable that young trees should enjoy the light and air essential to the formation of stout shapely trunks, and that old pollards should have the space required for the free extension of their branches. There cannot be two opinions upon these points among those who have devoted any considerable share of their attention to arboricultural matters, and to discuss them is therefore unnecessary." Again: "A considerable amount of thinning has been done on the opposite side of Theydon Bois Road, and although a few more trees may have been removed than was required, the thinning is, for some distance northward, highly judicious. The opening out of the track in the Forest from the Theydon Bois Road is a decided improvement, and I should like to see some further thinning at this point." And again: "It will have been gathered from what I have already said that I regard judicious thinning as essential to the proper management of woodlands, and if my views upon what has been done are not in exact accordance with those responsible for the thinning, it must be understood that my object is not to raise an outcry against the removal of a tree, or, indeed, a stick of wood, however ill-placed."[6]

Indeed, when the elements of this controversy come to be resolved into their ultimate constituents, I think we shall find that differences of opinion will resolve themselves largely into matters of individual taste. It is precisely upon such points that it is most difficult to arrive at any unanimity. In going over the districts now cleared or marked for thinning I have seen some cases to which I should demur. But when it comes to such questions as to whether one tree should have been felled in preference to another, whether one particular group should have been left intact and another group thinned, whether a view should be opened out in one direction rather than another, or whether the view should remain permanently shut out by a dense wall of foliage—then I say we are dealing with individual tastes, upon which no two of you in this room would be in absolute agreement: and if you are going to appeal to the public for decision we should have a pretty mess of a forest in a very short time. I dissent most strongly from the statement of one of our members in "The Times," (April 3rd), who says: "I contend it is purely a question for the public." It might as well be maintained that when a difference of opinion exists between medical experts as

6 An eminent botanist and authority on arboriculture writes with reference to the dislike shown to the cutting down of trees: "It is a fatal mistake. I never saw a woodland yet which would not be improved from an ornamental and sylvan point of view by a copious thinning. If the growth of timber is desired from a commercial point of view, a totally different set of considerations come into play. Plantations for timber purposes are not, however, beautiful, and are not what you want in the Forest." I regret that the writer of this opinion, for reasons which have nothing to do with the present meeting, does not desire to have his name made known. —R. M.

to the precise treatment which a patient should undergo that the matter should be decided by a jury of our "intelligent countrymen."

And now I leave the question in your hands. For my own part I am glad to state that I feel no alarm as to the future of the Forest under the present management. The Editor of "The Gardener's Magazine"—whom I again quote as a hostile witness—says "there is, of course, no cause for alarm as to the future of the Forest." The question before us appears to me to resolve itself into a simple quantitative one as to the number of trees which, in the judgment of those who are responsible, it has been thought necessary to remove. It is absurd to speak of the danger of the Forest being made into a park; you must have realised the absurdity of this notion for yourselves this afternoon, for you have been through portions of the Forest from which some thousands of trees have been removed since last autumn. There is nothing, in my humble opinion, very park-like about the result so far. It is doing an injustice to the Conservators and the Verderers, and, I will add, to Mr. E. N. Buxton in particular, to suppose that they or he has any such ulterior design upon our favourite haunt. And when considering this question of the amount of thinning, will you kindly make a correction for what might be called the "personal equation" of the Forest conditions. For the stacked heaps of felled trunks have *not* all been cut down from the immediate area surrounding them, as some of the correspondents seem to imagine, but have been gathered together from a very much wider area, and therefore give an idea of destruction which to the unitiated may appear highly exaggerated—not to say appalling. Also, be it remembered, that the thinning and pruning of trees has to be done at a period of the year when there is no foliage, and this is another factor of exaggeration. And lastly, may I appeal to those critics of the recent doings who are present—and there are many whose opinions I shall estimate most highly—to favour the meeting with their views as to what ought to be done, as well as what ought not to have been done, for there has as yet been nothing to speak of by way of *constructive* criticism. If these gentlemen would give us their views as to what the Forest ought in their opinion to be, and how in their judgment this result is to be achieved, then we can meet on common ground as naturalists and as lovers of the picturesque, and a useful discussion can be held in accordance with the scientific and æsthetic spirit which has prompted the summoning of the present meeting.

Mr. A. D. Webster was next asked to favour the meeting with his views, but he begged to be excused from doing so, having been chosen as one of the experts to report upon the Forest, and he thought it best to reserve any observations until he and his colleagues officially reported.

Mr. Percy Lindley admitted that it was he who wrote the letter in "The Times" of April 2nd, alluded to above by Prof. Meldola. He thought it only fair to quote the opinion given by Prof. Meldola in 1882 (in vol. iii. of the "Proceedings of the Essex Field Club"), and to place in juxtaposition the Professor's statements in "The Times" of March 31st. Mr. Lindley then spoke of the slope in the Forest, near his house at York Hill. One morning he found a number of men going through it—as if they were a sort of scythe—and clearing away the undergrowth, leaving only a few patches here and there; cutting down sound trees, and leaving a few rotten pollards. On Fairmead, three or four seasons ago, he was astounded to see that young spear trees—the trees that were to form the future forest—were being laid low, and he wrote to Mr. Buxton, who replied that he had marked trees to be cut down, and then somebody else went through and cut down the trees which he had wished to spare. He went on to complain that

the Conservators pollarded trees after paying Loughton £7,000 to extinguish the lopping rights—cutting off boughs and branches and leaving bare stems, which looked like nothing so much as magnified clothes props. They had a full appreciation of the benefits that the Forest had derived from Mr. E. N. Buxton and his brother, whose names would never be forgotten, and it was with real regret that they opposed them and the policy which the Buxtons had taken under their wing. But they must oppose. They had this remnant of old England, this primeval bit of woodland, for which they were fighting.[7]

Mr. W. G. S. Smith asked whether a resolution would be taken.

The President thought it would be better not to do so, as they had only been over a portion of the Forest where thinning operations had been carried on.

Mr. Smith: Thank you, sir.

Mr. E. N. Buxton said that he had occupied so much of their time that afternoon that he had intended rather to listen than to speak at the meeting, but after the very direct appeal of Mr. Lindley he must beg to be allowed a few words. The pollarding to which Mr. Lindley referred was a very small detail. He was not responsible for every tree that was marked; he had never said that, and he dissented from the policy of pollarding. But this was in the discretion of the Superintendent; trees that were marked for removal were left pollarded instead of being completely removed. Mr. Lindley had called attention to a communication—a private communication—which was made to him some some years ago. He (Mr. Buxton) did not wish to conceal from the Club that there had been differences of opinion on the Epping Forest Committee in the past, but surely they might disagree without imparting bitterness into the controversy. When there was a difference he should not think it his duty to appeal to the outside public, who might or might not always have just views on these technical questions. As to the opening of spaces, he remarked that in a few years the heather would come up, and then perhaps thorns, and after them other trees, the nurses of the future. As he had said during the afternoon, the question which some of their critics had not realised was, How was the Forest to renew itself? He was strongly opposed to the policy of plantations; he wished the Forest to renew itself. He asked them to look at the matter as a whole and decide whether they thought that, on the whole, judgment had been exercised. Mr. Smith did not wish a resolution to be put. He (Mr. Buxton) did; he was quite ready to face it. He did not understand why Mr. Smith should be afraid of the fair judgment of ladies and gentlemen who had looked into the question with impartial minds, and who were, many of them, distinguished men, having special knowledge, not only of forestry and natural history, but of the peculiar conditions and history of the Epping woodlands.

Mr. W. G. S. Smith (Secretary to the "Forest Fund"), reminded his hearers of the indignation with which many years ago they witnessed a saw-pit made in the vallum of Ambresbury Banks. Since then the Forest had been handed to the Conservators, and it had been reserved to them to see now a steam saw-mill in the Forest. (Laughter and cheers.) He went on to speak of beech trees two hundred years old razed to the ground. In other parts the trunks of grand old beech trees stood bare—like sausages. (Loud laughter.) They went into Monks Wood and could look through it anywhere and see the sky, and they were told that it was improved. (Hear, hear.) The beautiful slopes which used to be covered with undergrowth were now beautifully smooth. (Laughter.) They went down to the watercourse, over the edges of which old hornbeams used to lean,

7 See foot-note appended to report of Mr. Smith's speech.—Ed.

They were swept away now. (Hear, hear.) Was that preserving the natural aspect of the Forest? (Cheers.) Coming to Queen Elizabeth's Lodge, they saw Battersea Park to the left of them. (Laughter.) That was arranged for the enjoyment of the people, but it was quite enough of it. (Cheers.) Leave the rest to nature. Looking south, they would see the trunks of two grand old oak trees which had been cut at ten feet high, and pitch put on the top of them. (Hear, hear.) See the clearing at the Rising Sun, and see Whipps Cross perfectly bare. (Hear, hear.) Wanstead Flats, covered, as they all knew, with splendid fibrous turf, had been turned over with the spade, and asphalted. (Oh.) A great clearance had been made in Lord's Bushes, and it had in no respect improved it. Great quantities of underwood had been taken away. (Cheers, and cries of "no.") Trunks of trees had been left cut off three or four feet above the ground. It had been stated in the Press repeatedly and never contradicted that up to the end of 1891 a hundred thousand trees had been cut down in the Forest, and since then ten thousand more had been cut. If this sort of thing was not stopped they were justified in saying that the Forest was in danger. (Professor Boulger: No, no.) He recollected when that Club stood up and manfully resisted the Great Eastern Railway. Some members of the Council argued that it should do nothing in the matter—that it should confine itself to toadstools—(laughter)—and not resist the railway company in its grand desire to benefit the Forest and take a great deal of it. (Laughter.) He then referred to the visit of the experts to Hawk Wood, and said that they were asked there to bless the action of the Conservators, but stayed to curse it.

Mr. Buxton: I must protest, sir; that statement is absolutely without authority. It is absolutely untrue, Mr. Chairman. I am sure Mr. Smith would not say what is intentionally untrue, but I ask you to call upon him to recall that most damaging and untrue statement.

Mr. Smith: I should be sorry to say anything that is not founded upon fact. I am expressing the view that these gentlemen were taken there to bless the intentions of the Conservators, and they have cursed them.

Mr. Salmon (Chairman of Epping Forest Committee): They say that the trees should not be cut this season because they are in leaf; but what shall be the future of those trees we have not heard. Mr. Smith's statement is that these gentlemen were brought to bless our work. Nothing of the kind. I did not take any part in the selection of these gentlemen without referring to Sir Joseph Hooker. These gentlemen are not in the pay of the Corporation. Their legitimate expenses must, of course, be paid; but to say that they were brought down to bless our work is an absolute falsehood, and Mr. Smith knows it.

Mr. Smith: Is it not a fact that the six hundred oak trees marked are already sold? I would like to ask Mr. Salmon that question.

Mr. Buxton: Mr. Chairman, I hope you will call upon Mr. Smith to withdraw his statement, which I characterise as a most offensive statement, that these gentlemen were brought to bless us. Then he says they curse our work. They have expressed no opinion. I call upon you to call upon that gentleman to withdraw that expression, grossly untrue, grossly offensive.

At this point Prof. Meldola read out the provisional report of the experts as given in "The Times" after their visit to Hawkwood, on Wednesday, April 25th. It was as follows:—"After a careful examination of Hawkwood, we are of opinion that the trees as now marked in it should not be cut for the present season. Other questions as to the general management of the Forest so as to secure the object the committee have in view are best determined after we have seen the

Forest in all parts and at various seasons. (Signed) W. SCHLICH, A. D. WEBSTER, W. ROBINSON, JAMES ANDERSON."

Mr. Smith: I will withdraw it with pleasure; I would not say anything offensive to anyone, but especially to Mr. Buxton, who has done more for the Forest than any man living. We have been successful in putting off destruction for one season: I hope we shall be successful in putting it off for ten seasons.[8]

The President said that in consequence of the expression of opinion by the preceding speakers he would put it to the meeting whether a resolution should be put before them or not. On a vote being taken, it was in favour of a resolution being submitted.

Professor Boulger, in rising to move a resolution, as reference had been made to opinions formerly expressed by him and also to consistency, said that he was unaware whether the Conservators were at all solicitous as to a charge of inconsistency, but that for his part he was not. Few people had been more outspoken in their comments on the action of the Conservators in the past than he had himself, and he would frankly admit that his criticisms, unlike those of his friend, Professor Meldola, had been directed not only against the threatened railway, but also against various points of forest management. He had blamed the thinning in the past as excessive as well as injudicious, but the result forced him to the admission that he had to some extent been wrong; in the case of Lord's Bushes, for instance, entirely wrong. He had the less compunction in making this admission because, like the Conservators, fourteen years ago he had no precedent to go upon. He would be the last person to find serious fault with the drafting of the Epping Forest Act by one whom they were all glad was now in the House of Lords; but, when that Act laid down that the natural condition of the Forest was to be maintained, he ventured to submit that it enjoined an impossibility, since there was no natural condition to maintain. The Conservators had the unspeakably difficult task of regenerating a forest all but destroyed by the vandalism of generations, and they had no precedents to guide them in their action. Such action must, therefore, be very largely experimental, and it was also a process demanding a considerable term of years. It was unreasonable to expect to see the Forest made beautiful in a year or two, and at the same time to allow nothing to be done to bring about such a result. He was far from endorsing all that the Conservators had done or all the opinions they had expressed. He differed from their friend, Mr. E. N. Buxton, for instance, as to the possibility of regenerating the Forest by what he might term successive nurses—thorn springing up through heather, and forest trees through the thorn—as he did not believe that thorn could grow from seed among heather, nor could any of their trees do so except the birch. The thinning again may have been excessive in some places—he thought it had; but of late years he had more and more confined his criticism—for the last three years entirely—to complaints as to the injudicious selection of the trees felled. There were still many parts of the Forest where much more thinning was required, and, though the sacrifice of so many fine young oaks was, no doubt, a painful necessity, a private examination had convinced him that even the much debated oaks in Bury Wood had been rightly marked for felling. He had been very pleased to see that day what had been done in Great Monk Wood, with the result of adding greatly to its beauty, as he had urged that action a good many years ago, and had been met by the

8 Although both Mr. Lindley and Mr. Smith were applied to for corrected copies of their speeches, no such copies have reached us. We therefore quote the reports in "The Essex Times," which we presume these gentlemen consider to correctly represent the views they expressed. —ED.

objection of the late Superintendent that the thinning of any of the pollard beeches there would let the wind in and blow them all down. He still thought mistakes had been made, as was only to be expected, but the present debate had reference to recent thinning, say that of the last year or two, and, after what they had seen that day, it gave him, as a generally hostile critic, great pleasure to move the resolution :

"*That in the opinion of this meeting, the general action of the Conservators in the recent thinnings has been judicious.*"

Mr. A. Double, C.C., as a member of the Club, proposed to second the resolution, but on the appeal of Mr. Salmon, who said that he did not think any member of the Corporation, even though a member of the Club, should vote at the meeting, Mr. Double gave way to the Rev. W. C. Howell, who, as an old member of the Club and well acquainted with the Forest, heartily seconded the resolution.

Mr. F. Carruthers Gould said : I am, I believe, one of the oldest inhabitants of the district bordering on the Forest, for within a month or two I shall have lived twenty-five years in the neighbourhood, and throughout the whole of that time I have habitually frequented and enjoyed the beauties of this woodland. And as there is probably no one in the room who has less respect than I have for the ancient Corporation of London—(Laughter)—no one can accuse me of being unduly prejudiced in their favour. When the correspondence about the Forest clearings first commenced, I certainly formed the opinion that too much had been done by the Conservators, and I was asked by some of my friends to intervene and support the views of the critics, but I declined, as I had not had the opportunity of seeing for myself the recent clearings, and I did not care to express a definite opinion without personal investigation. A fortnight ago I had this opportunity. I went with the pre-conceived idea that too much cutting had been done, and as it is a human weakness to try and make facts fit into pre-conceived fancies, I did my best to discover grounds for adverse criticism, but I am bound to admit that these ideas which I had formed disappeared in face of the evidence. I could find no grounds for the charge brought against the Conservators of wilful and wanton Vandalism, of a desire to destroy the woodland character of the Forest, and to turn it into an open park. This opinion has been strengthened by what I have seen to-day. Certainly here or there in Monk Wood mistakes might have been made ; certain trees had been cut down which might have been allowed to remain, but I must confess that in every case there were distinct and intelligent reasons given for the course taken. The whole thing, therefore, resolves itself into a question of individual taste and judgment with regard to individual trees; and that being so, it appears to me that there can be no question of Vandalism generally. With regard to Lord's Bushes, I certainly formed at one time the opinion that there had been too much clearing, but when I look at the result, and see the healthy condition of the undergrowth, I must again acknowledge that the thinning was judicious, and has improved that part of the Forest. Experts all agree that, in dealing with Epping Forest, which is not a primeval forest, clearing of some sort is necessary, and that being so, the question is—who shall do it? For my part, I am content that the responsibility should rest in the hands of a body of whom Mr. Buxton is so active a member.

Mr. David Howard, J.P., F.C.S., said that he remembered the Forest ever since he was a small boy, nearly fifty years ago, and certainly the last description that could have been then given of it would have been "primeval" forest. It would have been impossible to find a stretch of country more unnatural,

disfigured, and unlovely. The best evidence how well it has been handled by the Conservators is that anyone should already speak of it as "primeval." He must most earnestly deprecate appeals to sentiment and popular prejudice. The art of forestry—that is, the art of giving free scope to the natural development of trees—was a very technical and difficult science, and to be successful, the best judges of what was really wanted should be found and given a free hand. Of course they must cut away redundant growth, and give light and air, unless they wanted a hopeless thicket in which the vegetation was dying from suffocation, neither beautiful nor healthy, nor useful for man or beast. Why, moreover, should a park-like appearance be objected to, if by that vague expression was meant single trees of perfect growth standing by themselves; such are found in natural forests and are their greatest beauties. He would specially protest against the suggestion that the Forest was to be managed to suit the ideas of the East-End population, the ideal of most of whom was a tea-garden. It would be just as reasonable to decide on the surgical treatment of some patient in the London Hospital, suffering from a complication of diseases resulting from neglect, by a *plebiscite* of Whitechapel. He was quite a free lance, but from his long knowledge of the woods, he most cordially supported the resolution.

Sir Frederick Young (Chairman of the "Forest Fund") said: I have listened with attention to the discussion which has taken place, and particularly to the interesting address of Professor Meldola, in the course of which he has referred to my name. I hope, therefore, I may be permitted to make a few remarks on the question, which has especially brought us together on the present occasion. In consequence of the complaints recently made in the press of the reckless and even "ruthless" cutting and clearing of the trees in certain parts of Epping Forest, I was induced to enter my protest against it on the faith of the accuracy of the reports which had reached me. Since that time I have paid three visits to the spots in question, and I have also had the opportunity of hearing from Mr. E. N. Buxton, on the part of the Verderers, the explanation of the reasons for the cutting, clearing, and thinning of the trees, which have been sanctioned by them in pursuance of their avowed object of treatment for the purpose of preserving, and not destroying, the Forest committed to their charge. I am bound frankly to own that although in my judgment this process appears to have been too rigorously pursued, and that many trees which have been cut down might have remained without detriment to the object in view; yet, from what I have seen and heard, my opinion has been considerably modified, and on the whole, my hope is that the injury to the Forest is not what I was at first led to fear and believe of the character I supposed. Professor Boulger has anticipated me by moving a resolution. I should rather, I confess, have preferred one to this effect, which I have prepared, and which, with the permission of the meeting, I will read. It is as follows: "That this meeting of the Essex Field Club, and of several scientific representatives of Forestry and others interested in the preservation of Epping Forest, take this opportunity of expressing the opinion that it was the intention of those who, many years ago, successfully secured Epping Forest for the public, that it should always be preserved in its primitive condition of wild, natural woodland, and should not be subjected to any treatment calculated to convert it into a park or artificial playground. That having visited several of the spots about which serious complaints have been made of too much cutting, clearing, and thinning of the trees having been sanctioned by the Verderers, and having heard the explanations given by Mr. Edward North Buxton on their behalf, this meeting believes that the Verderers and the Corporation of London,

to whom the care of the Forest has been entrusted by Parliament, concur in this view. It trusts, therefore, that no more cutting or thinning of the trees and shrubs will be permitted in future than is considered necessary for the preservation of the Forest in its natural sylvan beauty."

I do not intend to move this resolution as an amendment to Professor Boulger's, which I propose to support; but I own I should have much preferred something of the kind I have indicated being passed instead of this in order to meet the views and reconcile the differences of opinion of those who are assembled here this evening.

Mr. Bernard Gibson said that, as he started the discussion by a letter which appeared in "The Times" of 23rd of March last, he would like to make a few remarks, but at that late period of the evening he would be brief. He alluded to Mr. E. N. Buxton without any intention of making a personal attack upon him (for he, Mr. Gibson, deplored anything personal), but solely because he looked upon Mr. Buxton as the dominant controlling spirit upon the Committee. All lovers of Epping Forest owed a deep debt of gratitude to Mr. E. N. Buxton, and Mr. Gibson trusted that he might be spared many years to take an active part in preserving the beautiful forest which he loved so well. Mr. Gibson said that there were two practical suggestions he would like to make, that—as in thinning the Forest no consideration of profit in stripping the bark need influence the management—no oak tree should be felled in the spring. Felling oaks when the sap is up is sure to result in more damage to the undergrowth than if they were felled in the dead season, when the woods were leafless and dormant. When an oak wood on a private estate is to be thinned, the underwood was cut in the winter, and the wood thus prepared for the felling of the oaks in the spring, as soon as the sap is sufficiently up for the "barking" to begin. This point had not received proper consideration from Mr. Buxton and the Superintendent of the Forest, and he (Mr. Gibson) would ask the meeting to try and realise the state that the beautiful undergrowth of Hawk Wood would be in *then*, if the 600 oak trees marked and sold had been felled in April. It was, moreover, a certainty that they would have been felled had not his letter started the agitation which had resulted in experts being appointed to report, and those oak trees were in consequence reprieved until winter, when probably 100 will be felled instead of 600; that result was ample justification for the agitation. He much regretted that Hawk Wood was not visited that day, and he would earnestly beg any of those present, who could do so, to visit that wood, and judge for themselves what the result would be of clearing away the 600 oak trees marked with a white ring. Lastly, he would suggest that before marking any timber tree, if there were any doubt as to the wisdom of removing it, and the advantage the neighbouring tree or trees would derive from its removal—that the tree should have the benefit of the doubt. Not all the wealth of the Corporation could replace the noble beeches felled in Monk Wood.

Mr. Walter Crouch mentioned that he had known the Forest well at all seasons for over thirty years, and could compare its condition then, with the time when it was acquired by the Corporation, and at the present moment. He had recently walked over the woodlands where thinning had been done, and in his opinion the Forest was in a more natural condition than it had ever been under the old system. It had been mentioned in one newspaper that the old chestnut, which formed an arch by the great lake in Wanstead Park, had been cut down. There was a suppression of fact in this statement, the cutting having been in consequence of the limb being blown down by a heavy wind last January. The whole

of the tree was quite rotten, and the huge bole hollow. The large branch which formed the arch broke away some sixty years ago, and it was then that Mr. Boyd (who rented the shooting), had the stay placed to support it, which it has done until this year. No one could regret more than he did the loss of one of the features of Old Wanstead Park; but it was "the hand of God."

Sir Fowell Buxton declared that in the whole Forest district it would be difficult to find one more able to deal with the management of the woods than Mr. E. N. Buxton. It was the wish of the Verderers and the Epping Forest Committee to carefully consider any reasonable suggestions from those having any knowledge on the subject. He wished those interested would inspect parts of the Forest which had years ago been subjected to treatment similar to those in parts recently so severely criticised. He would mention Woodreddon Hill, and especially on the north side of the road going down to Waltham. He was not prepared to say that the Committee had not made mistakes, but they were all at one with their critics in the desire that Epping Forest should be made as natural and beautiful as possible.

Mr. F. W. Elliott was of opinion that the meeting was not competent to pass this whitewashing motion, as the party had been through Monk Wood very hurriedly, and through only a small portion of Lord's Bushes.

Mr. Lindley: May I justify, in three lines only, a statement I have made?

The President said that he must rule Mr. Lindley out of order, he having already spoken once.

Mr. W. Cole said he was afraid that his old friend, Mr. Smith, must have forgotten what the state of the Forest was when the Conservators took over the management. He had known the Forest intimately for over thirty years, and he was deliberately of opinion that since it had been in the hands of the Committee, it had, on the whole, been immensely improved, and each year showed a further improvement. As to Mr. Lindley's speech, he wished that Mr. Lindley would take the Club to the spots he spoke of at York Hill and at Woodford, in Gilbert's Slade, and let the members form their opinion; he (Mr. Cole) knew very well what it would be. Mistakes had possibly been made as to certain trees, but they must regard the question as a whole. Experience had thoroughly satisfied him that thinning was a necessity, and he thought they should thank Mr. Buxton and the other Verderers for the great care, attention, and foresight exercised in this matter.

Mr. Porter asked if the meeting had been called by the Council.

The Secretary said that it was an Ordinary Meeting of the Club, called by himself as executive officer, in the usual way in which all meetings of the Club were summoned.

Mr. Porter: Then it is irregularly called, and I protest.

The Secretary said that Mr. Porter was in error—the calling of the meeting was entirely in accordance with precedent.

Professor Boulger: If you will read my resolution it says "In the opinion of this meeting."

Mr. Porter: Then it is not a meeting of this Club.

The President (Mr. F. Chancellor) said that if he wanted the best opinion on forestry in relation to Epping Forest he would go to Mr. E. N. Buxton, as he believed he was as good an authority upon the subject as any man in England. It was impossible for any man to cut down a tree without someone abusing him for doing so. In dealing with woods like Epping Forest, it was necessary to consider the subject as a whole, and to do to-day what would be beneficial in the

future. His own observations made that afternoon, and the evidence he had heard from those best acquainted with the peculiar conditions of the Forest, had convinced him that the thinnings were an absolute necessity.

The President then put Professor Boulger's resolution to the meeting, when forty-one voted for it, and eight against—the Verderers and members of the Epping Forest Committee present not voting.

Mr. T. V. Holmes (*Vice-President*) said that he had great pleasure in proposing a vote of thanks to their Conductors and more especially to Mr. E. N. Buxton, from whose clear and full explanations they had learned so thoroughly both what had been done and the reasons for doing it. There was a singular notion among some persons that Epping Forest had been an almost virgin forest previous to the present management, but a glance at Mr. Buxton's excellent Guide, which was obtainable for one shilling, would at once show the absurdity of that view. The present managers were indeed doing their best to undo the deplorable results of the pollarding and general artificialising of the Forest which had prevailed before their time. In the hideously grotesque group of pollards adjoining Monk's Wood they had seen what the Forest generally would have been like had it been left untouched by its present Conservators. On the other hand, in Lord's Bushes they had visited a spot which had been described as one in which the most ruthless devastation had recently taken place, and yet Lord's Bushes had been the most natural-looking piece of the Forest they had seen. He had therefore great pleasure in proposing a hearty vote of thanks to Mr. E. N. Buxton and their other Conductors for their services on that occasion.

Mr. John Spiller seconded, and the vote of thanks was carried *nem. con.*

Mr. Buxton, in the course of his reply on behalf of the Conductors, said that he had had the greatest possible pleasure in acting as guide that afternoon, and he was very gratified to see such an interest taken in the dear old Forest. He had visited many so-called "natural" forests in the four quarters of the world, but never one from which man was not taking toll. But there was this difference, that whereas, generally, man removes the best or the most applicable to his purpose, in Epping Forest only that is removed which is unsightly or injurious.

A vote of thanks to the President for presiding was cordially passed at the instance of Mr. Gellatly and Mr. F. C. Gould, and brought the meeting to an end.

[I feel that no apology is needed for presenting my readers with a nearly verbatim report of the above meeting, in order that the true position of the Club in this matter may be put fairly before the public. The tone of some of the newspaper correspondence could only be paralleled in the lower kinds of political controversy, and it was evident that many of the writers were quite ignorant of the history and condition of the Forest. One or two did not scruple to take the name of the Club in vain, and attempt to father upon it or upon members (either individually or collectively as "founders of the Club") opinions which these members have for years strongly repudiated. They further attempted to support their views by a kind of reckless assertiveness of statement which the real lovers and students of the Forest knew to be either simply untrue, or often ludicrously exaggerated and unfair to the Conservators, and I feared that the Club was getting seriously compromised. Were it not from unwillingness to stand in the way of more important speakers, I should (as the "Founder of the Club") have repudiated, as Prof. Meldola did, the absurd charge of inconsistency. My opposition to some of the proceedings of the Conservators years ago had reference either to a totally different subject (*e.g.*, railway or tramway schemes) or to fears that they were adopting a policy of artificialisation with regard to the Forest, which further experience and observation has in most cases (excepting with regard to deep drainage) proved to be unwarranted, or it originated in lack

of foresight on my part. At meetings of the Club called for inspection of the Forest (*e.g.*, on April 27th, 1889, E.N., vol. iii., p. 164) I have repeatedly strongly objected to the exaggerated statements inserted from time to time in the newspapers, and demonstrated to scores of people the want of knowledge in the writers of the condition of the woods, and I say emphatically that these statements did not, nor do not, represent my views, nor, as far as I know, those of any of the "founders of the Club." I do not often obtrude my own opinions upon my readers, but this question of forest management is a matter of importance, and I will not permit members or non-members of the Club to misrepresent my own or my colleagues' views with regard to a district which has possessed the deepest interest for me during the greater part of my life.—W. COLE.]

NOTES ON ESSEX DIALECT AND FOLK-LORE, WITH SOME ACCOUNT OF THE DIVINING-ROD.

By GEORGE DAY, F.R.M.S.

[*Read February 24th, 1891.*]

ALTHOUGH traces of folk-lore may be found in almost every subject connected with the history and development of mankind, it may be well to commence with a definition of the phrase.

Dr. Johnson tells us that "folk" is properly a collective noun, and has no plural, except by modern corruption: yet he wrote, "Folks want me to go to Italy." Walker says that "folks" is the proper orthography. The expressive phrase "folk-lore," is said by French, in his "English Past and Present," to be borrowed from the German: but in this he appears to be wrong. Mr. W. T. Thoms in "Notes and Queries" for October 6th, 1872, distinctly claims to have coined it. The word was first used in "The Athenæum" for August 22nd, 1846, in an article written by Mr. Thoms, and signed "Ambrose Melton." But the general idea of the words is something like that given by Webster in his "Dictionary," viz., "rural tales, legends, or superstitions"; and, to my mind, the words explain themselves, if we take "*folk*" to mean the general community or people, and *lore* to signify learning in general, as opposed to science —that is ascertained knowledge. We get, then, "folk-lore"—*the common knowledge of the people*—popular learning and ideas on all matters connected with man and his surroundings: or *the popular explanation of observed facts.*

Folk-lore is becoming more and more studied, and year by year it is receiving greater attention. Its object is to collect, classify, and preserve survivals of popular beliefs, and to trace them as far as possible to their original sources. This is no easy matter. School-

boards and railways are fast sweeping away every vestige of old beliefs and customs which in days gone by held such prominent places in social and domestic life. The folk-lorist has also to deal with remote periods, and to examine the history of tales and traditions which have been handed down from the distant past and have lost much of their meaning in the lapse of years. But as a recent writer has said, "Folk-lorists tread on no man's toes. They take up points of history which the historian despises, they prosper and are happy on the crumbs dropped from the tables of the learned, and grow scientifically rich on the refuse which less skilled craftsmen toss aside as useless." The tales with which a nurse wiles her charge to sleep provide for the folk-lore student a succulent banquet, for he knows that there is scarcely a child-story that may not be traced back to the boyhood of the world, and to those primitive races from which so many polished nations have sprung.

Around every stage of human life a variety of customs and superstitions have woven themselves, most of which, apart from their antiquarian value as having been bequeathed to us from the far-off past, are interesting in so far as they illustrate those old-world notions and quaint beliefs which marked the social and domestic life of our forefathers. Although many of these tales and phrases appear to us meaningless, yet it must be remembered that they were the natural outcome of that scanty knowledge and those crude conceptions which prevailed in less enlightened times than our own. Probably if our ancestors were in our midst now, they would be able in a great measure to explain or account for what are often looked upon nowadays as the childish fancies of the nursery.

Many of the old traditionary beliefs and practices associated with the nursery are relics of what the Scandinavian mothers taught their children in days long ago. The familiar fairy tales of our own childhood still form the nursery literature or "baby classics" in most homes, and are of unusual interest as embodying not only the myths and legends of the ancient Aryan race, but also their conceptions of the world around them.

Our task, however, is not concerned with the large subject of the fairy tales of the infant world in general, but rather with the local traditions, superstitions, and common beliefs of our Essex county and peasantry.

It may be useful to say something of the *dialect* of Essex, the greatest peculiarities of which occur north of Chelmsford, especially

in Braintree, Halstead, Gosfield, Wethersfield, and in the vicinity of the Salings. In some parts of the county the dialect resembles that of Kent; in others of Suffolk. The Essex dialect is, however, not generally so broad as either, nor is it spoken with the strong whine of the Suffolk folk. It contains many words from the Anglo-Saxon (this may be accounted for by the fact that in A.D. 530 Saxons landed in Essex), Friesic, Dutch, and Belgic, not usually found in other English dialects; such as *ails*, *amper*, *bigge*, *boy*, *bullimony*, *cowl*, *golls*, *housen*, *lugsome*, *mat*, *mawther*, *pillow*, *beer*, *rumpled*, *stiver*, *stump*, and *snace*. And words from the Norman, as *foizon*, *frail*, *chate*, and *coppy*.

There is a tendency to transpose letters, as *aers* = ears. Vowels are often lengthened, as *maade* for made, and *maake* for make. *A* is liable to become *O*, as *ollis* for always. *E* is often changed into *A*, as *a*nough for enough, *a*rrant for errand, and w*a*rse for worse. *I* has a broad sound, *foine* = fine, *noice* = nice, *smoile* = smile, *toime* = time, *twoice* = twice, etc.

O becomes *U*, e.g., *frum* = from, *sput* = spot, *nut* = not.

D is changed into *T*, as in *arrant* = errand, *ballet* = balled.

R is often dropped altogether, as *suppased* = surpassed, *hul* = hurl.

There is also the usual tendency to abbreviate words, *e.g.*, *awmas*, *arst*, *au to*, *boarnt*, *mosly*, *lowance*, *monsus*, for "almost," "asked," "all to," "bonnet," "mostly," "allowance," "monstrous." *W* for *V* is common, as *warse* for verse.

But to their credit, Essex people generally pronounce the letter *H* correctly; this was remarked at the celebrated Ardlamont Trial recently held (see "Law Reports," Dec. 19th, 1893).

The old plural occurs in some parts, as *housen*, *assen*, *shoon*, etc.

The total number of provincial words used in Essex is put down at 589, as compared with Suffolk 2,400, Norfolk 2,500; but these figures cannot be implicitly relied upon.

As a few examples of words used in Essex, we may note the following:

Bed-steddle—A bedstead. ("Steddle" seems to be a diminutive of the Anglo-Saxon *Stede* [Danish id.], a place.)

Bellar—To bellow.

Bile—To boil.

Boa—Boy. ("Wa'a yow gowan altogether, boa?" is common in the rural districts of Essex.)

Bullimony, *Bullimong*—A mixture of several sorts of grain as peas, oats, and vetches.

Bum-by—By and by.

Buss—To kiss, to embrace.

Cop—To throw (as "cop that to me," and "cop it here," etc.).

Cowl or *cow*—A tub. Ger., *Kugel*, a bowl.

Dag—Dew, from the Swedish *dagg*.

Dog-rapper—The parish beadle with the long willow wand in church. This has been handed down from the early 17th century.

Dunt—To confuse by noise.

Down—At, as "down t'other end of town."

Enow—Enough.

Grift—Slate-pencil, from the Danish and Swedish *griffel*.

Gumption—Nonsense, foolish talk. (It also means talent, understanding.)

Haysel—Haytime, from A.-S. *heg*, hay; *sel*, time.

Hodmadod—A shell snail, from A.-S. *hod* (whence hood), and *mad* an earth-worm.

Mawther—A great, awkward girl. This word is also used in Norfolk and Suffolk.

Paagles—Cowslips are so-called by children in N. Essex. This is a corruption of paigles. In some places the word signifies flowers in general.

Pay—To flog or beat, as "I'll pay you" said to a bad boy. Shakespeare also uses the word "*pay*" in the sense of "to beat or thrash."

Tighted up—Put in order.

Weavers' Beef of Colchester—Sprats.

Flacked—Hung loose, agitated by wind.

Funnick—A tawdry dressing woman.

Golls—The hands, as

"Warm golls warm
Boys are gone to plough,
If you want to warm golls,
Warm golls now." (N.E. Essex.)

Many more examples might be given, but want of space forbids.

Essex is particularly rich in LOCAL SAYINGS, and the following may be noted:

"*As wise as a Waltham Calf, which went nine miles to suck a bull, and came home as dry as it went.*" This needs no explanation.

"*Dovercourt all talkers and no hearers.*"—At Dovercourt a court is annually held, at which, as it consists chiefly of seamen, the irregularity described is likely to prevail. "Keeping Dovercourt" is said to mean making a great noise, and a further explanation was that Dovercourt was celebrated for its scolds. (See Nare's "Glossary," Halliwell, Wright, "Prov. Dict."; Also Ray.)

"*Every dog has its day and a cat two Sundays.*"

"*Giving the straight tip*," meaning speaking plainly and decisively, and very often an insult is intended.

"*Good elm, good barley, good oak, good wheat*," is well understood.

"*Laying by the wall.*"—If anyone is dead, he or she is said "to lie by the wall," implying also that one is dead but not yet buried. In the Dutch there is

a phrase "Aan de laager wol zyn," to be brought to a low ebb, but the phrase may well be a corruption from the Anglo-Saxon "*wael*," death, Ger. "*wahle*," and so meaning "he is laid down by death."

"*Moon and mushrooms.*"—It is a prevalent belief in Essex that the growth of mushrooms is influenced by the changes of the moon, and the subjoined rule is often strictly adhered to :

"When the moon is at the full,
Mushrooms you may freely pull ;
But when the moon is on the wane,
Wait ere you think to pull again."

"*Not to have her change*"—when speaking of a woman—"*He has not got all his buttons* of a man, are expressions used in referring to people not quite right in the head.

"*Essex stiles, Suffolk miles,*
Norfolk wiles,
Many a man beguiles."

An Essex stile is a ditch, a Suffolk mile is an ordinary mile and a "bittock," and they were often impassable, and hence the way seemed longer. Norfolk is said to have been remarkable for litigation, and the quirks and quibbles of its lawyers.

"*To put the miller's eye out*" means to overdo the milk with water and to make the pudding too thin.

"*Scare a job*" implies that the work will soon be completed, or in other words, "making the job look foolish."

A person who excels in anything is a "fright"—a good gardener is a fright at gardening, a clever person is a fright, etc. This is not generally understood, however.

"Caution" is a word also to indicate a clever person—a good farmer is a "caution," or anyone who attends to business properly.

"Braintree boys"—brave boys.
"Bocking boys"—rats.
"Church Street"—puppy dogs.
"High Garrett"—cats. (See Hazlitt.)

Who feteheth a wife from Dunmow
Carrieth home two sides of a sow"

The ceremony connected with the granting of the "flitch of bacon" is not peculiar to Essex. It was established at Dunmow in the time of Henry II., but was originally founded by Juga, a noble lady, in the year 1111. "*He has gone to Harwich*" signifies he has gone to rack and ruin. An old Essex word is "Harriage," meaning confusion, the "i" is dropped as in marriage, carriage, etc., and the similarity to our Essex sea-port will account for its being used. It is from the old verb *harry*, to harass, to drive. French *harier*.

The word "Hatch" is very common in our county : e.g., Albury Hatch, Chingford Hatch, Kelvedon Hatch, Pilgrim's Hatch, Rayne Hatch, West Hatch, etc., etc. Wherever this occurs it signifies that there is, or was, a gate across a high-road, at the entrance to a common, to prevent the escape of cattle. In many places where the commons have been enclosed or thrown open the gate has disap-

peared, but its reality is still discoverable by the word hatch being affixed to the name of the place as above.

I am not prepared to say how many times the Devil has appeared in our county, but it is reported that he showed himself to the inhabitants in the form of a Minorite friar during a thunderstorm at Danbury, 1402, when the nave and a great part of the chancel of the church was destroyed.

In the parish of Tolleshunt Knights there is an uncultivated field, and at some distance from it is an old mansion known as "Barn Hall." The legend is that the Hall was intended to have been built on the first named spot, but the devil destroyed in the night time all that had been done in the day. A knight with two dogs was sent to watch, and when the evil one came there was a sharp tussle, but of course Apollyon was vanquished by Greatheart. The irritated demon thereupon snatched a beam from the building and hurled it through the darkness, exclaiming:

"Wheresoever this beam shall fall
There shall stand Barn Hall,"

and further added that on the knight's death he would have him, whether he was buried in the church or out of it. To avoid this calamity the warrior was buried in the church wall—half in and half out. A curious doggerel was common in the district named.

The "Legend of the Flying Serpent," an account of which appeared in a pamphlet published by Peter Lillicrap in the year 1669 with the title of "The Flying Serpent, or Strange News out of Essex, being a true relation of a monstrous serpent which hath at divers times been seen at the parish of Henham-on-the-Mount, 4 miles from Saffron Walden." This was reprinted a few years ago by our member, Mr. Miller Christy.

"It is the hardest thing in the world to shake off superstitious prejudices. They are sucked in as it were with our mother's milk and growing up with us at a time when they take the fastest hold and make the most lasting impressions become so interwoven into our very constitution that the strongest good sense is required to disengage ourselves from them." These were the words of Gilbert White, written in 1776, and if true in his day they are as true in ours.

In Essex it is considered lucky to see the new moon over your right shoulder, but unlucky to see it through glass. One good woman I came across always shut her eyes when she closed the shutters, lest she should see the moon.

It is lucky to put on your stocking wrong side out, but unlucky to turn it immediately on discovering the mistake.

"*Good fortune will follow you if you pick up a horse shoe.*" At Ilford I saw a horse shoe nailed to the door of a cow-house, and on asking a lad the reason, he replied, "Why, to keep the wild horse away, to be sure." This seems to be a new explanation of the custom.

It is considered ominous of evil to spill salt, or to lay your knife and fork across each other. These are two very wide-spread beliefs, not by any means confined to our county. The first of them has been handed down to us from the Romans. Gay, who attributes them to his old market woman, was from the north of Devonshire."

> "The salt was spilled, to me it fell,
> Then to contribute to my loss,
> My knife and fork was laid across."
> —*The Fable of "The Farmer's Wife."*

The signs of coming death are numerous, such as breaking a looking-glass—if a corpse should not stiffen—the thrice repeated crowings of a carrion crow—having green brooms in the house during May—the barking of a dog at dead of night—the tapping of a beetle, known as the Death Watch—the bringing of a solitary primrose into the house; and many others.

The origin of Monday being looked upon as the "Shoemakers' Holiday" is interesting. The story is this: While Cromwell's army lay encamped in Essex one of his most zealous partizans, whose name was Monday, hanged himself. Cromwell offered a reward for the best lines on his death. A shoemaker sent in the following lines:—

> "Blessed be the Sabbath day,
> And cursed be worldly pelf,
> Tuesday will begin the week
> Since Monday's hanged him-self."

Cromwell was so well pleased, that he not only gave the reward, but also ordered that shoemakers henceforth should observe Mondays as holidays.

A mode of punishment for robbing churches, though not entirely confined to our county, may be found connected with it. It is that of flaying the offender, and fixing his skin to the door of the parish church. This penalty for sacrilege appears to have had the sanction of the law in Anglo-Saxon times, when money was often paid by the offender to save his skin, called "hide gold," a ransom for one's

skin.[1] Morant mentions this barbarous custom in connection with the church at Copford, "that the building was robbed by the Danes and their skins were nailed to the doors." In 1789 there was exhibited before the Society of Antiquaries, a plate of iron from the door of Hadstock Church, with a portion of human skin upon it. Mr. Maynard read a paper on this subject at a meeting of the Club at Saffron Walden, in 1889. (See ESSEX NATURALIST, vol. iii., p. 292.)

The folk-lore of plants is considerable. The curious legend of the "Holy Thorn," in connection with Woodham Ferrers, has already been detailed in THE ESSEX NATURALIST (vol. vii., pp. 48-50), and there is a thorn of the same kind in Coggeshall.

Other plants around which legends hover are the maiden-hair fern, rosemary, broom, lilac, laburnum, etc., etc.

Interesting beliefs concerning birds and insects are current throughout the county.

Robins if allowed to die in the hand cause that hand to shake always.

The *wren* is considered the wife of the robin, and in many places it is thought unlucky to kill or injure it.

"The robin and the wren
Are God Almighty's cock and hen."
"The martin and the swallow
Are the next two birds that follow."

It is considered highly unlucky to kill a swallow from, perhaps the idea of its being a breach of hospitality, these birds being in the habit of taking refuge in houses. If they fly low and often touch the water with their wings they are said to foretell rain. Thus Gay sings:

"When swallows fleet soar high in air.
He told us that the welkin would be clear."

"There are no nightingales at Havering-atte-Bower," runs the legend, because Edward the Confessor, being interrupted by them in his meditations, prayed that their song might never be heard again; but the Rev. R. Faulkener, who was Incumbent of Havering for over twenty-five years, says: "Their sweet notes are still heard chanting their Maker's praise amongst the shady groves of this pretty village."

In Essex the peasants have a rhyme on the crow. If crows fly towards you, then "One's unlucky, two's lucky, three is health, four is wealth, five is sickness, and six is death."

Magpies are considered unlucky, and an old tradition believed in by many in our county is "that it was the only bird that refused to enter the ark with Noah and his folk, preferring to perch itself on the roof of the ark, and to jabber over the drowning and perishing world." Ever since, it has been regarded as unlucky to meet this defiant and rebellious bird

1 It is possible that another explanation may be given of expressions in the Saxon codes—such as that an offender "shall pay with his hide." This may mean that he may be scourged; and Mr. Fisher, in his "Forest of Essex," quotes from another Anglo-Saxon code the words, "If any one put his hide in peril, and flee to a church, be the scourging forgiven him." —ED.

Round our coast sea-gulls are considered ominous. The following rhyme I heard at Walton :

"Sea gull, sea gull, sit on the sand,
It's never good weather when you're on land."

Insects.—During harvest, reapers take very great care not to injure a large kind of "daddy-long-legs," known to them as "harvest men," under the idea that it is unlucky to kill one.

Crickets about a house are considered lucky, but it is believed (especially in the Tendring Hundred) that they eat holes in the stockings of those that kill them. The "Death's-head Moth" is ever looked upon with suspicion and dread. A capture of a very fine specimen was made by Mr. A. J. Furbank at Maldon, on Sept. 15th, 1888, on the occasion of the Essex Field Club's excursion down the Blackwater (See ESSEX NATURALIST, vol. ii., p. 188). The calamity which befell the Club was that the barge was becalmed some sixteen miles from Maldon. Had the members been believers in superstition the reason would not have been difficult to discover.

There are various beliefs concerning bees. At Hyde Green, Ingatestone, I inquired of some cottagers how the bees were, they said, "They have all gone away since the death of poor Dick, as we forgot to knock at the hives to tell them he was gone dead."

Matters referring to the household come in for a large share of beliefs.

A popular notion in Essex is that a mild winter is less healthy than a cold one :—

"A green Christmas makes a fat churchyard,"

but the returns of the Registrar-General prove the contrary; the mortality of the winter months being always in proportion to the intensity of the cold.

Candles are not without their omens. A collection of tallow rising up against the wick of a candle is called in Essex a winding sheet, and looked upon as an omen of death in the family. A bright spark on the wick tells that a letter is coming to the house, and that the person towards whom it comes will be the one to receive it.

The belief in witchcraft has not entirely lost its hold amongst our rural population, and against it one of the best preservatives is a horse shoe.

Bodily ailments present a wide field for folk-lore, and remedies for every conceivable ill that flesh is heir to are to be found in the notions of our village wise-women. Some of the prescriptions are of

the most nauseating description, and would rather aggravate the complaint than otherwise, but yet around them hang the hoar-frost of superstition and antiquity.

Several curious sayings and customs are connected with Colchester. Amongst them may be noted the following. It has been the habit of the Town Crier at Colchester, on the 1st of every December, thus to proclaim the birth of that month in various parts of the town in the early hours of the morning :

"Cold December has come in,
Poor men's clothes are very thin,
Trees are bare, and birds are mute,
A pot and a toast would very well suit."

"Past 12 o'clock and a *cold, frosty* morning. Good morning, masters and mistresses all, and God bless you."

Gooseberry-pie day.—The origin or this curious name reaches so far back that it is not easy to say who was first responsible for it. For a great many years past the expression has been applied by the people of Colchester to signify the day on which the Society of Friends have an annual religious gathering of an extensive character, which is followed by a repast at which gooseberry pie figures on the *menu*. It was also considered that the berries were not to be bought cheaply until after that particular day. In Colchester, also, it was held that mackerel were not fit to eat till the chapter concerning Balaam and Barak was read as the first lesson in church (second Sunday after Easter), but no reason can be given for this strange saying.

THE DIVINING-ROD.

A notice appeared in the daily press in December, 1893, "That a good spring of water has just been found at Thremhall Priory, Essex, the residence of Mrs. Archer Houblon, by means of a divining rod," etc.

This is by no means the first time that this practice has been resorted to in our county ; a similar search for water was made at Broomfield at the instance of Mr. Christie-Miller, who, on the 12th June, 1891, engaged Mr. Mullens, of Chippenham, to search for water by means of the divining rod. Again, in the month of September in the same year, the divining rod was used by Mr. A. K. Barlow, of Lynders' Wood, Braintree. The belief in the rod existed from the earliest years. The Staff of Hermes was venerated by the Greeks and Romans, and they also had their "wish rods" like our-

selves, or at least traditions of such objects is plain from sundry passages in their writings. Tacitus speaks of divination by means of rods. But the Middle Ages was the date of the full development of this superstition. The first notice of its use among the late writers is in the "Testamentum Novum" of Basil Valentine, a Benedictine monk of the fifteenth century. He says that there are seven names by which this rod is known. To its excellences, under each title, he devotes a chapter of each book. The names are "Divine Rod," "Shining Rod," "Leaping Rod," "Transcendent Rod," "Trembling Rod," "Dipping Rod," and "Superior Rod." The most general name is that by which it is known to us, viz., "The Divining Rod," but in Germany it is known as the "Wünschel Ruthe," and in France as the "Baguette Divinatoire." It is also known as the "Virgula Divina." We find no mention made of the "Virgula" in any author before the eleventh century, but from that time it has been in frequent use, and the notion still largely prevails in England of a twig of hazel's tendency to turn to a vein of lead ore, a seam or stratum of coal, water, etc. In the "Living Library," 1621, we read "that no man can tell why forked sticks of hazel or some other wood (but hazel in preference) are fit to show the places where the veines of gold or silver are. The stick bending itself in the places at the bottome where the same veines are."

From a paper in Tulloch's "Philosophical Magazine," written by W. Phillips (vol. xiii., page 309), it appears that the Divining-rod was advocated by De Thouvenal in France in the eighteenth century; and soon after in our own country by a philosopher of unimpeachable character, Mr. Cookworthy, of Plymouth. This is mentioned in Sir Thos. Browne's works, vol. ii., page 97; also in "The Gentleman's Magazine," 1752 (page 77); and in "The Agricultural Survey of the County of Somerset," 1797; in "The Quarterly Review" for March, 1820; in "The Autobiography of Henrick Zschokke," published by Messrs. Chapman & Hall, 1845; several records are also given in "The Spiritual Magazine" for March and April, 1862, and May and June, 1868.

In "The Shepherds' Kalendar or the Citizen's and Countryman's Companion," there is a receipt given to make the "Mosaic wand to find hid treasure" without the intervention of a human operator:

"Cut a hazel wand forked at the upper end like a Y. Peel off the rind and dry it in a moderate heat; then steep it in the juice of

wake-robin or night-shade, and cut the single lower end sharp, and where you suppose any rich mine or treasure is near, place a piece of the same metal you conceive fs hid in the earth to the top of one of the forks by a hair or very fine silk or thread, and do the like to the other end, pitch the sharp single end lightly to the ground at the going down of the sun, the moon being at the increase, and in the morning at sunrise by a natural sympathy you will find the metal inclining, as it were, pointing to the place where the other is hid."

We find in "The Virtues of Sid Hamet, the Magician's Rod," by Swift, 1710:

> "They tell us something strange and odd,
> About a certain magic rod,
> That, bending down, its top divines
> Where'er the soil has golden mines.
> Where there are none it stands erect,
> Scorning to show the least respect."

But the most extraordinary treatise on this subject is an old book, written in French in the seventeenth century: "La Physique Occult ou traité de la Baguette Divinatoire des sources d'eaux, des mineres, des tresors cachez, des voleurs, et des meutriers fugitifs, avec des principes qui expliquent les phenomenés le plus obscurs de la nature. Par M. L. L. de Vallémont, Ph.D.," illustrated with rudely-drawn woodcuts. Other references to works on the subject might be given, but those mentioned are the most important. Whatever may be the merits of the Divining-rod in the opinion of the educated and scientific its efficacy is very generally credited in the coal and other mining districts, and persons who have the reputation of being skilled in its use are had recourse to with as much faith as is the "wise man" or "cunning woman" of the neighbourhood in affairs of another description. In Cornwall the miners place much confidence in the indication of the rod, and even educated and intelligent men ofttimes rely on its supposed virtues. But Cornwall is so plentifully stored with tin and copper lodes that some accident frequently discovers a fresh vein. In Lancashire and Cumberland the power of the rod is much believed in, and also in many other parts of England.

Amongst the many virtues ascribed to the rod is that of detecting water springs, and the mode of use is as follows:—

The rod is a little forked stick of hazel or some other wood. The operator takes one of the branches in each hand, and, extending the shaft or stem horizontally from his body, moves slowly over the spot which is supposed to conceal the spring of water or the vein of coal.

In the year 1874 an advertisement appeared in the local papers as follows:—

"Water.—Mr. J. Bailey, of Vine street, Grantham, in addition to his thirty years' experience in raising and conveying water by self-acting machinery, has arranged with Mr. John Mullens, the great water discoverer, for his services, and all orders addressed to him at 10, Vine-street, will receive prompt attention."

Mullens was known as the Bath water-finder, or the "man with the twig." He, however, did not use a twig of hazel, but one of blackthorn. This man had been employed to discover water on the estates of the Duke of Beaufort and other noblemen and gentlemen, and it was said that his discoveries by means of his twig were always attended with success, and that a good spring of water was invariably found in the precise spot where his rod had indicated its presence. At the annual meeting of the Science Classes, held in September, 1878, Sir W. E. Welby Gregory, Bart., M.P., said in his speech:

"The really great man, who devotes his whole life to the pursuit of knowledge, progresses in his discoveries from day to day, only to become more and more convinced of the depth of his ignorance and the vastness and the mystery of the things which lie beyond his ken. The man, on the other hand, who has but a slight acquaintance with science, is far too apt to think that he knows everything, and to set up his own judgment in opposition to all authority, even the very highest. I had occasion to seek for an additional supply of water for my house, and I was induced to send for a man out of Wiltshire, who was said to be able to discover running water by the aid of a twig, or, as it used to be called in ancient days, a Divining-rod. The man came, apparently a very simple, straightforward sort of a fellow, who did not profess to know the reason why, but simply the fact that when he crossed running water the twig turned upwards in his hand, and he indicated two spots where he said I should find water at a very moderate depth. So I determined to sink my wells in accordance with his directions, and I may say at once that in both cases I found water. But meantime I mentioned what I had been doing separately to two friends well versed in geology, and both as by one consent agreed in laughing the water-finder to scorn. They said he might by long experience have gained some skill in judging where water would be found; he might simply be an impostor; only one thing was certain—he could not be possessed of any occult power. Science could not understand such a power existing, and science believes nothing it cannot understand. Now why should not this man be endowed with some force or power that is not yet explained? Did science know all about electricity a century ago? What can it tell now about animal magnetism, mesmerism, and so forth?"

But scientific men who have bestowed any care or examination of nature regard this alleged power as an unconscious delusion, ascribing the whole phenomenon to the effect of a strong impression on the mind acting through the agency of the nerves and muscles. Let anyone try the experiment. Hold the two branches of the fork as *loosely* as possible about 6 inches from the angle. At first one points over each shoulder, then without clenching the fist turn the hands till the backs are towards the ground, keeping them about 6 inches apart. It will be seen that, however loosely the twigs are held, they become a little twisted, and that the slightest movement of the hands will make the fork fly up and down again at pleasure. Another method is to hold the small ends in the hands in a position parallel to the horizon and the upper part at an elevation having an angle of 70°. The rod must be *strongly grasped* and steadily held, and then the operator walks over the ground. When he crosses a lode or spring, its bending is supposed to indicate the presence thereof. The position of the hands in holding the rod is a constrained one; it is not easy to describe it, but the result is that the hands, from the weariness speedily induced in the muscles, grasp the end of the twig yet more rigidly, and then is produced the mysterious bending. The phenomena of the rod and table turning are of precisely the same character, and both are referable to an involuntary muscular action, resulting from a fixedness of idea.

But, in the opinion of the ancient experts, the operation of the rod depended upon many special conditions. It was always to be used after sunset and before sunrise, and only on certain nights, among which are specified—Good Friday, Epiphany, Shrove Tuesday, St. John's Day, and the first night of a new moon or that preceding it. In cutting a rod one must face the east, so that it shall have caught the first rays of the morning sun, or, as some say, the eastern or western sun must shine through the fork, otherwise it will be good for nothing.

It must not be thought that no scientific (so-called) reason has been given to account for this supposed power. I trust the following may be understood:—

It is stated "that the corpuscles rising from the springs or minerals entering the rod determine it to bow down in order to make it parallel to the vertical lines which the effluvia describe in their rise. In effect the mineral or water particles are supposed to be emitted by means of the subterraneous heat or of the fermenta-

tions in the bowels of the earth, and the rod being of a light porous wood gives an easy passage to these particles, which are also very fine and subtle. The effluvia then being driven forward by those that follow them, and oppressed at the same time by the atmosphere incumbent on them, are forced to enter the little interstices at the fibres of the wood, and by that effort they oblige it to incline or dip down perpendicularly, and to become parallel with the little columns which these vapours form in their rise"!!

Now to sum up the whole matter. How can we reconcile our disbelief in the powers of the Divining-rod with the testimony of those persons who have either used it themselves or seen it used, and whose writings have been published from time to time? The task is not so difficult. We are quite willing to admit the good faith of those we have named, and do not for a moment disbelieve the accuracy of their facts. We have no doubt that the rods turned and that the water was found; we merely refuse to arrive at the conclusion that the rod turned *because* there was water below the holder's feet. The truth is, there is generally water under the soil if we only try for it, and the ceremony of walking backwards and forwards with a twig in no way alters the fact. Before we go further, let us hear how often the rod has failed, let us see whether water cannot be found by digging where it has not indicated water, and minerals found in places over which the rod has made no movement.

NOTES ORIGINAL AND SELECTED.

Badgers in Essex.—A remarkable letter from Mr. B. Morris, of Blackheath, appeared in "The Standard" of May 17th, which was the occasion of a "leader" in that paper of the following day. We should be much obliged for any further information. Mr. Morris's letter was as follows: "Being on a visit recently at a country house in a village not far from Braintree, in Essex, I was greatly surprised to learn that quite a large number of badgers had been found in a wood near the village. I was also more surprised to hear that they had all been caught, and, if not killed, sent away. One would have thought that such rare and interesting visitors would have been taken the utmost care of and strictly preserved. There were no less than eleven. I had imagined that the badger was nearly extinct—at least, in so thickly populated a part of the country as that I speak of. The small wood in which the earths were situated is close to a much-frequented high road, within a stone throw of the village and church. The squire of the parish is a capital sportsman, and I cannot understand how he could have allowed such vandalism. I may add that there was lots of woodland country round for them had they been left alone; at all events, the fact of there being such a rare species of wild animal as the badger in Essex ought to have

assured them protection and strict preservation." Mr. Morris subsequently writes, under date May 26th, that—"I have heard from the owner of the covert in which the badgers had made their earth that out of the eleven badgers nine were saved; six are hoped to be safe in another part of Essex, to which they were deported to coverts where their services were required to construct earths for foxes; two came to grief, one by natural causes, the other through misadventure, *i.e.*, entanglement in a poacher's snare; the remainder were relegated to another county. I ask the favour of this explanation for two reasons, to allay the apprehension that they were destroyed, and to be able to state that the owner of the wood was too good a sportsman to allow them to be slaughtered."

Otter Notes.—The following records of the destruction of otters in Essex have appeared in the local papers. It appears to be futile to remonstrate against the senseless and wicked attempt to exterminate this most interesting animal.

Otter at Heybridge.—"On January 15th, Mr. James Woodcraft, of Heybridge Basin, shot a very fine female otter, on the bank of the Chelmer and Blackwater canal, near the Basin. The animal measured 3 ft. 7 in. from the nose to the tip of the tail, and weighed 13 lbs. The coat was in splendid condition."

Otter at West Bergholt.—"On Thursday afternoon, January 11th, while Mr. A. E. Diss and Mr. W. H. Wythe were up the river wild fowl shooting, they managed to secure a male otter."

Otters in the Blackwater, near Langford.—"A number of otters have made their appearance in the Blackwater, at Langford, since the London Anglers' Association restocked their private water there with two tons of fish. Remains of fish have frequently been discovered on the banks, and three otters have recently been shot. The last one was killed on Sunday, February 4th, and was subsequently exhibited at a committee meeting of the Association, held at Foresters' Hall, Clerkenwell."

An Otter thirteen miles from a river.—"In the early part of April, a labourer on the Fanton Hall estate, North Benfleet, saw what he took to be a fox run into a drain under a field gateway. He immediately informed Mr. W. Butcher, bailiff to the Ecclesiastical Commissioners, to whom the property belongs. Mr. Butcher at once proceeded to dig it out, and after some three hours' digging got down to the drain, which was covered in with timber slabs; but another hour and a half elapsed before he was able to capture the animal, which he did by passing a workman's waist-strap over its head. He had never before seen an otter (for so it turned out to be, a female, weighing 14½ lb.), and had no notion of what animal he had caught. It is a mystery what the otter was there for, as there is an entire absence in the neighbourhood of anything in the shape of otter's food. The nearest river is the Chelmer, thirteen miles away. It is supposed that the animal had been disturbed by a shooting party."

Death of a Horse from Yew Poisoning.—"On Wednesday afternoon, February 7th, Mr. H. J. Hutson, Maldon, had a horse die from eating some yew boughs, which, it is said, had been gathered by the borough road men, and thrown on a rubbish heap. The animal reached over the fence of the field in which it was, and picked them up and ate them, dying shortly afterwards."—"Essex County Standard."

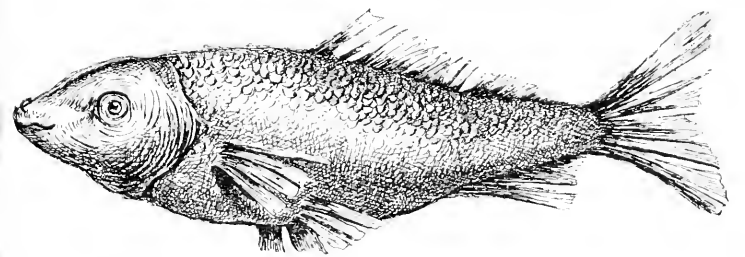
Rough-Legged Buzzard in Essex.—"A rough-legged buzzard (*Archibuteo lagopus*) has recently been trapped at Hatfield Peverel while feeding on a pheasant."—"Essex County Chronicle," January 25th, 1894.

A Travelling Sparrow's Nest.—"A sparrow's nest, containing five eggs, was the other day discovered between the Westinghouse brake of one of the London, Tilbury, and Southend Railway Company's carriages and the bottom of

the carriage. The nest was not disturbed, and the eggs have now been hatched, notwithstanding that in the interim the carriage had been used to form part of a local train running between Dagenham and Fenchurch Street."—"Standard," May 17th, 1894.

A Lunar Rainbow.—The evening of Saturday, January 20th last, was marked at Chelmsford by occasional showers of rain, while the moon, which was nearly full, shone brightly from between the clouds from time to time. At 6.25 a slight shower fell in the yard of the County Technical Laboratory while the moon was shining, and a lunar rainbow was consequently formed. The centre of the bow was almost due west of the observer and not more than fifteen degrees above the horizon. The colours of the spectrum, though distinctly visible, were much paler than those of a solar rainbow.—THOMAS S. DYMOND, Chelmsford.

Tenacity of Life and Natural Repair of Injuries in a Gold-fish.—On the afternoon of Friday, February 9th, the servant heard a noise in the breakfast-room, and upon seeking the cause, she found the bell-glass aquarium pulled over on its side, and the contents—water and three gold-fishes—projected on to the floor about two feet off. The fishes were wriggling and gasping, and she picked



them up, put them back into the bell-glass and filled it with fresh water. The catastrophe was brought about by an Essex-bred frolicsome kitten who had invited a neighbour to enjoy the fun, and between the two thoughtless and unfeeling felines the poor fish must have had a bad time of it. The poor little things were terribly mauled; not a fin or even the tail escaped the sharp combing of the cats' claws. The drawing I have made gives a fairly good idea of the extent of mischief wrought by the two playful Grimalkins.

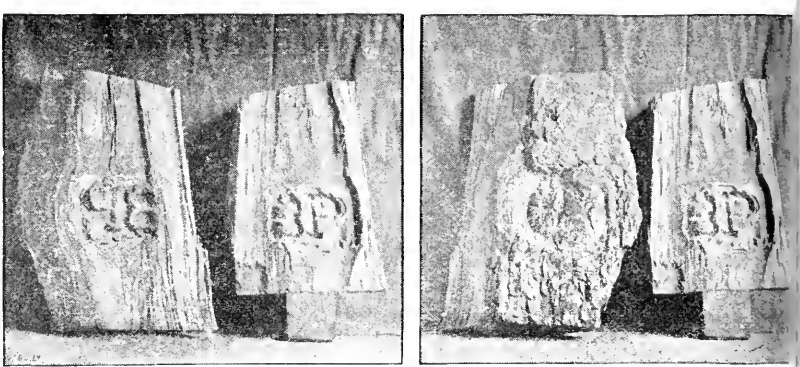
The fish however, on the next day were swimming about almost as well as if they had their fins intact, and came to the side of the glass to be fed with meat-pulp, the food invariably given, and took it with as keen a relish as if nothing unusual had occurred, and their propelling organs were uninjured. To-day, February 23rd, I have again carefully examined the fish. The largest one, the subject of the drawing, has now so far recovered that its fins are perfectly joined, the only evidence which they now exhibit of the laceration being the appearance of white lines where the membranes of the fins have grown together — the scars of the healed wounds in fact—showing how quickly they heal up, and how very protective the scales must be to resist the rough treatment.—FREDERICK H. VARLEY, 82, Newington Green Road, N., February 23rd, 1894.

Early Swarms of Bees.—The Rev. Henry H. Allott, Rector of Stifford, near Grays, records in "The Standard" that he hived two good swarms of bees on Saturday afternoon, April 28th. He adds that he has kept bees for some years now, and the earliest swarms have happened not sooner than the latter end

of May. [Two swarms came forth from the straw skeps in our garden at East Mersea on May 15th, which we considered remarkably early.—W. COLE.]

Vanessa Antiopa in Epping Forest.—On Saturday, April 7th, I was delighted to take a hybernated specimen of the "Camberwell Beauty" butterfly in Great Monk Wood, Epping Forest.—W. F. WHITTINGHAM, "North View," The Drive, Walthamstow, April 23rd, 1894.

Inscribed Letters in a Tree Trunk.—In the middle of December last, during one of the heavy gales that prevailed at that time, a large elm was blown down by the roadside near Cannock Mill, on the road to Donyland, near Colchester. A month or so later portions of the timber were being chopped up for firewood when a curious discovery came to light. A piece of the trunk split open under the chopper, and revealed the letters "B. P." boldly inscribed on one sur-



INSCRIBED LETTERS IN AN ELM-TREE.

face and in clear relief on the other. The tree had in former days marked the parish boundary of St. Botolph's. Bark had been cut away and a plane surface of wood levelled, on which the letters had been cut. The bark appears to have crept over and covered up the inscription, and the growing wood fibre of the tree had buried the letters deeper and deeper into the tree trunk. I have heard of a story, whether apochryphal or not I cannot tell, about a somewhat similar incident, though of a more romantic character, the following suggestive lines having been similarly incised in the heart of a piece of timber :

> "Long shall this tree witness bear
> We two lovers walked here."

The discovery at Colchester has led me to wonder whether other parish boundary marks have not been tree-swallowed in the same way. The present instance shows that such cases could be detected without cutting the tree down, for the outside scar would never be completely covered up. I am on the look out in this neighbourhood, and have already found a suspicious-looking tree exactly level with the modern stone boundary of a Colchester parish ; but unfortunately, the trunk is so clasped with ivy that its secret, if it has one in its heart, is at present inscrutable. Members in other parts of the county might hunt for examples, for it is not unlikely that trees were, in the times of the "simple great ones gone," the accustomed landmarks of parochial boundaries.—CHARLES E. BENHAM, Colchester, April, 1894.

Silene Conica. Lin.—I found this plant growing freely in a field of crim- clover (*Trifolium incarnatum*, Lin) near this town. I believe this is the first e that this plant has been recorded in this county. It is a rare plant, found y in the Eastern counties, and occasionally in ballast hills further north. Pro- ly it has only recently been introduced into this locality, but seed vessels ing been freely formed it may become established.—J. C. SHENSTONE, Col- ster. [In Gibson's "Flora of Essex" it is stated that "D. French has a imen of this species gathered near Harlow Bury House, in 1858. It was y once found."—ED.]

A Remarkable Meteor.—A meteor of great brilliance was observed at elmsford on Sunday evening, April 22nd, at 7.35. The evening was fine and r, and it was still almost broad daylight, the sun having set at 7.5. The eor appeared near the zenith, and took a course a little to the east of south, tting a dazzling greenish light, and leaving behind a number of sparks. About above the horizon it suddenly "went out," but for a short distance it was visible as a red hot ball before finally disappearing into space.—THOMAS S. MOND, Chelmsford, April 24th, 1894. [This meteor appears to have been seen arious parts of England. The Hon. R. Russell recorded it as seen at Hasle- e, in "Nature" (April 26th), and at Williton in Somerset-hire. It "broke denly into view at thirty-seven minutes past seven, about 50° above the zon, and gradually very steadily fell towards the earth, a high range of hills, Quantocks, forming the eastern boundary. A very large elm-tree standing ut a quarter of a mile from us, the meteor became hidden by the tree, so that could not see its contact with the ground. It was of as bright a light as the at midday. We should much like to know if it was seen by parties the other of the hill. It fell just as steadily as a spent rocket-stick, leaving for some le distance a tail of sparks. Apparently the meteor was about two and a half es from us, the Quantocks being three miles." Another observer, writing n Margate, noted it at twenty-five minutes to eight, its direction being "from th-west to south-east, the altitude 45° to 30°, in view about thirty seconds; our a brilliant green, and apparent dimensions about the volume of a Roman dle." From Guildford it was noticed at exactly the same time, falling "in a ect line to the earth, leaving behind a magnificent train of blue. After velling to within, apparently, a very short distance of the earth, it broke into ee pieces, something like the bursting of a sky-rocket, the lower portions being ut the size of a breakfast cup. The sight was the more remarkable, there ng no star visible in the clear light of day."—ED.

Mammoth Tusk near Chelmsford. — Under the heading "Mammoth rn," the "Essex Weekly News" of Nov. 10th, announced that the "men in employ of Mr. James Brown at his brickfield, near Lower Anchor Street, ently found a portion of a mammoth horn lying on the top of the white y at a depth of between 12 and 14 feet. The portion of the horn measures t. 3 in. in length, and at one end is as large as a man's thigh." We have n unable to obtain any further information as to this find, but just as we go press we learn that Mr. Brown has kindly presented the specimen to our seum.—ED.

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NEW LONDON ROAD, CHELMSFORD.

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Chelmsford has been chosen as the site of the principal Museum and Libr being the County Town and occupying a central position in Essex. Funds now being raised to build and fit up rooms worthy of the comprehensive sc of the Museum and Library. It is also anticipated that before long an Epp Forest Museum will be established in Queen Elizabeth's Lodge, Chingford.

DONATIONS OF SPECIMENS AND COLLECTIONS OF A LOC (ESSEX) CHARACTER are invited. They should be sent at present to I W. Cole, *Hon. Sec. and Director*, care of Mr. Edmund Durrant, 90, High Str Chelmsford. A letter should precede the donation, and the Council reserves itself the right to refuse any unsuitable specimens.

The fullest details should be given of the locality, finder, and other pre information about each specimen, for insertion in the Register.

The Director will be glad to give any instructions in his power to th proposing to collect for the Museum.

The Club already possesses a very considerable LIBRARY, consisting of boc MSS., prints, photographs, etc., appertaining in any way to the County of Ess and also of scientific, antiquarian, topographical, and other literature, and ev effort is being made to enlarge it and increase its usefulness. The Library is the use of the members only, and such visitors as may be admitted under regulations of the Librarians.

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)S. 6-10, VOL. VIII.] *Price 3s. 6d.* [JUNE-OCT., 1894.

The Essex Naturalist:

BEING THE

JOURNAL

OF THE

ESSEX FIELD CLUB.

EDITED BY

WILLIAM COLE,

Honorary Secretary.

Contents.

[*Title and Index to Vol. VII. accompanies this part.*]

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ie authors alone are responsible for the statements and opinions contained in their respective papers.

PUBLISHED BY THE CLUB, BUCKHURST HILL, ESSEX.

E. DURRANT & CO., 90, HIGH STREET, CHELMSFORD.

Stationers' Hall.] Published Dec. 31, 1894.

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(*Founded January 10th*, 1880.)

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THE OAK TREE IN ESSEX.

By J. C. SHENSTONE.

[*Read June 23rd, 1894.*]

"Time made thee what thou wast—King of the Woods!
And Time hath made thee what thou art, a cave
For owls to roost in."

Cowper "Yardley Oak

SOME time ago our member, Mr. R. Miller Christy, suggested that we should together collect material for a paper of oak trees in Essex remarkable either for their age and size, or their historical and topographical associations. In consequence of more pressing matters, Mr. Christy has left the work in my hands, and I now venture to submit the results of the inquiry to the Club, although I have not by any means completed the search for notable Essex oak trees. I hope that by affording data which will enable others to judge as to what may be considered a tree worthy of record in our county, I may interest and encourage them to add to our information on the subject.[1]

It may be safely said that no member of our British Flora surpasses the oak in interest. The tree is intimately connected with our history from the earliest period, though in recent times the advent of "ironclads" and other changes in the art of naval architecture have robbed it of much of the romance which clung about it when "our ships were British oak, and hearts of oak our men." Volumes might be written about the uses our forefathers found for its timber; for their buildings, as may be seen in the roofs and carvings of our historic houses and churches; for their furniture in the days when the household belongings were made to be handed down from generation to generation: for their art work, as may be exemplified by the beautiful oak carvings in our museums and galleries; with the bark they tanned the hides of their cattle, and in the days when more than half our country was "King's Forest," the acorn was of extreme value, as may be seen by a glance through the

1 The illustrations of this paper are taken, unless otherwise stated, from photographs by Mr. Shenstone, who has also very kindly presented the blocks to the Club. Mr. Shenstone writes respecting his own drawings:—"I think that some explanation is needed with regard to the illustrations. I felt that a paper on oak trees would be incomplete without pictures. The trees being spread through the length and breadth of our county, it was not practicable to send an artist to make careful drawings. I therefore had no choice but to do the best I could myself. In most instances I photographed these trees, and from my photographs made the drawings. Though, no doubt, these are open to much criticism from an artist's point of view, I believe I am justified in stating that they correctly represent the condition of the several trees at the present time."

The pictures of the Cuckoo Oak (fig. 4), the Pulpit Oak (fig. 5), and Theydon Oak (fig. 6), are from drawings from nature, kindly presented by Mr. H. A. Cole.—Ed.

"Domesday Book" for Essex, where we find the number of swine which the woods in each parish would sustain carefully recorded as one of the most valuable belongings of the manors.[2] The "Round Table" of King Arthur in our national romance, was made of the trunk of an oak, and our Saxon forefathers held their primitive parliaments under the spreading boughs of the favourite tree. It was on the stout trunk of an oak that the arrow struck which found its way to the heart of the second William, and in popular story it was to the shelter of an oak that King Charles the Second owed his life.

No tree excels the oak in its picturesque beauty. With its ponderous trunk, its gnarled but spreading branches, its rich coloured luxuriant foliage, it is indeed a monarch of the vegetable kingdom.

To the modern biological student the oak tree offers the material for much interesting research, as a glance through Marshall Ward's work, "The Oak," will prove. I have, however, said enough to show how wide a subject we have entered upon, and how necessary it will be to confine it within strict limits; but I must make a few introductory remarks for the benefit of those of our members who may not have previously given attention to the subject.

The varieties of oak which might be selected from extensive woods are very numerous, but they have been in a great measure neglected by foresters, as they are difficult to propagate except by acorns. I must however describe the two varieties into which oak trees are usually divided by botanists, known as *Quercus pedunculata*, Ehr., having long peduncles (flower-stalks), and sessile leaves (without stalks): and *Quercus sessiliflora* having peduncles short and leaves stalked. It is stated that much, if not all, of the wood found in old houses, frequently called "chestnut" by builders, is in reality the wood of *Quercus sessiliflora*, which resembles the chestnut-wood, and which is devoid of what is popularly known as the 'silver grain,' generally considered characteristic of the timber of the oak.

These varieties are usually found growing together in the wild state, and they are used indiscriminately for all purposes for which the oak is applicable. Some writers state that *Quercus pedunculata* is a low spreading tree or "Broad Oak," whilst *Quercus sessiliflora* is

[2] See for much information on this subject the late Mr. W. R. Fisher's valuable book, "The Forest of Essex."

a tall conical tree. Other authorities contend that there is no difference in the "habit" or growth of the two supposed species.

It was suggested that I should ascertain the variety of each tree which I propose to describe, but it appeared to me that while it would be interesting to take a census of the oaks of our county to determine which variety predominated, and was presumably most suited to local circumstances, the question of the variety to which the comparatively few isolated oak trees which had grown to a great age should be referred, was not of sufficient importance to compensate for the considerable amount of trouble it would have entailed to have visited or secured branches from each tree at the time it was flowering.

One other variety, or rather sub variety, I must also mention, viz., *Quercus pedunculata* var. *pendula*, the "Weeping Oak." My readers will probably be rather incredulous as to the existence of such a form, as I was when I first heard of it; the very term "*pendula*" indicating an amount of variation from the ordinary character of the tree which almost surpasses belief. Nevertheless, a large tree of this variety occurs at "Moccas Court," Herefordshire, some of its branches being thirty feet long, and no thicker than a cart-rope, and moreover all trees raised from acorns of this variety after the age of twenty years, if not earlier, partake of the weeping character of their parents. It is possible that our Essex specimens of "Weeping Oaks," which I shall describe later, are descendants of this Moccas Court tree.

It is extremely difficult to decide at all accurately upon the age of an oak tree. It is not possible to ascertain the exact date when an ancient oak tree was a seedling, for, unlike a building, our tree probably was not sufficiently remarkable to attract notice until it had reached a venerable age. It is stated that oak trees add one ring of wood to their growth each year. These rings can readily be distinguished by reason of the wood being less compact and having more vessels in the early part of the year, when the growth is more vigorous, the later slower growth producing more compact wood. Even this basis for calculation would only give the approximate age, because exceptionally long seasons, like that of 1893, do occasionally occur, in which trees will put forth fresh leaves and may even blossom a second time and form a second ring of wood as the autumn advances. Moreover it would not be a wise thing to cut down our oak trees to discover their age. There are however

grounds for believing that oaks may live upwards of 1,000 years, and that the age of many of our venerable trees may vary from 500 to a 1,000 years, or even more. The "Oak's Pedigree" is scarcely an exaggeration :

"In my great grandsire's trunk did Druids dwell ;
My grandsire with the Roman eagle fell ;
Myself a sapling when my father bore
The hero Edward to the Gallic shore."

The following extract from Arthur Young's book[3] affords an Essex illustration of the slow growth of the oak tree.

"*Allen Taylor, Esq., of Wimbish*, 1792.—Young's oak at five feet from the ground ; it is eight feet five inches and three-quarters in girt ; and a larch only twelve years old, at the same height from the ground, two feet four inches.

"1805. Young's oak, eight feet ten inches. The larch, five feet one inch.

"The oak in thirteen years has increased four inches and a half. The larch two feet nine inches. What a difference !

"I hope that Mr. Taylor and those who follow him will publish the future progress of these two trees." (Vol. ii., p. 151.)

Loudon, in his list of notable oaks of Great Britain, includes trees in which the boles are 30 feet and upwards in circumference. The five trees with the largest boles in Great Britain are stated as follows :—

"Salsey Oak," Northampton, 46 feet.
"Grimstone Oak," Surrey, 48 feet.
"Hempstead Oak," Essex, 53 feet.
"Merton Oak," Norfolk, 63 feet.
"Cowthorpe Oak," Yorkshire, 78 feet.

Amongst trees having the widest stretch of boughs, the following are mentioned :—

"Worksop Oak," 180 feet.
"Oakley Oak," 110 feet.

The above figures will give rough data for the comparison of our Essex trees with oaks in other counties. It is to be remembered that the accurate measurement of an oak is often found to be impossible owing to the ruggedness of its trunk.

In a county which a few centuries ago was half forest, and in which the soil and climate are admirably suited to the growth of the oak tree, we might expect some fine specimens, and indeed, the inquiry I have made would show that Essex is by no means deficient in this respect.

3 "General View of the Agriculture of the County of Essex, etc." Two volumes. 1807.

The Hempstead Oak.—I think that the great Hempstead Oak deserves the foremost place amongst Essex trees. This tree, as will be seen by the list of finest trees in Great Britain in "Loudon's Arboretum," in the circumference of its bole was the third largest tree in England. This oak might even date back almost to pre-historic times. Under its branches Saxons have possibly met to transact their business, and in more recent times under this old tree may have often wandered that notorious highwayman, "Dick Turpin"; he was born in the parish of Hempstead, in a house near the church known as the

The great Oak at HEMSTEAD, Essex

FIG. 1. (*From* "*The Gentleman's Magazine*," 1804).

"Crown Inn." In the Church Register, the event is recorded thus:—A.D. 1705, September 21st, Ricardus filius Johannis et Maria Turpin. Dr. Harvey, the discoverer or demonstrator of the circulation of the blood, possibly also may have rested beneath the boughs of this tree. He is buried in the parish church of Hempstead.

Arthur Young (*op. cit.* pt. ii. p. 149.) refers to the Hempstead Oaks as follows:—"At Hempstead I viewed two immense oaks, one of which is apparently of very great antiquity, they are unfortunately both pollards, but the size such as must astonish the spectator." An Essex Directory (1848) states that—"Arthur Young mentions two immense pollarded oaks in a field near Great Dawkins Farm House

at Hempstead, but that only one was then standing which was much mutilated and decayed. This venerable tree was supposed to be a thousand years old, and was formerly 99 feet in height; its boughs covered an extent of 36 yards diameter, and its bole 53 feet in circumference. Seven waggon loads of hay have stood under its shelter at one time." The illustration I give represents the tree as it was in 1801; it was engraved for the "Gentleman's Magazine," in which journal it appeared in 1802. A part of the tree fell thirty years ago, and has quite disappeared. Another part fell twenty-five years ago, and all that is now to be seen of the old tree is lying in a meadow adjoining the farm-house of "Great Dawkins." I give an illustration of the ruins of this forest giant.

Fig. 2.—Remains of the Great Oak at Hempstead, 1894.

Fairlop Oak.—Another celebrated Essex tree was the Fairlop Oak, in the Hainault district of Waltham Forest, of which Mr. Gilpin remarks in his "Forest Scenery":

"The tradition of the country traces it half way up the Christian era. It is still a noble tree, though it has now suffered greatly from the depredations of time. About a yard from the ground, where its rough fluted stem is 36 feet in circumference, it divides into eleven vast arms, yet not in the horizontal manner of an oak, but in that of a beech. Beneath its shades which overspread an area of 300 feet in circuit, an annual Fair has long been held on the second of July, and no booth is suffered to be erected beyond the extent of its boughs. But as their extremities are now sapless, and age is yearly curtailing their length, the liberties of the Fair seem to be in a very desponding condition. The honour however is great. But honours are often accompanied by inconveniences, and Fairlop has suffered from its honourable distinctions. In the feasting that usually attends a fair, fires are often necessary, and no place seemed so proper to make them in as the hollow cavities formed by the heaving roots of the tree. This practice has brought a speedier decay in the Fairlop Oak than it might otherwise have suffered."

Phillips in his "Companion to the Orchard" gives the following notice of the same tree:—

"This venerable tree was cut down previous to the Fair in 1820. The founder of the Fair was a Mr. Daniel Day, commonly called the 'Good Day,' who was born in the parish of St. Mary Overy in 1682. His father was an opulent brewer, but Mr. Day followed the business of a block and pump maker in Wapping, and possessing a small estate in Essex, at no great distance from this remarkable tree, he used on the first Friday in July to repair thither, having given his accustomed invitation to a party of his neighbours to accompany him for the purpose of dining under the shade of its branches and leaves on beans and bacon. This benevolent, as well as humorous, man never failed to pay his annual visit to the public beam-feast, and as regularly provided several sacks of beans and a proportionate quantity of bacon, which he distributed from the trunk of the

View of FAIRLOP OAK on Epping Forest.

FIG. 3.—(*From "The European Magazine,"* 1820.)

tree to the persons there assembled. A few years before the decease of Mr. Day (in 1767) his favourite oak lost a large limb, out of which he procured a coffin to be made for his own interment. We have been informed that the following gave rise to the name of Fairlop bestowed on this celebrated oak. Some of Mr. Day's friends having promised that he should be buried in a coffin made from that tree, lopped off one of the branches, for which trespass an action was brought against the party, fortunately for whom some flaw was found in the pleadings, and the plaintiff was non-suited. It was, however, proved that the act committed was not injurious to the tree, but a 'fair lop.' As lately as 1794 this venerable oak in the meridian of the day shadowed an acre of ground, although then greatly decayed."

In Mr. H. W. King's (late Hon. Sec. to the Essex Archæological Society) annotated copy of Morant's "Essex" there is a printed leaf introduced containing the following statement:

"On the fair day, 1813, a gentleman gave a boy half-a-crown to get me [illegible]

him the last green sprig off the end of the branches, and when the drawing was made for the vignette in the August following there was not a leaf on it."

Some years before the fall of the tree Mr. Forsyth's composition was applied to its decayed branches to preserve them from further injury, and a board was fixed to one of its limbs bearing the following inscription :

"All good foresters are requested not to hurt this old tree, a plaster having been lately applied to its wounds."

In the year 1805 the trunk of the Fairlop Oak took fire in consequence of the carelessness of a party of cricketers who had spent the day in the vicinity and had left a fire burning too near it. The fire was discovered the same evening, and although a number of persons did their utmost to extinguish the flames, it continued burning till the morning. This untoward accident so weakened it that, as Professor Burnet informs us, "the high winds of February, 1820, stretched this forest patriarch to the ground after having endured the storms of perhaps a thousand winters."

It is stated in Loudon's "Arboretum" that the Fairlop Oak, at 3 feet from the ground measured 36 feet, near the ground 48 feet. The boughs were 10 to 12 feet in girth and covered 300 feet in circuit. The pulpit and reading-desk in the new church of St. Pancras were constructed out of its remains. A picture of this tree is given from the plate in the "European Magazine" (1802), kindly lent for reproduction by Mr. Walter Crouch, and copy of another early engraving appeared at page 169, vol. v., of THE ESSEX NATURALIST.

King's Oak, High Beach.—There was formerly an oak tree of some historical interest at High Beach, Epping Forest. It is stated that King Henry VIII. sat under this tree waiting to hear the cannon fired which announced the death of Anne Boleyne. The tradition is thus related by Tytler in his "Life of King Henry VIII." (1837), who appears to have drawn the story from Nott's "Life of Surrey":

"That Henry waited with unfeeling impatience for the death of Anne is certain; and a tradition is yet preserved in Epping Forest, which strikingly illustrates this fact. On the morning of the day which was to be her last (May 19th, 1536) he went to hunt in that district; and as he breakfasted, surrounded by his train and his hounds, under a spreading oak which is still shown, he listened from time to time with a look of intense anxiety. At length the sound of a distant gun boomed through the wood. It was a preconcerted signal, and marked

the moment when the execution was completed. 'Ah, ah! it is done,' said he, starting up, 'the business is done; uncouple the dogs, and let us follow the sport.' On the succeeding morning he was married to Jane Seymour."[4]

Lock, in his "Essay Concerning the Human Understanding," (1825 Ed., p. 243) refers to this oak: "The well-known tree in Epping Forest called the King's Oak, which, from not weighing an ounce at first, grew to have many tons of timber in it." The tree has long since disappeared. An inn called the "King's Oak" indicates the locality where it formerly stood.

Fairmead Oak.—At High Beach there is still a fine oak at

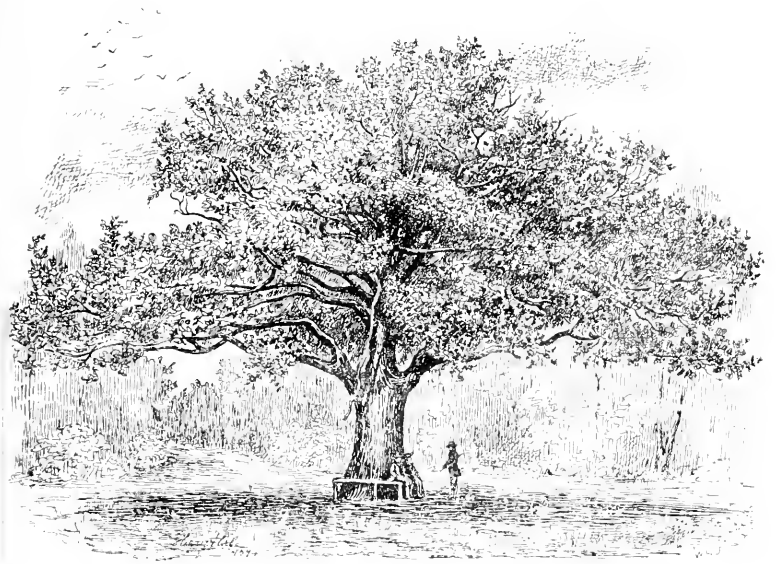


Fig. 4.—Cuckoo or Bedford Oak, Epping Forest.

"Fairmead Lodge." Its bole measures 29 ft. and 30 ft. in circumference at different heights. The tree and the Lodge were illustrated by Mr. H. A. Cole in The Essex Naturalist for 1893 (Vol. vii., p. 86).

"*Cuckoo*" *or* "*Bedford*" *Oak.*—We have also in Epping Forest an oak tree formerly called the "Cuckoo Oak," but more recently named "Bedford Oak," in honour of the Councillor of the City of London of that name who did so much towards rescuing Epping

[4] I am indebted for this extract to Mr. B. G. Cole.

Fig. 5.—"Pulpit Oak" and "Poacher's Pocket," Epping Forest.

Forest from the encloser. It is yet only 12 ft. 8 in. in circumference, but as it is a vigorous tree, so we may hope it will, in the centuries to come, continue to be an ornament to the Forest, and serve to remind many generations of the good work done by the worthy Councillor Bedford.

At *Theydon Garnon* there is an oak (fig. 6) which, previous to its partial decay, probably measured 16 feet round its trunk. In Lodge Bushes, a charming portion of Epping Forest, we have also the "Pulpit Oak," and the tree called the "Poacher's Pocket," both of them picturesque specimens, but comparatively small (fig. 5).

When we recollect the many thousand acres of this ancient woodland, one cannot but wonder that it does not contain more fine oaks than exist in many a private park of not more than a dozen acres. Perhaps the explanation given by Fisher in his "Forest of Essex," is the correct one. He says:—

"The comparative scarcity of large trees in the Epping division of the Forest arose from the continual felling of timber, and from treating new growth as coppice wood. This was much practised in the eighteenth century."

It is also possible that the right of lopping which prevailed in

Fig. 6. Oak at Theydon Garnon.

Epping Forest may explain the dearth of large oak trees, for though the lopping rights were regulated by law, yet such rights would be likely from time to time to be abused. Nor must we forget that the trees which most largely prevail in the Forest are the beech and the hornbeam, trees which are extremely scarce in some parts of the country outside private grounds.

Danbury Oaks.—I believe that I am justified in saying that the spot in all Essex richest in fine oak trees is the park at Danbury Palace. The largest tree is situated S.W. of the Palace (fig. 7). It now measures thirty-one feet in circumference, but probably its girth was some five or six feet more before a portion of the trunk collapsed. The inside of the bole was completely burnt out more than sixty years ago; the tradition is that it was fired in smoking foxes out of the tree. Thirty-five years ago, Bishop Wigram caused an iron band to be put round the trunk to strengthen it. This iron band is now imbedded in places some inches into the tree, and as the trunks of hollow oaks increase in thickness both inside and outside, it is evident that this fine old giant, which was perhaps the largest tree Essex ever possessed (excepting only the Hempstead Oak), may yet survive many years.

Fig. 7.—Finest Oak at Danbury.

There is a tree in front of Danbury Palace with a bole thirty-one feet in circumference, another with bole twenty-seven feet; and behind the Palace, in a fence, there are four large trees having trunks

Fig. 8. Oak Tree at Danbury Palace.

twenty-three to twenty-seven feet in circumference. There are also many other fine examples in the Park, which is so well worthy of a visit from lovers of trees.

Several Bishops of the Diocese of Rochester and St. Albans have taken a pride in these trees. Bishop Claughton took a special delight in showing them to his friends, who must have sometimes felt a certain fitness in having these ancient forest giants shown to them by so venerable an old gentleman.

Thorington Oaks.—At Thorington Hall there are four monster oak trees, with trunks varying from twenty-seven to thirty-one feet in girth. A tradition current in the village asserts that these trees were mentioned in the Domesday Book. I have, however, searched Marsh's translation of Domesday Book for Essex, but have failed to

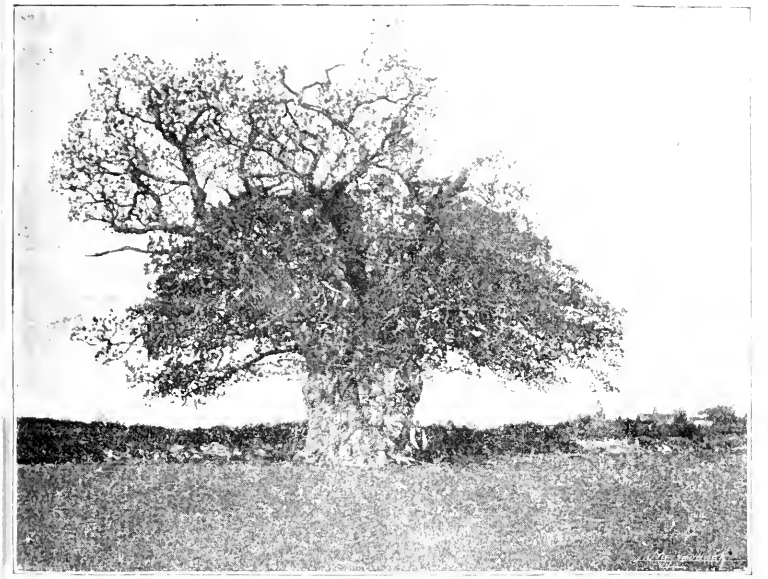


FIG. 9. OAK AT THORINGTON HALL.
(Photograph, J. C. Shenstone.

find any reference to individual trees, though the woods are carefully recorded as affording food for certain numbers of swine. In fact, so accurate was this survey, that in one case it is stated that there is wood for one swine (figs. 9 and 10).

Doodle Oak, etc.—In our county we have one parish, viz., Hatfield Regis, or Broad Oak, which probably derives its name from a mighty oak tree. This, Morant says:—

"The distinguishing appellation of *Regis* seems to have been given at the Conquest, because this was the king's demesne, that of 'Broad Oak' is from the Saxon, generally thought to be a tree of extraordinary bigness. There has been another since, for it will hardly be allowed to be the same, the remains of which appear to be some hundred years old, that covered a great deal of ground. This called Doodle Oak in the Forest near Stane Street looks as if fresh branches had grown out of the ground as others decayed or were cut."

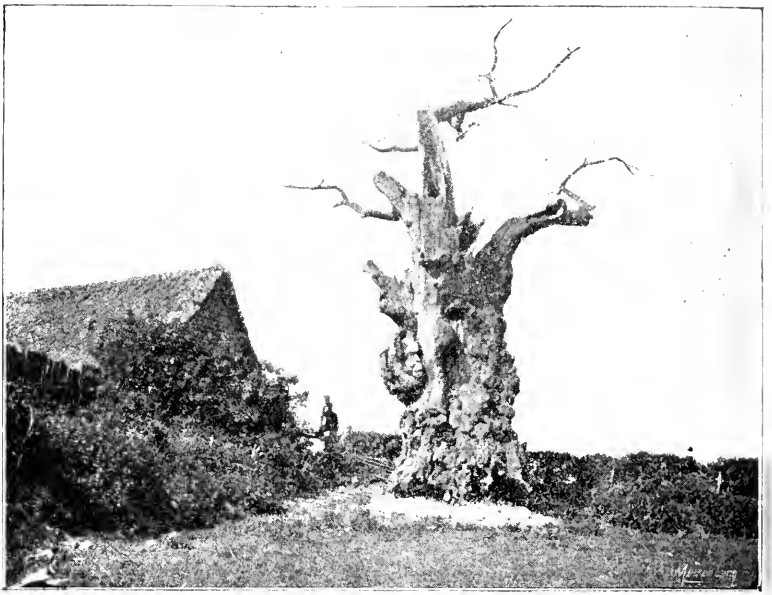


FIG. 10.—OAK AT THORINGTON HALL.
(*Circumference, 31 feet. Photograph, J. C. Shenstone.*)

Arthur Young observes, "Sir John Barrington possesses in the Hatfield Forest a very beautiful oak, for which a timber merchant offered one hundred guineas. Near it is the ruin of a most vener-

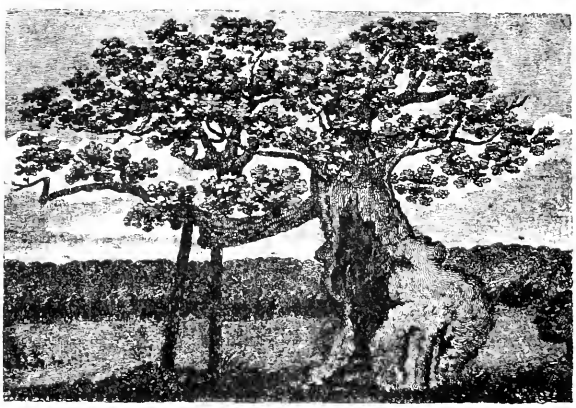


FIG. 11. ORIGINAL HATFIELD BROAD OAK.
(*From Young's "Agriculture," 1813.*)

able one which gave the name of Broad Oak to Hatfield." Young gives an illustration of the oak as it was in his day (fig. 11), and in THE ESSEX NATURALIST for 1890 (vol. iv., p. 218) Mr. H. A. Cole has a drawing of the tree as it then appeared.

Whilst agreeing with Morant that a tree old enough to have given the name "Broad Oak" to the parish in the days of the Anglo-Saxons, would probably not have endured another 1,000 years, yet his implication that the "Doodle Oak" is comparatively modern is equally wide of the mark, for the "Doodle Oak" must certainly, even in the days of Morant, have been some centuries old. Loudon says :—

"In Hatfield Broad Oak stands the remains of an old oak from which the village and forest derive their name of Hatfield Broad Oak, measuring 42ft. in circumference at base, but in 1813, before a large portion of the trunk fell in, it was upwards of 60 feet. The age of the tree is unknown, but cannot be less than seven or eight centuries."

Barrington Hall Oaks.—The park round Barrington Hall, close to Hatfield Forest, formerly the mansion of Sir John Barrington, now the property of G. Alan Lowndes, Esq., J.P., still contains some magnificent timber. One tree (fig. 12) has a trunk measuring 29ft. 6in. circumference of its bole. Another tree is one of the finest examples of the oak tree in full vigour of growth which our county

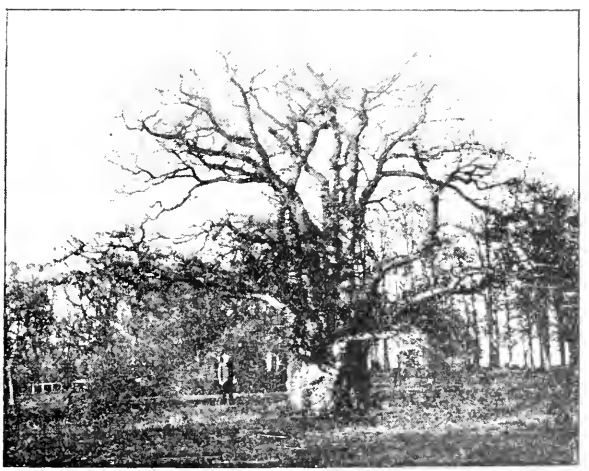


FIG. 12.—OAK AT BARRINGTON HALL, HATFIELD BROAD OAK.
Bole, 29 ft. 6 ins. in circumference

possesses. Its trunk has a circumference of 18ft. 9in. The circuit of the shadow of its branches is 312 feet. There are other very fine oaks in this park, "Old fashioned oak trees" my guide

FIG. 13. OAK AT BARRINGTON HALL, HATFIELD BROAD OAK.
Circuit of shadow of branches, 312 feet.

called them, using an expression not infrequent in rural Essex when speaking of oaks more or less decayed. Possibly one of these fine trees is that for which Arthur Young tells us Sir John Barrington was offered one hundred guineas. I am told that foxes breed in these trees, notwithstanding their closeness to the Hall.

Takeley Forest, Mr A. Young observes, "is about half covered with wood, among which, with a great deal of other very valuable timber, is an oak that measures at 5ft. from the ground, 14ft. in circumference, and is thought will cut to timber at ninety feet." Takeley Forest is now enclosed in the park of Hallingbury Place.

Great Yeldham Oak.—At Great Yeldham there is an immense oak tree which, standing in the centre of a three-cross way, forms a very prominent object and is familiar to every one in that part of the county.

In the "History of Essex by a Gentleman," the following passage occurs, referring to this tree :—

"On this road, and near the church, is a remarkable large oak tree, supposed to be upwards of three hundred years old. (A person in this parish, near one hundred years of age, declares that when she was a child, she heard a person, who was then older than her by eighty years, say that in his infancy this tree was distinguished by the appellation of old oak), the stem of which measures twenty-

Fig. 14. Oak at Gosfield Hall.

seven feet three quarters, but the height is not in proportion to the bulk; the stem from the branches being not above twelve feet high, and the height of the whole not exceeding eighty feet. At the place where this oak stands, the road from Braintree is divided into the form of a letter Y."

This tree is in a much decayed condition. Every care has been taken to preserve the trunk as far as possible by building it up with cement, and otherwise supporting it. The view I give of it was taken from a field adjoining the road.

Twinsted Oak.—At Twinsted, opposite the church, there is a

Fig. 15. Twinsted Oak.

grand oak, with a bole having a girth of twenty seven feet.

Screens Oaks.—There are some fine old oak trees at "Screens,"

FIG. 16.—OAK AT SCREENS.
Girth, 26 feet.

the trunks of which measure from twenty-one to upwards of twenty-six feet in circumference.

Writtle Oaks.—In a hedge near Writtle Park, there is an oak with a trunk measuring 31 feet in circumference. This was almost

FIG. 17.—OAK AT WRITTLE.
Bole, 31 feet circumference.

destroyed forty-five years ago by a fire lighted by a boy employed for scaring birds. There is also a fine oak in Writtle Park (fig. 18),

Fig. 18.—Oak in Writtle Park.

the trunk of which is 25½ feet in circumference. This trunk was split completely into two by lightning twenty years ago, and it was again damaged four years ago. It is easy to walk between the two sections.

Fig. 19.—Oak at Warren Farm, Writtle.

At Warren Farm, Writtle, there is a fine and picturesque old oak tree, having a trunk 18 feet 10 inches in circumference.

Rivenhall Oaks.—In the park there are some fine trees measuring from twenty-one to twenty-three feet in circumference. A remark-

able oak in the parish of Rivenhall is known as "King Stephen's Oak." Local tradition says that King Stephen found a hiding place

Fig. 20.—Oak in Rivenhall Park.

in this tree, also that the oak is mentioned in Domesday Book. However, as previously stated, I cannot find that any individual tree is recorded in that careful survey. Although small, the circumference

Fig. 21.—King Stephen's Oak, Rivenhall.

of the trunk being only sixteen feet, it is a noteworthy tree, for nothing remains of the trunk but a mere shell, apparently a few inches thick, and this so much broken away that it can be seen through. Nevertheless, the tree comes out into full leaf every year.

Stisted Oak.—At the Lower Lodge at Stisted Hall there is a

very fine tree, probably destined in future years to become one of the remarkable oaks of the county. Its boughs stretch ninety-nine feet, and its trunk measures sixteen feet six inches, at five feet from the ground. Should any of my readers wish to visit this oak, let me recommend them to go in the spring of the year. Stisted Park and parish abounds in crimson and white-flowered thorns, and anything more bright and beautiful than this spot when the bushes are blossoming, I cannot imagine.

Fig. 22.—Woodham Mortimer Oak.

Woodham Mortimer Oak.—At Woodham Mortimer there is a grand oak tree with a trunk twenty-four feet in circumference.

Fig. 23.—Oak at "Bedford's Head" Inn, Little Baddow.

Bedfords Oak.—At "Bedfords," Havering-atte-Bower, the seat of the late Jas. Theobald, Esq., M.P., is an oak in vigorous growth, the stem of which measures twenty-seven feet in its narrowest circumference. This tree was unfortunately rent in two from top to bottom on the night of February 17th, 1894. The fallen part was replaced in its original position by the late Mr. Theobald's desire. An account of this accident will be found in this number of THE ESSEX NATURALIST, page 153.

Maldon Hall Oak.—At Maldon Hall, close to Maldon West

FIG. 24. OAK AT MALDON HALL.

station, there is an oak tree, the boughs of which stretch 107 feet. Its trunk measures 16 feet in girth at five feet from the ground.

FIG. 25.—OAK AT MUNDON HALL, NEAR MALDON.

Mundon Hall Oaks.—At "Mundon Hall," near Maldon, there is a magnificent collection of oak trees, no less than forty-nine fine trees in a field of moderate size, and in an adjoining wood there is another, making fifty in all. A large proportion of these trees have trunks which have grown to the respectable size of from 16 to 17 feet circumference. It is quite wonderful to find so many well-grown oaks in one small enclosure. The Hall, though modern, no doubt replaced some older building, as an extensive moat formerly surrounded both the hall and church. Very probably the group of oaks is the remains of a park.

Quendon Hall Oak.—One of the finest trees in Essex, in its full luxuriance of growth without a sign of decay, is the oak at Quendon Hall, Newport. Its stem is 20 feet 2 inches in girth at three feet

Fig. 26.—Oak at Quendon Hall.

from the ground, and it is a truly magnificent tree. In a few centuries, if no mishap occurs, this may rival the Great Hempstead oak. In the same park there is another fine tree 17 feet 3 inches in girth.

Mistley Oaks.—There appear to be oak trees in almost every district with trunks measuring from fifteen to nineteen feet in girth. In the park at Mistley, near the "Dairy Farm," is an oak in luxuriant growth (fig. 27), the boughs of which cover a circle of 110½ feet in diameter, the trunk being 16 feet 8 inches in circumference at five feet from the ground On the verge of a hill in the north-east of the park, is a tree the boughs of which cover a circle

Fig. 27.—Oak near Dairy Farm, Mistley Park.

105½ feet in diameter, with a trunk 17 feet in circumference three feet from the ground. There are also several venerable pollards, some with boles measuring as much as 22 and 23 feet in circumference.

Prittlewell Oak.—Mr. H. W. King, in his annotated edition of Morant's "Essex," writes:—

Fig. 28.—Oak at Fingringhoe.

"Oak tree standing on Colman's Farm, Prittlewell, the boundary between that parish and Eastwood, girt, middle of trunk 20 feet 6 inches, near the base 24 feet. Sketched 24th May, 1869. This tree still lives."

Dedham and Lawford Oaks.—At Fingringhoe (fig. 28) is an oak with trunk having a girth of 17 feet at narrowest circumference. The tree is remarkable, not only for its picturesque surroundings, but also from the fact that the earth has been worn away from its roots, leaving them exposed, thus affording the village children the facilities they love for breaking their knees in climbing over something. In a

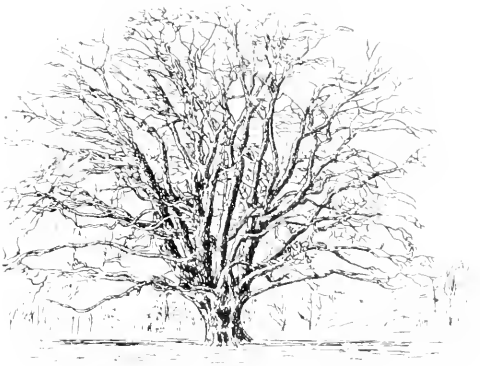


Fig 29.—Oak at Lawford Hall.

paddock near the "Rookery," at Dedham, is a fine oak tree with trunk 16 feet in circumference. There are two oak trees of similar size at Dedham Lodge. At Lawford Hall, there is a vigorous tree with a trunk 19 feet 3 inches in circumference, and having a stretch of

Fig. 30.—Oak at Chignal St. James.

bough of 74 feet. At *Chignal St. James* there is also a fine tree, an illustration of which is given; but I fear that our journal could scarcely afford space to mention the many luxuriant specimens of our national tree which exist in most districts of the county, and which promise in their day, centuries hence, to become objects of admiration for future generations.

Weald Side Oak, Brentwood.—Mr. Henry Sperling, of Weald-side House, Brentwood, writes that this tree has a bole of 27 feet in circumference. A tree of this magnitude certainly ranks amongst our giant oaks. I regret that I am not able to include full informa-

tion, or an illustration of this tree, as Mr. Sperling's letter did not arrive until the paper was in the printer's hands. I shall, no doubt, have more to say about it at a later date.

Old Oak trees mentioned in Colchester Borough Muniments.—In the Muniments of the Borough of Colchester oak trees are frequently mentioned. Thus, in the fourth year of Henry V., we read :

"Roger Best, the abbot, appropriated a piece of land in Lodderslane, another piece next Northshieve, another in the Burgh Field, and also in Tye Field, and he had foul ditches at the King's Oak at Munk Wick, and he turned a water-course from Chaunte Field by the Chapel of St. Anne toward the King's Oak."

Again in the Chamberlain's accounts for 1717, there is a charge for payment to Edward Bartholomew for "pning" (? pruning or preserving) the Broad Oak, the sum of half-a-crown. This "Broad Oak" is marked upon Bower's map of Essex (1760) as near Mile End Hall. In an examination, in 1646, of John Pierson, apprehended for robbing his master, it is recorded : "He went on the 20th of April to Milende, and coming home from thence to the said shunie's house, did meete with the said shunie on the side of the Milende broade Oake." Neither of those two old oaks is now known.

In Savernake Forest, Wilts, there are, according to Harrod, two oaks of gigantic size called the King's Oak and the Braden or Broad Oak, a genuine Saxon name. Here at Colchester, in the old King's Woods, were two noted oaks of the same name. The "Leet Presentment," showed a King's Oak at Greenstead, at the end of East Street, which disappeared in Henry VI.'s time. Of the other, the Broad or Braden Oak, I have given all the particulars I can gather. Numerous other oaks remained after the disafforesting of King's Wood. Besides the King's Oak and the Broad Oak, the Leet Rolls mention the "Great Oak in East Street, near the Gallows"; and in the Perambulation of 1637 (in the Assembly Book for that year, printed by Morant, p. 95) we have Robin Hood Oak, "right against Thomas a Bridge, on the left hand of the Buttolph Brook, after crossing the river at Mott's Bridge"; and in the Perambulation of 1671, it is added that the oak stood "right on the pitch of the hill," and afterwards in the latter Perambulation the boundary is stated as going "inside the hedge of Soame Wood to Goresbridge, which is at the bottom of Beggars' Oak Heath, leading to Ardleigh Street from Gallow Green."

It will be noticed that perhaps the most frequent names of oak

trees in olden times were "Braden" or "Broad Oak," and "King's Oak"; the derivation of "Braden" is apparent, but the origin of "King's Oak" is not so evident. It would be interesting to discover what this term indicates. There is reason to suppose that in some instances these trees mark the spot of some historical event connected with the sovereigns of our country, but this can scarcely have been the case with every tree known as the "King's Oak." I do not know whether any of the members of our Club can afford information upon this point.

Weeping Oak at Cressing.—In conclusion, we must not forget the Weeping Oak alluded to at the commencement of my remarks. At Newbarn Cressing, between Witham and Braintree, now occupied by Mr. Thomas Challis, there is a good specimen of this interesting variety. Having been told that there was such a tree, Mr. Harris Smith, of Stisted, kindly offered to assist me in the search; but after driving for some time, we had almost given up our quest, when, happening to look over a hedge at Newbarn, we saw a tree much crowded by other trees, the species of which we could not quite make out, and this, upon a closer examination, proved to be the object of our hunt. The oak had many of the characteristics of a weeping ash, and certainly it was the most extraordinary looking tree I have ever seen. To find the mighty oak, associated in one's mind with all that is sturdy and strong, thus disguised, was indeed a shock to one's sense of fitness.

We all know that when our Club was founded some fourteen years ago, Essex was much depreciated in popular estimation. We have, however, at our meetings and in the pages of our Journal, clearly established the fact that our county has its share of natural beauties. When I commenced hunting for the fine trees in Essex, I was told that I should never complete my work; that I should find some trouble in collecting sufficient material for a paper. You will, I think, admit that the result of my search, as far as it has gone, is sufficient to firmly establish the reputation of Essex for the number of noteworthy specimens it contains of that tree deservedly called the king of the forest. Our trees will probably hold their own, for historical interest, for beauty, for age, and for size, with those of most counties in England.

I would suggest that our members might well occupy their leisure in carrying out a similar inquiry in other branches of natural history.

Recreation of this kind is, I can assure our members, a delightful rest from the drudgery of every-day life, giving healthy exercise and pure air, and taking us into beautiful spots which one would have been unlikely to visit but for some object of inquiry.

I cannot help remarking upon two things which have impressed themselves upon me during my search. One is the slight attention given to this subject by our topographical writers; and secondly, the fact, that in almost every instance the first inhabitant I met in any village could direct me to the finest trees in his district without hesitation.

I have only to add that I have received assistance from several kind friends, in particular from Mr. Miller Christy, who not only suggested the inquiry, but has given much information. I am also indebted to Messrs. W. Cole, E. A. Fitch, Harris Smith, G. N. Maynard, Hy. Myhill, J. C. Gould, W. Crouch, and many others too numerous to mention.

I hope that my paper may be the means of attracting to the pages of our journal much information concerning Essex trees.

"Let India boast her plants, nor envy we
The weeping amber and the balmy tree;
While by our oaks the precious loads are borne,
And realms commanded which those trees adorn." *Pope.*

[Mr. Shenstone's Notes on Essex Oaks not being grouped on any definite plan, it will be useful to arrange the trees in the alphabetical order of the places in which they grow, for ready reference :—

THE MANAGEMENT OF EPPING FOREST.

OFFICIAL REPORT OF THE EXPERTS.

IN the report of the meeting of the Club on April 28th last, called to consider the condition of parts of Epping Forest referred to by the newspaper critics, it was stated (*ante* pp. 52-71), that a Committee of Experts in Forestry had been appointed by the Epping Forest Committee to report fully on the subject. At a meeting of the Common Council held on June 14th, the following report was submitted. We print the document in its entirety, as the full text has not been published in the newspapers, and it will form a valuable record for future reference. We have numbered the paragraphs for convenience of quotation:

To the Right Honourable the Lord Mayor, Aldermen, and Commons of the City of London, in Common Council assembled.

WE whose names are hereunto subscribed, of the Epping Forest Committee, have the honour to report that in pursuance of the undertaking given by the Chairman of this Committee to your Honourable Court on the twelfth day of April last, we resolved that Viscount Powerscourt, who has had a large experience in the culture of woods; Dr. Schlich, the Professor of Forestry at the Royal Indian Civil Engineers' College at Cooper's Hill, and Inspector General of Forests to the Government of India; Mr. William Robinson, Editor of the "Garden" Newspaper; and Mr. James Anderson, of Manchester, who is a professional Expert in Forestry; and also two gentlemen to be nominated by Sir Joseph Hooker, formerly Director of Kew Gardens, should be requested to view the Forest, and advise us forthwith as to the effect of the thinning, and our future policy with regard to the management of the Forest.

In answer to our application, Sir Joseph Hooker nominated Earl Ducie, F.R.S., Mr. A. B. Freeman-Mitford, M.P., formerly Secretary to H. M. Commissioners of

Works, and Mr. Angus D. Webster, formerly Forester to the Duke of Bedford and who formerly acted in the same capacity for Earl Derby and Lord Penrhyn.

Earl Ducie and Viscount Powerscourt were unable, owing to pressing engagements, to undertake the work.

In asking these gentlemen to report upon the matter, they were requested to consider the question solely with regard to the preservation of the natural aspect of the Forest, and not to the commercial value of the timber.

The Experts visited the Forest on the 25th April, and the 22nd, 23rd. and 24th days of May last, and examined portions of the Forest thinned at various periods during the last 14 years, including those places where the action of the Conservators has been severely criticised, and also other parts of the Forest which are still overcrowded.

On the 7th and 8th instant they met at Guildhall to consider and sign their Report, a copy of which we beg to submit to your Honourable Court.

The Report is unanimous, with the sole exception that Dr. Schlich dissents from the last paragraph in the Addition to the Report as to there being no need for a nursery.

In presenting this Report, we are glad to find that the Experts support the policy which the Conservators have pursued.

All of which we submit to the judgment of this Honourable Court. Dated the fourteenth day of June, 1894.

James Salmon, P. Gellatly, Richard Adam Ellis, W. T. Brown, John Greenwood, William Battye, Graham King, Oliver Henry Davis, T. Fowell Buxton, R. C. Halse.

June 7th, 1894.

SIR,—In accordance with the wishes of the Corporation of the City of London we have visited Epping Forest, and have very carefully examined it, having regard to its management in the past, and with a view of offering suggestions as to its future treatment.

(1) We have been greatly struck by the immense value to London of so beautiful a tract of sylvan scenery in its immediate neighbourhood, and it is with a view of preserving for the present, and perpetuating for the future, the beauties of the Forest that our recommendations are made.

(2) We leave on one side all questions of forestry for profit, and we do not propose to treat this natural woodland from the point of view of a park; we consider that the only way of doing justice to Epping Forest is by maintaining intact those characters which have been its chief distinction.

Our proposals are as follows:—

(3) As there is much beautiful landscape in and around the Forest, the opening up of which would add much to its charms, we think that the best views should be carefully opened up by making judicious clearings. Such views would be in every way a gain. Honey Lane Quarters is an example where by careful clearing pretty views of the Lea Valley may be obtained.

(4) The Rides and Drives are beautiful features of the Forest, and those made in recent years are well designed. They should receive constant attention lest the encroachments of vegetation should mar their picturesque effect. In this connection we would call attention to the beauty of the glades which already exist. These should be increased in number where it can be done without sacrificing the finer trees or interfering with the massive groups of the Forest.

(5) *Pollard Hornbeams.*—A vast proportion of the area of the Forest is covered by Pollard Hornbeams. In parts they are an interesting feature, but the practice of pollarding having been discontinued, the trees are now so dense that neither light nor air can penetrate. We consider that with a view to encouraging the growth of better trees and varying the monotony of the Forest, the best course will be, not generally to thin the trees, but to make bold clearances among them. The finer Pollard Oaks throughout the Forest should be carefully preserved.

(6) *Planting.*—We are opposed to any artificial planting in the Forest. The natural vegetation is so luxuriant that there is little need of the planter if Nature be allowed to take her course; but where the tree growth falls short it would be advisable to assist it by the introduction of seed of the trees which are indigenous to the Forest. It may be necessary for a time to protect certain spaces against the inroads of cattle, horses, and deer.

(7) We most strongly object to the planting of any Foreign trees.

(8) We do not approve of the small ring plantations which have been formed in parts of the Forest. They are, in our judgment, out of keeping with the true character of the woodlands.

(9) *Underwood.*—Although in many places this forms one of the beauties of the Forest, we do not think that in all parts sacrifices should be made for the purpose of encouraging it where the trees do not allow of its healthy growth, as under Beeches. The effect of closely-massed forest trees constitutes a beauty in itself.

(10) *Drainage.*—We consider that there should be as little artificial drainage as possible, though in the case of rides or drives it is sometimes necessary. The natural drainage is in most places sufficient, and the streamlets should be allowed to make their own courses.

(11) In approaching the question of thinning, we think we can best point out our views by taking as examples a few typical parts of the Forest, as it is impossible to lay down any general principles for dealing with so vast and various an area.

(12) *Hawk Wood* is, in the main, an Oak Wood, and the trees are not such as would be improved by wholesale thinning. It would be, in our opinion, wise to take out no trees, except such as are obviously dying, and a few scrubby stunted trees which are injuring the others. Where, here and there, a single specimen of more than usual beauty can be encouraged into noble growth, it should be protected from overcrowding. But we attach great importance to preserving the massive character of the Forest, especially in this Wood.

(13) *Monk Wood.*—This consists of fine old Pollarded Beeches, and, in our judgment, it needs no further thinning for many years to come.

(14) *High Beach.*—The trees here are of considerable age and beauty, and we do not think that they should be interfered with.

(15) *Wathamstow Wood.*—The beautiful undergrowth of Holly is here a distinctive feature. There are a few dead and dying trees which should be removed, and here and there some Pollards, which threaten to injure the Hollies. The healthy Oaks, even where crowded, should be left standing. The beauty of tall oak stems, often lichen-covered, when growing in close woods, should be considered.

(16) *Theydon High Wood.*—Here are Beech trees of moderate age which have

not been pollarded, forming a dense canopy of leafage, and constituting a distinct feature. We recommend moderate and periodic thinning.

(17) *Lord's Bushes.*—At this point there is a struggle between healthy young trees (Oaks and Beeches), and a number of old Pollards, some of which are dying. Having regard to the preponderance of Pollards in the Forest, we should, as a rule, let the young trees take the lead, preserving the finer and more picturesque Pollards.

(18) As profit is out of the question, we consider that the thinning of the Oak trees should be done in winter, without regard to the value of the bark. Less injury will accrue in this way to adjoining trees. All cutting should be done in late autumn and winter.

(19) In conclusion, we may say that we are not prepared to endorse the strictures which have been passed upon the work carried out in Epping Forest. We are of opinion that much has been done judiciously and well. In some instances we should not, perhaps, unanimously approve of the whole of the action of the authorities. In others, we may consider that more might have been done. But of one thing we are certain, that whatever has been done has been animated by earnest desire to preserve the finest features of the Forest and through intimate knowledge of its necessities and peculiar conditions.

We have the honour to be, Sir,

Your obedient Servants,

A. B. Freeman-Mitford, William Schlich, A. D. Webster, W. Robinson, and James Anderson.

To SIR JOHN MONCKTON.

June 8th, 1894.

(20) We think the practice of Gravel Digging should be discontinued as tending to the disfigurement and injury of the Forest, as may be seen at Strawberry Hill.

W. Schlich, James Anderson, A. B. Freeman-Mitford, A. D. Webster, and W. Robinson.

(21) As we have expressed a strong opinion against the re-planting of the Forest in the ordinary sense, we think there is no need for a Nursery, and that it should be discontinued.

A. D. Webster, W. Robinson, James Anderson, and A. B. Freeman-Mitford.

While there is not much in the Report that is new to those who have carefully considered the matter, it will, we believe, be accepted by them as a correct statement of the present condition of the Forest, and although there may be some slight differences of opinion in matters of detail, they will be prepared to endorse most of the recommendations of the Special Committee.

We are very glad to see the condemnation of excessive artificial drainage (paragraph 10). We have always strongly opposed deep drainage in the Forest, as being in the highest degree detrimental to

the natural growth of plants, mosses, etc., and we hope, for instance, that Debden Slade will be allowed to re-form itself into the delightful swamp of former years, fragrant with mints and gay with *Lychnis* and Ragworts. To the Conservators we would say, keep your paths dry if you wish, but pray leave us our *Sphagnum* bogs!

We also cannot agree with the assertions as to replanting parts of the Forest (paragraphs 6 and 21), and the non-necessity for a nursery of young trees. Dr. Schlich appears not to coincide with these views of his colleagues, and we trust that the matter will be further considered. As Prof. Meldola says: "None of us will ever live to see some tracts of the Forest restored to anything like a natural condition unless planting is resorted to."

Taking the Report as a whole, naturalists will, we are sure, be very well satisfied, and will accept it as a satisfactory answer to recent criticisms on the work of the Conservators.

With this document as a new *Magna Charta* of the Forest, we may feel quite happy in the anticipation of living to see a restored woodland, yearly becoming more natural and beautiful. Let us hope also that the Report will put a stop to some of the nonsense in the newspapers. One leading journal the other day, in the course of a political attack on the Corporation, sneered at their work in "Epping Forest, which they have so grossly mismanaged"! We should recommend this writer to take a tramp this month through Lodge Bushes and Theydon Thickets; he would get rid of his attack of dyspepsia, and go home with some more correct notions of the character and beauty of the autumnal woodlands.

In conclusion, we may refer to an interesting analysis of the Report, communicated by Prof. Meldola to *Nature*, of July 5th last, under the title of "The Settlement of the Epping Forest Question."

NOTES ON THE CONFERENCE OF DELEGATES OF THE CORRESPONDING SOCIETIES OF THE BRITISH ASSOCIATION, OXFORD, 1894.

HAVING attended the Conference of Delegates at Oxford as Secretary of the Corresponding Societies' Committee and as Delegate of the Essex Field Club, I have pleasure in forwarding for THE ESSEX NATURALIST a few notes on the proceedings of the Conference, of which Prof. R. Meldola, F.R.S., was Chairman.

It was thought by the Corresponding Societies' Committee that it might increase the practical advantages of the Conference if its first meeting were devoted to the discussion of some one subject of general interest to the Corresponding Societies, and the second to the various matters usually touched upon in connection with the various Sections of the Association. Accordingly, Mr. Cuthbert Peek, M.A., a member of the Corresponding Societies' Committee, kindly consented to open a discussion at the first meeting of the Conference on August 9th on the subject of *Local Museums*, proposing to treat the question under the following headings :

1. Methods of registration and cataloguing.
2. The protection of specimens from injury and dust.
3. The circulation of specimens and type collections for educational purposes.
4. Central referees for nomenclature and classification.
5. The most satisfactory methods of making museums attractive.
6. Museum lectures and demonstrations.
7. The relations between museums and County Councils.

For small museums Mr. Peek considered the card catalogue was the most convenient, and he dwelt on the advantages of having a letter and number painted on a specimen, and of other means by which a specimen might easily be identified if the label were displaced by a careless cleaner. As regards the preservation of specimens from injury and dust, he reminded the delegates that every closed case was acted upon by changes in the pressure of the atmosphere, and that it drew in or gave out air and dust with every change of pressure. Professor Miall, of the Yorkshire College, had a rectangular hole cut in the top of each case and covered with damiette This filtered the air passing through. Mr. Peek himself inclined to use cotton wool. It should be remembered, he added, that enough air should be admitted at the authorised entrance to prevent a supply from being sucked in through the inevitable joints and cracks elsewhere.

He then spoke very highly of the advantages of the circulation of loan collections illustrating the subjects taught in elementary schools. At Liverpool, he remarked, a system for doing this had been very carefully elaborated, and those interested in the subject should consult a paper by Mr. J. Chard in the Report of the Museums' Association for 1890.

He thought that an organisation of specialists, who would, for a small fee, allow specimens to be sent to them for identification, would be of great value. In the discussion after the conclusion of

his remarks, Sir John Evans said he thought the keepers of the various departments of the British Museum would be found admirable referees in such matters.

Mr. Peek considered that the leading feature of an unattractive museum was a dusty stagnation. Such a museum became almost as much fossilised as the fossils it contained; its labels were either illegible from age or invisible from displacement. Those who casually entered such museums seldom revisited them. Some variation in the aspect of a museum was itself an attraction. It was most desirable that the English as well as the Latin name of a specimen should be given. Much might be done to allow of comparisons between creatures of different families or genera. Thus, at the Natural History Museum, South Kensington, the skeletons of a man and of a horse had recently been placed, the one in front of the other, in the attitude of running, so that the relations of the two, bone for bone, could be distinctly seen.

Museum demonstrations, though of the highest value, could only, he thought, be really useful to a few persons at a time. It was desirable that the demonstrator should be placed on a temporary stand so that he might see, and be seen by, his audience.

Lastly, he touched upon the relations between museums and County Councils, remarking that it had always appeared to him that demonstrations in museums should take a very prominent part in technical education, especially in rural districts, and he had been surprised that so little assistance had been given in aid of local collections by County Councils. In order to ascertain what had been done he had sent out a circular to County Council Technical Education Committees, and had found that local museums and free libraries had been assisted in only nine cases. The County Council of Cumberland had been the most liberal, having made a grant of £600 per annum during the last three years for the purpose of aiding the Corporation of Carlisle to erect a Museum, Free Library, and Art School. A grant had also been made to a Free Library at Whitehaven for the purchase of books for the use of students at Technical Instruction classes; and a grant of £200 per annum had been given to the Local Board of Millom in aid of the Free Library and Technical School at that town. Passing over grants to Free Libraries, and for the purchase of technical books in various counties, it appeared that in Surrey it was proposed to found a Museum in connection with buildings for technical education, and a reference

library. The London County Council had a proposal to aid a certain museum under consideration, and in Dorset the museums at Poole, Dorchester, and Sherborne had all received aid. From some counties no information had yet been received, but enough had been stated to show that there was no insuperable obstacle to the application of money intended for Technical Education to the development of museums. Mr. Peek concluded by remarking that any grants made to local museums and free libraries would tend more than anything else to increase local activity.

The discussion on Mr. Peek's paper turned largely on the relations between local museums and County Councils. Sir John Evans doubted whether grants to museums would be permitted to pass by the Government auditors, though a grant of technical books to a local museum might be allowed. The Rev. O. P. Cambridge (Dorset) believed that in some cases County Councils had made grants which they were not altogether legally entitled to make, but which, from the good work done, were not likely to be called into question. And Mr. T. W. Shore said that it was at least clear that grants could be made by County Councils to defray the expense of lectures and demonstrations in museums.

For my own part, I remarked that I held in my hands a letter from Mr. W. Cole, Secretary to the Essex Field Club, who was intimately acquainted with the system of Technical Education as it was carried out in Essex. Mr. Cole lamented that nothing had been granted by the County Council to aid museums, but thought that to do so was probably beyond their legal powers, and hoped for an amendment of the Technical Instruction Acts. He would doubtless be cheered by Mr. Peek's remarks on that point, which showed, at least, that grants to museums were by no means unquestionably illegal. Mr. Cole doubted the efficiency of mere lecturing, especially in rural districts. When a lecturer departed he took away the specimens he had brought with him as illustrations to his remarks, and but little real and abiding interest in his subject was aroused. What was really wanted was a permanent central museum which was constantly sending forth loan collections to the remoter districts, and allowed them to remain there for a certain time after the lectures illustrated by the collections had been given. Mr. Cole, however, did not think that museums should be entirely worked by County Councils, as that would greatly weaken the interest taken in museums by the naturalists and Field Clubs who had

usually originated them. Moreover, the placing of these institutions entirely under the control of such public bodies might tend to stereotyping them, the country through, into "cut and dried" collections of "educational type specimens" in connection with technical classrooms, and thereby possibly destroy the primary function of county museums, which is to gather together authentic series of local specimens, whether of a "natural history," geological, or ethnological character, so as ultimately to establish collections of permanent scientific value, and of the greatest interest to every intelligent resident and visitor. But the funds of almost all societies of naturalists were so small that the main hindrance to the development of a museum was a want of money, which suggested a want of permanence. By a small grant towards the cost of a curator, or for some similar purpose, obtainable only while the museum remained efficient, a County Council might do very much to render a museum permanent and efficient without diminishing the interest of individual naturalists in its welfare and development.

Mr. Coates (Perthshire) stated that at Perth they were building a large addition to their Museum, and had applied for aid both from the Town Council and the County Council. They had obtained a grant from the County Council on the condition that they should provide specimens suitable for agricultural teaching. These specimens would be used for lectures and demonstrations, and they had been advised that they could not otherwise obtain the grant.

Mr. Seward (Cardiff) was anxious to learn, if possible, what things purchased for a museum with the view of making it more attractive and useful to the poorer classes could be legally purchased under the Act.

Sir John Evans replied that he supposed the best authority in these cases was the Science and Art Department, at South Kensington.

The following resolution was eventually proposed by Sir Douglas Galton, seconded by Dr. Brett, and carried unanimously:

"That in the opinion of this Conference it is desirable that local Natural History Societies and those in charge of local museums should place themselves in communication with the Technical Instruction Committee of the County or Borough in which they are placed, with the view of obtaining pecuniary grant towards extending technical knowledge by means of lectures or by demonstrations in museums."

The SECOND CONFERENCE took place on August 14th. On the subject of *Meteorological Photography*, Mr. Clayden,

the Secretary to the B. A. Committee dealing with this subject, said that he would be glad to receive photographs showing lightning flashes of an abnormal character. He added that he read now and then in the newspapers accounts of the remarkable effects produced by a whirlwind in this or that district. But he usually found that it was then too late to have the results photographed, the damage done having been repaired, or the damaged object removed. In such cases he would be very grateful to the Secretary of any local society in the district affected who would get photographs taken at once and send them to him.

Earth tremors.—Mr. Davison, Secretary of the Earth Tremors Committee, gave some account of the work of the Committee, and Mr. Horace Darwin described the construction and use of the Bifilar Pendulum, which he has invented, and a full account of which appeared in "Nature" of July 12th, 1894. He said it was not affected by the rapid complicated movements which took place during an earthquake, nor by the slight tremors produced by passing carts or trains. The movements which it would measure and register were such as would make a factory chimney lean over to one side. Extremely small movements of this kind could be detected. Mr. Symons, the Chairman of the Earth Tremors Committee, said that some time ago the attention of the Committee had been directed to certain vibrations recorded by an instrument placed at the bottom of a deep mine in the district of Newcastle-on-Tyne. These pulsations were traced to two causes, one, the gradual settlement of the ground in consequence of the removal of the coal, the other, the beating of the waves upon the coast. Mr. Davison on one occasion found pulsations were taking place which eventually turned out to have been produced by an earthquake then going on in Greece. They wanted information, added Mr. Symons, as to the changes going on in connection with the faults in geological strata, and, if possible, to get records of the alterations in the earth's crust caused by tidal waves. The Committee had one instrument under the charge of Mr. Davison at Birmingham, but they wished to establish others in various parts of the British Isles.

In Essex we have no great lines of fault along the course of which an instrument for recording earth tremors would be especially desirable. But in the small compact area from Colchester to Mersea, which was so severely damaged by the earthquake of 1884, we have a tract of country in which we might expect earth tremors

to be especially numerous and powerful, if Palæozoic rocks are unusually near the surface there, a view to which I am myself inclined. It would be interesting to compare with the record of an instrument so placed, that of another at Culford, near Bury St. Edmunds, where Palæozoic rocks of doubtful affinities have been found at a depth of only $637\frac{1}{2}$ feet below the surface. And it is evident that others are also desirable in districts where the earthquake was unfelt, and where Palæozoic rocks (as near Battle, in Sussex) are known to be at a great depth below, for the sake of comparison with the results attained in differently constituted areas.

Pollution of Air in Towns.—Dr. G. H. Bailey gave some account of the examination of the air of towns in which they had been engaged at Manchester, in connection with the Manchester Field Naturalists. He had come to the conclusion that the amount of the death-rate varied with the amount of the pollution in the air. The diminution in the amount of sunlight or daylight in the centres of large towns, as compared with their suburbs and with the open country, might amount to fifty, sixty, or seventy per cent. The work already done had been chronicled in the "Journal" of the Manchester Field Naturalists for 1893. As regards the effects of smoke on plants, the Chairman (Professor Meldola) remarked that cryptogams and lichens were once common on trees in Epping Forest though now they are rare.

Mr. W. Whitaker, F.R.S. (representing Section C), said that the first subject to which he would refer was *Coast Erosion*. The final report on this subject would be made next year, and the matter would then be handed over to the local societies, when those which had coast lines could register future changes on six inch maps. The Committee dealing with the *Circulation of Underground Waters* would also issue their final report next year, and the local societies would be able to continue the investigation. Twenty reports had been issued, and it had been suggested that if the material in them were arranged topographically, and possibly condensed, many local societies might be glad to have the volume, which would probably form an octavo book of 250 to 300 pages.

Professor Blake wished to inform the representatives of the local societies that he was engaged in examining the microzoa of clays, especially of Jurassic Clays, and would be much obliged if they could send him samples. He would be glad to report to the senders as to the general character of these clays and their microzoa. He

also took the opportunity of mentioning that he could no longer afford to publish the "Annals of British Geology," at a loss, but that it must cease to exist unless he received increased support. Mr. Whitaker trusted that Mr. Blake's remarks would tend to prevent the cessation of a very useful and entertaining work.

Geological Photographs.—Mr. Jeffs, Secretary to the Committee dealing with this subject, said that the Committee had received 1,055 photographs, and that they passed a resolution recommending the Council of the British Association, whose property they were, to deposit them in the Museum of Practical Geology, Jermyn Street, London.

Passing from Geology to *Geography*, I have to note that Mr. Sowerbutts, the delegate of the Manchester Geographical Society, who has, year after year, denounced the neglect of geography in our primary schools, and who this year said, no doubt rightly, that geography would never be properly taught unless it was made a compulsory subject, admitted that some improvement had taken place. It is, indeed, as Mr. Sowerbutts remarked, a strange thing that geography should be so much neglected by a country owning more isolated tracts of territory in every quarter of the world than any other nation. The Manchester Geographical Society, of which Mr. Sowerbutts is Secretary, has been in the habit of instituting examinations in geography for school children. The result of a recent examination on the geography of Yorkshire was to show that out of 60 candidates, comprising 33 boys and 27 girls, the twelve prizes and certificates had been won either by Yorkshire girls or Lancashire boys. A glance at the report of the Society for 1893, a copy of which Mr. Sowerbutts was good enough to present to each delegate, shows that the seven successful boys all came from the Hulme Grammar School, Manchester, while the five prize-winning girls had all been trained at the Northcote Girls' School, Armley, Leeds. The advantages of sound methods in teaching geography could not have been more triumphantly demonstrated.

Mr. Brabrook gave some account of the progress made towards the *Ethnographical Survey* during the past year. Their list of suitable villages had, he said, considerably increased, and amounted to 367. Mr. Brabrook mentioned the various places at which sub-committees had been formed. The Keeper of the Museum at Liverpool, Dr. Forbes, had rendered most valuable assistance, and the Glasgow Archæological Society had promised help. Of the places at which

sub-committees have been formed, to develop the work locally, I will only here mention Ipswich, a place not far from the northern border of Essex, at which the British Association will meet next year. It is most desirable that residents in Essex interested in the Ethnographical Survey should put themselves into communication with the Ipswich sub-committee, in order to ascertain its mode of work and the area with which it occupies itself, and thus economise time and labour and prevent over lapping. Whether it would be better for workers in Essex to report to Ipswich as their local centre, or to establish another sub-committee in Essex, is a point which can only be satisfactorily settled when it is known what the Ipswich sub-committee has done, is doing, and proposes to do in the future.

It appears to me that the discussions at Oxford gained in interest and concentration from the devotion of the whole of the first meeting to a single subject, and of the second to the ordinary sectional discussions. At Edinburgh or Nottingham it might happen that Messrs. A, B, C, and D all intended to speak on a certain subject. A and B might speak on it at the first meeting, during the absence of C and D at a garden party, and C and D might discuss it at the second, during a similar absence on the part of A and B. At Oxford a delegate knew precisely when a special subject would be discussed, and that he must either speak on it then or lose his opportunity altogether.

It is impossible to find anything to object to in the terms of the resolution about Local Museums. Indeed the delegates from some districts may have felt that scarcely anything more could be legitimately desired. In Essex, however, where the chief thing required is the permanent establishment of a museum, the resolution will seem to have no practical interest. As the Rev. Canon Tristam remarked at the Edinburgh Conference of Delegates, there is urgent need either of endowment or of help from the County Council to maintain a museum in working order. He added that many museums had gone to utter decay from the want of an endowment, while those at Newcastle, York, Manchester, Liverpool, and Norwich were all endowed. It is indeed impossible that any local society of naturalists can do much to maintain a museum, though it may be a most powerful aid in the formation of one.

For, in the first place, its numbers will vary considerably from time; the loss of four or five of its most prominent members in the

course of a year or two may lead to the secession of a considerable number of members, and consequently to a serious diminution of income. New accessions may possibly revive it, but a museum must cost as much in adversity as in prosperity, or be got rid of entirely. A thinner volume of Transactions may be published and money saved in that way, but such savings are a very common cause of renewed secessions, the publication of Transactions being a primary object of the society and the establishment of a museum a secondary one—if that. And in its most prosperous times the income of a local society consists of an amount which leaves it no surplus after the expenses of its evening meetings and excursions have been met, and its Transactions have been issued in a creditable form. For the numbers of persons in any district who become members of Naturalists' Societies is very limited, and varies largely with the amount of subscription required, as may be learned from a glance at the list of the Corresponding Societies of the British Association.

In short, while the fact that a local society usually comprises almost all the local collectors makes it the best possible body for the formation of a museum, its small income, which is necessarily devoted almost entirely to other objects, makes it utterly incompetent to maintain one. It is, therefore, most gratifying to learn that the County Council of Dorset has given grants directly to three local museums on the simple condition that they should be open to the public free on one day in the week, and that the Government auditor has apparently not objected to this grant.

T. V. Holmes.

THE QUESTION OF WORKABLE COAL MEASURES BENEATH ESSEX.[1]

By the Rev. A. Irving, D.Sc., F.G.S., *Vicar of Hockerill.*

In dealing with this question, a few preliminary and general considerations may perhaps be necessary, in order that a fairly clear idea may be gained of the place of the Coal Measures in the geological history of this globe by other than students of geology.

While this earth was yet young, but had so far cooled down from the conditions of a glowing star that the greater part of the aqueous vapour of its primordial atmosphere had been condensed upon the

1 This article is reprinted from the "Herts and Essex Observer," of July 14th, 1894, by the kind permission of Messrs. Mardon Bros., the proprietors, and Dr. Irving.—Ed.

primæval crust (a state of things perhaps not altogether unlike that which exists in the larger planet Jupiter), that crust was much thinner than the present lithosphere, or stony outer structure, of the globe. Into this great question we cannot enter here.[2] Now this thin crust at an early period began to depart from the geometrical regularity of a spherical surface, and as the whole globe contracted from further loss of heat, the crust had to bend and throw itself into a series of slight flexures, rising in parts into broad flat arches or domes (which initiated our present continents in outline) and sinking in other parts into vast saucer-like hollows (outlining the ocean-basins of the globe). Further contraction necessitated other movements of a more local nature, their localities being determined by lines of weakness in the crust as it gradually thickened, though not equally in all parts. Such movements have given direction to most of the mountain-chains of the globe, some of which have since been worn down by denudation to mere stumps, as is the case with the Scottish and Welsh Highlands, the mountains of Bohemia and Central Germany, and others that might be mentioned. Along the early *axes of elevation* in many cases, further movements (at the early stages feeble) have taken place, as the result of the lateral thrust due to contraction of the globe as a whole, and in their later stages have lifted into the sky such present lofty ranges as the Alpine System, the Pyrenees, the Himalayas, the Andes.

Two general accompaniments of such axes of elevation must be mentioned—(1) the fundamental crystalline rocks (the gneisses and schists of the text-books) form everywhere the inner cores of these elevated regions: (2) such disturbances have given rise to innumerable foldings and faultings of the crust, producing lines and points of weakness, through which enormous quantities of molten material have escaped from the interior, giving us another class of crystalline rocks known to the geologist as *eruptive* igneous rocks. These have been simply *passive* accompaniments of elevation: the notion (found in the older text-books) that they were the active agents of elevation may be relegated to the limbo of geological fiction. This has all been discussed by myself and others elsewhere, but its discussion here would be out of place, and involve scientific technicalities which

2 It is dealt with in my "Chemical and Physical Studies in the Metamorphism of Rocks" (Longmans, 1889). The view there worked out has since been adopted by a leading American geologist as furnishing the only clue to the observed relations of the Archæan Rocks of the North American Continent and was warmly appreciated at the time by Professor Hermann Credner, of Leipzig, whom I regard as one of the very foremost of European geologists. These ideas are slowly working their way into the text-books published in this country.

would make this article unreadable to the general public. Such axes of elevation as have been referred to are, however, but mere wrinkles on the larger curvatures of the lithosphere of the globe; while in some cases, as in the broad arch of the Rocky Mountains, the later stratified rocks still form a vast plateau, which may some day be thrown into the form of a normal mountain-chain, when the deep incisions made by the cañons shall relieve the strain sufficiently to allow the rocks below to be ridged up into another crystalline axis.

We must free our minds of the popular fallacy that the stratified rocks of the globe are parts of what were once continuous layers spread over the globe. All recent progress in geological science has led to the recognition of the fact that they were definitely related to the older continental masses, off the margins of which they were deposited, from which also their materials were in great part derived by the ordinary processes of waste and transport by water. This was first, I believe, prominently put forward in this country by Professor Geikie, in his presidential address to the Geographical Section of the British Association at Edinburgh in 1892, though to some of us who were familiar with the Continental literature of the subject, there was nothing new in it.

Now the question naturally arises as to whether geology affords any evidence of the stage in the earth's history at which "dry land" was first formed by elevation above the once universal ocean. This has been often considered and debated. For my own part I am inclined to the view which I have put forward elsewhere, and which is held by some geologists whose views are entitled to respect, that we have no evidence of any general land elevation before what is known as the Devonian age, when we meet with first appearances of a definite land-vegetation, the anthracite and graphite of the earlier strata being derived from marine Algæ.[3] All the formations of previous date (the sandstones, the conglomerates, the mudstones, the limestones, and the clays since altered into slates), of the Cambrian and Silurian periods, are of the nature of *marine* deposits, as testified by their fossil contents; and where these fail us, as in the Cambrian and Huronian conglomerates and sandstones (altered in many cases into quartzites), the occurrence of such strata is perhaps best explained by the enormous tidal action

3. That is to say, the earlier stratified sedimentary rocks. The graphite of the Archæan rocks had in all probability a different origin altogether, and had nothing to do with plants, but was of mineral origin, as I have shown *op. cit.*, and in a paper read at the Bath meeting of the British Association, 1888.

(far greater in those early stages than anything of which we have experience), which was brought to bear upon those gradually rising portions of the crust, which have formed the nuclei of present continents, before their final emergence above the waters of the universal ocean. By a series of sketch maps Professor Dana, of America, attempted years ago to trace the outlines of the growth of the North American continent from the earliest elevation of the Archæan region of the Canadian Dominion; and if we turn our attention to the European continent, we can trace in a similar way its gradual growth by deposition of later (stratified) formations going on *pari passu* with differential movements of the lithosphere of this part of the globe, from the earliest elevation of the Archæan regions of Scandinavia (with Lapland and Finland), continued through the western flank of the British Isles into Brittany; while another region of earliest elevation probably extended through Auvergne, Central Germany, Bohemia, and Upper Austria. A portion of the present Spanish Peninsula may perhaps have formed a third and minor region of elevation.

I have dealt with this matter in papers published back in the "eighties" in its relation to the distribution of the younger Red Rocks of Europe (the Permian and the Trias) with the aid of the writings of some leading Continental geologists, added to my own observations in Germany and in Britain. We are thus brought to see that in later Palæozoic time, that is to say, in the great Carboniferous Period, together with the Post-Carboniferous (the Permian or Dyas), while the crust of the globe was still thinner than it is now, the lithosphere must have been in a very unstable condition of equilibrium, and that, as a rule, those broad belts of its surface, which formed the margins of the earliest regions of elevation (being subjected to less hydrostatic pressure than those portions which served as the beds of the deeper oceanic basins), would furnish conditions of greatest instability: that is to say, conditions most favourable to the relief of the general strain of the lithosphere by up or down movements. Of such a condition of things we have the actual record in the general facies of those formations, which constitute the strata of the Carboniferous Period, to the later portion of which our Coal-measures, as a rule, belong.

The sequence of changes recorded in the rocks of the later Palæozoic Period, speaking generally, is as follows (beginning with the older strata):

1. Deep-sea marine formations, consisting for the most part of limestones with marine animal remains, known as the *Carboniferous Limestone*, passing up into Yoredale shales and sandstones. In some areas (as in Devon) this formation changes its character to the *Culm*, the marine fauna being feebly represented along with a considerable development of a land-flora.

2. Shore-formations indicating a gradual shallowing of the sea, consisting of grits and sandstones, known in English geology as the *Millstone-grit*.

3. Fresh-water marsh and lagoon formations, broken by insignificant oscillations and occasional shallow sea deposits, consisting of the Coal-bearing strata with land-plants in abundance, the vegetation, where sufficiently concentrated (chiefly in the middle and upper strata), being mineralised into seams of coal, which together with the sandstones and shales form the *productive Coal-measures*.

[The maximum thickness of the Millstone-grit and Coal-measures in Britain exceeds 15,000 feet.]

4. Shore formations, consisting chiefly of conglomerates and sandstones, bearing workable coal-seams in some parts of Europe, and indicating gradual subsidence (of more limited areas than in 1) generally *with a stratification quite discordant with that of the older formations*. This is the *Rothliegendes*, or *Lower Dyas* of German geologists.

5. Deep-sea marine formations, consisting for the most part of limestones with marine animal-remains, the *Magnesian Limestone* of the north of England, the *Zechstein* of Germany.

The storage of carbon in the lithosphere of the earth in the form of the mineralised vegetable-matter of our coal seams is not confined to one stage of the earth's history, but it is to be found so concentrated at that stage as to exceed the aggregate amount of the work done of this nature through all other periods put together; and no name in geology has, perhaps, been more felicitously chosen than that which is universally given to the great Carboniferous System. How was this brought about? There must have been a cause, and recent researches have brought the cause to light. We must recollect that the small quantity of carbonic acid gas (about four parts in 10,000) in our present atmosphere is no measure of what existed in the atmosphere of palæozoic times, for the simple reason that all the carbon of our coal-seams, all the carbon of the later (Tertiary) Brown Coal deposits, all the carbon locked up in the present vegetation and

peat-deposits of the globe, together with all the carbon which forms the essential element of the limestones of the subsequently-formed strata of the crust of the earth, existed as free carbonic acid gas, either suspended in the atmosphere or dissolved in the waters of the universal ocean, at the time when the land first began to emerge from the ocean. This carbonic acid gas is—as is well known—the essential food-stuff of the plant world; and we should expect, therefore, that when once a land vegetation had got a start, as we have noticed above, in the Devonian Age, it would develop and multiply with a vigour and rapidity altogether unknown to us in the present stage of the earth's history, in which the vegetation of the globe may be said by comparison to subsist upon "starvation diet." This has, I know, been called in question by some whose opinions are entitled to respect; and several years ago the question was raised again in the pages of the "Geological Magazine." This led me in the summer of 1888 to carry out a series of experiments on the effect of atmospheres of different compositions with varying proportions of carbonic acid upon plants of the same kind, of the same age and healthy growth, exposed to the same conditions of light and temperature. The general results, which were published in the "Report of the British Association Meeting" at Bath in that year, showed clearly enough that so long as the roots of the plants were kept well supplied with water, and there was a fair percentage of free oxygen in the atmosphere to maintain the activity of the protoplasm, *the rapidity of growth was greatly increased as the percentage of carbonic acid gas was higher in the air to which their foliage was exposed.* I was informed afterwards by one of the most distinguished botanists in this country, that this result agreed with the results which had been recently obtained in a similar way in Germany. As I pointed out in the "Report" referred to (page 661) this great and extraordinary development of plant life (chiefly Vascular Cryptogams, Conifers, and such intermediate forms as *Sigillaria*) in the Carboniferous Age served both "as a means of storage of carbon in the earth's lithosphere and to purify the atmosphere, so as to render it fit for the development of air-breathing forms of life in the Mesozoic Age." There can be no doubt that with the removal of carbonic acid from the air the supply of oxygen to it was proportionately increased; assimilation of carbon by the green colouring matter of plants under the stimulus of sunlight and the setting free of oxygen being two concomitant factors of the fundamental law of vegetable growth.

Now, as the detritus derived from the higher land regions together with the vegetable matter of the Coal accumulated along the margins of the earlier continental regions of elevation to a thickness in the British area of over 15,000 feet (and equal to the aggregate of maximum thicknesses of all the British Secondary and Tertiary formations), certain mechanical results must have followed. The enormous additional burden thus imposed upon these areas of deposition would tend to depress them. Such a force acting vertically downwards would be resolved partly into lateral thrusts tending (1) to pinch-up in places the Carboniferous limestone floor of the sea at greater distance from the land, giving rise to new and minor axes of elevation; (2) to increase the elevation of the land-regions from which the detrital material had been derived followed or accompanied by increased degradation of their materials. There is evidence of the latter having actually occurred, in the conglomerates and sandstones of earlier Permian strata (known as the Rothliegendes), some of which are shore deposits, while others of vast thicknesses, as in Thuringia and in Devonshire, bear evidence (as shown in my recent papers on the Devon Red Rocks in the "Journal of the Geological Society") of having accumulated on the flanks of great mountain regions of older land. In parts of Germany and Austria these Rothliegende strata even contain workable Coal-seams, a fact which testifies to their land origin; in other cases the Coal-Measures proper are worked beneath them, as they are in Notts and elsewhere beneath the red strata of the Trias, which in many cases overlap both Permian strata and Coal-Measures. But we cannot go here into details.

Further movements of the crust occurred during that long period in which the sandstones, pebble-beds, and marls of the Trias (one of the most puzzling of all geological systems) were deposited, by which large marine basins were formed, the outline of which we can, in the light of the accumulated evidence furnished by geology, trace as far back as the Jurassic period. Such were, in the European area, the Anglo-Gallic Basin, in which the secondary strata of the south east of Britain and the north of France were deposited; the North Sea Basin (continuous with the former) covering all of what is now North Germany and Denmark; the Aquitanian Basin of the South of France; the Helveto-Germanic Basin, which, as a narrow sea extending over Northern Switzerland and Southern Bavaria, connected the Pannonian Sea of the great

plain of the Middle Danube to the east with the Mediterranean Basin to the south of the main axes of Alpine elevation, then feebly outlined. The range and extent of these areas of deposition continued pretty much the same during the Cretaceous period, during which the Chalk formation of our southern hills, which underlies the Tertiary strata of this part of England, was built up. Then followed further movements, which upon the whole were movements of elevation for North-Western Europe, giving us the much more contracted basins, in which the older Tertiary strata (the Eocene) were deposited. Of such strata examples are seen in the sands and clays of the Rye-street brickyards, and in the London clay (the estuarine equivalent of the great Nummulitic Limestone marine formation), which (with its capping of later Boulder-clay) forms the upper portions of nearly all the higher country in this part of England, where the chalk does not come to the surface. In this Eocene period it was that such minor axes of elevation as that of the Weald were developed, though these, doubtless, in most cases were but the further accentuation of such minor folds of the older strata as had been covered up by the secondary or Mesozoic strata. *It is with such minor axes of elevation of the older rocks that we are chiefly concerned in estimating the probability of the existence of productive Coal measures under Essex.*

If now we turn our attention to the coal measures in which coal is worked in Britain and in Europe, we find them so distributed as to bear just such a relation to the older Palæozoic strata as we should expect, from what has been already discussed. Thus we find the great coal measures series of the Scottish Lowlands lying in a great, broad, synclinal trough, the general axis of which (complicated by minor flexures) trends north-east and south-west, between the older strata which rise into the Southern Uplands on one side and the Highlands on the other. The great coal fields of Durham and Northumberland and of Yorks and Notts (on the one side) and that of Lancashire (on the other side) flank the great Penine axis of elevation. The Midland Counties coalfields, which by later crust movements have been thrown into the separate basins of Staffordshire, Leicestershire, Warwickshire, and Worcestershire, may be connected in a series with those of Gloucestershire and South Wales by the coal measures which have been proved in recent years by borings at Burford (Oxfordshire) and Clandon (near Bath), the whole series representing a broad belt of deposition in the Carboni-

ferous period, having a marginal relation to the very ancient region of elevation occupied by the Palæozoic strata of the Welsh Highlands. *There is no evidence to show that these coal measures ever extended into the region of East Anglia.*

Turn we now to the continent of Europe. There we find the great axis of elevation of the Ardennes running through Belgium, and the Lower Rhine country. On the north flank of this is the connected series of coal measures worked all along the country by Aix-la-Chapelle, Liège, Namur, Charleroi, Mons, Valenciennes, and even as far west as Calais and Marquise in Picardy. This axis of the Ardennes points to a continuation of it under the Weald, the axis of which (cut through by the English Channel) begins in the Boulonais, and is continued through Hastings, Crowborough, and Horsham, beyond which we trace distinctly an axis of elevation through Hind Head (near Guildford), Kingsclere, and Inkpen, in the direction of the axis of the Mendip Hills. It is to the *north* of this that the proved coal measures lie, as do also, in all probability, those recently discovered at Dover, though in a sketch map attached to a pamphlet recently issued by Mr. W. Jerome Harrison, F.G.S., this axis is made to turn more to the north so as to pass under London and leave the Dover coal measures to the south of it. The Dover coal measures are in all likelihood a direct continuation of those of North France and Belgium, and (according to the views of some eminent geologists who have given special attention to this question) are most likely to be found in their continuation further west by trial borings along the line of country lying immediately south of the great chalk escarpment of the North Downs. When nearly twenty years ago highly-inclined Devonian indurated shales, some of the cores of which I had opportunities at the time of examining, were brought up from a deep boring for water at the brewery of Messrs. Meux and Co., at the corner of Tottenham Court Road and New Oxford Street, the natural conclusion of geologists at the time was that there was a *Palæozoic ridge* running east and west under London; but further evidence obtained in more recent years from deep borings at Cheshunt (Turnford) and Ware have shown that this inference is no longer tenable. These have proved that for twenty miles north of London, not only does the old Palæozoic floor rise as we proceed northwards to that distance, but we pass from the Devonian strata proved at Tottenham Court Road and at Kentish Town, into the still older strata of the Silurian, getting further down

the geological series and away from the horizon of the coal measures. It is true that an earlier boring at Harwich had proved the existence of *Lower* Carboniferous strata under that locality, and until the dip of those strata shall have been proved by another boring not far from Harwich, any coal measures in that region may be, as likely as not, found beneath the bed of the German Ocean. *There is no evidence whatever of the extension of any portion of the Carboniferous strata to the west under North Essex.* On the contrary, a boring at Culford (north of Bury St. Edmunds) executed only so recently as 1891, tell us plainly enough that the Palæozoic floor, which, as we have seen, rises with a steady gradient northwards from London, exists at a still higher level under the country about Bury. These facts, taken along with the *entire absence in all the East Anglian borings of Jurassic and Triassic Strata* (the former of which occupy a large portion of the Midlands, while the Trias has been proved beneath them in many borings in Northants, South Notts, and Leicestershire), point to the conclusion that we are here on a line of country marked by an axis of elevation during all Triassic and Jurassic times, representing possibly a faint continuation of the inner Scandinavian axis of elevation along the line of the Dogger Bank. There is nothing to show that such an axis does not date back even to the Carboniferous period, a view to which the occurrence of crystalline rocks in the boring at Bletchley lends strong support. Such an axis would bear a relation to the two more pronounced axes of the west of Britain and of the Ardennes, similar to that which the axis of elevation of the Appenines bears to the greater and older axes of elevation of the Alps and of Corsica and Sardinia.

We must not omit reference to the Lower Rhine coalfield, in the region of Elberfeld and Dortmund, because this has been spoken of sometimes as a separate and distinct basin from that of Aix and Liège, as if thrown off by an axis of elevation which points to a similar axis continued through East Anglia to the north of Harwich. Such a view would lend support to the conjecture to which Mr. Harrison has given expression in his map (*op. cit.*), and the sectional drawing, which represents the Carboniferous strata (including the coal measures) as let down into a synclinal flexure between Ware and Bury, upon which *his argument for coal beneath North Essex entirely rests.* A careful examination of so trustworthy a document as Von Dechen's geological map of Germany leads one to the conclusion that there is no such axis, as has been premised by some,

throwing off the Westphalian coalfield ; but that on the contrary the multiple axis of the Devonian district of Sauerland, to the north of which this coalfield lies, is really a feebler continuation of the Ardennes axis, which rises to its highest elevation in the Hohe Veen, from which it has been severed by a quondam arm of the sea now occupied by the broad valley of the Rhine about Cologne as drawn on Mr. Harrison's map. One is thus led to reject the conjecture upon which the diagram in question is based, so far as the existence of a synclinal coal measure trough under North Essex is concerned ; and the whole diagram is seen to be still further misleading, when one recognises the fact, that, in what professes to be a continuous section, the line of country represented by that portion of the section which extends from Dover to London is about *at right angles* to the general trend of the remaining portion of the section. A further difficulty arises if we attempt to reconcile Mr. Harrison's map with his sectional diagram, for in the former he has postulated an axis of elevation running north from London, the evidence of the borings quoted showing a general dip of the strata to south, as shown in the diagram.

GENERAL CONCLUSION.

The view which I am inclined to take from the foregoing considerations is that the existence of the Lower Carboniferous strata beneath Harwich points to a possible general dip of the strata from the Herts and East Anglian Palæozoic axis *to the south-east*, the dip indicated in the line of borings partaking of this, but not representing the *true dip* of the Palæozoic strata ; and that the Dover coal measures may be continued under the Nore and might be reached in *South-East Essex*. Of their occurrence in North Essex I see no probability. When the *actual dip of the Coal Measures at Dover is proved by sinking shafts into them* new light will be thrown upon this ; meanwhile, no more useful experiment perhaps could be tried than (as is, I believe, contemplated) the execution of a second boring into the Lower Carboniferous strata a little way from Harwich, so as to ascertain the dip of those strata in that region.

Note.

Writing on August 1st, Dr. Irving adds : "A paper by Messrs. W. Whitaker, F.R.S., and A. J. Jukes-Browne, was read at the meeting of the Geological Society on June 20th, and has since been published ("Jour. Geo. Soc." vol. l., pp. 448-514). It contains a list

of all the borings in the London Basin (using the term in its wider sense) in which Palæozoic rocks have been reached. They are ten in number, as follows: Culford (Suffolk), Ware, Cheshunt, Kentish Town, Meux's Brewery (London), Crossness (Kent), Streatham (Surrey), Harwich, Dover, Richmond. Not much new light after all is thrown upon the question under consideration, since the results of all these borings were generally known to geologists. A gleam of light perhaps is gained from a consideration of the limited distribution of the Jurassic strata under the London Basin. So far as these borings can tell us anything, we can infer that (making all allowance for a certain amount of denudation) the arm of the Jurassic sea was co-incident with a line of synclinal flexure lying to the *north* of the westward extension of the Ardennes axis through the area of the Weald, as indicated in my article, and that in this trough the coal measures of Dover had been let down, since it is precisely along such a belt of country that the *Jurassic* strata are found immediately overlying the Palæozoic rocks at Richmond, Streatham, New Oxford Street, and Dover.

"As we advance northwards, however, we lose touch of the Jurassic series altogether, and, so far as the borings can tell us, enter upon a region of Palæozoic strata, which in all probability was a land-surface during the long period of time represented by the Triassic and Jurassic formations. This is a simple inference from the fact, that in the borings at Kentish Town, Cheshunt, Ware, Harwich, and Culford, we pass at once from the *Cretaceous* strata into those of the Palæozoic series. Earth-movements in this area, about the beginning of the Cretaceous period, led to the submergence of the land-area indicated above, so that the Cretaceous sea spread over the whole of the south-east of England; just as earth-movements on a grander scale led to the submergence of the Bohemian area, and the deposition of strata of Cretaceous age upon the older Palæozoic and Archæan rocks of that region. All this lends emphasis to what was said in my article as to the significance of the absence of Triassic and Jurassic rocks in all the East Anglian borings. That the region of elevation in the East Anglian area during Triassic and Jurassic time was of the nature of an axis trending approximately to the north-east, is a hypothesis (as I before pointed out) favoured by the penetration of crystalline rocks beneath the Jurassic at Bletchley, and of the Carboniferous, at Northampton, beneath the Trias. The paper just published contains information which tends to strengthen that view, as 'further north, at Yarmouth, Norwich, Holkham, and Lynn, such (Palæozoic) rocks have not been reached by borings taken to a deeper level than that at Culford.' This would lead us to suppose that the axis of elevation of the older rocks trends more to the east than was suggested in my article above.

"The few additional facts here indicated make the probability of the existence of Coal-measures beneath north-western Essex

smaller than ever; and even the chance of the Dover measures being found to extend beneath the Nore into the region of south-eastern Essex is reduced by the absence of Jurassic strata in the boring at Crossness (Kent), although there, as well as at Richmond and Streatham, there is some uncertainty as to the age of 'red and grey rocks,' which immediately underlie the secondary series."

COAL UNDER SOUTH-EASTERN ENGLAND.

Reports by T. V. Holmes, F.G.S., and W. Whitaker, F.R.S.

THE possibility of finding workable seams of coal under Essex has, from its vast commercial importance, naturally attracted great attention in our county since the hypothesis was first started by the late Mr. Godwin-Austen in 1855 in a paper read before the Geological Society, "On the Possible Extension of the Coal-Measures beneath the South-Eastern Part of England" ("Quarterly Journal of the Geological Society," vol. xii., page 38). As there is now a certainty that the search will be undertaken in earnest it will be useful to present the gist of the reports of Mr. T. V. Holmes, Mr. W. Whitaker, and Dr. Taylor, prepared for the "Eastern Counties Coal-Boring Association," for permission to reproduce which we are indebted to the secretary, Mr. G. F. Mansell, who was the first to take the matter up practically, and who has since June, 1891, worked in the most energetic and business-like way to bring this question to a practical trial. We must also call attention to the important paper by Dr. Irving, who expresses views of his own, printed in the present number.

The problem was first brought under the notice of our readers by Mr. T. V. Holmes, in his paper on "The Subterranean Geology of South-Eastern England," being his Presidential Address at the meeting of the Club on January 28th, 1888, and which was given in full, with illustrative diagrams, in The Essex Naturalist (vol. ii., pp. 138-158). To this valuable paper the reader should refer for a discussion of the hypothesis put forward by Mr. Godwin-Austen.

At the time Mr. Holmes's paper was written it was very doubtful whether any experimental borings in S. E. England would ever be made. But, since 1888, the Directors of the Channel Tunnel Company have made a boring at Dover reaching the Coal-Measures

(700 feet in thickness) at 1,113 feet from the surface,[1] and in our own district an association has been formed for investigating the question. The "Eastern Counties Coal-Boring and Development Association" was started to raise funds to make borings in various parts of the Eastern Counties, for "the purpose of ascertaining the position of the Coal seams, which, in the opinion of experts, almost certainly exist in East Anglia, and also to open up and develop the same." Under the auspices of the Association, Dr. J. E Taylor has delivered several very instructive lectures, and in "The East Anglian Daily Times" and other newspapers popular articles on the subject have appeared from time to time, proving the interest which the public is now taking in this important question. Shares equal to about £5,000 have already been subscribed for the purpose of the proposed operations, which will be commenced during the ensuing autumn. The recently-published account of the discovery of Palæozoic rocks (of somewhat doubtful age) at Culford, near Bury St. Edmunds, at a depth of only $637\frac{1}{2}$ feet, has doubtless quickened the desire for experimental borings in the Eastern Counties.[2] The association has obtained permission from the Tendring Hundred Water Company to use an abandoned bore-hole which was put down at Bradfield in Essex on the southern bank of the Stour, nine miles west from Harwich. This bore goes to the depth of 463 feet, and could be deepened to a further 500 feet at a small expense. More recently, we understand, a tender has been accepted for an experimental boring to be commenced forthwith, at Stutton, in Suffolk. Stutton is on the north bank of the Stour, eight miles south of Ipswich, seven miles north-west of Harwich, and three miles south-east of Bentley Station on the Great Eastern Railway. The boring operations are to commence on the estate of Mr. Wm. Isaac Graham, one of the principal landowners of the parish. Mr. Holmes, Dr. J. E. Taylor, and Mr. Whitaker, have been advising the Association, and the two reports which are here given were prepared to

1 It was stated in "The East Anglian Daily Times," of April 20th, 1893, that a "few of the plants from the Coal Measures found in the Dover boring are now on exhibition in the Fossil-Plant Gallery at the British Museum of Natural History, South Kensington. They were presented to that establishment by the engineer, Mr. Francis Brady, together with portions of the solid cores. The fossil plants in question prove that the Dover coal at present struck is on the horizon of the upper part of the Middle Coal Measures, so that there is every probability of the occurrence of other productive seams lower down. The specimens were obtained from two horizons—namely 1,262 feet and 2,234 feet from the surface of the ground."

2 The fullest information about the borings at Culford and Ware will be found in a paper by Messrs. Whitaker and Jukes-Browne, published in the "Quarterly Journal of the Geological Society," vol. l., pp. 488-514 (August, 1894), "On Deep Borings at Culford and Wingfield, with Notes on those at Ware and Cheshunt."

afford information to the public. As these reports present an excellent summary of the evidence upon which the theory of the existence of coal in East Anglia is based, we have pleasure in being allowed to reprint them.

I.—REPORT BY MR. T. V. HOLMES, F.G.S.

(*Vice-President, E.F.C.*)

In the year 1855 a geologist of eminence, the late Godwin-Austen, pointed out that in Belgium, from the valley of the Ruhr to that of the Scheldt, near Valenciennes, Coal Measures exist on the northern flanks of a ridge of still older Palæozoic Rocks. From Valenciennes westward Coal Measures, and the older Palæozoic Rocks associated with them, are covered by formations of later date, but have been traced by Douay, Bethune, and St. Omer to Calais. The continuation in England of this ancient ridge of Palæozoic Rocks is to be seen in the Mendip Hills, on the northern flank of which lies the Bristol Coalfield, with those of the Forest of Dean and of South Wales. Between the Mendip Hills and the Straits of Dover the ground is covered by rocks of much more recent age than the Coal Measures, but there could be no doubt, added Godwin-Austen, that a ridge of ancient rocks with associated Coal Basins continued to exist beneath the Secondary and Tertiary Strata of South-Eastern England, though not visible as in Belgium and in Somerset.

Since 1855 much evidence confirming this view has been obtained. A boring at Burford, on the western border of Oxfordshire, showed the existence of Coal Measures there at a depth of 1,184 feet beneath Lower Secondary Rocks. And borings made in or near London in order to obtain water from rocks beneath the Chalk, have disclosed the fact that beneath the Gault (which underlies the Chalk, and maintains like it a nearly uniform thickness), the strata met with in the area between the Valley of the Thames on the south, and Ware on the north are either of greater age than the Coal Measures or, where possibly later, are yet much older than any seen at the surface in South-Eastern England.

Thus the existence of a subterranean ridge or plateau of very ancient (or Palæozoic) rocks connecting that of the Mendips with the continuation of it in Belgium has been fully demonstrated. And the result of the recent boring at Dover has confirmed the evidence of that at Burford, and shown that we may expect this ridge to be accompanied by Coal Basins in the South-Eastern districts, where Secondary and Tertiary Rocks form the surface.

The question which we may now enter upon is the position of the various spots in the Eastern Counties which offer the most favourable prospects of finding Coal Measures beneath the surface-rocks. The available evidence on this point is unfortunately very scanty.

On examining the deep borings near London, we find that the lowest rocks discovered were at Ware, Upper Silurian strata having been reached there beneath 160 feet of Gault and a trace of Lower Greensand. At Cheshunt and Meux's Brewery the boring ended in rocks of Devonian age. All the above borings thus ended in strata older than Coal Measures. At Kentish Town, Richmond, Crossness, and Streatham the oldest rocks were of either Old or New Red Sandstone age, the most eminent geologists holding different views as to their affinities. In other words it has not been decided whether the borings at these four places ended

in beds older or newer than the Carboniferous Series, of which the Coal Measures form an upper member. Dover and Harwich are the only places in South-Eastern England at which rocks belonging to the Carboniferous Series have been found. But while at Dover Coal Measures were pierced, at Harwich the boring ended in beds apparently older than Coal Measures. However, in the district where the lower beds of a series are found, the higher are more likely to be discovered than elsewhere.

We have learned that, east of the Straits of Dover, Coal Measures have been found on the northern flank of a ridge or plateau of older rocks. This ridge, though having a general east and west range, is seen, where visible, to take a more or less sinuous course, like that of an ordinary mountain-chain. The lowest beds yet reached in South-Eastern England are (as already mentioned) the Upper Silurians at Ware. Between Ware and the Thames at and near London only Devonian or Old or New Red Rocks have been discovered, as already stated; but we have seen that we are not justified in expecting Coal Measures on the ancient plateau but on its northern flank. Assuming that the Coal Measures struck at Dover are thus situated, it is evident that the range of the plateau between Dover and Ware is nearly north-westerly in direction, and that the most probable position of any Coalfields associated with it is on the north-eastern side of a line connecting those towns. Thus a section between Harwich and Ware would probably disclose a state of things more or less resembling that indicated in the diagram below, the surface rocks being removed.

A. Silurian Rocks.
B. Devonian.
C. Lower Carboniferous
D. Coal Measures.

But the utter want of evidence between Ware and Harwich, and the probability that any Coal Basins existing under South-Eastern England are comparatively small, and detached from each other, will make a series of borings necessary before the subterranean geology of Essex and Suffolk can be clearly intelligible. Every boring, however, will add to our knowledge, and it matters little or nothing whether the Coal Measures themselves are pierced in the first boring or only in the third or fourth, as it is almost as important to know where they are not as where they are. The accidental discovery of Coal Measures at Dover, for example, tells us nothing about the size of the Coal Basin touched, or the directions in which it extends. It may lie mainly between Dover and Canterbury or Dover and the Goodwin Sands, and may accordingly be either workable or almost entirely out of reach. Nor does it show whether there is, or is not, any inversion of the beds. In short, its interest and importance resemble that at Burford. As the Burford boring proves the existence of a Coal Basin under Secondary rocks many miles eastward of the Coalfields of Bristol and of the Forest of Dean, so the Dover boring demonstrates the existence of coal under Secondary rocks about an equal distance westward of the nearest continental Coalfields.

In selecting a site for the first experimental boring in the Eastern Counties, I should be inclined to favour one somewhere between Ware and Harwich, but much nearer to the latter town. Probably a spot three or four miles north-east

of Colchester would be a good place, as in that district the top of the Chalk is within a few feet of the surface, and it is also obviously better to begin near the place at which Lower Carboniferous rocks are known to exist than where beds of some other series are more likely to occur, as in Western Essex. An additional presumption in favour of this spot seems to me to be furnished by its position with reference to the area within which structural damage was done by the Essex earthquake of April, 1884. If a straight line be drawn, having a north-west and south-east direction, parallel with the general course of the Colne between Colchester and the sea, and about two miles east of the river, this line gives us the eastern limit of damage. The western limit might be similarly shown by a line parallel with the first and connecting Coggeshall with Tillingham, south of the Blackwater, the northern boundary being another line between Coggeshall and Colchester. Of course there are a few outlying places at which some damage was done, but at least nineteen-twentieths of it took place within the area described, as may be seen on the map given by Professor Meldola and Mr. White in their report on this earthquake.[3] Now it seems to me that the most probable explanation of the restriction of the damage to so compact and limited a district is to suppose that the ancient subterranean ridge or plateau is unusually near the surface there, while it speedily becomes deeper towards the north-west of Colchester. And as we may expect Coal Measures, not on the ancient ridge, but here and there on its more northerly flank, it seems best to begin operations a little north-east of the area of earthquake-damage.

P.S.—The result of the Culford boring (learned since the above Report was sent in) does not seem to me to make any modification in what I have written desirable.

II.—REPORT BY W. WHITAKER, *B.A., F.R.S., F.G.S., ASSOC. INST. C.E. (Hon. Mem. Essex Field Club).*

The question of the probability of an uprise of Older Rocks underground in the South-East of England was first started, as a matter of reasoning, a good many years ago. The effect of such an underground uprise would be to interrupt the continuity of many of the beds below the Chalk, by bringing much older formations nearer to the surface than they would be if the Upper Cretaceous beds were duly underlain by Lower Cretaceous, Jurassic, etc., as at the outcrops on the north, west, and south.

The line of reasoning was as follows: It was suggested that the uprise seen in parts of South Wales and in the Bristol district, with a general direction more or less west and east, was likely to be connected underground with the other like uprise through Northern France and the neighbouring part of Belgium, although that connection was hidden at the surface by a covering of Tertiary, Cretaceous, etc., rocks. As a consequence of this hidden uprise the continuity of the Jurassic and Triassic rocks underground would be imperfect, so that in many places the Cretaceous beds would be found to rest directly on much older rocks, whilst in other places these two might be separated by no very great thickness of Jurassic rocks.

It was argued, too, that amongst the older rocks thus brought nearer to the surface Coal Measures were likely to occur, probably in a set of separate masses, as in South Wales and round Bristol.

[3] "Report on the East Anglian Earthquake of April 22nd, 1884." ("Essex Field Club Special Memoirs," vol. i.) London: Macmillan & Co., and Essex Field Club, Buckhurst Hill.

No sooner had this important theory, based on reasoning from observed facts, been thoroughly started than the truth of the first part of it, that is the occurrence of old rocks directly beneath the Cretaceous beds of the South-East of England, was absolutely proved. This proof was given by the deep boring at Harwich, which showed the occurrence, at a depth of about 1,015 feet below Ordnance Datum,[4] of Carboniferous rocks, but which are older than the Coal Measures.

At about the same time further evidence was given by the Kentish Town boring, which reached red and grey beds of doubtful age, but unlike anything Cretaceous or Jurassic, at about 930 feet below Ordnance Datum.

Other borings in and near London, and all made for water-supply, have continued the proof. In some cases these have shown more of the doubtful red rocks, in others rocks of which the age is clearly marked by the contained fossils, both Devonian and Silurian beds being found. There is no need to enter into details of these deep borings, which have been fully described. Their sites are Richmond, Streatham, and Crossness (on the south of the Thames), Kentish Town, Meux's Brewery, Cheshunt, and Ware (on the north of the Thames).

Besides these, two other deep borings, at Chatham and at Dover Prison, though they have not reached the older rocks, yet give evidence of the underground thinning of the Lower Cretaceous and of the Upper Jurassic beds.

It should be noted that in some of these borings a thin representation of Lower Jurassic beds comes between the Cretaceous and the older rocks, which last are reached at depths of from about 710 to 1,222 feet below Ordnance Datum.

From what has been said above it is clear that the question of the presence of a floor of Older Rocks next beneath the Cretaceous beds, or but slightly separated therefrom by Jurassic beds, in South-Eastern England has for some years passed out of the chrysalis stage of theory into the fully-developed stage of fact. A full account of the question has been given in a Geological Survey Memoir ("The Geology of London and of Part of the Thames Valley," vol. i., pp. 10-50, 1889), to which the reader is referred.

Although the occurrence of a floor of Older Rocks at no enormous depth beneath the surface was soon proved, geologists were still greatly at variance as to the second part of the theory, the likelihood of the occurrence of Coal Measures. There were not wanting some to contend that Coal Measures would not be found underground in the South-East of England, but that the formation in question was likely to thin out southward and westward from our known coal-fields. Others, too, held that, should Coal Measures occur in such a position, they would be found to be unprofitable as far as regards containing seams of coal of a workable character.

Others, however, who, it always seemed to me, had more reason on their side, pointed to the fact that not only do Coal Measures occur at some depth underground on the west, in the Bristol district, and on the east, in Belgium and Northern France; but that in both cases these hidden Coal Measures yield workable coal, which, indeed, was and is largely worked. This being the case, it was argued that what had been proved to be the case at either end of the long line of disturbance (from South Wales even to Western Germany) was likely to occur also in the tract between, in which the range and extent of older rocks were little known.

Strange to say, no attempt to prove the truth of either view was made in England for many years, and all our knowledge was derived from borings made

4 In this and in the following cases the depth *from the surface* of course varies according to the level of the site. The figures given are referred to one level, practically sea-level.

for water, with one exception. A very deep trial, known as the Sub-Wealden Boring, was made: not for the purpose of finding coal, however, but for the more general one of proving the underground succession of the beds beneath the lowest part of the great Wealden Series in Sussex. From this trial came most valuable information. Jurassic beds were found to a very great thickness, and there is every reason to expect that they continue to a good depth below the 1,900 feet to which the boring was made, as the Middle Division of the Series was not wholly pierced.

Geologists who have worked much at the subject were well agreed that the neighbourhood of Dover was, for various reasons, one of the best for a trial for underground coal. At Dover has been made the *only trial for coal* in the South-East of England (though others are in progress or in prospect), and it has been successful, for Coal Measures were reached (in 1889) at a depth of 1,113 feet below Ordnance Datum, beneath Cretaceous and Jurassic beds. The Coal Measures have since been pierced to a further depth of 762 [5] feet, in which thickness nine seams of coal, with a workable thickness of about 14 feet, have been found.

The second part of our theory as to the underground structure of the South-East of England has therefore been partly proved, and the existence of one coal-field has been shown.

It remains now to consider whether things should be left as they are, or whether it will not be well to make other trial-borings in search of other hidden coal-fields, and my own opinion is strongly in favour of the latter view. The extension of the Coal Measures from Dover and the thickness of the formation in that neighbourhood will of course be worked out, and I believe it is meant to put down a shaft on the site of the trial-boring, a work of no great difficulty, and of less depth than many of our colliery-shafts.

Amongst other tracts the Eastern Counties should certainly be thoroughly examined. Though the only published evidence we have is from the Harwich boring, yet it should be remembered that this alone, of all the deep trial-borings for water above alluded to, has reached Carboniferous rocks, giving us therefore fair reason to speculate on the presence of Coal Measures at no great distance.

Some fresh evidence however has just turned up, and though it does not show the existence of Coal Measures, it does show that old rocks of some sort come nearer to the surface in part of Suffolk than anywhere else in the London Basin, as far as is yet known. I cannot now enter into details, which it is hoped will soon form the subject of a special paper: enough to say that the depth at which old rocks have been struck, a few miles from Bury St. Edmund's, is about 520 feet below Ordnance Datum.

Again, we are not certain what line our underground Coal Measures may take from Dover, and the opinions of geologists vary somewhat on the matter. On the one hand most hold that the extension will be found to trend westward, toward Bristol; but on the other hand some think that it may take a more northerly turn, toward the Midland coal-field, in which case the Eastern Counties would clearly benefit. It seems to me that there is no need to limit ourselves to either view: both extensions may occur.

I would point out that it is not to be expected that every trial should be successful. Failures to find coal must be expected; but even failures will teach much, and will not only give us much information as to the character of the beds deep underground (a matter of great practical importance in the search), but may

5 These figures are corrected, since the Report was written, from later information.

also warn us off certain tracts, at all events until our knowledge has greatly increased.

I would also allude to the fact that in Northern France disturbances of a peculiar character sometimes occur, by means of which older formations have been pushed up above newer ones; so that Coal Measures have been found and worked beneath Devonian rocks. A like thing occurs also in the Bristol district, though to a less extent. From this it follows that we need not utterly despair of finding Coal Measures even where an older formation has been struck. At the same time I do not advise the carrying on of trial-work in such cases, which should probably be left until actual work gives indications of possible success. In conclusion I would draw attention to the fact that about a third of the coal-yield of France is got from hidden Coal Measures (covered by Cretaceous, etc., beds) along the line indicated above. From this it seems fair to infer that there will be a successful result from like enterprise in England. As I ventured to say, before the successful issue of the Dover boring, "it seems to me that *the day will come when coal will be worked in the South-East of England.*"

Dr. Taylor's short report was of a general nature, agreeing with the above, but he did not recommend any particular locality in the Eastern Counties as a place of trial for coal.

Since the reports were written, Messrs. Holmes and Whitaker, having been asked by the Coal Boring Syndicate as to the best locality for a first trial, decided, without any concert with each other, that some place between Colchester and Harwich, not far from the Stour river, would be the best.

Mr. W. Jerome Harrison, F.G.S., has written a pamphlet[6] on the subject, in which he gives his reasons for preferring the north-west of Essex (in the neighbourhood of Newport, Quendon, and Thaxted) as offering the most eligible site for a bore-hole likely to reach Coal Measures, because he thinks they would there be met with at less depth than in the other localities mentioned. Mr. Harrison's pamphlet consists of revised reports, with additions, prepared by him at the request of Col. Cranmer-Byng in 1887 and 1891, and contains a large amount of information on the subject. But with regard to his selection of a site, M. T. V. Holmes has kindly sent us the following remarks:

"I cannot make out on what grounds Mr. Harrison expects to find Coal Measures in the north-west of Essex. Of course they may be there. But as we have Lower Carboniferous Rocks at Harwich, and know only of Palæozoic rocks of quite another kind at Ware and Culford to the west and north-west, it seems to me that the first step in a systematic series of borings should be to try a few miles away from the only spot in the Eastern Counties where lower rocks of the same series as the Coal Measures have been found. It is quite possible that the Palæozoic rocks under Bradfield may be older than those of Harwich, and that the coal-

6 "On the Search for Coal in the South-East of England, with special reference to the Probability of the Existence of a Coal Field beneath Essex."—Birmingham, 1894.

basin, if any, may be out at sea. But Bradfield, about half way between Colchester and Harwich, is an excellent spot for testing the question whether *available* Coal Measures exist near the Lower Carboniferous rocks of Harwich. In the area of earthquake damage between Colchester and Mersea Island, I should anticipate that Palæozoic rocks, older than either Lower Carboniferous or Coal Measures, would probably be met with at a less depth than at Harwich or Bradfield. But, as I have already remarked, I should *not* expect to find Coal Measures specially near the surface, *for Palæozoic rocks*, but quite the reverse.

"In short, in endeavouring to ascertain the whereabouts of coal-basins—if any—in the Eastern Counties, it seems to me that we cannot have a better place for a first boring than a spot where we are six or seven miles only from a place (Harwich) where Lower rocks of the same series have been met with, especially as Harwich is the only place in the Eastern Counties where they (the Lower rocks) have been found."

Addendum.—It is but right to add that the general concurrence of opinion in favour of a site near Harwich for an experimental boring is combatted by Mr. W. H. Dalton, F.G.S., who was the geological adviser for the Culford boring, and whose opinion is undoubtedly entitled to considerable weight. In a letter dated December 12th, 1892, Mr. Dalton thus states his view of the matter :—

"Allow me briefly to indicate the position of this most important question. We have beneath us, at from 500 to 1,500 feet below the sea level, a region of rocks classed as Palæozoic, divided into Silurian slates, Devonian shales, and (let us hope) Carboniferous Limestone and Coal Measures. These are hidden by the Chalk and London Clay, and but few borings have penetrated to the ancient series. In Woolwich Marshes, in London, and at Cheshunt, Devonian beds have been found, and at Ware, Silurian. At Culford, near Bury, and at Harwich the rock found is regarded as Carboniferous by some, as Silurian by others. I hold the latter view, and think that but for the commercial glamour attaching to the word Carboniferous,[7] that age would not have been suggested by the samples obtained, and which no authority of weight has decisively pronounced to be Carboniferous. Seeking further evidence, we find that in Leicestershire and Warwickshire and near Boulogne the tendency of these old rocks is to occur in belts or streaks of a north-west trend, and for a dozen years past I have maintained that this trend is continuous under Essex, in opposition to the orthodox theory of an east and west course, which has no facts in its favour and many against it. The bearing of this on Essex is that the possible Coal Measure area of the county lies between the Silurian ranges of Ware and Culford-Harwich, and trial borings should be as central as may be in the intervening space. I trust no funds are being or will be wasted in further boring at or near Culford or Harwich. Geologists, of course, are glad of any boring yielding interesting facts, but if the result be fuel, other research is guaranteed, while if only useless rock be struck, investigators will be discouraged. Therefore, the most likely point for Coal Measures, and not any spot whose owner may be willing to permit boring, should be selected."

7 Inasmuch as a Carboniferous fossil was found in the Harwich boring, Mr. Dalton must surely intend this remark to apply to the Culford boring only.—Ed.

NOTES—ORIGINAL AND SELECTED.

Remarkable Tale of a Fox.—The county newspapers of Dec. 8th, 1893, printed the following:—"Three remarkable robberies have taken place at Tillingham. During a recent Sunday night Mr. Joseph English, butcher, lost a brown blanket from off his cart, which was standing in a shed on his premises. During the following Friday night he lost a blanket and a whip, and on the Monday night he lost a blanket, a whip, and a nosebag—all from the same place. On the Tuesday morning he gave information to P.C. Collins, of Tillingham, who subsequently ascertained that the blanket, whip, and nosebag, which were lost on Monday night, had been picked up by Mr. Thomas Peacocke, of Tillingham, baker, who found them scattered about in his meadow early on Tuesday morning. He then searched the hedge and ditch which divide Mr. English's premises from Mr. Peacocke's meadow, and near a hole in the hedge, where dogs are in the habit of going through, he found the whip which was lost during Friday night, but was still unable to gain any trace of the thief. In company with P.C. Taylor, of Bradwell-on-Sea, Collins continued making inquiries throughout the day, but obtained no clue to the thief. On returning home in the evening P.C. Collins again examined the blanket and nosebag, when he noticed in them a strong scent of a fox, which at once caused him to suspect that Master Reynard had committed this robbery. He then called the attention of Mr. English and several others to it, and they all expressed themselves perfectly satisfied that the scent was that of a fox. Again during Tuesday night (29th November) Mr. English was paid another visit by something, which dragged a sack containing about a peck of oats out of his shed, down his garden, and left it in the direction where the other articles were found. On Wednesday night, shortly after twelve o'clock, P.C. Collins was watching on Mr. English's premises, when he saw a fox come into his yard. It had a good look round, and a smell round the slaughter-house, and then it went into the cartshed, jumped up into the cart, and again had another look round. Finding nothing there, it came out and pulled a large empty sack from off the chaff-cutting machine and dragged it out of the yard into Mr. English's garden, where he dropped it and ran off. This was quite sufficient to satisfy everybody that the thief is a four-legged one. This fox appears to think that he wants a whip for the hounds, as well as the huntsman."

The Cry of the Wood-Pigeon.—A contributor to "Notes and Queries" (8th S., vi., 252) gives an interesting contribution referring to the well known idea that the cry of the bird includes the words "Take two cows, Taffy." He writes under the signature J. B. B. as follows:

"I have heard birds in the same wood leave off at all parts of this cry. A curious thing connected with it is this, that the bird invariably begins where it left off. For instance, if it simply cries 'Take,' it will begin next time at 'two cows, Taffy,' I have heard this over and over again."

Have any of our Essex readers noticed the peculiarities of the wood-pigeon's cry?—I. C. GOULD, Loughton.

A travelling Sparrow's Nest.—"A sparrow's nest, containing five eggs, was the other day discovered between the Westinghouse brake of one of the London, Tilbury, and Southend Railway Company's carriages and the bottom of the carriage. The nest was not disturbed, and the eggs have now been hatched,

notwithstanding that in the interim the carriage has been used to form part of a local train running between Dagenham and Fenchurch Street."—"Evening Standard," May 17th, 1894.

Galeus vulgaris (the Toper) off Clacton.—On Saturday, September 29th, 1894, a male specimen of this shark, five feet four inches long, was brought to me for inspection. It was caught in a trawl, a short distance outside the Colne. The captors appear to have been much afraid of their prize, when they found what they had in their net, and took considerable trouble to kill it by hammering its head.—HENRY LAVER, F.L.S., Colchester, October 1st, 1894.

Capture of a Sheat Fish (Silurus Glanis) in the Stour.—On June 15th, 1869, Sir J. T. Rowley, of Tendring Hall, Stoke-by-Nayland, turned out four females and one male of the *Silurus glanis* into a piece of water in his park, the overflow from which runs into the river Stour. After a heavy thunderstorm on July 25th, some nets, known as eel brays, were put into the stream at Stratford Mill for the purpose of catching a run of eels as they proceeded down stream to deposit their spawn in salt water. During this operation Mr. Busby, a gamekeeper, and Mr. W. Gifford were somewhat startled at hauling out, in one of the eel brays, a monstrous fish, five feet long, and over thirty pounds in weight. It proved to be a *Silurus glanis*, or Sheat-fish, and there can be no doubt that it came from the Park Lake at Stoke-by-Nayland. The fish is unknown in Great Britain as a native, though it frequents many of the large Continental rivers. Many experiments with a view to English acclimatisation have been made, but hitherto, I believe, without known results. The specimen has been sent to a London taxidermist for preservation. It is greatly to be hoped that no large family of these voracious and destructive creatures lurks in the depths of the Stour. A proposal is now on foot to stock the river with Chub and Barbel, but a few *Siluri* would probably make short work of the new comers. We have in this country laws against the destruction of fish by dynamite and by poison, but the eventuality of their wholesale slaughter by the introduction into rivers of such foes as the *Silurus* does not appear to have entered into the arena of practical politics.—CHARLES E. BENHAM, Colchester, July 31st, 1894.

Pentamerous Symmetry in Aurelia observed in Essex Waters.—While shore-hunting at Brightlingsea on August 4th I came upon a stranded *Aurelia* which exhibited a pentamerous instead of the usual tetramerous symmetry. I append a brief description :—Sub-umbrella surface presents five equally developed oral lobes at the five corners of the mouth. Intermediate with these lobes are five horse-shoe shaped reproductive organs, also five sub-genital pits with orifices. There are five perradial branched canals, five interradial, also branched, and ten adradial straight canals. Thus it will be seen that the animal presents a pentamerous symmetry, which is unusual among the Cœlenterata.—HERBERT W. UNTHANK, B.Sc., 37, Aden Grove, Green Lanes, N.

[Mr. Unthank's observation gave rise to an interesting correspondence in "Nature." Prof. Herdman remarks, on August 30th, that "in an expedition of the Liverpool Biological Society to Hilbre Island a few weeks ago, we found several such specimens, and remarked upon the frequency of the variation. I think the number was either four or five pentamerous forms out of twelve examined." Dr. H. C. Sorby, F.R.S., who is so well acquainted with the natural history of our Essex Waters, wrote on August 31st from his yacht "Glimpse," off Burnham : "During the last few months I have seen countless thousands of living specimens of *Aurelia aurita*, and have paid special attention to abnormal

varieties. I have found not only such as have throughout the five-fold symmetry, seen by Mr. Unthank at Brightlingsea, but have with me on the "Glimpse" specimens stained and mounted as lantern-slides, having entire three-fold and entire six-fold symmetry, and one in which it is partially two-fold. I think it may be said that in Suffolk and Essex a few such abnormal varieties occur per thousand of the normal. An imperfect four-fold symmetry is much more common." Mr. Unthank adds to the above: "In Bateson's 'Materials for the Study of Variation' *Aurelia* is stated to be commonly variable, and Ehrenberg mentioned as putting the pentamerous variation at 3 per cent.—much lower than Prof. Herdman's 'four or five out of twelve.' Out of 1,703 specimens thrown up on the shore at Northumberland, 1,735 specimens (I think) were normal, and only 1 per cent. pentamerous."]

Silene Conica. Lin.—I found this plant growing freely in a field of crimson clover (*Trifolium incarnatum*, Lin.) near this town. I believe this is the first time that this plant has been recorded in this county. It is a rare plant, found only in the Eastern counties, and occasionally in ballast hills farther north. Probably it has only recently been introduced into this locality, but seed vessels having been freely formed it may become established.—J. C. SHENSTONE, Colchester. [In Gibson's "Flora of Essex" it is stated that "D. French has a specimen of this species gathered near Harlow Bury House, in 1858. It was only once found."—ED.]

The Bedford's Oak, Havering-atte-Bower.—Mr. D. T. Bruton wrote on 29th of November, 1893:—"I don't know whether the fact has been reported to you, but during the gale of Saturday night and Sunday morning the great old oak in the grounds of "Bedfords," the seat of James Theobald, Esq., M.P., was rent in half from the top to the bottom. It had a wonderful hale-looking top, being alive in every branch; was a great feature in the grounds, and highly prized. The view from it is one of the finest the kingdom of Essex could command, and is to-day one of the noblest, richest, and most beautiful of industrial England, commanding as it does the Thames Valley between London and the sea, all laden and aglow like a heavenly shore.

"The trunk of the old oak measured twenty-seven feet in circumference at the smallest part. The base was encircled with a rustic seat."

In a subsequent letter Mr. Bruton remarks:—"So far as I know, the history of the oak is unwritten. It is a very remarkable specimen, and is adjudged to be quite a thousand years old [? ED.], and so must have been a good-sized tree before the Saxon line of English kings came to an end. Hence my remark that Edward the King and Confessor of canonized memory may have read and meditated beneath its spreading boughs. For here at Havering, the centre of the old Heptarchic Kingdom of Essex, stood the palace where he sometimes resided as did many other of our English kings. It is a very lovely spot, and those who first selected it, in the days when the land was all before them where they chose to dwell, showed an appreciative taste.

"To recur, however, to the old tree. Truly it is a grand specimen of an oak. The trunk, or body, was shapely, and of a good, fair height, with a noble and symmetrical head of nevertheless very gnarled branches, a very study of a hardy giant of centuries' growth, that had withstood storm and tempest, winter and rough weather. Several drawings were made of it last summer by an artist named Johnson, then residing in the village. A good photograph was also taken by Mr. Smee, the successor of Mr. Porter, photographer of Manor Park.

"The fallen part of the trunk has been replaced in its original position by Mr. Theobald's instructions, the better to protect and preserve the remaining portion, and to restore the trunk to its original appearance, with the rustic seat around it." We shall be glad of any further information about this oak, which is evidently very ancient, although the age assigned to it in Mr. Bruton's note will be received with considerable hesitation by botanists.—Ed.

Spring Foliage on the Oaks at Midsummer.—In some of the woods in this district, the oak trees have been nearly as bare of leaves as at Christmas, the result partly of frost, but more especially of caterpillars, which were in great numbers, and cleared off every bit of green. I noticed this particularly in a wood in Stanway, near Kingsford Bridge; but lately the oaks there have quite recovered, and instead of seeing the bright green of the midsummer shoot, with a backing of darker foliage, the trees are now in the spring coating of light green leaves, just as one sees them when they first put out their full foliage in early spring. I never remember seeing such a mass of light green at this time of the year as is now shown in Kingsford Grove. It may be that I never saw such destruction by caterpillars as has been apparent this year, and it would be of interest if observers in other parts of the county would state whether they have noticed a similar condition of the foliage of the oaks in their districts, the results of similar causes.—Henry Laver, F.L.S. Colchester, July 7th, 1894. [Several times in my recollection the oaks in certain parts of Epping Forest have suffered severely from the depredations of caterpillars (chiefly *Cheimatobia brumata*, and *Hybernia defoliaria*, and *aurantiaria*) in the way described by Dr. Laver, and have afterwards put on fresh leaves in the summer, a renewed spring. This phenomenon occurred last year, and in a less degree during the spring and summer of the present year. Such second foliation has a very marked effect on the appearance of the midsummer woods, and also diminishes the number of leaf-galls and other insects, whose eggs may be laid on the buds or young leaves of the oaks in the spring.—William Cole.]

Algæ and Folklore.—In 1890 I sent to The Essex Naturalist (vol. iv., p. 142) a note with regard to *Euglena* on a pond surface at East Donyland, which at certain times of the day changed from green to red, to the alarm of the superstitious who looked upon the phenomenon as an omen of blood. The appearance was again to be seen in 1891. I notice in "The Antiquary" for July an account of the Holy Wells of Scotland, from which it appears that St. Tredwell's Loch in the Orkneys was anciently believed to appear like blood before any disaster befell the royal family, a tradition which may not improbably have been due to a similar cause. On July 2nd I visited the Donyland ponds again, and found the one which was covered with *Euglena* in 1890 and 1891, is this year full of green patches, which turn out to be an alga consisting of loose spirals or coils, apparently *Anabæna*, or one of the *Nostocæ*. If some member of the Club with leisure would investigate by actual cultivation, the life-history of some of these forms which come and go with mysterious periodicity, a great deal that is at present altogether unknown might be discovered; and possibly it would be found that species differing even as widely as these that are named above have a closer relationship than is at present suspected. Your readers may be also interested to know that in the same pond are now to be found numbers of balloon-shaped lumps of jelly, three to four inches in length. They appear to be void of organisation, and may be only the remains of some kind of spawn, but in the plasm are vast numbers of the beautiful *Pediastrum*.—Charles E. Benham, Colchester, July, 1894.

Further Notes on some Sections on the New Railway from Romford to Upminster, and on the Relations of the Thames Valley Beds to the Boulder Clay.—Our Vice-President, Mr. T. V. Holmes, read a paper to the Geological Society on April 25th, under the above title, being observations supplemental to his papers in THE ESSEX NATURALIST (vol. vii., pp. 1-14) and "Quarterly Journal Geological Society," for August, 1892. Mr. Holmes alludes to his discovery of Boulder Clay on the new railway at Hornchurch, dealt with in his previous paper, and describes the finding of more Boulder Clay close to Romford during the deepening and widening of a cutting there. The Boulder Clay was on precisely the same level as that at Hornchurch, a mile and a-half to the south-east, and, like it, was covered by gravel belonging to the highest, and presumably oldest, terrace of the Thames Valley system. A portion of the silted-up channel of an ancient stream-course was also found in this Romford cutting. Its relations to the Boulder Clay could not be seen, as they were not in contact, but they were alike covered by the oldest gravel belonging to the Thames Valley system. The author discusses the probable direction of the flow of this stream-course, and the way in which it was superseded by the ancient Thames. After noticing certain points brought forward during the discussion of his former paper, he concludes with a criticism on the views to which Dr. Hicks inclines in his paper on the sections in and near Endsleigh Street ("Quart. Journ. Geol. Soc." vol. xlviii., 1892), as regards the age of those beds, asserting that they are, in all probability, simply River Drift of the Thames Valley system, and consequently post-glacial, in the sense of being later in date than the Boulder Clay of Essex and Middlesex. Mr. Holmes has promised a fuller account of his observations for a future number of THE ESSEX NATURALIST.

Mammoth Tusk near Chelmsford.—Under the heading "Mammoth Horn," the "Essex Weekly News" of Nov. 10th, 1893, announced that the "men in the employ of Mr. James Brown at his brickfield, near Lower Anchor Street, recently found a portion of a mammoth horn lying on the top of the white clay at a depth of between 12 and 14 feet. The portion of the horn measures 6 ft. 3 in. in length, and at one end is as large as a man's thigh." Mr. Brown has kindly presented the specimen to our Museum.—ED.

John Brown, F.G.S., of Stanway.—I have recently been reading "Retrospections, Social and Archæological," by the late Charles Roach Smith, F.S.A.: and find the following note on the above geologist in vol. ii. p. 43, being an extract from a letter written to him by Mr. Joseph Clarke, F.S.A., of Saffron Walden :—

"Mr. John Brown was apprenticed at Colchester to a mason. He chose to work as a journeyman until he could see an opening for himself; he told me it was the happiest time of his life when he earned fourteen shillings a week and spent it all. I know nothing of his struggles, if he had any; or of his efforts to commence for himself. I only knew him when he had retired with a competency, his last work being the hospital at Colchester. He had then purchased an estate at Stanway, three miles north of Colchester, as he told me, to please his wife. He most hospitably received his scientific and other friends. He outlived three wives and left no family. Like Hugh Miller, whose *sobriquet* was 'Old Red,' from his bringing to light fossils in the old red sandstone, Mr. Brown also imbibed a taste for the study of geology from the occurrence of fossils in the material he worked upon."—Copied by W. CROUCH, December 15th, 1893.

The Colne Fishery.—Mr. J. Horace Round writes to the "Essex County Standard" as follows: "The volume of 'Acts of the Privy Council,' lately published, contains some references to the Colne Fishery in 1567, which are not found in Morant's work.

"Early in that year some fishermen 'of the townes of Roughehedge, Dolyland, and other townes thereaboutes' complained to the Lords of the Council that the Bayliffs of Colchester had 'commanded that none of them should use their acustomyd trade of trayling oisters and other fyshing in the water of Colne without their lycense, and be also bounde in recognisaunce to bring all such fyshe as they shall take to New Hythe at Colchester and there unlade the same, with other condicions not heretofore used or to them knowen; and for that they have caused vii. of their botes to be taken on the water, affirminge that they will sell the same for the breche of the said order.' Thereupon the Council, 'fearing lest this quarrell may brede such hart burninge in the complainers that they will, for revenge of that which hath ben offerid unto them, forbeare their accustomyd trade of uttering such fyshe [as] they shall take at the towne of Colchester,'—instructed Lord D'arcy, of St. Osyth's, to order the fishermen to continue supplying the inhabitants of Colchester with fish, and the Bailiffs to let them continue fishing *pendente lite*, and to restore their boats. Both parties were ordered to appear at the next Assizes, 'and to ende the quarrell yf they so can,' and, failing this, to come up to London for the hearing of the case. The Council were desirous 'that such auntient pryviledges as have been granted to that towne should be observid and kept.'"

"Culch," "Cultch," and "Cutch."—The trial on June 19th last of five Tollesbury fishermen for "Piracy" in preventing certain men from Burnham from removing dead oyster-shells or "Culch" from the "common" or public grounds at sea near the mouth of the Blackwater (which resulted in a triumphal acquittal) led to some discussion as to the exact meaning and spelling of the word. The substance is well known—the refuse oyster-shells, stones, etc., form an admirable nidus for the reception of oyster-spat, and were it not for the presence of the culch on the grounds the gathering and culture of the oyster would be impossible. The several spellings given above are current, but some correspondents attempt to draw a distinction between the "culch" and "cutch." An "East Anglian Sailor" writes:—"I have always heard the word 'Culch' used with reference to refuse, etc. (to wit): 'The mass of stones, old shells, and other hard material of which an oyster-bed is formed.' Cutch is the spawn of the oyster, and adheres to the Culch or Cultch. I believe the latter words to be quite local, and might have had their origin from cultivate, which means 'to till, to prepare for crops, to foster, to raise by cultivation, etc.' This is really what the 'Culch' is so valuable for—to raise, foster, and cultivate the Cutch or spawn, commonly called spat."

Dr. W. M. Young, of the Suffolk County Asylum, Melton, writes that the correspondence thereon recalls "a little comedy (with its under-current of tragedy) which was of daily occurrence in this asylum for many years. The principle figure in the scene was the daughter of one of Nelson's 'sea-dogs,' who has only recently died at an advanced age, after many years of mental aberration of a particularly unique character. Her language, as befitted her descent, was as 'robust' as the most thoroughgoing believer in heredity could desire. She lived entirely in the ways of the century's beginning; the peculiarities of its end were of no interest to her. "I do not wish to imply that this latter was part of her

'mental aberration'; in fact, I think it should be counted unto her for righteousness. Her physical condition made it absolutely necessary that she should be constantly fed on light diet. When this was presented to her she invariably indulged in a string of expletives worthy of the Nelsonian time, and ended up by stoutly declaring that she would not eat 'Culch.' After having satisfied her *amour propre* by this vigorous protest, she ate her food most heartily, and became quite good-tempered whilst under the immediate beneficent influence of the aforesaid 'Culch.'"

Mr. Horace Hart, Printer to the University of Oxford, and Controller of the Clarendon Press, says that the word "Cutch" is not known to him "or to any other East Anglian; whereas 'Culch' is thus dealt with by Dr. J. A. H. Murray, in Part 8 of the great 'Oxford Dictionary,' in course of issue from the Clarendon Press:

"Culch or 'Coultch.'—The mass of stones, old shells, and other hard material, of which an oyster-bed is formed. 1667 Sprat "Hist. R. Soc." 307 The Spat cleaves to stones, old oyster-shells, pieces of wood, and such-like things, at the bottom of the sea, which they call Cultch. 1774 E. Jacob 'Faversham' 83 A dredge full of Cutch instead of oysters. 1863 C. R. Markham in 'Intell. Observ.' IV. 424 Paved with stones, old shells, and any other hard substances . . so as to form a bed for the oysters, which would be choked in soft mud. This material is called Culch. 1891 W. K. Brooks 'Oyster' 103 Oyster shells . . form the most available Cultch, and are most generally used."

[We shall be very glad to receive any information from our readers as to the suggested use of the word "Cutch" in the sense of Oyster Spat.—ED.]

Periodicity?—Some years ago a pond by the side of the Mersea Road, near Colchester, was very lively in the summer and autumn with newts. One summer more recently I noticed this pond swarming with stickleback. How they found sustenance it is difficult to imagine, for they were in such vast numbers that a cart passing through the water slaughtered them like a veritable car of Juggernaut. This year I visited the pond and found quantities of young newts again, but not a single stickleback.—CHARLES E. BENHAM, Colchester.

"Sand-Pit Plain," Epping Forest.—I cannot but regret that the Editorial Note on page 56 of the preceding number of THE ESSEX NATURALIST was not printed in block rather than in diamond type. Living, as I do, close to Sand-pit Plain, this "ride" is a constant eye-sore. It is true that, within the last few years, its hideous rigidity has been somewhat modified; but I cannot help thinking that Nature might still be artfully assisted to recover herself. In my opinion, given for what it may be worth, bays or recesses, such as those referred to on page 59 of the report, will serve to obliterate the artificiality of that uncompromising road. Would it not be possible to break it up and give it curves, with plantations of thorns, among which sapling oaks, beeches, and hornbeams might be sprinkled? And would not it be possible to make the approach to the Forest from Baldwyns Hill less formal and rectangular? Without a plan it is difficult to make clear what one means; but my own notion would be to plant up the present entrance, which is utterly impassable in winter, and to cut a narrower fresh one, more or less diagonally, and on the curve, through the grove of young growth which has sprung up from the stools of trees felled now some thirty years since. And, while one is suggesting, perhaps it might not be inopportune to add that the so-called "reservoir" in Staples Road looks as if it would benefit by receiving some such addition, in proportion to its area, as that recently accorded, and with such brilliant success, to the Connaught waters.—W. C. W.

A Remarkable Meteor.—A meteor of great brilliance was observed at Chelmsford on Sunday evening, April 22nd, at 7.35. The evening was fine and clear, and it was still almost broad daylight, the sun having set at 7.5. The meteor appeared near the zenith, and took a course a little to the east of south, emitting a dazzling greenish light, and leaving behind a number of sparks. About 10° above the horizon it suddenly "went out," but for a short distance it was still visible as a red hot ball before finally disappearing into space.—THOMAS S. DYMOND, Chelmsford, April 24th, 1894. [This meteor appears to have been seen in various parts of England. The Hon. R. Russell recorded it as seen at Haslemere, in "Nature" (April 26th), and at Williton in Somersetshire. It "broke suddenly into view at thirty-seven minutes past seven, about 50° above the horizon, and gradually very steadily fell towards the earth, a high range of hills, the Quantocks, forming the eastern boundary. A very large elm-tree standing about a quarter of a mile from us, the meteor became hidden by the tree, so that we could not see its contact with the ground. It was of as bright a light as the sun at midday. We should much like to know if it was seen by parties the other side of the hill. It fell just as steadily as a spent rocket-stick, leaving for some little distance a tail of sparks. Apparently the meteor was about two and a half miles from us, the Quantocks being three miles." Another observer, writing from Margate, noted it at twenty-five minutes to eight, its direction being "from north-west to south-east, the altitude 45° to 30°, in view about thirty seconds; colour a brilliant green, and apparent dimensions about the volume of a Roman candle." From Guildford it was noticed at exactly the same time, falling "in a direct line to the earth, leaving behind a magnificent train of blue. After travelling to within, apparently, a very short distance of the earth, it broke into three pieces, something like the bursting of a sky-rocket, the lower portions being about the size of a breakfast cup. The sight was the more remarkable, there being no star visible in the clear light of day."—ED.]

Fairmead Lodge, Epping Forest.—This lodge, sometimes known as Sotheby's, has already ("Two Forest Lodges," ESSEX NAT., vol. vii., p. 82, and see also E.N., vol. vi., p. 206) been identified with that known in former ftimes as New Lodge. A reference to it probably occurs in the recently published "Correspondence of Mr. Joseph Jekyll." Writing under date July 18th, 1826, he says:—"Poet Sotheby invites the boys to a Fête Champêtre at a hovel he has built in a bog on Epping Forest, where his brother the Admiral is to waltz, but they have no stilts, so decline it."

A few years later on, in January, 1834, Mr. Jekyll records Mr. William Sotheby's death, and says of him that "he was a man of considerable talents and many virtues . . . Many of his original compositions were highly poetical, but his principal fame will rest upon his translations. His 'Virgil,' his 'Wieland,' and I think, too, his Homer, manifest a scholar's intimacy with the idiom of their respective languages, and extraordinary facility of versification." Jekyll's view of the matter in 1829 was somewhat different: "Think," he says, "of Poet Sotheby translating Homer after Pope"; and in 1825 he alludes to "Botherby's" having left a card on him, "which he has not done these seven years. It has no black edges, so it is probably to shew he has not hanged himself."

In 1822, Mr. Sotheby was involved in a dispute with the Benchers of the Inner Temple, of whom Jekyll was one, and they expected a satire from him. Incidentally we are told that it was Byron who christened him "Botherby," and not, it is added, "without good reason."

But the connection of the Sotheby family with New Lodge dates from a period long anterior to William Sotheby's re-erection of it. In May, 1701, the Earl of Lindsey, chief warden in fee of the Forest of Waltham, granted to James Sotheby, jun., of Gray's Inn, Esq., the keepership of New Lodge Walk, for life. Sotheby, on his part, covenanted to sufficiently uphold the house or lodge standing thereon, with the outhouses; and to provide one or more able, faithful and diligent keepers or under-keepers, attendant on Her Majesty's vert and venison, and pay the salaries of the same. By other clauses in the deed he was precluded from transferring his office without consent, and bound to serve the warrants directed to him by the Earl, on pain of rendering the grant void.

The original deed of grant, from which these particulars are taken, is now in my possession; but will I hope, shortly find a permanent and fitting home in the newly-constituted Forest Museum at Queen Elizabeth's Lodge.—W. C. WALLER, Loughton.

Corrigenda.—On page 83, *supra*, 7th line from the bottom, for "price" *read* piece; and on page 85, for "Wagner" *read* Wayner.

Cheesemaking in Essex.—In connection with the efforts now being made by the Technical Instruction Committee to revive the industry of cheese-making in our county, the following letter, addressed by Dr. H. Laver, F.S.A., to the Rev. D. Bartrum (who has taken so much interest in the subject), is worth placing on record. Dr. Laver says:—"It may interest you to know that a few ago a Devonshire or Somersetshire family took the Grange Farm at Steeple, nine miles from Maldon, and they introduced there their own customs. They made splendid clotted cream and cheddar cheese of such a good quality that they had no difficulty in disposing of it. The late Mr. Oxley Parker, of Woodham, used no other, as he considered it first-rate. Essex at one time made large quantities of cheese, as all old descriptions of the county testify, but what its qualities may have been I do not know. I have, however, at various times seen proofs of the existence of the industry in the shape of perfect cheese-pressers, and more often of their remains. In Norden's description of Essex, 1594 (published by the Camden Society in 1840), par. 8, he says—'The Hundreds of Rocheford, Denge, which lye on the South-Easte parte of the Shire, yelde milk butter and cheese in admirable abundance, and in those partes are the great and hugh cheeses made, wondered at for their massiveness and thickness. They are also made in Tendring Hundred, where are many wickes or dayries.'

"Page 10.—'Canney Handes—and for that the passage over the creek is unfit for cattle, it is only converted to the feeding of ewes, which men milke, and thereof make cheese, such as it is, and of the curdes of the whey they make butter once in the year which serveth the clothier.'

"In all the older notices of the products of the county cheese is always mentioned. It is a pity that nearly or quite all of our rural industries have disappeared."

It is certain that Essex in the past was not only a cheese-making, but a cheese-exporting county. Vol. VIII. of the "Acts of the Privy Council," lately published, shows that letters were sent from the Privy Council in August and November, 1574, "for staying the transportation of butter and cheese beyond the seas out of the counties of Essex, Suffolk, and Norfolk," owing to the scarcity of victuals at home.

MUSEUM NOTES.

I.—PLEISTOCENE NON-MARINE MOLLUSCA FROM WALTON-ON-THE-NAZE.

[THE small collection of Mollusca described in the following notes has been kindly arranged and collated by Mr. Webb, and was exhibited at the meeting of the Club at Birch Hall, near Colchester, on June 23rd, 1894. It is intended from time to time to print "Notes" of this nature, descriptive of various specimens or collections in or added to the museum, as they may be determined or arranged. Such details will be interesting as records of our collections, and will afford valuable data for the future compilation of a catalogue of the museum.—ED.]

THE shells now catalogued were collected by the late John Brown, F.G.S., of Stanway, and were presented by him many years ago to the "Essex and Chelmsford Museum." On the handing over of the museum to the Essex Field Club, the specimens were taken from the midst of a collection in which they had been inserted with other pleistocene shells from Copford, and where they were at the tender mercies of two large *Echini* from the chalk which rolled over them on the slightest provocation. The series under consideration was easily distinguished from the Copford specimens owing to its having been mounted on cards in trays, whereby also it had escaped somewhat from the roving *Echini*, while the others, merely glued on to wooden tablets, were in most cases completely pulverised. Many Walton shells were found intact in the trays under their respective cards, and help was obtained from a printed slip (though where it was published, if at all, has not yet been ascertained), giving a list of the species, and stating that they were found "with the fossil horns above at a part of the Essex coast five miles southward of Walton Naze."

The writer has carefully worked through the specimens, and has had the benefit of the opinion of his friend Mr. B. B. Woodward, F.G.S., who has specially given his attention to Pleistocene Mollusca. The list will now stand as follows :—

GASTROPODA.

PULMONATA.

Stylomatophora.

Helix pulchella, Müll.

H. nemoralis, Linn.

H. hortensis, Müll., one specimen included with the last species.

H. caperata, Mont. Given as *H. concinna* Jeff.

Pupa muscorum, Linn. (=*marginata* Drap.)

Vertigo moulinsiana, Dup. Given as *Vertigo pygmæa*, Drap.

Basomatophora.

Carychium minimum, Müll.

[**Ancylus fluviatilis**, Müll. Given in the list, but no specimens were forthcoming.]

Lymnæa auricularia, Linn.

L. pereger, Müll. (Not *peregra* as usually spelled).

Planorbis albus, Müll.

PROSOBRANCHIATA.

Paludestrina ventrosa, Mont. (=*Hydrobia ventrosa.*) Given as *Paludina stagnorum*, Turt.

P. marginata, Mich.; given as *P. minuta* (*marginata* of French authors). *Extinct in Britain.*

Bythinia tentaculata, Linn.

Valvata piscinalis, Müll. The specimens labelled *Valvata cristata*, Müll, were in reality young examples of this species.

PELECYPODA.

EULAMELLIBRANCHIATA.

Submytilacea.

Unio littoralis, Lam. *Extinct in Britain.*

Veneracea.

[**Sphaerium corneum**, Linn. Given in the list, but no specimens were forthcoming.]

Pisidium amnicum, Müll.

P. astartoides, Sandb. Mounted with the last species. *Extinct in Britain.*

Other remains found in the deposit were :—

LAND AND FRESHWATER.

[**Cypris**. Two species, specimens destroyed.]

Chara hispida, Oöspores.

Corylus avellana. Nuts gnawn by rodents.

MARINE.

Scrobicula piperata, Gmel. Given as *Lutraria*.

Tellina baltica, Linn. Generic name only in the list.

[**Mytilus**
[**Balanus** } Specimens not forthcoming.]
[**Flustra**

It is worthy of note that at the British Museum, Natural History Department, are two species from the Bowerbank Collection labelled "Near Walton (Mr. Brown)," to wit :—

Planorbis nautileus, Linn. (given as *crista*), which does not occur in the above list, and

Paludestrina ventrosa, Mont.

In the British Museum also, is one species from Walton, presented by John Brown :—

Helix nemoralis, Linn.

WILFRED MARK WEBB, F.L.S.,
Memb. Malac. Soc.

THE SEROTINE BAT (*SCOTOPHILUS SEROTINUS, GMEL.*) IN ESSEX.

BY MILLER CHRISTY, F.L.S.

NEARLY eleven years ago, I had the pleasure of recording the occurrence of the Serotine Bat for the first time in this county. (PROCEEDINGS ESSEX FIELD CLUB, Vol. iv., p. iv.) Since that time the species has not, until now, been again met with in Essex, and the record still stands as the most northerly occurrence of the animal in Britain. I am glad, therefore, to be able to add that, about one a.m. on the 25th of August last, a fine male specimen entered my bedroom at the "Pryors," Bloomfield, by the window, which stood open to the extent of two inches at the top. I made every effort to secure it, as I saw that it was one of the less common species, but it was more than half an hour before I succeeded, and then only by the novel expedient of standing on a chair in the middle of the room and whirling a large bath-towel round my head, so that the bat had only the corners of the room to fly in, and was soon knocked down. It proved an unusually large specimen. Its total length (tip of nose to end of tail) is 5¼ inches; weight ⅝ oz.; and expanse of wing 14 inches, thus rivalling the ordinary dimensions of the Noctule, which is usually the larger of the two. In colour, too, it varied considerably from the description usually given of the Serotine. Nowhere was there any appearance of the "deep chestnut brown" which both Bell ("British Quadrupeds," p. 46) and Harting ("Zoologist," 1891, p. 102) speak of as usually distinguishing the species. The back was of a dark blackish-brown, but the fur was tipped with yellowish-grey, thus giving much the same "frosty" appearance as the silvery-grey tips of the fur on the back of the Barbastelle. The under parts were of a smoky-grey. I have deposited the specimen in the Club's museum at Chelmsford.

TWO PREHISTORIC WEAPONS RECENTLY FOUND NEAR EPPING.

AT a meeting of the British Archæological Association on the 4th of April, 1894, our esteemed member, Mr. Benjamin Winstone, M.D., F.S.A., exhibited two interesting prehistoric implements, and read some notes on the same, which have since been published in the "Archæological Journal." Mr. Winstone has kindly lent the blocks of the engravings of these implements and allowed us to make the following extracts from his paper:

The bronze weapon illustrated by Fig. 1 was taken by Mr. Francis Hart off a heap of old iron gathered on Caines or Cannes Farm, in North Weald, near Epping. "Unfortunately there is no procurable information as to when or on what part of the farm it was found; but as it had been carelessly thrown on the heap of metal, there is trustworthy circumstantial evidence of its having been turned up during some agricultural operations." The total length of the weapon is $15\frac{3}{4}$ inches, the blade tapers to a fine point and is $13\frac{1}{2}$ inches long and $1\frac{5}{8}$ in width at the base. "The arrangement for fixing the handle differs from that in the bronze instruments usually found. They have the butt-end prolonged like scythes, sickles, chisels, etc., of the present time, so as to go through the length of the handle, whilst the specimen now described has the butt-end flattened out. The handle must have been formed of two pieces of wood, through which passed the rivets, which were then bound or riveted together to fit the handle to the hand; or a groove cut in a piece of wood properly shaped, so as to admit of the insertion of the flat end and made fast by the rivets." Cannes Farm is not more than six miles from Fyfield, where, according to Gough in his edition of "Camden," were found in 1749 a "great number of celts, with a large quantity of metal for casting them, fifty pound of which, with several of the instruments, the late Earl Tilney gave to Mr. Lethieullier." Mr. Winstone thinks that the evidence points to a manufactory of such implements at Fyfield, the bronze being imported in lumps as stated by Sir John Evans, and that the implement here figured may have been one from this manufactory. In the British Museum are some daggers of similar description and one is figured by Evans, found at Coveney, near Downham Hithe, in Cambridgeshire, so like the one from North Weald as to give rise to the supposition in Mr. Winstones' mind that they came out of the same manufactory, more especially as Fyfield is not very far from Cambridge-hire.

FIG. 1. BRONZE IMPLEMENT FOUND ON CAINS OR CANNES FARM, NORTH WEALD BASSETT, ESSEX, BY MR. FRANCIS HART.

The stone implement figured (Fig. 2) was found in 1888 by our member, Mr. Charles B. Sworder, of Epping, on "Gill's Farm," in Epping Uplands, and was exhibited by him at a meeting of the Club on January 30th, 1892 (see ESSEX NATURALIST, vol. vi., p. 17). Its length is $6\frac{1}{4}$ in., breadth $3\frac{1}{8}$ in., thickness 2 in., and it weighs 2 lb. 2 oz. "It was on a heap of stones gathered off the field, intended for use in mending the roads. . . . Mr. Sworder could obtain no information as to when or where it had been found, so the supposition as to its having been gathered with other stones off the farm can only be accepted as

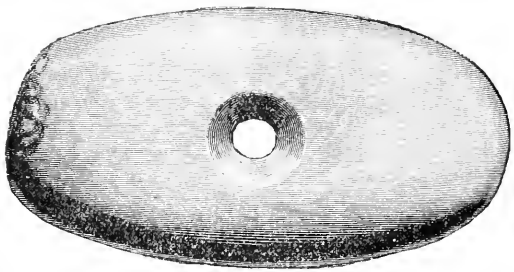


FIG. 2.—STONE IMPLEMENT FOUND ON GILL'S FARM, EPPING UPLANDS, BY MR. C. B. SWORDER.

probable. The material of the instrument is quartzite—a stone not belonging to Essex nor to the neighbouring counties, although occasionally found with other stones in gravel-pits. It seems by its high finish to have been of the latest period of the Neolithic age; the manner, moreover, in which the hole has been drilled shows that it was done by a skilled workman. Mr. Worthington Smith says that he has never found a drilled hammer-stone in the valley of the Lea, but he has

SECTION TO SHOW FORMATION OF THE HOLE DRILLED THROUGH THE STONE.

seen one preserved in the school-room of Waltham Abbey, which had been taken out of the bed of the river. Sir John Evans has given in his work, "Ancient Stone Instruments of Great Britain," a drawing (p. 518) of a similar stone found at Winterborn Bassett, in Wiltshire; and there is also a drawing of another stone resembling it found at Sporle, near Swaffham, in Norfolk. . . . The hole for the handle has been bored from each side, and is conical, the hole in the middle being much smaller than on the surfaces. How the handle was fixed needs explanation, on account of the peculiar formation of the hole. If at right angles, like an adze or garden hoe, it would apparently have required wood to have been compressed sufficiently to have gone through the small hole in the middle, and

then for it to swell again like a champagne cork. A handle, however, might have been made by passing a stick of wood, so prepared as to admit of its being bent nearly double, through the hole, and bringing together the two ends or lengths, and binding them by a leather thong, so as to make a compact handle. The chipped edge shows that it has been used." Mr. Winstone thinks that the instrument was imported into the district in Neolithic times, and gives in his paper some interesting information as to possible lines of communication in ancient times, and probable primitive traffic in bronze as indicated by the hoard of the metal found at Fyfield, Havering, etc.

We may add that heaps of stones picked off fields in likely localities are often worth searching over, as Mr. Sworder found; Mr. H. A. Cole picked up a very good celt and a "hammer-stone" off such a heap at Parndon some years ago.

A SKETCH OF THE DEVELOPMENT OF ARCHITECTURE IN ESSEX.

BEING THE PRESIDENTIAL ADDRESS, DELIVERED AT THE FOURTEENTH ANNUAL MEETING, ON MARCH 31st, 1894.

By FREDERIC CHANCELLOR, J.P., F.R.I.B.A., *President*.

THE study of the architectural and archæological remains of Essex is one that becomes more fascinating the more it is pursued, until so wide a field of inquiry is opened up that it becomes impossible in one short paper to treat, otherwise than generally, of the whole subject. Our friends, the geologists, are able to extend our studies to a very remote period of the world's existence. I do not pretend to compete with them in point of antiquity, and, indeed, a range of 2,000 years will cover the whole period over which my remarks will extend. I have observed that with the exception of some few, who are always particular as to dates, there is great confusion in the minds of many people as to the date of any particular building. The object, therefore, I have in view is to endeavour to set out some of the leading features in the buildings of the various periods into which I may say the architectural history of Essex is divided; and to enable me to do this more effectually, and also to enable you to grasp it more easily, I propose to divide my subject into the following heads:

1. The Roman period extending from the invasion of Julius Cæsar 55 B.C. to 410 A.D.
2. The Saxon and Danish period from 410 A.D. to 1066.
3. The Norman and Gothic period from 1066 to 1546.
4. The Tudor period from 1546 to 1602.

Except for defensive and religious purposes, and then only in the shape of earthworks and Druidical remains, there are no buildings left to us of a date prior to the Roman invasion, and in this county, with the exception of some few earthworks, which have been claimed as belonging to this period, we have nothing to illustrate it, unless, indeed, we can satisfy ourselves that the deneholes in the neighbourhood of Grays, and which some of the members of our Society have done so much to elucidate and delineate, belong to a remote period. That they were formed by a race who had some idea of design, cannot, I think, be doubted after looking at the plan published in THE ESSEX NATURALIST, and indeed, one may go so far as to say that not only had they an idea of planning, but the construction of the arch must have been floating in their brains, although maybe somewhat dimly.

The invasion of Julius Cæsar, in 55 B.C., marked the commencement of a new era in this country, pretty much in the same way as our proceedings in Matabeleland at the present moment will be regarded in that country some centuries hence. The Romans at this period were almost at the zenith of their power, and possessed, undoubtedly, architects of great celebrity and engineers of great resources. As we do now, when we invade a country inhabited by wild tribes, so they did then ; signalise their victories by the construction of military roads, and the formation of stations at certain distances along those roads, with the view of holding in check the sudden attacks of the half-conquered tribes, by the facilities thus obtained for concentrating a strong force upon the point attacked. The construction of one of these roads through this county had undoubtedly great influence over its future history. Starting from Londinium (London) it proceeded through Durolitum (Romford) to Cæsaromagus (Chelmsford) on to Canonium (Kelvedon) and Camulodinum (Colchester), and so on to Suffolk.[1] There were also branch roads from Colchester, through Coppeshall, Braintree, Dunmow to Bishops Stortford, and from Colchester through Halstead, Hedingham, Yeldham, Ridgewell to Haverhill, and from Chelmsford to Maldon and probably on to Bradwell-juxta-Mare, and there were no doubt other roads of more or less importance throughout the county.

1 Since this paper was written Mr. G. F. Beaumont has startled the antiquarians of Essex by asserting that the 9th Iter of Antoninus did not pass through Romford, Chelmsford, and so on to Colchester, but by Cheshunt, Braughing, Royston, and Chesterford. Without stopping to discuss this question, I think it cannot be doubted that a Roman road did pass through the first named towns whether it was the 9th Iter or some other road not mentioned.

At each of the places mentioned as lying on the foregoing roads, remains of the Roman occupation have been found. Colchester undoubtedly was one of if not the chief Roman town in East Anglia, and the remains of the wall with which the ancient town was surrounded and defended gives us an excellent example of the Roman mode of building. Finding no stone in the county but an abundance of clay, they set to work to manufacture a substitute for stone and well they succeeded, for the hardness and durability of a Roman brick is proverbial; but probably they found that the manufacture of bricks with which to carry up the whole building would involve not only a great expense but very considerable delay. They therefore utilised material which was ready to hand and required no manufacturing process. I refer to the pebbles and flints which are found throughout the county, and to the small hard calcareous boulders found in the clay, and also on parts of the coast, especially at Harwich, which they called *Septaria*. The mode of construction of their walls was as follows: having carried up the foundations for three or four feet in rubble work, that is, with pebbles and flints and septaria mixed with mortar composed of good lime and sand, with a certain admixture of ground bricks or burnt clay, they bedded thereon two or three courses of their bricks, which were about half the thickness of the bricks of the present day; they then carried up the next three or four feet with rubble work as before described, and then repeated the courses of bricks, followed again by rubble work and bands of bricks until the wall was completed. This was the mode of construction adopted in the Colchester wall, and similar construction was adopted in building the walls enclosing the great camp at Bradwell-juxta-Mare; also in the walls of the Roman villa at Chelmsford, in the south-west wall of the nave of Broomfield Church, which I believe to be a fragment of a Roman building, and I think I may venture to say that this mode of construction is found in all buildings in this county which can be verified as of the Roman period, and it therefore becomes practically a test of Roman work. From the numerous remains of undoubted Roman pottery and other matters, which have been found from time to time throughout the county, and especially at Colchester, indicating a very considerable population, it has been to many a matter of surprise that there are so few Roman buildings left to us; but it must be remembered that the habits and religion of their successors was so different, that certainly no Roman temple would stand a chance of existence when

its competitor was a Christian church, and buildings of this class especially were treated as quarries from which to obtain building material, and I am afraid what was still worse, as it meant absolute destruction, they were used as quarries for road material. If, in your perambulations you will note the materials of which our old parish churches were erected you will find in very numerous instances Roman bricks and septaria mixed with other material, this indicates that near by once stood a building of the Roman period. I have long had a strong conviction that the site of many of our old moated manor houses, especially those which are within a short distance of one of the old Roman roads, were, in the Roman period, military stations, and if so, in addition to the defensive earthworks and water moat by which they were surrounded, there would be a substantial residence for the Commandant, the materials of which were re-used when the Norman lord required materials for his church or his new buildings. I have often been surprised when conning over the plans of Roman villas, which have been discovered in this county and elsewhere, of the comparative thinness of the walls as compared with those which were considered necessary by the Normans. The Roman walls of houses seldom exceed 2ft. in thickness, whilst a Norman would not consider himself secure with walls of a less thickness than from 4ft. to 5ft. From fragments left to us, the Roman villas would seem to have had rich pavements and the interior walls plastered and decorated in divers colours. All these things seem to indicate that the Roman occupiers, after having thoroughly cowed the ancient inhabitants, lived here for two or three centuries in comparative luxury and safety. As the Roman power became weakened, the old British races became emboldened, until upon the final withdrawal of the Roman troops they re-asserted their power and, as usual with undisciplined and barbarous troops, gave way to the wildest excesses and destroyed with fire the belongings of their late masters, and certainly traces of fire have been found in many of these Roman remains when unearthed, which seems to support this suggestion.

After the departure of the Romans the country was rent and devastated by the British princes who had assumed the sovereignty, and the invaders, who were attracted by the spoil—the Jutes, the Saxons, and the Angles—until at last the Saxons gradually established themselves in the country, Essex, with Middlesex and part of Herts, falling to the East Saxons, whose kings continued to reign from

Erchwine in 527 to Egbert in 823, when that king established his supremacy over the whole Heptarchy, and so became king of all England. The Saxons continued to rule the land until 1013, when Sweyn, the Dane, and his son Canute obtained temporary possession, and from this date to 1066 the Saxons and the Danes fought for the supremacy, sometimes the one and sometimes the other being the victors; and it is noticeable that many of the battles between these two peoples took place on Essex soil, and it cannot be doubted that the dissensions caused by the break up of the Roman power, and which continued with more or less interruption from 410 down to 1066, led to the destruction of many a noble pile of building.

In discussing the remains of this period we must remember that we are treating of a people who seemed to be the opposite of their predecessors.

The Romans were ambitious and imperial, great architects and great engineers, both civil and military; the Saxons were agricultural and domestic. The former were never so happy as when building or constructing or fortifying; the latter as when ploughing or tending their flocks and herds; and no doubt they availed themselves, not only of many of the buildings, but of the earthworks and other defences of the Romans, altering or adapting them as occasion required; and had it not been for the re-introduction of Christianity in the Saxon period we should probably have had very much fewer remains of the architecture of this period than we have now, few as they are, and although the Roman temple did not suit the early Christians, yet the materials could be adapted; and so with the proverbial enthusiasm and impulsiveness of converts they would consider it incumbent upon them to destroy all vestiges of the Pagan religion.

It cannot be doubted that a people so strongly imbued with religion would, when the country had been divided into parishes, which practically represented small communities, be eager to construct buildings for public worship, and there cannot be any reasonable doubt but that in very many of our Essex parishes a Saxon church was built, for we are told that at the time of the Norman Conquest there were throughout England 1,700 Saxon churches.

In Essex there are only two specimens of Saxon work left that I am aware of, although there may be fragments of that period which have escaped attention. The two specimens I allude to are the tower of Trinity Church, Colchester, and the nave of Greensted Church, near Ongar.

The former is mainly built with Roman bricks and other materials. The west doorway has a triangular arch, a peculiar feature of Saxon work, and the windows have plain semicircular arches which, together with the jambs, are formed of Roman bricks, as are also the quoins of the tower itself.

The latter is a unique specimen of work. It is constructed of oak trees about 12 inches in diameter, cut down the centre, placed side by side and morticed into a cill and top plate, and forming in fact an oak wall, the flat side being placed inside and the round side outside. Those at the west end were probably removed when the tower was erected. Some forty or fifty years ago a new cill was inserted, the old one having decayed, and it is believed it is placed at a higher level than the old one, the tenons of the trees having no doubt become decayed.

In lists of Saxon buildings we find Boreham and Felstead Churches described as of that period. I presume the towers are alluded to, but a close examination has satisfied me that both these structures are Norman.

The peculiarities of Saxon work are:

1. Long and short masonry.
2. Plain semicircular and triangular arches.
3. Rude balusters when windows have two openings.
4. Absence of buttresses.

The absence of remains of Saxon buildings in Essex probably arises from the fact that they were no doubt constructed with timber; stone, except that arising from older buildings, being very difficult to obtain, the county itself being absolutely devoid of any stone whatever.

We now come to the most interesting period of English architecture, the third division of my subject, namely, the Norman and Gothic period, extending from the landing of William the 1st, in 1066, to the death of Elizabeth, 1602. During this period, the architecture of England developed so rapidly and assumed such distinct characteristics, that architects have adopted the divisions set out originally by Rickman, namely—

A. The Norman period, from William I., 1066, to the death of Henry II., 1189.

B. The Early English, from Richard I., 1189, to the death of Edward I., in 1307.

C. The Decorated, from Edward II., 1307, to the death of Edward III., in 1377.

D. The Perpendicular, from Richard II., 1377, to the death of Henry VIII., in 1546. To which I have added,

E. The Tudor, from Edward VI., 1546, to the death of Elizabeth, in 1602.

The sudden access of wealth by the captains of the Conqueror's army, and by others who were related to him, or had assisted him in the invasion of England, combined with the natural characteristics of the Norman race, namely, a love of building and fighting, impelled them to enter upon a building mania, the like of which has never since been seen.

The castles and fortified houses were a necessity to those who had to hold what they had obtained by the strong arm. And the religious edifices, the churches, the abbeys, and the priories were the outcome of their religious zeal. Whatever the Norman took in hand, he did to the best of his power. If he built a castle, he built it for all time, and according to the instinct of the day against all attacks of the then known implements of war and of surprise. If he engaged in a fight he fought as well as he knew how. If he desired possession of another man's land or property he did his very best to secure them; and so in his soberer moments, and when appealed to by the ecclesiastics of the day, he laid the foundations of his abbey or his priory with a princely disregard of its ultimate cost. The erection of a church in every parish was a duty not to be neglected under any circumstances; and when we remember that the great ecclesiastics of that period were as eager and as active on the field of battle and in the senate as their military and judicial brethren, and possessed of great influence and power, we can readily understand that they would not allow the erection of the parish church to be forgotten or postponed.

Amongst the Conqueror's followers to whom he made considerable grants of manors and lands in Essex were Eustace, Earl of Boulogne, Odo, Bishop of Bayeux, Suene of Essex, Aubrey de Vere, Ralph Baynard, Geoffrey de Mandeville, Eudo Dapifer, Robert Gernon, all well-known names to readers of Essex history as heads of families, and who, either themselves or through their posterity, were connected with many of the churches and castles and other buildings of the county.

As the question of mouldings is one of considerable importance, often in point of fact determining the date of a window or door, I think it will be advisable at this point to draw your attention to this

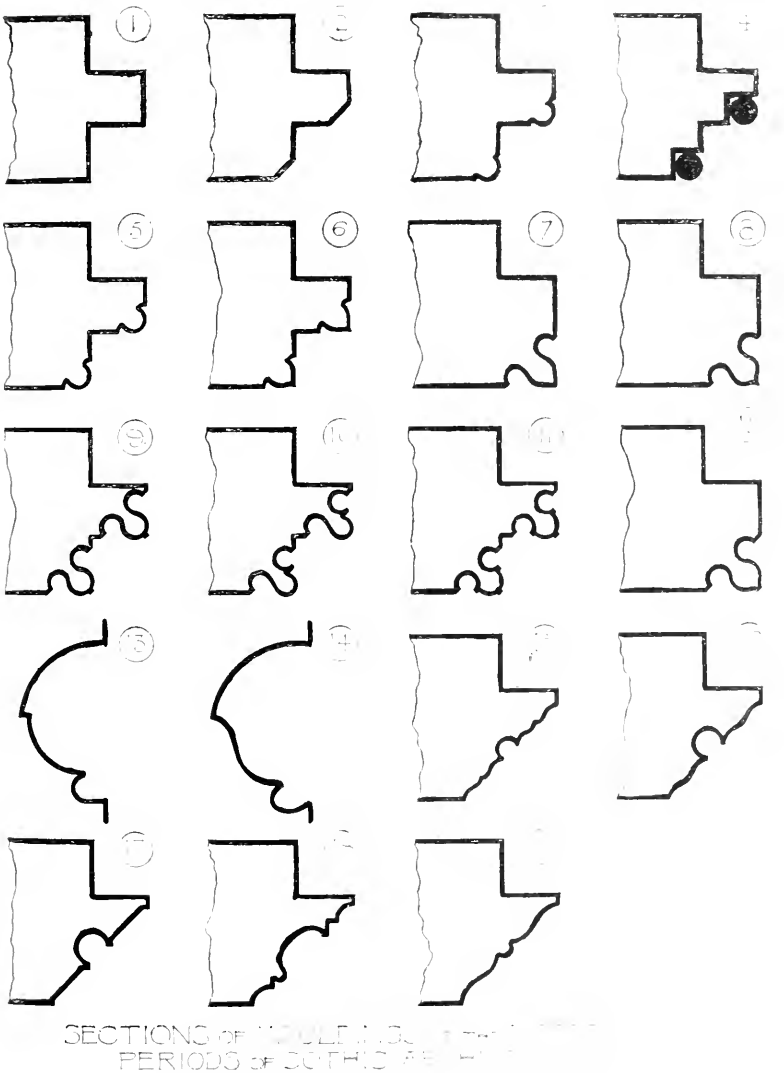
part of the subject, and give you a slight sketch of the history and development of mouldings characteristic of the various periods as they progressed. My remarks are illustrated by the plate of outline drawings on the opposite page[2].

The mouldings of the Norman period were very simple, as they never got beyond the chamfer, the roll, and the hollow. The earliest examples of jamb mouldings, of course, were perfectly square (Fig. 1 on plate), then the angle was chamfered off (2), or converted into a roll (3), and these features, as time progressed, were repeated, the square angles being further enriched by the introduction of shafts (4). Then, in the transitional period from Norman to Early English, the roll became more detached by the introduction of a hollow on either side, converting it more distinctly into a distinct member (5); sometimes the roll became pointed (6); then, as Early English work became developed, a deepish hollow was cut on either side of the roll or bowtell (7), the pointed bowtell was sometimes depressed on one side (8), sometimes the cylindrical bowtell was filletted, now on the edge only (9), sometimes on one side only (10), at other times on both sides and on edge (11). You will observe how these variations, especially when the hollows were deeply under-cut, gradually divided the jamb or arch as the case might be, into a series of depressed and projecting mouldings, produced deep shadows and an infinite play of light and shade.

I should like to draw attention at this point to the fact that in Gothic work there are three planes in which mouldings will be found to lie—one parallel with the outer wall, called the wall plane, one at right angles to it called the soffit plane, and the third the plane formed by chamfering one edge generally, but not always, at an angle of 45 degrees, called the chamfer plane. As a general rule Early English mouldings lie on planes rectangular; Decorated on either these, or on the chamfer plane alone. Perpendicular almost always lie on the last. The introduction of the fillet on the roll was the most important feature in Early English work, and appears to have brought about a revolution in the system of moulding, as it afforded the opportunity of introducing a great variety of combinations of mouldings.

We have seen that the *Norman* mouldings were: 1. *The chamfer*;

[2] These drawings were kindly made by Mr. Wykeham Chancellor for reproduction by the photographic process.—Ed.



From Drawings by WYKEHAM CHANCELLOR, M.A. *November*, 1894.

2. *The roll*; 3. *The hollow*. In the transition from Norman to Early English the roll became more detached, sometimes being pointed.

The *Early English* mouldings included the roll, now having the appearance of a rib by having on either side a deep hollow.

Fillets on the roll, sometimes in the centre, sometimes on one side only, sometimes on both sides, and sometimes on both sides and the centre.

In *Decorated* work the fillet became much broader (12). An important form generally considered distinctive of Decorated, but occasionally met with in advanced Early English work, is the *scroll moulding* (13 and 14). Another moulding of this period is the *double ogee* (15), the fillets being at right angles to each other with a hollow between them. The hollows in Decorated work generally divide groups of moldings; in the Early English individual members.

In this period the plain chamfer of two orders is frequently used, especially in our small village churches.

Another moulding of this period is the *wave moulding* (16), and its repetition with a hollow between is very characteristic of the period.

Another peculiarity of this period is the sunken chamfer (17).

In Perpendicular work the tendency is to flatten the work; for instance, instead of the deep hollow of the Early English and Decorated periods, we have the flattened hollow known as the *Cavetto* (18). The bowtell is reduced in size, forming a slender shaft.

The double ogee is much more common than in Decorated work. Another feature is the double ogee with small bowtell in the centre (19).

Of course, the moldings of an earlier period are introduced with modifications at a later period, and although mouldings are a very important element in determining the date of a building or a feature, yet, after all, the general design of the building is a factor not to be disregarded.

The chief characteristics of Norman work are:

1. The semicircular arch to both doors and windows.

2. The introduction in the arches and sometimes down the jambs and elsewhere of the zigzag or chevron, the billet, the nail-head, the beakhead, and other enrichments.

3. The general massiveness of the work, as for instance the short, thick, circular, sometimes octagonal columns, undivided as in subsequent periods, and frequently enriched with zigzag or other ornament.

4. Absence of buttresses, any projection from the face of the work having more the character of a pier than a buttress.

In the earlier examples of Norman doors, a stone lintel or arch was introduced at the level of the springing, and the semicircular head or tymphana, filled in with masonry, sometimes hatched as in the north door of Tillingham Church.

The walls of our churches of this period were generally three feet thick, and sometimes even thicker.

The quoins or corners of the buildings, especially of the churches, were built square, either with Roman bricks or stone, and this is a point to which I would specially direct your attention. If you come across an ancient church with the nave and chancel walls carried up with square quoins, you may infer that although the doors and windows and roof have been altered, the walls themselves are of the Norman period. Another feature of Norman work, but which requires considerable experience to detect, is the mode of building the walls. They seem to have been carried up in regular layers (I am now alluding to walls built of pebbles and flints), so that the courses of pebbles can be distinguished in the same way that we see the courses of bricks in walls of that material. Rubble and pebble walls of a later period seem to have been built in what is technically called "random work": that is work where you cannot detect any regular coursed work. Of course in many of these old Norman walls repairs have been carried out which sometimes materially interfere with the original coursed work.

There does not appear to have been, at any rate in Essex much variety in the design of the old Norman church. Sometimes, but very rarely, they were built in the form of a cross.

Sometimes the tower was introduced between the nave and the chancel, as at Boreham. But more generally the church consisted of a nave and chancel, sometimes with a tower at the west end, but usually, I suspect, with a bellcot only, over the western bay of nave. In this description of church there would probably be one or two, or possibly three, semicircular headed windows at the west end, about six inches wide and about two feet six inches high, with very slight external reveal, but a very deep splay all round internally. On the north and south sides would be, starting from the west end, a similar narrow window, then a doorway, and then two other windows: that is, three windows and one doorway on either side. The chancel would have two or three windows on either side, and one, two, or

three windows at east end; if the latter, the centre window would probably be raised above the others.

It would be a work of time to prepare a list of churches containing remains of Norman work in Essex; but I will give a few instances within my own recollection.

1. The nave of Marks Tey Church, a specimen of very early Norman work, with inserted windows of later date.
2. The nave of Great Leighs Church.
3. The nave and chancel of Great Canfield Church.
4. Part of the nave of Broomfield Church.
5. The nave of Birdbrook Church.
6. The tower of Boreham Church.
7. The nave of Springfield Church.
8. The nave and chancel of Fryerning Church.
9. The tower and, probably, nave of Heybridge Church.
10. The nave of Lambourne Church.
11. The nave and chancel of Mashbury Church.
12. The tower of Felstead Church.
13. The round towers of Broomfield, Great Leighs, S. Ockendon, and Lamarsh Churches.

At S. Ockendon is the finest example of a Norman door we possess in the county.

14. The north wall of nave of Tillingham Church.
15. The nave of Stanway Church.
16. The chancel and the arcades of nave of Castle Hedingham Church.
17. Nave of Willingale Spain Church.
18. Tower of Great Tey Church.
19. Nave of Leaden Roothing Church.
20. The chancel of Copford Church.
21. Nave and chancel of High Easter church.
22. Nave of Margaret Roothing Church.

This last is really a nearly perfect specimen of the period. The walls are three feet thick. On the south side is a very fine doorway with three reveals, two of them containing shafts with caps and bases, one shaft on either side having the zigzag moulding worked up its whole length, the other being plain. The arches over the shafts are also enriched with the zigzag moulding; under the semicircular arch is a flat arch, the tymphanum being filled in with diagonal pieces of stone with a

diaper pattern worked thereon. The whole arch has a hood moulding enriched with the billet ornament, and beyond that a diaper ornament. There is a peculiar feature about the jamb stones where flush with walls, they are all diapered on the flat surface with a four-leaved pattern. On the west side of door is a semicircular arched window, and on the east side there is another; there was originally a second one more to the east, but this has been removed and a window of Perpendicular date put in its place. On the north side is a door, but quite plain, with one window on the west side of it and two windows on the east side. These windows are very high up and measure externally 3 feet high by 8 in. wide, with merely a slight chamfer round; internally they are boldly splayed to an opening 5 feet 9 in. high by 3 feet 6 in. wide. The external arch stones of these windows are all enriched with diaper work, similar to that round the south doorway. At the west end is a double window with semicircular heads, but internally they are under one arch, deeply splayed. The work of this window is comparatively modern, and therefore we cannot say positively whether it is a faithful restoration. High up in the gable is a single light window similar to those in the side walls.

The chancel arch was originally semicircular, but this has been removed, and a wide, flat, four-centred arch introduced. Unfortunately the external rubble work has been subject to that vicious treatment known as raised pointing, that is with a wide raised joint round each pebble or flint, so that the character of the work has been utterly destroyed. All the four corners of the nave are formed of squared stones and there is no buttress of any kind.

No doubt there was a Norman chancel, but this has been replaced by one of later date. At the time of the Survey, Margaret Roding was held by Geoffrey de Mandeville, one of the Conqueror's chief captains, who rewarded him as we are told with 118 lordships, forty of which were in Essex, and of these we find Norman work at Great Waltham, Barnston, Mashbury, Broomfield, Margaret Roding, South Ockendon, Great Leighs, High Easter.

In Essex we have very few remains of the Monasteries of this period.

Of Hatfield Peveril Priory, founded by Ingelrica, the wife of Ralph Peverill, but a fragment remains at the west end, and the

west door is undoubtedly a relic of the original edifice, which was then the Priory Church, now the Parish Church.

At Blackmore there is still left a portion of the west end of the original Norman nave of the Priory Church, now the Parish Church.

At Little Dunmow the north arcade of the south aisle of the Priory Church, as erected by Juga, sister of Ralph Baynard, about 1100, still remains, although now built up, so that this fragment of a glorious old Priory Church now forms the north wall of the Parish Church.

I am not aware whether there are any remains of this period at St. Osyth's Priory; it was probably the oldest monastery in the county, having been founded by St. Osyth in the seventh century. It was, however, destroyed by the Danes in one of their harrying expeditions, and was not apparently rebuilt until the time of Henry I., about 1118.

Waltham Abbey contains by far the most important remains of this period of any of our old monasteries. The nave and aisles of the Old Abbey Church, although they have been at the west end subsequently altered, are most interesting.

St. Botolph's Priory, Colchester, is a very interesting building of the Norman period, and is remarkable for the interlacing arches which decorate the front; the pointed arch formed by the interlacing of semicircular arches is said to have led up to the next period, of Gothic architecture.

Of castellated buildings of this period the most important is Hedingham Castle. Here we have the remains of the ancient keep or tower of the castle, erected by the second Aubrey de Vere, and as his father died in 1088 and he himself in 1140, it follows that this work must be considered as belonging to the early part of the twelfth century. It is indeed a magnificent piece of work, entirely faced with Barnack stone, which shows but little depreciation from the storms and winters of seven centuries, with walls upwards of ten feet thick as solid as they were when first built. As the architecture is all of the same period it must have been rapidly constructed, and no doubt the De Vere of that period was anxious to consolidate his power as quickly as possible. The exterior is entirely faced with regular blocks of stone about 24 inches long by 12 inches high. The original doors, windows, and fireplaces are all there, and, with

the exception of those parts that have been damaged, are in good condition.

Second only in importance to Hedingham is Colchester Castle. Several battles have been fought over this building, some stoutly maintaining that it was a Roman temple built by the Romans, whilst on the other hand papers have been written to prove its Norman origin. I do not propose to enter minutely into this discussion, because to examine the question thoroughly and exhaustively would occupy more time than I can afford out of that at my disposal. After examining the building many times, and reading the arguments for and against, I have never been able to come but to one conclusion, and that is that this is a building erected for defensive purposes in the Norman period, and not one erected for religious purposes in the time of the Romans. It occupies a much larger area than Hedingham, but is not so lofty, and is not such a fine piece of masonry.

The transition from Norman to Early English work was very gradual, insomuch that it is sometimes difficult to place the building or feature on the right side of the line. For instance, it has often been said that the distinguishing feature of the Norman style is the semicircular arch, and that of the Early English the pointed, but I am disposed to believe that arches not quite semicircular were used by the Normans. For instance, in the tower of Boreham Church the windows of the ringing chamber have semicircular heads, whilst those in the belfry in the stage over have heads slightly pointed, but, with some few exceptions, we may describe the principal features of the Early English style, the next division of my subject, as being :

1. The pointed arch.
2. Long narrow windows without mullions, but sometimes grouped together in threes.
3. The heads of the windows often plain at the commencement of the period, but as it progressed the heads became trefoiled.
4. Columns frequently consisting of small shafts grouped round a large central shaft.
5. The capitals of columns bell-shaped and decorated with graceful foliage, as distinct from the squat, cushion-like shaped capital of the Norman column.
6. The foliage of this period is bulbous, very distinct from the sharp, acanthus-like foliage of a later period.
7. An ornament known as the tooth ornament.
8. As the style progressed the groups of windows began to get

closer, until they were separated only by a shaft or mullion, and geometrical tracing was introduced into the heads of the combined windows.

9. The mouldings of arches became somewhat more elaborate, being divided by hollows and fillets into a greater number of members.

10. Buttresses became a feature of this period and were generally placed at right angles to the wall, projecting some distance, and with one, two, or more slopes.

It is more difficult to point out a purely Early English church in Essex, because I think it probable that nearly every parish would have been provided with its church during the Norman period, and therefore the work of the succeeding century would probably in the main consist of alterations, enlargements, and sometimes of rebuilding a portion of the edifice.

The Church of St. Augustine, Birdbrook, gives us a very good example of the style prevailing in the early part of the thirteenth century. We have at the east end a group of three narrow lancet windows with plain heads, with shafts and mouldings inside, with a small single lancet window in the north side, and similar lancets on north and south sides at west end of nave. These windows were no doubt repeated, but they have been superseded at a later period by more elaborate windows. There are also at the S.E. and N.E. corners of chancel two buttresses to each corner, with two distinct slopes, and similar buttresses to nave. This church is an example of the adaptation of a Norman building to an Early English one; the remains of some of the old Norman windows being still visible. One of the most interesting buildings of this period is the Chapel of St. Nicholas at Little Coggeshall Abbey, of the Order of the Cistercians. It is interesting from two circumstances:

1st. It is practically unaltered from the original design. No doubt repairs have from time to time been executed, but the whole design is practically the same as when originally erected; it has neither been added to nor diminished.

2nd. The jambs and arches of windows, strings, quoins, and other features, are executed in moulded brick, and it is therefore probably one of the earliest examples of moulded brickwork in the kingdom.

The Abbey was founded by King Stephen and Maud, his queen, in 1140, and we may fix the date of this building at about 1200. It is a very simple design, being in plan a parallelogram, measuring 43 feet in length from east to west, and 20 feet in width

from north to south. The doorway is on the south side, and has on each side a lancet window. There are two other windows on the south side towards the east, but their cills are raised in order to give height for the sedilia and piscina under them. There are four windows on the north side similar to those on the south. The east and west windows are triple lancets under one arch. There are no buttresses. I am glad to say, through the exertions of my friend, Mr. Beaumont, works necessary to preserve this highly interesting building have been carried out.

Another very interesting example of Early English work is the Chapel or Chapter House at Beeleigh Abbey, near Maldon. The building is about 40 feet long by 18 feet wide, with columns in the centre supporting the groined roof. The double doorway, separated by shafts, is a feature of this period, and in the jambs of the doorway is introduced a very elegant example of the dog's tooth or four-leaved ornament. Other portions of the old buildings, notably the old refectory, are of the same period, with inserted windows and chimney piece of later date.

This Priory of the Order of the Premonstratenses, or White Canons, was founded by Robert de Mantell in 1180, and dedicated to St. Nicholas; it was endowed with several lands, and confirmed by the Charter of Richard I., in the first year of his reign, about 1190. These buildings were probably erected during the first half of the thirteenth century.

I look upon the development of Gothic Architecture in England as one of the most interesting periods of architecture in the world. It seems to me certain that there was during the period extending from the Norman Conquest down to the reign of Henry VII., a kind of intercommunication which ensured the carrying out of the same kind of architecture throughout England at the same period. And it is surprising when one contemplates the peculiarities of the various divisions into which we have divided Gothic Architecture, that the development should have been exactly similar throughout the whole of England, even to the details of mouldings, about which I have somewhat enlarged—and you will find that the mouldings which were in use in the south of England during the eleventh, twelfth, thirteenth, fourteenth and fifteenth centuries were used at the same time in the east, west and north of England.

The Decorated period (which succeeded the Early English), extending from 1307 to 1377, was perhaps the purest period of

English Gothic. I have often said that I believe the glass painters of this period had very considerable influence upon the architecture of the period. The small narrow window of the Norman and Early English period gave but little scope to the mediæval artist in painted glass for the exhibition of his talent, and we can well imagine how the painted glass artists would urge upon the architects of that day the necessity for affording them a better and wider scope for their talents.

I need hardly remind you that architects of all people in the world, are the most eager to assist their artistic brethren, and I can quite believe that the architects of the fourteenth century would be actuated by the same feelings. At any rate, it is clear that as soon as the narrow lancet window of the Early English architects had become discarded, great advances were made in the enlargement of the window until at last, in the Perpendicular period, the window had almost become absorbed in what might be called a glazed wall.

But to return The period we have now to consider is the Decorated period, extending from about 1307 to about 1377. If the transition from Norman to Early English was gradual, much more so was the transition from Early English to Decorated ; so much so that it is exceedingly difficult for us to decide to which period many works really belong. The principal features of this style, which may be said to be coeval with Edwards I., II., and III., are the development of windows into three, four, and five lights, which branch into tracery in the heads of a flowing description, the canopies were openings enriched with crockets and finials, the introduction of the ball flower ornament, and the general enrichment of the details.

In this county we have numerous examples of this style, although, as I was obliged to observe in the case of the Early English style, it is very difficult to identify a whole building as of this period.

I may, however, mention the chancel of Lawford Church as a very beautiful example of this period.

Also the chancel of Great Leighs Church.

The chancel of Tiltey Church.

The north aisle of Danbury Church.

I cannot help thinking that Edward III. or the architects of that period were very conservative, for during his reign the Decorated period of architecture seems to have held its own, but upon his death and the accession of his grandson, Richard II., a further change was

carried out, and English Gothic then began its downward career, and from this time until the time of Henry VII. it had entered the period known as the Perpendicular period.

The general peculiarities of this period are as follows :

1. The general adoption of the square head to doorways, with four centred arches underneath, the spandrils being filled in with carving.
2. The window mullions run up perpendicularly into the arches, hence the name.
3. The piers of arches are very much divided, and sometimes the first shaft of pier is carried up to receive principal of roof.
4. The openings of window lights are wider than heretofore.
5. The whole front of the building is often panelled, and, in fact, the windows form a series of glazed panels.
6. The introduction of fan-tracery.

No doubt the architects of this period were impressed with the importance of dealing architecturally with the whole surface of the external walls of their buildings. Hitherto the Gothic architects had been content with dealing with the architecture of the windows and doors as so many distinct features ; but now the idea seems to have been to make the windows and doors subordinate to the architecture of the whole building, until, in Henry VII.'s Chapel at Westminster, King's College Chapel, Cambridge, and St. George's Chapel, Windsor, we find that the whole surface of the external, and even internal walls are enriched with panelling and tracery, and the windows really become pierced openings in the tracery.

Very beautiful is all this work, but not, in my opinion, so chaste as that of the time of the Edwards.

Of churches of the Perpendicular period we have several examples. Amongst the most notable are those of

1. Saffron Walden Church.
2. Thaxted Church.
3. Coggeshall Church.
4. Chelmsford Church.
5. Dedham Church.

Upon and even previous to the death of Henry VIII., Gothic architecture had been on the decline, and it had lost its hold for a time upon the English mind. The irruption of Italian artists had its effect, and Italian details had been mixed up with Gothic outlines, so that in effect the architecture of the time extending from the death of Henry VIII. to the time of James I. had been a mix-

ture of Gothic and Italian, known as Tudor, until in the time of the Stuarts the architecture of Rome had again obtained its supremacy, so that in the reign of Charles II. the most perfect specimen we have of Roman architecture was erected in England, namely, St. Paul's Cathedral.

It is curious that Englishmen brought up in the traditions of Gothic architecture should have allowed themselves to have been seduced from their old traditions, so as to have embraced classic work, but what is more curious is that for 150 years they should have abhorred and treated with every disrespect and contumely all work associated with the Gothic period. However, we live now in happier times, and there is no man who will venture to say a word against the Gothic remains of our ancestors; on the contrary, even with every desire to retain the old features of an old building, any architect who ventures upon the path of restoration is assailed with an amount of abuse which requires a strong mind to repel.

At the end of the fifteenth and the commencement of the sixteenth century, a great change had come over the architecture of the country by the re-introduction of brickwork. Hitherto all work had been executed in stone. The arches and jambs of doors and windows, the slopes of buttresses, the copings and strings of battlements, had all been executed in stone, and the walls constructed of pebbles and flints; but about 1500, probably from the extreme difficulty and expense in obtaining stone to meet the demands of the building mania which undoubtedly set in in this country at that period, the architects were forced back upon native material, and as, undoubtedly, the manufacture of bricks and tiles had never actually ceased in this country, a fresh impulse was given to it by the fact that it was found possible to manufacture moulded bricks, and also that the rich red colour of the best bricks was capable of producing an artistic effect. At any rate, from whatever cause arising, it is clear that during the reigns of Henry VIII., Edward VI., Queen Mary, and Elizabeth, the use of red brick was the fashionable material, at any rate in this county, and it must be admitted that the old red brick mansions of this and other counties, harmonise with the surrounding scenery almost as well, if not better, than the cold grey stonework of a former period.

There is a fashion in architecture, as well as in everything else, and there cannot be a doubt but that the use of red bricks had almost entirely superseded the use of stone and rubble during the

sixteenth century. Throughout this county there are innumerable buildings of this period, both ecclesiastical and domestic, which are of the greatest interest. The peculiarities of the style are a use of plain bricks throughout the building, varied in many instances by chequers of dark headers worked in patterns over the face of the building. These dark headers were produced by the wood used in the brick burning, which emitted a kind of acid, which burnt black or dark-grey the face of the brick exposed to its action. The use of moulded bricks was confined to the jambs, mullions, transoms, head and labels of doors and windows, the splays of plinths and buttresses, the strings and the corbelling and coping and details of battlements.

Amongst the churches, I have always thought that the tower of Ingatestone Church is one of the finest examples we have. Then again, Fryerning Church tower, and Sandon Church tower, clerestory of nave, the battlements of aisles, and the dormers of chancel of Great Beddow are really very picturesque, although not true Gothic. Then again, the tower of Rochford Church, although here the windows and other moulded work is executed in stone.

Again, the tower of North Weald Church, the upper part of the tower of Colne Engaine, and numerous porches and other additions and alterations to windows, doors, and other details, until in one church, Chignal Sowerby, we have the whole built of brick, and even furnished with a brick font; well may it be popularly known as "Brick Chignal."

Of domestic buildings of this period we have numerous mansions about the county: New Hall, Boreham; Faulkborn Hall, near Witham; the old parts of Hill Hall, Epping; Spains Hall, Finchingfield; Moyns Park, Birdbrook; what is left of Graces, in Little Baddow, and of Crixea Place, and others. Many of these old mansions, erected during the sixteenth century, have disappeared, and others so altered as to be almost unrecognisable, because during the eighteenth century the rage for square-built classic houses was so predominant, that many of the picturesque old mansions of the Elizabethan period were destroyed. We have distinct accounts that such was the case with Moulsham Hall, the seat of the Mildmays, and West Hornden Hall, the seat of the Petres, Heron Hall, the seat of the Tyrells, and Marks Hall, Romford, the seat of the Herveys, and Gidea Hall, the seat of the Cookes.

I have now, in a very cursory manner, travelled with you up and down the county, exploring the buildings spread over a period of sixteen centuries. My object has been to point out to you the main characteristics of each period of architecture. The limit of an hour has scarcely been enough to enable me to do more than to touch in the lightest manner, the peculiarities of each period, but if the few remarks I have been able to put together will induce even one person present to study the subject more closely I shall have been amply rewarded.

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NOS. 11-12, VOL. VIII.] *Price 2s. 6d.* [NOV.-DEC., 1894.

The Essex Naturalist:

BEING THE

JOURNAL

OF THE

ESSEX FIELD CLUB.

EDITED BY

WILLIAM COLE,

Honorary Secretary.

Contents.

The authors alone are responsible for the statements and opinions contained in their respective papers.

PUBLISHED BY THE CLUB, BUCKHURST HILL, ESSEX.

E. DURRANT & CO., 90, HIGH STREET, CHELMSFORD.

Ent. Stationers' Hall.] Published July, 1895.

COMMUNICATIONS *and* ADVERTISEMENTS *should be addressed :—*
The Editor of "THE ESSEX NATURALIST,"
7, Knighton Villas, Buckhurst Hill, Essex.

Publications of the Essex Field Club.

In Volumes I. to III. the "Transactions and Proceedings" were combined, but Vol. IV. "Transactions" and Vol. IV. "Proceedings" were issued with separate title-pages. These five Volumes record the work of the Club down to December, 1886. In 1887 the "Essex Naturalist" was commenced.

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IZAAK WALTON'S ASSOCIATION WITH THE RIVER LEA.

WITH SOME NOTES ON THE FORMER EXISTENCE OF SALMON IN THAT RIVER.

By J. E. HARTING, F.L.S., F.Z.S.

[*Read at Meeting on River Lea, July 14th, 1894.*]

IT is impossible to wander along the Lea from its source towards the metropolis, and visit such places as Ware, Amwellbury, Hoddesdon, Broxbourne, Theobalds, or Tottenham, without being reminded at every turn of the genial author of "The Complete Angler," who two hundred and fifty years ago, as he tells us, "in such days and times as he could lay aside business," was in the habit of visiting these and other places on the river for the purpose of fishing.

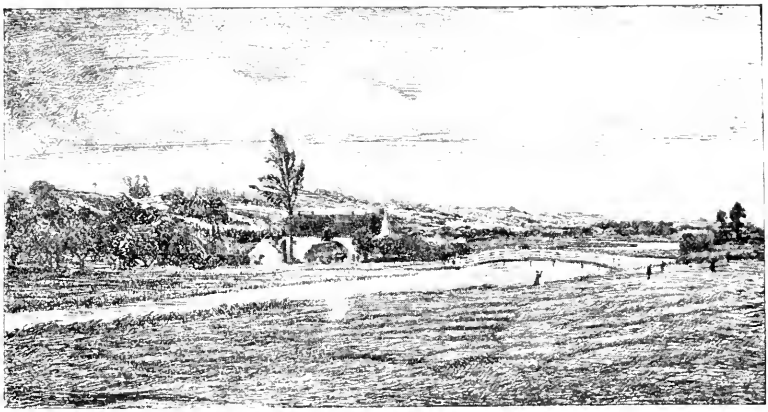
He must have been a good pedestrian, for (except when on a visit to his friend Cotton in Dovedale) he makes no mention of a journey on horseback, and in those days there were no railways or steam barges (as on the present occasion) to help him on his way.

Izaak Walton was not a Londoner bred and born, though he spent a great part of his life there. He was born at Stafford in 1593, and at the age of twenty came to London where he was apprenticed to a sempster (or haberdasher as he would now be called) in Whitechapel.

Sir John Hawkins (one of the earliest editors of "The Complete Angler") thought that Walton was first settled at the Royal Exchange, but in the opinion of Sir Harris Nicholas (the editor of Pickering's fine edition of this work) there is no evidence to support such surmise. Walton removed from Whitechapel to Fleet Street—to a

house on the north side, two doors west from Chancery Lane, at least as early as 1618—two years after the death of Shakespeare (whom, strange to say, he never once mentions or quotes), and in 1626 he married Rachel Floud, of Canterbury, who died in London in 1640. Six years later he married for his second wife Ann Ken (the daughter of an attorney), who also predeceased him.

Considering his comparatively humble station in life, and the number of influential persons he could count amongst his friends and correspondents, it is evident that he must have been a man of some attainments and conversational ability, and of singularly affable character. The respect and esteem in which he was generally held



FISHING HOUSE ON THE RIVER LEA.

(Reproduced by permission of Robert Bayster, Esq., from an etching by Thomas, after John Linnell.)

may be inferred from his acquaintance with such men as Dr. Donne, Vicar of St. Dunstan's, whose "Life" he wrote; Dr. Gilbert Sheldon, Warden of All Souls, Chaplain to King Charles I.; and after the Restoration, Archbishop of Canterbury, through whom in 1662 he obtained a lease of a house in Paternoster Row, adjoining the "Cross Keys," which he subsequently left by will to his son-in-law, Dr. John Hawkins, together with the house in Fleet Street: Bishop Sanderson, who attended Charles I. at Carisbrook, and of whom we get a peep as he stands "in sad coloured clothes" talking to Izaak Walton, near a bookseller's shop in Little Britain, and then taking shelter from the rain in a corner under a pent house,

and then indoors, where they had bread, cheese, ale, and a fire for their ready money; Bishop Morley, of Worcester, and subsequently of Winchester, in whose house he wrote much of the "Life of Richard Hooker," author of the "Laws of Ecclesiastical Polity," 1666; Dr. Morton, Bishop of Durham; Dr. Fuller, author of "The Church History": Dr. Barlow, Bishop of Lincoln, who addressed him as "my worthy friend, Mr. Walton"; and Bishop King, of Chichester, by whom he was addressed as "Honest Izaak." He was slightly known to Ben Jonson, and alludes to Michael Drayton as his "honest old friend."

Thus it would seem that such part of his time as was not occupied in business was passed in the society of men whose acquaintance is sufficient proof of the esteem in which his talents were held.

But it is rather with those of his companions who accompanied him on his fishing excursions that we are just now chiefly concerned, since it is through them that we are likely to get the best view of him as an angler, and as a frequenter of the Lea and Thames.

Foremost amongst these, he seems to have had great admiration for Sir Henry Wotton, Provost of Eton, with whom he probably became acquainted through Dr. Donne.

"This man," says Walton, "with whom I often fished and conversed, was a dear lover and frequent practiser of the art of angling, of which he would say it was an employment for his idle time, which was then not idly spent."

William Basse, the composer, who at Walton's request wrote the "Angler's Song," must have been himself an enthusiastic fisherman, for he sang:

"Of recreation there is none
So free as fishing is alone;
All other pastimes do no less
Than mind and body both possess.
My hand alone my work can do
So I can fish and study too."

Then there was his friend Thomas Barker, who lived in Henry the Eighth's gifts, the next door to the Gate-house in Westminster, and who wrote a little book called "The Art of Angling," in 1651, two years before "The Complete Angler" appeared. Walton thought so well of this, that in his first edition (p. 108) he wrote:

"I will tell you freely I find Mr. Thomas Barker a gentleman that has spent much time and money in angling, and especially of

making and angling with the fly for a Trout, that I will give you his very directions, without much variation which shall follow."

And then he proceeds to quote him. In 1653 a second edition of Barker's book appeared, and in 1659 a third edition under the enlarged title "Barker's Delight; or, the Art of Angling."

Then there was Mr. Nicholas Seagrave whom he knew, that "ingenious gentleman of Leicestershire," who was so skilful in training the otter, that "he not only made her tame but to catch fish, and do many other things of much pleasure."

Finally there were the brothers "Nat. and R. Roe" who used to accompany Walton on his fishing excursions, and who were distantly related to him.

They both predeceased him, and in 1661 he thus lamented their death: "In such days and times as I have laid aside business and gone a fishing with honest Nat. and R. Rowe, but they are gone, and with them most of my pleasant hours." (Epistle to the Reader.)

It is probable that "Venator," "Brother Peter," "The Scholar," and "Coridon," also had an actual identity in the persons of some of his piscatory friends, but who they represented it is now impossible to determine.

There cannot be a doubt that Izaak Walton meant to identify himself with *Piscator* in "The Complete Angler," for not only does that personage express his own feeling and opinions, but he adopts his personal acquaintances, and alludes to many circumstances in his own life. His scholar lived near Golden Lane, Clerkenwell, where dwelt a fishing-tackle maker, at whose shop they used to meet.

In the first edition *Piscator* says:

"I will go with you either to Charles Brandon's near to 'The Swan,' in Golding Lane, or to Mr. Fletcher's in the court which did once belong to Dr. Nowel, the Dean of St. Paul's, that I told you was a good man and a good fisher; it is hard by the west-end of St. Paul's Church; they be both honest men, and will fit an angler with what tackling he wants."

The scholar replies:

"Then, good master, let it be at Charles Brandon's, for he is nearest to my dwelling, and I pray let's meet there."

Another fishing-tackle maker mentioned by Walton was Charles Kerbye, in Harp Alley, Shoe Lane, not far from Walton's own house in Fleet Street; and at the end of the second part of "The Complete Angler," we find an announcement that—

"At the sign of the *Three Trouts* in St. Paul's Churchyard on the north side, you may be fitted with all sorts of the best fishing tackle by John Margrave."

In order to trace the nature of Izaak Walton's association with the River Lea, we have to look a little closely into the plan of his book, but as there must be few who have not read it, it will be unnecessary to do more than recall the fact that in the latest edition issued in the author's lifetime it takes the form of a conversation between an angler, a huntsman, and a falconer (*Piscator*, *Venator*, and *Auceps*), each of whom in turn discourses on his particular recreation, and give his reasons for maintaining its superiority to the others.

Piscator, while ascending Tottenham Hill on a fishing excursion, overtakes *Venator* and *Auceps*, and after an exchange of compliments, expresses a hope that they were going towards Ware.

Venator replies that he is going to the "Thatched House" at Hoddesdon, where he has an appointment with some friends; and *Auceps* says he will accompany them as far as Theobalds, where he must turn off to see a friend who mews a hawk for him.

Discoursing by the way, they reach Tottenham High Cross. This is generally assumed to be an "Eleanor Cross," that is, one of the crosses erected by Edward I. in memory of his Queen Eleanor, to mark the route of her funeral *cortège* between Grantham, where she died (in November, 1291), and Westminster, where she was buried. But Tottenham was *not* one of the places where the corpse of Queen Eleanor rested, and the Cross was probably only one of the wayside crosses which were once common in England, as they still are in many parts of the continent. It could not have been a market-cross, for there is no mention to be found of any market there. About 1580 it was merely a column of wood capped with a square sheet of lead to shoot the water off every way. Ten years later Norden described it as a wooden cross lately raised on a little mound of earth. But both cross and name were of much more remote date. About 1600, the cross being decayed, Dean Wood, who lived in a house to the east of it, had it taken down, and erected in its place one of brick, octagonal at the base, square above, with a sundial on one of the faces, and crowned with a crocketed terminal weathercock. This was the Tottenham High Cross to which Walton bade his companions welcome.

It lasted for over two centuries, when, falling out of repair, the

inhabitants had it restored, cased with stucco, and surrounded by an iron railing.

Over against it there stood the "sweet shady arbour which Nature herself has woven with her own fine fingers—a contexture of woodbines, sweetbriar, jessamine, and myrtle, and so interwoven as

TOTTENHAM HIGH CROSS, 1805.

(From the "Gentleman's Magazine," April, 1820.)

will secure us from the sun's violent heat and from the approaching shower." Tradition affirms that this arbour was in the garden of the "Swan Inn," and that the "Swan" was Walton's usual resting-place when he came hither to fish. The "Swan" remains, but there is no such arbour there now, and none of that "drink like nectar," of which master and scholar partook and pronounced to be "too good for anybody but an Iers."

Tottenham was once noted for its village greens, most of which have now been built over, but two may still be observed. Page Green lies on the right at its commencement, where once stood the "Seven Sisters," *i.e.*, seven great elm trees growing in a circle, which have given the name to Seven Sisters Road. In 1818, when Robinson published his "History of Tottenham," they were considered to be upwards of 300 years old, and were fast going to decay. Thirty years later their lifeless trunks were still standing; now all traces of them are gone.

Walton, of course, saw and no doubt admired these trees. On quitting the *Swan* hostelry for the river side, he would pass along Tottenham Hale, to the east of the High Cross, and would reach the Lea at a point where there was then a ferry. This has since been superseded by a bridge, but its memory is preserved in the sign of the inn at its foot, *The Ferry-boat*, a fishing and boating house, much resorted to in summer.[1]

On the opposite side of the Lea are now the reservoirs and filtering beds of the East London Waterworks Company, commonly known as the Tottenham Reservoirs, but really in Walthamstow.

The wayfarers on leaving Tottenham would pass through Edmonton, and along Enfield Highway to Waltham Cross, which received its name from the cross erected here by Edward I. to the memory of his queen Eleanor. Only two other such crosses remain, one at Geddington, the other at Northampton, that at Tottenham (as already remarked) having no claim to be regarded as an "Eleanor Cross." That at Waltham is by far the finest of the three. It stands on the east of the main road, close to the "Falcon Inn," and at the corner of the road to Waltham Abbey, the burial place of Harold. Of this wonderfully interesting place with its many historical associations, standing as it did on the edge of the great forest of Essex, afterwards known as the forest of Waltham, a great deal might be noted *en passant*, but this would cause too great a digression, and would lead us altogether away from Izaak Walton and the Lea.

To the west of Waltham Cross lies "Theobalds," where *Auceps* was to turn aside to see his mewed hawk. This, in Walton's day, was a notable place, although its demolition had commenced a year or two before "The Complete Angler" was written. Queen

1 See the etching of this Fishing House on the Lea by Percy Thomas, after Linnell, in my edition of Walton's "Angler," ii., p. 48.

Elizabeth frequently stayed there, and it was the favourite hunting seat of James I., who, on his way from Scotland to London, was nobly entertained there by Sir Robert Cecil (afterwards Earl of Salisbury). So pleased was the king with this place that he gave Hatfield in exchange for it. He then enlarged the park, and enclosed it with a brick wall ten miles in circumference. Here he kept not only red deer and fallow deer, but also elk, which were presented to him in 1612 by the Marquis of Brandenburgh. They were still there in 1624. The red deer were imported from Denmark in 1612. There were still wild red deer, however, as well as fallow deer outside the park walls, in Epping Forest, Enfield Chace, and Hoddesdon Woods. It is probable that he also turned out in this park some of the wild boars which he imported from France and Germany. At Theobalds he had a heronry, and a large pigeon-house wherein he kept pigeons for his hawks, and he also kept silkworms. On a large pool with an island in it, he kept wild fowl which were netted for him in Lincolnshire.

It does not appear that he cared much for fishing, except by proxy with trained cormorants, with which he sometimes amused himself.[2] His chief delight was in hunting and hawking, and to these sports while staying at Theobalds nearly all his time was devoted. It was here that the king died on the 27th March, 1625. In 1650 the greater portion of the building was taken down, and what remained of the place in 1765 was demolished in that year, when the park was converted into farms.[3]

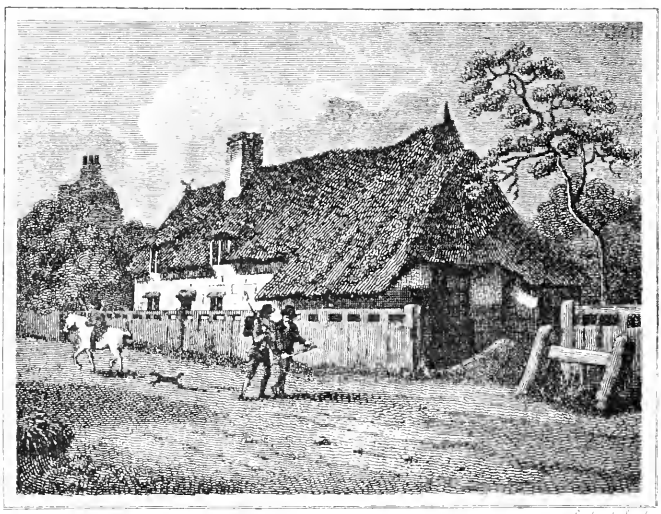
The inhabitants of Edmonton formerly had right of common upon Enfield Chace, and when the Chace was divided in 1777, a tract of some 1,200 acres was allotted to the parish. Upon part of the Chace a fair, known as "Bush Fair," was held twice a year. James I. threw this part of the Chace into his park of Theobalds, but granted a patent for holding the fair elsewhere, and under the name of "Beggar's Bush Fair," it continued to be held until about five-and-twenty years ago.

Before quitting Theobalds, it may be of interest to mention that the owner of the modern house upon this ancient site, Sir Henry Meux, having purchased the old "Temple Bar" upon its demolition in Fleet Street, caused it to be removed and re-erected as an entrance gate to his park.

2 Harting, "Essays on Sport and Natural History," p. 499.
3 Harting's edition of Walton's "Angler," vol. i., p. 38 note.

Continuing the journey with *Venator*, after *Auceps* had taken his leave here, Walton would follow the road to Cheshunt, and passing through Wormley and Broxbourne, would reach Hoddesdon to rest at the appointed *rendezvous*, the "Thatched House," of which *Piscator* says: "I know the Thatched House very well. I often make it my resting place and taste a cup of ale there, for which liquor that place is very remarkable."

The ancient site of the "Thatched House," long since de-



The Thatched House

molished, has been variously conjectured. The Rev. Moses Brown in his third edition of "The Complete Angler," published in 1772, supposed it to be seventeen miles from London on the Ware Road, a thatched cottage once distinguished by the sign of the "Buffalo's Head," standing at the further side of Hoddesdon on the left of the road going to Ware, and this identification for want of better information has been generally accepted by subsequent editors. There is now, however, good reason to believe that this is a mistake. Mr. R. B. Croft, of Ware, states[4] that Mr. Charles Whitley, of Hoddesdon, informed him that the "Thatched House" to which Izaak Walton referred was situate in the centre of the town of Hod-

4 "Trans. Hertfordshire Nat. Hist. Soc.," vol. ii., p. 11.

desdon, near the old chapel or clock house, and not far from the site of the old cross. Mr. Whitley quotes as his authority an authentic copy of "A circuit of the Bounds of the Parish of Great Amwell, as they were recorded by Thomas Hassall, clerk, Vicar there, anno 1634, and so observed in his day": in which the following mention is made of the "Thatched House":

"In the parish of Amwell, from Cunnisbye's, or 'The Bell,' we go up the town to Hoddesden, taking in all those houses which stand together on the same side as 'The Feathers,' 'The Thatched House,' and others, till we come to 'The White Hart,' an inn fronting the new Town-house over against Lord's Lane."

"The Bell" inn is still there, and Mr. Whitley is of opinion that the front of Hoddesdon Brewery is built on the site of "The Feathers," and that the house on the south side of the brewery gateway, with enclosed square grass plot in front, is built on the site of the old "Thatched House." His opinion is further confirmed by his knowledge of certain deeds relating to "The Thatched House" in which this site is indicated. "The Buffalo's Head," which had also a thatched roof, was some way off, and on the other side of the road.

"Sir," says Venator, "you have angled me on with much pleasure to 'The Thatched House,' and I now find your words true, that good company makes the way seem short: for trust me, sir, I thought we had wanted three miles of this house till you showed it to me. But now we are at it, we will turn into it, and refresh ourselves with a cup of drink and a little rest."

Early the next morning (May 2nd), the anglers were at Amwell Hill, now called Amwellbury, to meet the otter hounds of "noble Mr. Sadler," as Walton styles him. He was the son and heir of Sir Thomas, and grandson of Sir Ralph Sadler, the Chief Secretary of State and grand falconer to Queen Elizabeth. He lived at Standon (where there is a fine monument in the church to Sir Ralph), and died there in 1660, seven years after the publication of the first edition of Walton's "Angler."

Although there is no longer a pack of otter hounds maintained in Hertfordshire, otters are still met with in the Lea and its tributaries, where they, too often alas! encounter an ignominious death.

A day or two later (chap. iv.) we find Walton and his companion on their way to "Trout Hall," an "honest ale-house," as

he says, "where we shall find a cleanly room, lavender in the windows, and twenty ballads stuck about the wall."

A little further on he says: "At 'Trout Hall,' not far from this place, where I purpose to lodge to-night, there is usually an angler that proves good company."

It was on their way to this hostelry that they fell in with the milkmaid and her mother, who, at their request and in return for a trout, sang that charming song, "Come live with me and be my love," which Walton attributes to Marlow, but which the critics affirm was composed by Shakespeare. So far as it can be traced, it seems to have been first printed by Jaggard in 1599, in "The Passionate Pilgrim and other Sonnets, by Mr. William Shakespeare," although in "England's Helicon," published in 1600, seven years after Marlow's death, it is given with Marlow's name attached, and entitled "The Passionate Shepherd to his Love."

But this by the way. Walton, in the character of *Piscator*, on greeting the milkmaid, exclaims, "I have been a-fishing, and am going to 'Bleak Hall' to my bed." This probably was a *lapsus linguæ*, for he had previously mentioned "Trout Hall" as his destination. Sir Harris Nicholas, however, in his edition of "The Complete Angler" (chap. iv. p. 113), gives a view of "Bleak Hall," which he describes as a fishing-house on the banks of the Lea, about a mile from Edmonton, that is, at Cook's Ferry. But this must be a mistake, for Walton's inn was *above* Waltham, whereas Cook's Ferry was some miles *below* it.[5] Now, however, "Bleak Hall" has disappeared, and the ferry has been superseded by a bridge.

These are some of the thoughts which crowd upon the mind in connection with Izaak Walton and the River Lea.

To inquire into the nature of the fishes he caught, or the tackle he employed, would not only be beside our present purpose, but would extend these notes to an inordinate length. Nor is it material to discuss here the accuracy or otherwise of his observations in Natural History. These have been pretty carefully examined in the edition of "The Complete Angler," which I have lately published through Messrs. Bagster, and which is annotated and illustrated from the naturalist's point of view. But there is just one point upon

5 "*Peter*: But where shall we meet to-morrow night? for my friend Coridon and I will go *up the water towards Ware*.
Piscator: And my scholar and I will *go down towards* Waltham.
Coridon: Then let's meet *here*."

which it may be of interest to touch briefly before concluding, namely, the former existence of salmon in the Lea.

There is, no doubt, that long after the time of Walton, the Lea was a salmon river, but when it actually ceased to be so, it is not so easy to decide. Mr. Croft, in the article to which reference has already been made, quotes Farmer's "History of Waltham Abbey," to prove the existence of salmon in this river in 1735, but adds, "I have not been able to ascertain the date of the capture of the last salmon; probably they were very scarce, if not extinct here before the end of the last century."

This was by no means the case, for there is evidence to show that salmon were taken in the Lea at least a century after Farmer wrote. Amongst the notes which I have collected on this subject are the following:

"The Sporting Magazine" for 1816 contains the announcement that, "In January, 1816, Mr. Salter hooked a very heavy male salmon in the subscription water at Lea Bridge, supposed to be the largest ever taken in the River Lea with rod and line. After an arduous struggle of an hour and a half, he succeeded in killing it. It measured 3 ft. 7½ in. in length, and weighed 28 lbs. From its singular form and colours, Mr. Salter was induced to present it to the landlord of the "Horse and Groom," at Lea Bridge, who had it stuffed and a drawing made of the same and hung up in his parlour for the inspection of the curious."

A correspondent signing himself "an old and keen sportsman," writing in "The Field" of 13th October, 1877, says (p. 419):

"One day in April, 1825, I caught a brace of salmon-peel in the Lea a little above Old Ford, 6¾ and 4½ lbs. in weight. At that time it was thought a great piece of luck for any one to catch two in one day, and I, a little more than a boy then, was very proud of the feat."

"The Sporting Magazine" for 1833 records that,

"On December 9th, 1833, a fine salmon measuring 3 ft. 2 in. and weighing 15 lbs. was captured at Walthamstow Ferry Fishery. It had taken advantage of recent floods, and had passed mills and locks, and ultimately found its way into the old stream where it was caught. The depth of this part of the River Lea is influenced by the barge and copper-mill streams, and as the floods subsided, the fish found it difficult to pass the ford on which it was found splashing and throwing itself up towards a tumbling bay."

A well known angler in the Thames and Lea, Mr. T. R. Sachs,

informed me some time since, that when the brothers Want were the proprietors of the Broxbourne Fishery some forty years ago, about 1850, there used to hang in the smoking-room of the inn there a string of salmon, trout, and pike heads. On their quitting the place, however, the subsequent proprietor, Mr. Beningfield (who was a gardener and cared little for fishing), threw them away! Could they have been preserved to the present day, what interesting relics they would be in the eyes of anglers and naturalists.

THE GEOLOGY OF THE LEA VALLEY.

By T. V. HOLMES, F.G.S. (*Vice-President*).

[*Read at Meeting on the River Lea, July 14th*, 1894.]

AT London we are in the midst of a broad synclinal fold or basin, consisting of Tertiary and later rocks towards its centre and of Chalk and other Secondary formations towards its outer rim. The Tertiary area includes the greater part of Essex and the south-eastern corner of Suffolk, while south of the Thames it comprises a considerable portion of northern Kent and Surrey. West of London it becomes gradually narrower and narrower, till around Marlborough it is represented only by a few scattered outliers. Beyond this Tertiary district is one in which the underlying Chalk is more or less exposed, as at Saffron Walden, Royston, Hitchin, and Dunstable north of the Thames, and along the North Downs from Folkestone to Guilford, south of it. As the Chalk dips northward from its outcrop in Kent and Surrey, and southward in the counties of Essex, Cambridge, Bedford, Hertford, and Buckingham, it naturally follows that rain-water sinking into its surface, or percolating through it from some overlying bed, tends to flow southward from Essex or Cambridge, and northward from Surrey and Kent. A few springs are occasionally found at the base of the Chalk escarpment in certain localities, but in the main the water flows through the Chalk[1] in the direction of its dip, and issues from it in springs where the Chalk is so saturated that the saturation-level is above the local level of the ground. South of the Thames, along the North Downs, there is a much smaller breadth of bare Chalk[2] than there is from the Chiltern Hills to Essex and Suffolk.

1 See Whitaker, "Geology of London," etc., vol. i., pp. 61–62.
2 Chalk covered only by Glacial Drift is here included.

If we note the formations traversed by the southern tributaries of the Thames east of Windsor, the Wey, Mole, Darent, and Medway, we find that they all rise in the Lower Greensand or Wealden districts, beyond the Chalk of the North Downs. Only the smaller streams, such as the Cray, Wandle, and Ravensbourne, have their sources within the Chalk and Tertiary area.

But the northern tributaries of the Thames in the district between Windsor and the sea are all Chalk and Tertiary streams. The chief of these are the Colne and Lea (with the smaller rivers which fall into them), and the Lea is decidedly the more important of the two. It "rises from the lowest part of the Chalk, north-east of Dunstable" (Whitaker: "Geology London Basin," part i., p. 3), very close to the Chalk boundary. Its chief tributaries, the Mimram, Beane, Rib, Quin, and Stort, also originate in the Chalk, which, in the uppermost part of their courses, is either bare or covered by Glacial Drift, which consists of sand and gravel overlain by Boulder Clay. The sand and gravel appear in the flanks of the valleys which have been cut by the various streams, while the Boulder Clay forms the surface of the higher ground between them. Along a somewhat irregular line, which may be roughly described as ranging from Sudbury to Bishop Stortford, and thence towards Hatfield and Watford, Woolwich and Reading Beds have been detected here and there beneath the Glacial Drift. But the belt of ground occupied by them is a very narrow one, while the overlying London Clay may be seen either forming the surface, or more or less covered by superficial beds, over four-fifths of Essex. It forms, with the occasional addition of a capping of some superficial bed of gravel or Boulder Clay, all the higher ground on each side of the Lea valley below the junction with the Stort, beyond the alluvium of the marshes, and the older and slightly more elevated flats of gravel and brick-earth close to the river. These last-named deposits are entirely due to the action of the stream, and have been formed in the following manner.

In addition to the action of rivers in cutting their beds deeper and deeper, and further and further back, they also tend to change their courses laterally, to eat into the bank on the side where the current is strong, and to deposit material on the other where it is sluggish. This, in the case of the Lea, has resulted in the destruction of much high ground, consisting chiefly of London Clay, and the deposition, on the planed-down surface, of a comparatively thin bed

of gravel which has been brought down in the channel of the stream and deposited where the current was sluggish. Now and then, during floods, inundation mud would settle down here and there above the gravel, and remain as patches of brick-earth. And at a later date the river, flowing at a slightly lower level, and being more sluggish than at an earlier period, has ceased to bring down gravel in its channel, but has deposited instead the alluvium of the marshes through which it now meanders. We may now consider the evidence as to the lateral shiftings of the Lea.

In the case of the Thames a glance at the maps of the Geological Survey shows that from Windsor downwards it now takes on the whole a more southerly course than it once did. This is made manifest by the very much greater breadth of river deposits north than south of the river both above and below London. As regards the Lea, we find that from its junction with the Stort downwards it once flowed one, two or even three miles west of its present channel, while it never ran, on the whole, in its earliest days much further eastward than it now does. An interesting practical result of this is that we find a series of old populous villages from Tottenham to Hoddesdon, on the old river-gravel west of the Lea, along the course taken by John Gilpin in his involuntary pilgrimage to Ware. But on the Essex side of the Lea opposite there is no large ancient village except around Waltham Abbey, where there is a patch of old river-gravel of exceptional size. For the London Clay, which usually bounds the marshes on the Essex side, is incapable of affording any water supply, while the old river gravel at Waltham Abbey, Cheshunt, Edmonton, and elsewhere, allows water to percolate through it, and the underlying London Clay prevents it from sinking below a moderate depth, at which it can be utilised by means of a pump. In the days before a knowledge of geology caused deep borings to be made and companies to be formed for the supply of water thus obtained, the power of procuring water from surface gravel was a chief influence in the determination of sites for villages and even for towns.

Above the junction of the Lea and Stort, the Lea and its tributaries flow in valleys the sides of which are usually capped by Boulder Clay. South of the junction Boulder Clay appears only here and there in outlying patches on the higher ground. It is almost perfectly certain, however, that Boulder Clay once spread over the site of the valley of the Lea many miles below the junction

with the Stort, as outliers of considerable size may be seen as far south as Chigwell on the east and Finchley on the west. It can scarcely be doubted, therefore, that the valley of the Lea with the series of river-deposits which it contains are post-Glacial in age, in the sense that they are of later date than the Boulder Clay of Essex and Middlesex. Perhaps I may be allowed to add that in THE ESSEX NATURALIST (vol. vii., pp. 1—13) I have given some account of the evidence pointing to a similar conclusion in the case of the Thames. Of course it is quite possible that there may have been more or less low ground coinciding perhaps, here and there, with that of the present valleys of the Thames and Lea, in pre-Glacial times. But the evidence decidedly favours the view that the valleys as we now see them, with the series of river deposits at various levels which they contain, are post-Glacial in the only sense in which that term can be locally applied.

Just below Tottenham High Cross the gravel flats of the Lea become continuous with those of the Thames; it therefore becomes impossible to say whether the gravel about Walthamstow should be considered to belong to the Thames rather than to the Lea, or the reverse. From this point as far as the outfall of the Lea into the Thames we may note, west of the marshes of the Lea, the broad expanse of old river gravel on which London stands. And a glance at the map of the Geological Survey will show us that geological conditions which, as we have seen, led to the settlement of a large village population on the western flank of the valley of the Lea, equally decided the position of the great city of the Thames. London has now far outgrown the limits of the site which must have attracted inhabitants from the very earliest times. But if we confine our attention to ancient London, now known as the "City," we learn from the geological map that, as we ascend the Thames, this is the first spot we come to which consists of a broad spread of river-gravel of good elevation and yet close to the river; at once capable of being made into a place of strength and of yielding a good supply of water. And we must not forget that ancient London, besides the advantages already mentioned, had another in the existence of the river Lea on its eastern side. For its presence furnished the Londoners both with a valuable defensive outwork and with an additional watery highway.

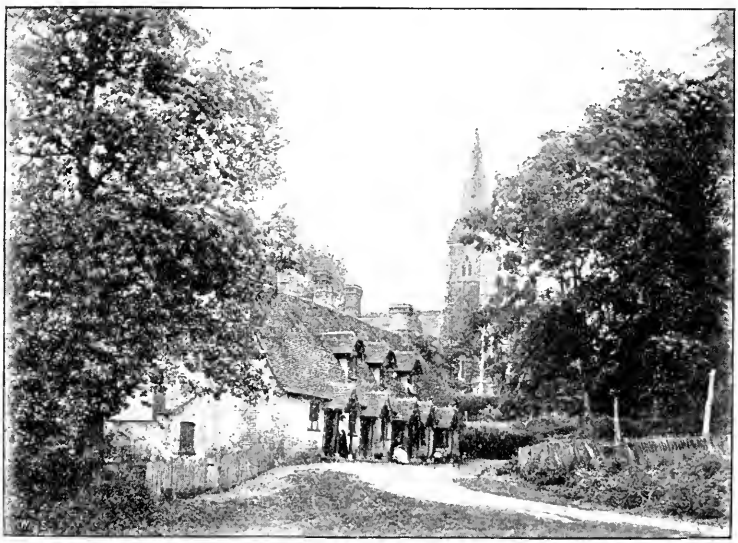
P

THE ESSEX FIELD CLUB.

MEETING AT COLCHESTER, COPFORD, BIRCH, ETC.

Saturday, June 23rd, 1894.

THE weather was perfect, and although the party was not so large as usual, those who attended were well repaid by a very pleasant excursion. The conductors were : Mr. C. E. Benham, Dr. H. Laver, F.L.S., Mr. J. C. Shenstone, and Mr. W. Cole.



BIRCH CHURCH AND VILLAGE.

At half-past eleven the party left Colchester (Main) Station in a brake for Mr. Benjamin Cant's Rose Gardens at Mile End. The culture of roses in this district, both by professional growers and amateurs, has attained great perfection. The ancient and interesting town of Colchester is as far famed for its beds of roses as for the produce of its municipal beds of oysters in the Colne, and a visit to these fragrant gardens in the month of June was a happy thought on the part of the conductors. Colchester took the lead for roses even fifty years ago, when one John Hedge, of Reed Hall, was the most successful amateur rose grower in England ; Mr. B. R. Cant standing first among professionals. Mr. John Hedge has long passed away, but we still have Mr. Benjamin Cant ; and although the number of English rose growers has greatly increased, he still holds his position as probably the most successful cultivator of this charming flower in England. Mr. Cant has won the Grand Challenge Trophy of the National Rose Society no less than six times. He won the Jubilee Champion Cup in 1892, the Chiswick Challenge Cup 1891 and 1892, and altogether he has taken 1,780 first

prizes. The hon. sec. of the National Rose Society in 1894 stated that Mr. Benjamin R. Cant was still the champion.[1]

At the gardens Mr. Cant met the members, and conducted them through his beautiful beds. There, in spite of the late season, a profusion of the queen of flowers in all varieties of colouring and form, afforded an hour's delightful inspection. The surprising modifications which the science of horticulture has developed from the original forms of the wild roses seemed almost limitless. Scarcely a shade of colour can be imagined which will not be found represented in the flowers of some of the modern varieties, which latter are, of course, always multiplying as the result of fresh experiments in cross-fertilisation. One form, which though scarcely notable from an æsthetic point of view, was of special interest botanically, was a rose named in catalogue *Rosa viridifolia*, in which the growth of the green sepals or leaves of the calyx had been doubled and developed to such a degree as to actually supplant the petals altogether, giving the effect of a green blossom.

Truly the gardens were a sight worth the viewing. The air was seemingly weighted with the fragrance of the blooms, and the eye was delighted with the range of colour. The technical names of the roses were lightly passed over, the object being rather to gratify the senses than to compile a gardener's dictionary; but some favourite blooms, of course, came in for particular notice. An old friend was the "Baroness de Rothschild," a very beautiful light pink, of large and fine form. Speaking of the hue, Mr. Cant mentioned that a large proportion of the orders from London this season were for pink roses. A contrast in its snow-white purity was the "Merveille de Lyon," only the centre being coloured, and that with an exquisite rosy peach tint. "General Jacqueminot" was pointed out as one of the oldest and still one of the best, the scarlet crimson being surpassingly brilliant. A newer variety was the "Gustave Piganeau," an exquisitely-shaded carmine. The fields of tea and noisette roses appealed especially to the organ of which the Autocrat of the Breakfast Table has written so much in praise. The bright rose and pink bordering of the salmon-white petals of the "Madame de Watteville" variety gave that, perhaps, a first place in the opinion of visitors, but many others shared the honour in a passing judgment. Several rich, deep yellows were particularly admired. That Mr. Cant has chosen an airy situation for his stock was made evident by the view from the lawn in front of his house. The town of Colchester lay, so to speak, at his feet; in fact, the summit of the church towers seemed to be on a level with the ground.

After luncheon at the "George Hotel," where Prof. Meldola, V.P., took the chair, the carriages were re-entered, and the course taken lay through the pretty village of Lexden, and on by the London Road to Stanway, where a halt was made outside the house of the late John Brown, whose geological researches have won him a niche in the temple of "Essex Worthies," and a portrait and life of whom appeared in THE ESSEX NATURALIST for 1890 (vol. iv., p. 158). John Brown was in his early life a stonemason at Colchester. He retired when he was

1 The "Gardener's Chronicle" thus refers to the excellence of the Colchester roses: "Essex, the writer says, "is a real rose county, especially around Colchester. Why East Anglia has obtained such an enviable reputation for the culture of the 'Queen' has been answered in various ways. Some have said the nature of the soil has been the chief help, others that the secret is to be found in the air or climate. Either or both of these very important circumstances may have much to do with it, but these natural conditions have been greatly assisted by the skill, enterprise, and energy that have been brought to bear in the matter of their culture, such as is only practised in so large a degree by growers who love the plants under their charge."

fifty, and devoted the remainder of his life to geological research, and corresponded with Owen, Lyell, and other celebrated men. He published several important memoirs on Essex Geology, a list of which will be found in the paper referred to above. The main portions of his collections were bequeathed to Owen, and they are now in the British Museum, and smaller collections were presented to the Chelmsford Museum, as noted below. His tomb in the churchyard at St. Allbright's, Stanway, was pointed out a few hundred yards farther on.

Just past the Stanway "Swan" is a turning to the left that leads to Copford Plains, and in this leafy lane the party alighted and set about botanising.

It is said that the rare Roman Nettle (*Urtica pilulifera*) has been recorded as growing at Copford, but it has not been found for many years, and in spite of a rigorous search, no specimens could be found on this occasion. On the leaves of the fragrant Ground Ivy (*Nepeta glechoma*) were found an abundance of the great hairy green galls, produced by the little Cynip, *Aulax glechomæ*. At the close of the perambulation of this most charming spot, Mr. J. C. Shenstone exhibited some of the typical plants of the district, and remarked upon them, including some of the species of *Stellaria*, the horehound (*Ballota*), and the Veronicas (Speedwells), a species of which (*V. beccabunga*), it was pointed out, is the true forget-me-not, though the legend has somehow attached itself in England to the *Myosotis* (Scorpion-grass), and with it the name.

A short drive, and the next halting-place was quickly reached—near Birch Church, where Dr. Laver conducted the party to a prehistoric relic, known on the maps as Birch Castle, standing at the S.E. of the church, in the charming old-world village. A circuit of earthworks is all that remains, and there is no probability that any but a wooden edifice ever stood as the "castle" within. Morant says the earthworks are connected with those at Lexden Heath and the Ramparts, but Dr. Laver said he was not able to trace the connection. He stated that Birch "Castle" was of uncertain age, but much earlier than the Norman Period. Ralph de Gernon, founder of Leighs Priory, fortified the castle against Henry III., but the structure of the earthwork showed that it was made long before Gernon's time. It was probably the remains of a small Roman camp, which had been utilised in later times by Gernon. Roman pottery had been found on the site.

Mr. Douglass Round joined the party at this point, and accompanied them across the fields to Birch Hall, where they were met by Mr. Round, M.P., who hospitably spread tea for the party in his pleasant grounds, the family being away from home, and the hall temporarily closed. The very ancient edifice, chiefly erected by the Tendring and Goldring families, was rebuilt in 1727-8 by a Mr. James Round, and afterwards in 1845 by Mr. C. G. Round; its situation is excellent, and the grounds are watered by a rivulet, which expands into a small lake.

The assemblage was further augmented by a contingent of the Colchester University Extension students, and other interested visitors joined the meeting (the 148th Ordinary Meeting), which, after tea, was held beneath the shadow of the lime trees,[1] Prof. Meldola in the chair.

The following were elected members: Mr. Horace T. Brown, F.R.S., F.G.S., Mr. Samuel Johnson, M.I.M.E., and Miss A. Johnson.

Dr. Laver exhibited on behalf of Mr. L. F. Manley, portions of the lower jaw

[1] On the twigs of these trees, more especially those springing from the boles, I found abundance of the galls of the little Dipteron, *Sciara tiliicola*, H. Loew.—W. Cole.

of a Beaver obtained from the clay-pits at Stanway. [Mr. Manley has kindly presented these to the Club's Museum, and with the assistance of Mr. W. M. Webb, I have fitted all the parts together, and they constitute a very interesting specimen.—W. COLE.]

Mr. W. Cole exhibited a series of specimens of Pleistocene Mollusca collected by the late John Brown, of Stanway, and presented by him to the Chelmsford Museum many years ago, where they remained neglected until they were recognised when the Museum came into the Curator's hands. The shells had been carefully arranged by Mr. W. M. Webb, F.L.S., with the occasional assistance of Mr. Horace Woodward, and would be described in THE ESSEX NATURALIST by Mr. Webb (see E.N., *ante*, p. 160).

Mr. Cole also exhibited the galls and other specimens collected during the afternoon.

Mr. Shenstone then read portions of his paper on "The Oak Tree in Essex," which is printed in the present volume (pp. 89-117).

Hearty votes of thanks were passed to Mr. Shenstone for his paper, and to him, Dr. Laver, and Mr. C. E. Benham, for arranging the details of the meeting.

Mr. C. E. Benham proposed a cordial vote of thanks to Mr. Round, for his hospitable reception of the Club at his beautiful seat that afternoon. Mr. Round had, with characteristic kindness, specially travelled down that afternoon from London, where he was then staying, in order to welcome the members. The vote was seconded by Prof. R. Meldola, and carried by acclamation.

Mr. Round, speaking as a member of the Club, said that it had given him great pleasure to receive the party. He regretted that he was not able to join in the excursions from want of time, as a member of the House of Commons, but he often read the report and papers in THE ESSEX NATURALIST with great interest.

The meeting was brought to a close, as the London members were obliged to seek their train from Marks Tey, to which station the drive through Copford Green was a pleasant one. A slight divergence was made *en route* to enable the visitors to catch a glimpse of the entrance to the clay pits at Stanway, in which John Brown collected so many of the specimens alluded to in the above report.

DOWN THE RIVER LEA FROM HERTFORD TO TOTTENHAM.

Saturday, July 14th, 1894.

CONDUCTORS :—Major Lamorock Flower, F.San.I. (Sanitary Engineer to the Lee Conservancy Board), Mr. G. J. Symonds, F.R.S. (Sec. R. Met. S.), and W. Cole, F.E.S. (Hon. Secretary).

REFEREES :—*Geology*—Mr. T. V. Holmes, F.G.S.; *Vertebrata*—Mr. J. E. Harting, F.L.S., Mr. Howard Saunders, F.L.S.; *Mollusca*—Mr. W. Crouch, F.Z.S.; *Botany*—Mr C. A. Wright, F.L.S., F.Z.S.

The object of the meeting was to view the scenery of the Lea Valley from Hertford downwards, and to enable the Conductors and Referees to give some account of the geology, water-supply, and natural history of the district.

The Lee Conservancy Board very kindly allowed the use of their steam barge, the *Lord Salisbury*, for the occasion, and Major Lamorock Flower (to whose exertions the improved state of the Lea in recent years is so largely owing),

rendered most valuable services in arranging the details of the meeting. Mr. H. A. Cole embellished the circular with four sketches, made on the spot a few days before the meeting.

The large party (consisting of over sixty persons) arrived at Hertford Station at 10.40 a.m., and at once proceeded on board the *Salisbury*, which was moored at Dicker Mill Bridge, on the Lea Navigation, and the start was made at a quarter past eleven.

To quote from the circular of the meeting, the County Town of Hertford is a place of considerable interest. The Castle (now a private residence) is reputed to have been built by Alfred the Great, but others say that Edward the Elder founded it A.D. 909. It was one of the residences of the Saxon Kings. In 1345, King Edward II. gave the Castle to John of Gaunt. Queen Elizabeth lived here for a time. The Parliamentary Army had its headquarters at Hertford in 1647. *En route*, towards Ware, can be seen Gallows Hill, remarkable as the site of the execution of a ringleader of a mutiny which, at one time, threatened destruction to the Parliamentary cause, but which was crushed by Cromwell's prompt action.

The morning was lovely, but some threatening clouds promised showers at least. These, however, fortunately did not reach us during the day, although heavy storms were experienced in some districts on either side of the river.

After passing the junction of the River Beane at Ware Park Mill, and the Balance Engine of the New River Company, where that Company draws its statutory volume of water (limited by Parliament to 22,500,000 gallons daily) from the Lea, it may be said that the business of the day commenced.

According to promise, Major Flower presented to each member and visitor a copy of his pamphlet, "The River Lea up to Date," and also exhibited some interesting maps of the Watershed of the Navigation, and on the invitation of the President (Mr. Chancellor) he stopped the barge on a picturesque part of the river, half-way between Hertford and Ware, and addressed the meeting as follows:

Major Flower's Address.

Major Flower said: "Before giving you a slight sketch of the River Lea and its tributaries above Hertford, I must, in the name of the Lee Conservancy Board and my own, wish the Essex Field Club a hearty welcome to the Lea Watershed. The barge on which we are assembled is placed at the disposal of the Club with every good wish, that all may enjoy a pleasant day, and that each will leave it at the close of our voyage down the Navigation with some appreciation of the value of the work of nearly half a century in abating pollution to the river, and with some knowledge of what the River Lea is.

"We have left Hertford, and started on our journey at a point on the main river, or rather in the navigable part thereof. This Navigation is of great antiquity. We read that the Danes sailed up the stream, it is said as far as to Ware. King Alfred followed them, entrenched himself below Ware, cut channels and drained the Lea dry, rendered their retreat by water an impossibility, and they were compelled, therefore, to escape across country, and found refuge in Gloucestershire. The Navigation does not extend farther than just above the 'Town Mill Bridge' in Hertford, about half a mile above the place where we embarked.

"The River Lea rises in Bedfordshire, about three miles north-west of Luton,

in some deep-seated springs which occur in the Lower Chalk. Mr. Whitaker, the well-known geologist, says they are the only springs in the Lea which rise at that depth. I shall not pursue the geology of the river basin, as we shall, later in the day, have the advantage of a paper hereon by Mr. Holmes.

"The town of Luton (famous for its straw-making trade, which was suggested by Mary Queen of Scots, and was introduced in the time of James I.) formerly was a source of great fouling of the Lea. The Lee Conservancy Act, 1868, inasmuch as a special clause was inserted for the protection of the rights of the town, so far as discharge of its refuse went, did not help the matter much. This clause was allowed when disposal of refuse was not so well understood as it is now. However, on my appointment, in 1871, to the charge of the Watershed, I determined to put an end to this unsatisfactory state of affairs, and, thanks to the good people of Luton, of whose wise deeds I have many times spoken in another place, all the sewage is now pumped on to high land, away from the town, and the river, and no pollution exists. I think Luton has spent over £40,000 in this great help to me in carrying out my duty. (Applause.) I wish I could speak equally well of all the towns in the Watershed. Still, we advance, and the doings of the Lee Conservancy Board have left their mark on the history of the water supply of London, so far as some 38 per cent. of it is concerned, namely, that supplied by the New River and East London Water Companies. It is a curious fact that on an inspection of the river, from its source to the intakes of the companies, which I made in 1891, in conjunction with Mr. W. C. Young, F.I.C., my consulting chemist, who analysed the samples, it was found there was more organic matter in solution in the water at Leegrave Marsh, the source of the river, than that at the companies' intakes. The figures are interesting, and are given in the footnote[1]. These figures have been confirmed since 1891 by Mr. Young and were given to the recent Royal Commission on water supply, under the chairmanship of Lord Balfour of Burleigh, on which I was a witness.

"The River Lea is joined at Hertford by several tributary streams, all of which are fully described in the little work I had the pleasure to offer for your acceptance.

"The Mimram is the first. This joins the Lea above Hertford. The river, however, is previously increased in volume by a large spring in the park at Woolmers.

"The Mimram is famous for its trout. I shall not, however, say a word about fishing. We are promised a paper on Izaak Walton after lunch.

"The Beane joins the Lea near Benges, and the Rib joins the Beane, and together these streams increase the Lea at Ware Park Mill.

"There is so much of historical interest above and in Hertford, that I fear, out of compassion for my audience, I must leave unsaid nearly all that might be told with advantage, if time permitted, and again refer you to the little blue book in your hands.

"I may for a moment note that at Bayfordbury Hall, Mr. Baker's house, the portraits of 'The Kit Cat Club' are preserved. It is a curious fact that the members of this club were all of considerable rank and position, and assembled

1 ORGANIC MATTER IN SOLUTION IN DIFFERENT REGIONS OF THE WATERS OF THE LEA.
(In grains per gallon.)

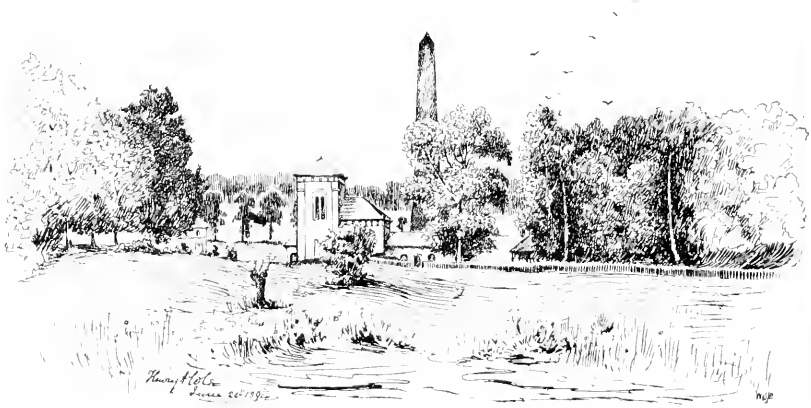
Source of the Lea	0·511	Lea Below Rye House	0·[illegible]
Chadwell Spring, source of the New River	0.693	Lea Below Waltham Abbey	0·[illegible]
Lea, in Town of Hertford	0·637	Lea Below Enfield Lock	0·490
Intake of New Rive from Lea	0·441	Intake of East London from Lea	0·423

for the purpose of eating famous mutton pies, made by one Christopher Cat, familiarly known as 'Kit' Cat, hence its title. Sir Godfrey Knoller painted the more distinguished of the members on one sized canvas, known ever since by artists as the 'Kit Cat' size.

"We have passed the intake from the Lea of the New River Company. Here 22,500,000 gallons are daily drawn.

"On yon hill, to the right of the barge, is the place where Oliver Cromwell hanged a mutineer, and so stamped out a mutiny ere it could assume definite proportions. Prompt action is occasionally of considerable value.

Nearly opposite to us and under the eastern slope of the hill is the rise of the New River—Chadwell Spring. I must explain that in the first of the excellent sketches which Mr. H. A. Cole has done for our programme, we must substitute 'St. Margaret's Well,' for the title he has given in error.



RYE COMMON PUMPING STATION, NEW RIVER COMPANY, ST. MARGARET'S, HERTS., SEEN FROM THE LEA.

"Chadwell Spring produces a flow which ranges from a minimum of 500,000 gallons per day to a maximum of 4,000,000.

"We are now about to order *full steam ahead* and proceed on our voyage; we have a long journey before us, and I am sure that I shall contribute more to the enjoyment of the day if I cease to talk. If you will *en route* occasionally refer to 'The River Lea up to Date,' and if in doubt on any subject ask me for such information as you may require, which I shall give with the greatest pleasure, we shall all get on nicely.

"Ware is the next place we shall reach, and the next lock is Ware Lock. This belongs to the New River Company, and is kept up by them under agreement.

"Before we start I shall refer to the fact, so frequently given in my evidence elsewhere, that *there is practically no pollution above the New River intake.*

"I will not say that there are no pollutions elsewhere, but I will say, as I did

before the Royal Commission, 'that whatever pollutions there may be, and they are not many, they are all oxidised by the natural forces before reaching the East London intake or that of the New River to which I have before referred.'"

Our attention was arrested by a most abominable odour just below Ware Lock, and at once came questions to Major Flower as to its cause. Could he do otherwise than admit that the cause was the Hertford sewage discharge into the famous "Manifold Ditch" and refer the Club to pp. 20 and 21 of "The River Lee up to Date" for explanation? He did more; he explained a scheme of his own for intercepting this abomination and taking it down below Ware Tumbling Bay, a point which he subsequently pointed out, and there filtering the effluent through earth on a sufficient area of land. The only question seemed to be, "*Who is to pay for it?*"

It was interesting, as passing along the river through Ware, to note the dry mouths of the disused sewers which conveyed all the filth of the town into the Lea, and other indications of abandoned sources of pollution.

We noted also "Ware Priory," the pretty home of Mr. Walters, who greeted us as we passed. The Priory, relics of which remain, belonged to a body of Benedictines, who were subordinate to the Abbey of St. Ebrulf, at Utica in Normandy.

About a mile below Ware was noticed the junction of another tributary, the Ash river.

Arriving at Stanstead St. Margaret's, a halt was made, for, whether it was the odours of the Manifold Ditch, or otherwise, "all hands" were ravenous—some suggested "breaking bulk" of ample provision provided for "afternoon tea"; however, this was "barred,"—and some of the more agile of the passengers leaped ashore as a foraging party, soon returning with an ample supply of scones, biscuits, fruit, and other creature comforts, sufficient to allay the cravings of hunger, for our halt for lunch (ordered at 2) was not likely to be attained before 3 p.m. We were late, but no one wished to hurry, and with such lovely weather and pleasant scenery and surroundings, who cared?

We soon arrived at the Rye House, famous as the place where the plot against King Charles II.'s life was hatched. The Castle is reputed to have been built in 1440.

Between Rye House and the junction of the Stort, great interest was shown in the large quantity of the Yellow Mimulus (*Mimulus luteus*, Willd.), which was growing on the Herts bank of the river. It was apparently quite wild, and we were told that it had been naturalised there for years.

The sewage of Ware is carried down to this place and disposed of on an area of land, the sub-soil being the drift gravel of the valley.

We next reach Fieldes Weir, a point of extreme importance, for here is the junction of the River Stort with the Lea, and the volume of water passing down the Lea is gauged. The party landed to examine the process of gauging the flow of water, which was explained by Major Flower. The River Stort, from Bishop's Stortford to Harlow, was traversed by the Club on July 18th, 1888 (see ESSEX NATURALIST, vol. ii., pp. 224-227).

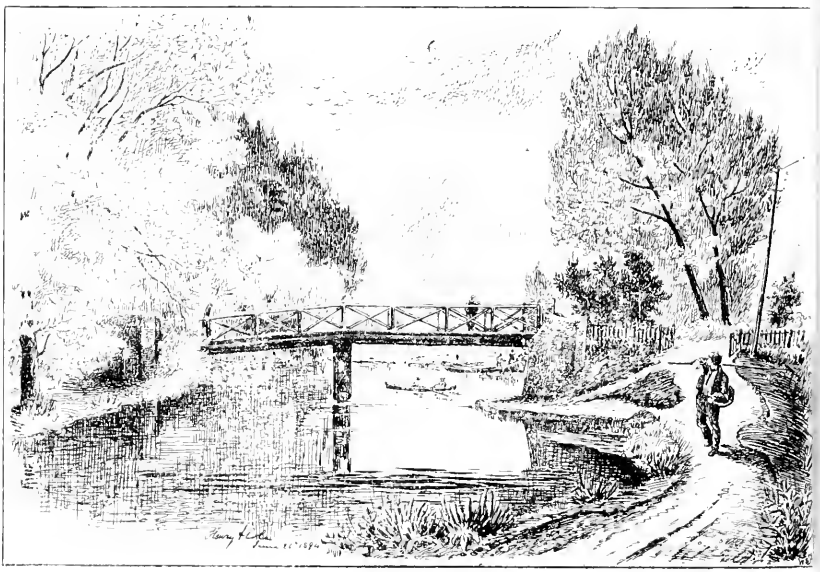
At this point also the rainfall is measured by one of Mr. Symons' gauges. This was an object of much interest on the part of one distinguished member, who promised us a few words on the subject at a later period.

The rainfall for May and June, for this and last year, is recorded thus:

1894	.	May	.	1·58 inch.	June	.	1·76 inch.
1893	.	,,	.	1·02 ,,	,,	.	0·31 ,,

The volume of water passing this year was in May 39,753,000 gallons for twenty-four hours, and in June 29,520,000 gallons in the same time.

The watershed area above Fieldes Weir is 460 square miles, and the average daily flow for three consecutive dry years was 81,000,000 gallons. The Royal Commissioners take the daily total available quantity for this area at 85½ million gallons. The whole watershed of the Lea is 600 square miles.



Bridge over the Lea near Rye House.

Leaving Fieldes Weir we passed along a charming reach of the river, the dome of Haileybury College being a prominent object on the horizon to the right, and soon came to "The Crown," at Broxbourne Bridge, where we went ashore, quite ready for a capital cold luncheon provided by the hostess, Mrs. Beningfield, to which the Club did ample justice, and then went to the pretty gardens attached to this famous hostelry, where the Ordinary Meeting (the 149th) was held, Mr. Chancellor, President, in the chair.

The following were elected members of the Club: Mr. Claude E. Egerton-Green, Mr. Frank Hughes, F.C.S., and Miss Florance Stephenson.

Mr. J. E. Harting read a paper on Izaak Walton's connection with the River Lea, illustrating his remarks with proof pictures from his fine Tercentenary Edition of "The Complete Angler." This paper is printed in present number.

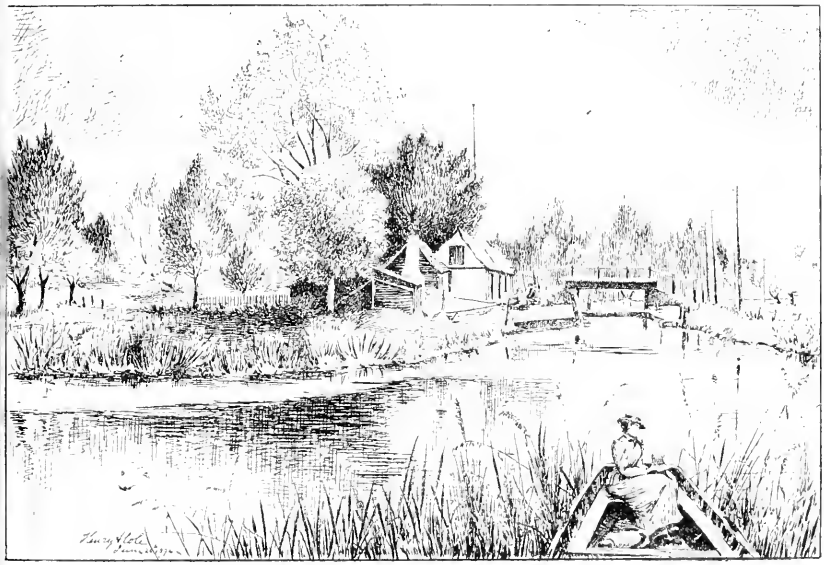
A vote of thanks was passed to Mr. Harting for his very interesting paper, and, on the proposal of the President, Major Flower was cordially thanked for his

conductorship of the meeting, and a like compliment was paid to the Lee Conservancy Board for their kindness in lending the steam barge for the excursion.

Mr. Cole briefly called attention to the project for severing no less than ten parishes near Bishop's Stortford and Stanstead from Essex and adding them to Hertfordshire, and said that he hoped the Club would take an early opportunity of protesting against such an injurious and absurd proposal.

The voyage was then resumed, and Mr. Symons, F.R.S., briefly described the peculiarities of the Rainfall and Water-shed of the Lea Valley, and Mr. T. V. Holmes read a paper on the "Geology of the Lea Valley," which is printed in the present number.

Mr. Charles A. Wright exhibited and explained some specimens of rare and



Junction Lock, near Fieldes Weir, where the Stort Falls into the Lea.

remarkable plants from his herbarium, and also exhibited a curious instance of phyllomorphy in a proliferous and distorted specimen of *Silene inflata*, gathered by Mr. E. Bidwell on July 7th last, at Sproughton, Suffolk.

It was now 4.30 p.m. and all hope of reaching the East London Water Work at Lea Bridge by 7.0, as mentioned in the circular, was abandoned.

The President announced that the journey would end at Tottenham Lock, and those who wished to leave earlier might do so at Ponder's End.

Much has been said and written as to the self-purifying power of the flowing river, and certainly its effect was conspicuous in the Lea, and to this many members of the Club gave ample testimony.

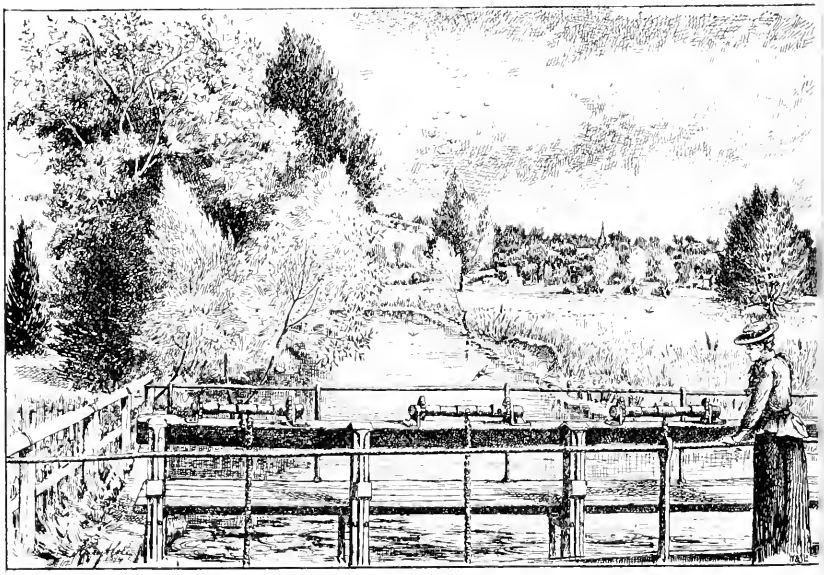
We passed rapidly along and through Waltham Abbey, omitting from want of time, a visit to the East London Company's well and pumping station, which

had been kindly arranged by the Chairman of the Company, Mr. George Banbury; instead of doing so, we went at "full steam" onwards.

"Afternoon tea" and gracefully presided over by the ladies of the party. Hot water was available on board, and after a long exposure to the warm sunshine, the repast was much enjoyed by all present.

Mr. Howard Saunders, F.L.S. (editor of "Yarrell's British Birds," and author of the "Illustrated Handbook of British Birds") gave some account of the more remarkable Birds of the district.

The intake of the East London Company is at Ponder's End—Kidd's Weir. There was an ample supply of good water flowing. But alas! nearly opposite



KIDD'S WEIR, THE INTAKE OF THE EAST LONDON WATER COMPANY. THE LAST INTAKE FOR DRINKING WATER ON THE NAVIGABLE LEA.

the point was moored a most foul-smelling cargo of London refuse—"manure" so-called. Major Flower has no power to prevent pollution to *the air*; and although the water was excellent, the frequency of manure heaps placed on the banks of the stream—fortunately kept back from draining into it as far as is possible—and the barges full of similar filthy refuse, forced the conviction on all present that the air is not as pure as it ought to be, especially below Enfield Lock.

Happily by a recent decision of the Board of Trade, a toll is to be enforced in future; up to the present day "manure" is carried on the Navigation of the Lea *free* "by Act of Parliament." It is to be hoped that this decision will lessen the evil, which is a blot on an otherwise beautiful river.

Tottenham Lock was reached at 9 p.m., and the party dismissed, leaving to a future day a visit to Lea Bridge, which we venture to hope may be accomplished—perhaps next year. Those who took part in the excursion will long

remember the day, and will ever have an affection for the modest stream, so long ill-used and abused, but which now, under the care of the Conservators, puts forth so many claims on the attention of admirers of pretty pastoral scenery, to say nothing of its extreme importance to modern London.

Visit to the Navestock District.

Saturday, July 28th, 1894.

The objects of this meeting as stated on the programme were: (1) to traverse a tract of the county not hitherto visited by the Club; (2) to inspect certain ancient earthworks; and (3) to see a remnant of the old Waltham Forest, which still survives as an outlier of the disafforested district of Hainault.

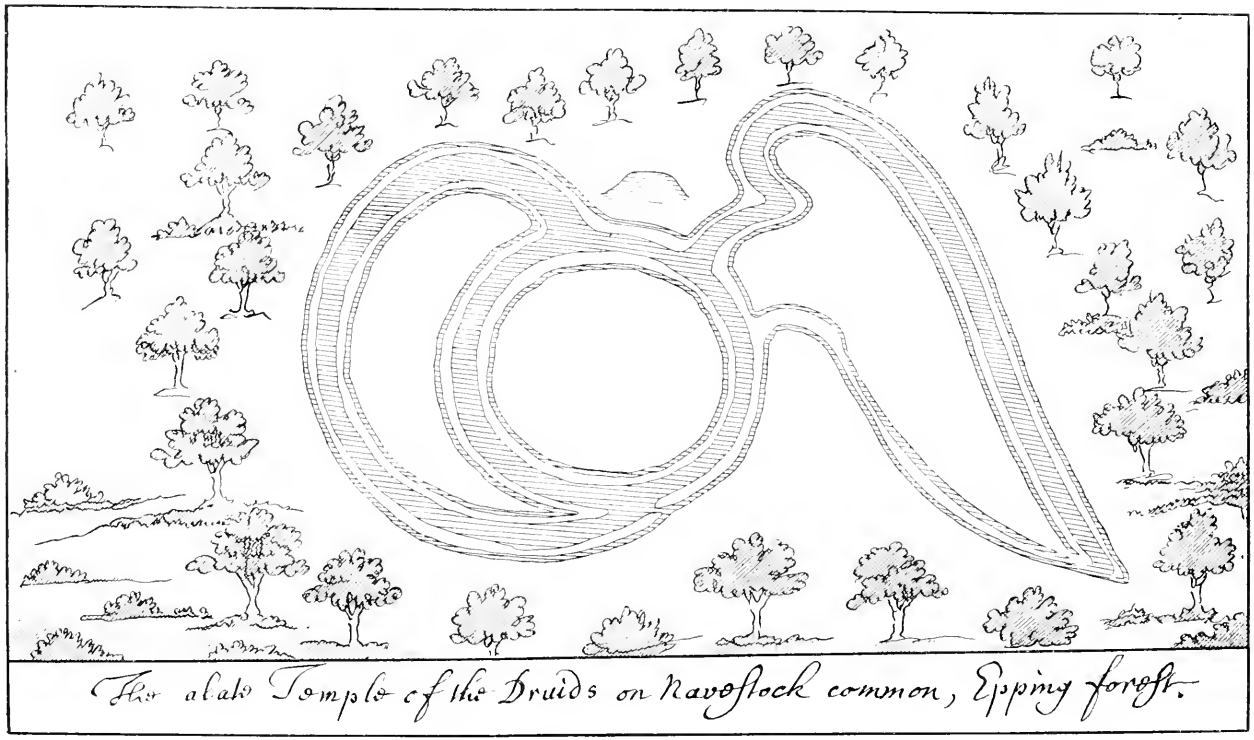
The conductors were the Rev. S. Coode Hore (Curate of Navestock) and Prof. R. Meldola, F.R.S., both of whom had taken great pains in arranging the details of the meeting.

The large party (about 70 in number) drove from Brentwood Station about mid-day, through Gallows Green, Pilgrims Hatch, and Coxtie Green, to the road running in a N.E. direction from Ditchley's to Princes Gate. The drive was a most pleasant one, the Club was again fortunate in the selection of the day; the sun shone out brightly and the very pretty scenery appeared at its best.

At a point on the eastern side of the road just mentioned, a halt was called, and the remains of an ancient entrenchment were pointed out, which there is good reason for believing to be a remnant of the "Alate Temple of the Druids," so called by Dr. Stukeley, who visited the place several times during the second quarter of the last century, and who has left a description of these remains in his Diaries. A copy of an unpublished drawing by the Doctor is here given on p. 214, by the kind permission of the Rev. F. St. John, who is the owner of these MSS. It is probable that in Stukeley's time the work was more complete, and that the ramparts have since been levelled.

Prof. Meldola gave the reason which led Mr. Coode Hore and himself to consider that here were the remains in question. He said:

"We have brought you here to see this circular excavation and entrenchment, not on account of any striking features which they show, but because of the historical interest which attaches to these remains. My colleague, Mr. Coode Hore, and myself, after considering the description given in Stukeley's 'Diaries,' have come to the conclusion that you are now looking at a remnant of what that antiquarian described under the portentous name of the 'Alate Temple of the Druids.' I may state that all the histories and guide books of Essex contain some reference to ancient remains which existed on Navestock Common, the site being sometimes confused with Navestock Heath, which is about a mile from our present position. As soon as it was decided to hold a meeting in this district, I determined to find out the evidence on which this statement as to ancient remains on Navestock Common was based, and ultimately traced it to Stukeley. It is his description which has been transferred under various guises to the histories and guide books, sometimes with the confusion of site already mentioned. Nobody had since identified these remains and the Common itself has since his time been completely under cultivation. Dr. Stukeley seemed very partial to this spot; there are three references to his visits in the 'Diaries' at intervals of several years, as you will learn from Mr. Coode Hore's paper. It is now generally admitted that Stukeley's theories were often fanciful and there can be



The unpublished drawing by Dr. Stukeley, of which this is a reduced facsimile, has been kindly lent for reproduction by Rev. H. F. St. John, of Dinmore Manor, near Leominster.

no doubt that he had a strong predisposition to see 'Druidical' remains in many of the ancient earthworks which he visited. But however visionary his theories, I have no doubt that he actually saw something worthy of note on Navestock Common. He has left a drawing of the supposed 'temple,' of which we have been fortunate enough to secure a copy, through our old friend, Mr. Walter Crouch. What the doctor actually saw, it is now impossible to decide, but I am disposed to think that some kind of an entrenchment was here, of which a great portion has been filled in and levelled by cultivation, and by the construction of the road which runs alongside of it. The remnant before you was seen by the ordnance surveyors of this district and is distinctly entered on the 6-inch map as an excavation, but, wisely, without note or comment. Our reasons for identifying this with Stukeley's site are that it agrees in all respects with his description. He says it was situated on elevated ground on a wild and open common; that it was on the dyke separating the Hundred of Ongar from the Hundred of Chafford; that St. Paul's could be seen from it and that a windmill was near. The dyke separating the Hundreds runs along the bottom of this field; in Stukeley's time this was a wild and open common and less than a mile to the east stood Bentley Mill. The belt of trees now shutting out the view towards London, was not there when Stukeley visited the place: in the old ordnance map this copse, now called the Mores, is entered as the 'New Plantation.' My colleague, Mr. Coode Hore, discovered this excavation and drew my attention to it; if we are right in locating Stukeley's 'temple' here it is certainly an interesting rediscovery of a lost site. That there was an entrenchment where the present fosse now runs, will not be doubted by those experts who are accustomed to the appearance of such ancient excavations.[1] The 'alate' form has probably been exaggerated in Stukeley's drawing in order to emphasise his theories."

The carriages were then re-entered, and the drive was continued by Navestock Side to the summer-house in Navestock Park (not far from Dudbrooke House) near the site of the hall, demolished in 1811, the new Dudbrooke House having been built about a mile away. Here the party met with a cordial reception at the hands of Mr. and Mrs. D. P. Sellar, who are now living at Dudbrook, and who had most kindly provided a sumptuous luncheon in a marquee erected near the summer-house, from whence charming views were obtained of the park, of the lake, and of the beautiful and well-wooded country beyond.

Mr. and Mrs. Sellars having welcomed the guests, were obliged to leave, owing to another engagement, but they were not allowed to go before a hearty vote of thanks had been tendered to them by the President, Mr. Chancellor, on behalf of the company.

An Ordinary Meeting of the club (the 150th) was then held, the President in the chair.

Mrs. Horace T. Brown was elected a member.

The Secretary stated that he had received a letter from the City Solicitor saying that the Epping Forest Committee had granted the application of the Club with regard to the establishment of a small local museum, to illustrate the natural history and archæology of Epping Forest, in the Queen Elizabeth's Lodge, at Chingford, subject to an agreement to be entered into between the parties, the draft of which the City Solicitor would prepare and submit to the Council of the Club.

[1] The "Temple" is distinctly described as an earthwork in the "Diaries"; no stone is mentioned.

An important discussion was opened by the President with regard to the threatened mutilation of Essex by cutting off no less than ten parishes in the Bishop's Stortford Union on the western side of the county. The proposed transfer was thus described in the notice calling the official inquiry :

"A proposal for the alteration of the boundary of the Administrative Counties of Essex and Hertford, so as to bring the ten Essex parishes of Berden, Birchanger, Elsenham, Farnham, Great Hallingbury, Little Hallingbury, Henham, Manuden, Stansted Mountfitchet, and Ugley, within the Administrative County of Hertford, and for their inclusion in the Area of the New Rural District in the County of Hertford to be formed of the Hertfordshire parishes of the Bishop's Stortford Union, and thus to form one Rural District within the said Union."

Mr. I. Chalkley Gould, in a vigorous speech, strongly objected to the proposed transfer, urging that it should be opposed not only on the grounds of sentiment and the loss of many places of archæological interest, but also from financial considerations. It would mean a loss in rateable value of £43,000 a year, no fewer than 22,955 acres of land (with a population of 6,908) being involved, as well as such parishes as Stansted and Elsenham, containing rich properties which would bear an important share of local taxation of the future, in whichever county they might be placed. From the archæological standpoint Mr. Gould asked whether Essex was to lose Berden, with its charming Elizabethan mansion and its earthwork, Hallingbury House and Park, Stanstead Castle earthworks, Manuden Hall and Church, Henham Church—all exceptionally interesting—and Wallbury, the grandest British camp in Essex. Mr. Gould moved the following resolution :

"That, in the opinion of this Meeting, the proposed transference of Ten Essex Parishes belonging to the Bishop's Stortford Union into the County of Hertfordshire, and of Bartlow Hamlet into Cambridgeshire, would not only be injurious to the general welfare of our County, but also, from a scientific and antiquarian point of view, would wrench from us some of the most beautiful villages in Essex ; would confuse maps, scientific and general statistics and reports ; would take out of the county many interesting antiquities ; and, above all, would tend to destroy that patriotic pride in the minds of Essex men which it should be the object of all public bodies to foster."

Mr. W. Cole warmly seconded the resolution, and (in the words of "The Essex County Chronicle") "speaker after speaker delivered himself in indignant terms against the extraordinary folly and injustice of the proposed proceeding, and very great regret was felt that steps had not been taken earlier to ascertain and arouse the real feelings of Stansted and the other affected parishes, which are now beginning to be expressed against 'the deep damnation of their taking off.'"—Mr. F. Smoothy (C.C.) remarked that if the transference were carried out, Essex would lose some very good men, such as Sir Walter Gilby and Mr. W. Fuller Maitland, M.P., whose seats were in the parishes named.—Mr. W. W. Glenny (vice-chairman, C.C.) said he had no doubt that the great majority of the Essex County Council were against the severance, but what was wanted was a missionary expedition to stir up the parishes affected. They seemed quite ready to leave the beneficent rule of Essex, the rates in Hertfordshire being a little less. (Laughter.) He believed, however, that it was only an accident of the moment that the rates in Essex were slightly more than in Hertfordshire, and that the parishioners would have nothing to gain by the change.—Mr. Thomas Thompson mentioned that at an influential meeting in Stansted a strongly-worded resolution against any lopping of the county of Essex was passed.—Mr. E. A. Fitch

(C.C.) said no doubt that was so, but some time ago resolutions were passed in seven out of eight Essex parishes in favour of the change. The result had been that by the casting vote of the Chairman a resolution had been carried by the Joint Committee of the Herts and Essex County Councils in favour of the change. Now the matter had to go before the Local Government Board.—Mr. Walter Crouch suggested that the Club should make a crusade in the parishes.—Mr. J. C. Shenstone and Mr. F. H. Meggy were strongly of opinion that the Field Club should hold a meeting in the district; and after the resolution had been heartily accepted by the large meeting, and carried by acclamation, the matter was referred to the Council of the Club.

[*Note.*—The resolution was extensively circulated, and met with very general approval by members of Parliament and others, but happily further action was rendered unnecessary, as at a meeting of the Districts and Parish Councils Committee of the Essex County Council, held on July 30th, after an emphatic protest had been read from nine of the ten parishes concerned, the following resolution was unanimously adopted: "That this committee, having received the report of the Joint Committee with respect to the Bishop's Stortford Union area, emphatically protests against the proposed transference of the parishes of Berden, Birchanger, Farnham, Great and Little Hallingbury, Henham, Manuden, Stansted Mountfitchet, Elsenham, and Ugley from the county of Essex into Herts."—The Clerk was directed to send a copy of the resolution to the Local Government Board, together with a copy of the memorials against the proposals, and the Essex delegates were authorised to take such further action as they may consider advisable. At the next meeting of the County Council this resolution was confirmed, and the danger of this most ill-advised and pernicious proposal was avoided.]

A walk through the park and fields of about a mile brought the party to "Fortification Wood," near Bois (or Boys) Hall. The name "Fortification Wood" is that on the Ordnance Map, but it was formerly known as the "Defence of Navestock." Within the wood is an ancient Earthwork, which has fortunately, as Prof. Meldola observed, been preserved in consequence of the thick overgrowth, which was evident to the visitors, who had to bend their way along as if in a dense plantation. Prof. Meldola described it as a well defined oblong "camp" which had long been known, and which was entered on the Ordnance Map, and judging from the sketch on the 6-inch map, it would appear to be about half the size of Ambresbury Banks in Epping Forest, and therefore about six acres in extent, As is the case in similar ancient Earthworks, nothing is known concerning its age; tradition is silent, and no systematic excavations have ever been made to ascertain the probable date of the "camp."

From Fortification Wood the drive was continued in a westerly direction towards the valley of the Roding, which was reached at Shonks Mill (a picturesque corner of bygone Essex), and so on, following the south side of the river, to Curtis Mill (or Court Mill) Green, which was the extreme north-eastern limit of the Great Forest of Essex (or Waltham Forest) in the time of James I. Here an interesting examination was made of one of the old boundary stones, known as "Richard's" stone, which was put up at the time of the perambulation of 1641. The eastern boundary was marked by seven stones, five of which have been discovered. The "Havering stone" is now let into the wall of the garden of a house facing Romford Road. Rubbings were exhibited of "Mark's" stone and the "Warren" stone. The last-named stone had been found by Prof. Meldola and Mr. Cole lying in a ditch, some hundred of yards away from its original position.

It is unnecessary to quote the remarks made on these very interesting boundary stones at the meeting, inasmuch as they are embodied in a paper by Prof. Meldola, entitled, "The Eastern Boundary Stones of the Forest of Waltham," with illustrations by Mr. H. A. Cole, which will appear in THE ESSEX NATURALIST.

Time would not allow all the party to visit "Navestock Stone," which had been found sunk in the banks of a stream, and which had been exposed by excavations in readiness for this meeting.

Then, in the words of the report of the meeting by Mr. Thompson, editor of "The Essex County Chronicle," "through charming undulating country, the party then proceeded to South Weald, one of the fairest of all the fair parishes in Essex, skirting the lordly parks of Weald Hall and Rochetts, to the Tower Arms Hotel, where an excellent tea, with many dishes of fruit, was provided. After this, a few went into the sweet old church of St. Peter, and there saw painted windows, alabaster chancel screen, sculptured reredos, and other ecclesiastical embellishments, notable for beauty of design, colour and execution."

Later in the evening members and friends re-assembled on the lawn of the inn to listen to the Rev. Coode Hore's paper on "Navestock in Olden Times—Stray Notes, Prehistoric, Saxon, Norman," printed in the present number of THE ESSEX NATURALIST.

Hearty votes of thanks were passed to Mr. Coode Hore for his paper, and to the local land-owners for their courtesy in allowing the party to pass over their grounds, and a pleasant drive back to Brentwood Station brought the meeting to a close.

ANNUAL CRYPTOGAMIC AND BOTANICAL MEETING.

Saturday, October 13th, 1894.

THE annual "Fungus Foray" was held in Epping Forest, at High Beach, on this day. The headquarters for the meeting was at the "King's Oak," and the arrangements were similar to those of last year, the scientific direction being, as usual, in the hands of Dr. M. C. Cooke.

About fifty members and botanical friends attended, and the search in the forest for specimens of Fungi was more successful than for several years past. A very large number of species were obtained, and some of the specimens were remarkably fine. One species was particularly abundant, viz., *Craterellus cornucopioides*, which could be gathered literally by hundreds on the woodland slopes in Honey Quarters. Seven new species were added to the Forest list.

The specimens as gathered were arranged on tables in the large room at the hotel, and presented a very beautiful sight.

After tea the 151st Ordinary Meeting was held in the exhibition room, Prof. R. Meldola in the chair.

Mr. J. W. Barefoot and Mr. S. J. Tomlinson were elected members of the Club.

The Secretary announced that the Club's petition to the Epping Forest Committee of the Corporation of London for the use of Queen Elizabeth's Lodge as a museum for the illustration of Natural History, &c., of Epping Forest, had been granted, and when certain legal formalities had been completed work in the arrangement of the specimens would be commenced. About £80 or £90 had already been subscribed to the "Epping Forest Museum Fund."

Dr. Cooke reported on the day's observations. It had been one of the best collecting days for fungi for many years. A very large number of species had been found, and, in many cases, the individuals were not only numerous, but very fine in condition and beauty. He anticipated some additions to the Epping Forest lists when some specimens about which he was doubtful had been subjected to more careful examination at home.

[Dr. Cooke subsequently communicated a list of the new species, which is printed in the present number, page 224.]

Dr. Cooke then delivered a very amusing address, entitled, "Some Confessions of a Fungus Eater."

The remainder of the evening was spent in examining the specimens on the table.

The 152nd Ordinary Meeting.

Saturday, November 24th, 1894.

The 152nd Ordinary Meeting of the Club was held in the Vestry Hall, New Street, Chelmsford, at 6 p.m., Prof. R. Meldola, V.P., in the chair. The President, Mr. Chancellor, sent word he much regretted that illness prevented him from being present.

Mr. W. Nicholson and Mr. G. T. Weeks were elected members.

Mr. Cole exhibited the lower jaw of a Mammoth (*Elephas primigenius*) with molar teeth *in situ*, found a few days before in Mr. Brown's clay-pits at Chelmsford. Mr. Cole said that they owed this fine addition to their Museum to Mr. Brown's kindness. He had also to thank Mr. Chancellor and Mr. Meggy for aid given in the negotiations for the acquisition of the specimen.

Mr. Crouch and Mr. T. V. Holmes made some remarks upon the specimen, and the latter gentleman promised to describe the geology of the site of the pit for The Essex Naturalist (see next volume).

Mr. Meggy exhibited part of the lower jaw of *Rhinoceros antiquitatis* (= *tichorhinus*), with six teeth *in situ*, found that afternoon also in Mr. Brown's pit. This specimen Mr. Brown had presented to the Museum.[1]

Mr. Crouch exhibited some lumps of hardened clay recently obtained from the gravel pits at "Carswell," Barking Side, which he thought were the remains of the "wattle and daub" of prehistoric dwellings formerly existing there, and connected with the Romano-British relics found in the pits. (See Essex Nat. vii., pp. 104-7, and vol. viii., p. 49).

Mr. Miller Christy exhibited and presented to the Club a length of leaden water-pipe from his house at Broomfield, gnawed in a most remarkable manner by rats. He thought the specimen showed that the object of the rats in making these laborious workings was not, as had been commonly asserted, to obtain water; a very small hole would have sufficed for that purpose, whereas, in the present instance, the rats had gnawed a hole extending over more than 18 inches of the length of the pipe.

Mr. Shenstone exhibited, on behalf of Mr. Quinton Brown, a spar picked up on the Essex coast, exhibiting a curious re-growth of wood-tissue inside a cylinder of wood, so that the spar consisted of a tube with a solid rod of wood inside. The opinion of the botanists present was that a temporary arrest and re-growth of the cambium layer had occasioned the phenomenon.

1 These specimens were subsequently described by Mr. E. T. Newton, F.R.S., in a paper communicated to the Club. See next volume.—Ed.

Mr. Durrant, one of the Librarians, reported that Dr. Cooke had presented to the Library about thirty books, consisting mainly of local floras.

Dr. Henry Laver, F.L.S., then read a paper on "Potash-making in Essex; a Lost Rural Industry." This paper will be printed in full in the next volume of THE ESSEX NATURALIST. An interesting discussion ensued, carried on by Prof. Meldola, Mr. J. Spiller, Mr. Dymond, Mr. Shenstone, Mr. Chalkley Gould, Dr. Thresh, Mr. Webb, Prof. Almond, Mr. T. V. Holmes, and the author.

The Rev. W. C. Howell read "Short Notes on the Foxglove, chiefly Etymological and Local."

Mr. Miller Christy gave a description of a specimen of the Serotine Bat (*Scotophilus serotinus*), which he exhibited and presented to the Club, recently caught in his house at Broomfield, being the second known Essex specimen (*ante*, page 102).

Cordial votes of thanks were passed to the authors of the papers, and to Dr. Cooke, Mr. Brown, and Mr. Christy for their valuable donations.

The Museum was open during the afternoon, so that the members might see the progress already made in the arrangement of the rooms.

NAVESTOCK IN OLDEN DAYS; STRAY NOTES, PREHISTORIC, SAXON, AND NORMAN.

BY REV. S. COODE HORE, CURATE OF NAVESTOCK.

[*Read July 28th*, 1894.]

AS a matter of course, the very mention of *prehistoric* times precludes any reference to the derivation of the name by which our parish is now known. That the place, however, now called Navestock, was inhabited at a very remote period is evident from the earthworks which remain as silent witnesses to the existence of such inhabitants.

I venture, to-day, to call your attention to two of such earthworks:

1. The first was referred to repeatedly during the last century by the well-known antiquarian Dr. Stukeley, as "The Alate Temple, on Navestock Common."

2. The second is described on the map of the Ordnance Survey as a camp.

I. THE ALATE TEMPLE.

Dr. Stukeley made several visits to Navestock. He discovered here an earthwork which his biographer says was supposed by him to have been an Alate Temple of the Druids (Mem. of Dr. Stukeley, *Surtees Society*, vol. III., p. 157), but I will give you the doctor's own

words, which I quote from his family "Memoirs," as published by the Surtees Society :

[Vol. III., p. 163.] "October 8, 1725. At the Alate Temple, Navestock Common.

"August 29, 1749. We went by Weald to Navestock Common to view the Alate Temple of the Druids, which I had seen twenty-five years ago. 'Tis on very elevated ground ; we may see St. Paul's Church there, and, down the river, an open heath oregrown with fern, erica, and the like plants on a dry, gravelly soil : great woods of oak all around, being on the edge of Epping Forest. The Temple is formed by mounds of earth, a ditch, the earth whereof is thrown out both ways. What I should call the meridian line of it is south-east, regarding the Thames. 'Tis ingeniously designed, the right wing as in action, the whole as it were in perspective. Many names of places hereabouts seemingly retaining to British. Navestock is the old oak by the temple, graph, alatus. Kelvedon hardly[1] the abode of the Druid that kept the place, whose name, probably, was Kelvis ; Kelweis,[2] a town upon the River Avon, not far from Abury, Wilts. Doddinghurst. Hurst, a town in Wilts, near Crokewood,[3] not far from Devizes ; Hurst, near Isle of Ely, where the old Britons long remained after the Saxons had driven 'em out elsewhere.

"Mr. Lethulier showed me the many cast celts of brass found near here lately[4] most of them of the recipient kind, and with rings to hang 'em by. One of the received, but the sides remarkably bent in order to hold the staff the better : 'tis broke, but the sides so much broader than ordinary and so bent, strongly confirm my notion of the use of those celebrated instruments, that the Druids used them to cut down the mistletoe with at their winter sacrifice.

"I observe that our temple is upon the division dike of Chalford[5] and Ongar. They that laid out these hundreds took the opportunity of this antiquity on a wide and open common, to draw their ditch near it as a remarkable and known thing.

"Mr. Lethulier showed me an infinite collection of all kinds of curiosities. . . . The road here is the great Roman road to Camulodunum, or Colchester.

"The Druids studiously formed the two wings in different attitudes on purpose to hide the appearance from vulgar eyes ; to render it, as it really was, symbolical and mystical ; and to represent it as in action, being, as Moses expresses it, the Spirit of God which moved on the face of the waters. Hence the Egyptians place this sacred character on their canopuses ; hence the alate temple on the bank of the Humber ; and this, though at a distance, regards the Thames' mouth, its meridian line (as I call it) being south-east. Thus the greatest star in the heavens, Canopus, at the bottom of Argo Navis, just skims the horizon, as brooding on the face of the ocean. Plutarch thinks Osiris' soul is in that star, which intimates the building, or rather making, such temples at the sepulchres of great kings as protectors of their ashes, and conductors of souls of heroes to their beatifyed estate, which custom was in time occasion of their deification. The Orientals have a wonderful notion concerning this star of Canopus, and worshipped it.

[1 hard by.—S.C.H.]
2 Probably Kellaway's, near Chippenham.
3 Crockwood, east of Potterne.
4 Not mentioned among bronze hoards, by Mr. Evans, in his work on "Bronze Implements of Great Britain."
[5 Chafford.—S.C.H.]

They thought it cherished, increased, and preserved all things, as the learned Hyde writes upon Ulegh Begh.

"Oct. 20, 1749, at the Alate Temple on Navestock Common.

"Aug. 5, 1761, at the Alate Temple on Navestock Common. 'Tis much oregrown with fern, and but lately, so that 'tis difficult fully to discern it. They have dug gravel there lately. Foxglove in bloom there still. Near it, by the windmill, is another work, for sports, like that in Westmoreland, called King Arthur's Round Table."

It will be seen from the above that Dr. Stukeley persisted in what his biographer terms his "fanciful conjecture" for a period ranging over thirty-six years.

We have to-day identified the site of the so-called "Alate Temple," having proceeded there by the same route as that made use of by Stukeley in 1749, viz., by Weald. We found what remains of it upon and embracing part of the road leading from Ditchleys, at S. by W., to Princes Gate, N. by E., and still touching very nearly upon the division dikes of the Hundreds of Chafford and Ongar. At Stukeley's last recorded visit, in 1761, the spot was still a wide and open common. It was very shortly afterwards enclosed, as we gather from Gough's edition of Camden, published in 1789.

This common enclosed, therefore, between 1761 and 1789,[6] is now, and has been for many years, under cultivation, and, doubtless, the only remains of this ancient earthwork still visible form but a small portion of the Temple which presented itself before the admiring eyes of Dr. Stukeley.

[See copy of Dr. Stukeley's plan of the "Temple" in the report of the meeting at Navestock on July 28th, 1894, *ante* p. 214.—Ed.]

I leave it to you to determine how far the plan drawn by the learned doctor, and now in your hands, may be recognisable in the greatly diminished but still surviving site of his Alate Temple.

II. THE EARTHWORK IN FORTIFICATION WOOD.

A second survival of the handiwork of the ancient inhabitants of Navestock is to be found in Fortification Wood, situated, roughly speaking, to the south of the road leading from the eastern portion of Navestock Park to Bois Hall and Dudbrook, and bounded on the north by Drake's Hill and Slades. This wood is marked on the Ordnance Survey by the word "camp," and the shape of such camp is more or less defined on the six inches to a mile issue of such Survey.

6 Since writing the above, I find the date of its Enclosure Act to have been 1768.

I am strongly inclined to think that this earthwork and wood may be identified with a certain wood known in the year 1222, as "The Defence of Navestock," with which its present title, "Fortification Wood," may be said to be synonymous.

We find in an Ecclesiastical Visitation of that date, known as The Domesday of St. Paul's, the following entry, "Stephen son of Robert holds [amongst other lands] half-an-acre juxta defensum de Nastok,"[7] and of this same Stephen it is further recorded that "he claims hereditary right in the forest of wood which is called The Defence, and shall answer to the Canons or their Bailiff concerning injury to the trees and shall have of windbreche whatever in the sight of the bailiff may be deemed unfit for timber, as also the loppings of the trees which are strewn about during the felling of timber."[8]

If Fortification Wood (as I take it to be) is identical with "The Defence of Navestock" (which latter was certainly a forest of wood capable of producing full-grown timber in 1222), some considerable antiquity must be allowed for the execution and *employment* of this earthwork, which by the kind permission of our good friend and most hospitable host, Mr. Sellar,[9] we have permission to visit to-day.

In connection with this work as a place of defence, I venture to call your attention to its position—directly east of Navestock Park and Church—the vicinity of Beacon Hill (a suggestive name in connection with defence)—and in particular to the shapes and positions (as marked upon the Ordnance Map) of the small clumps of wood by which it is bounded on the south-east, south, and south-west. Those among you who have visited the earthwork at South Weald known as "The Camp," may possibly have some suggestion to offer as to whether or not Fortification Wood—anciently known as "The Defence of Navestock"—and "The Camp" at South Weald, may have once had some or any features in common.

III. NAVESTOCK IN SAXON TIMES.

From the prehistoric we now turn to the historic period, and naturally the first question to be answered is: What is the origin and derivation of the name of the place itself? I fear that I cannot give a satisfactory answer.

7 Hale's S. Paul's Domesday, p. 79.
8 *Ibid.*, p. 75.
9 D. P. Sellar, Esq., Dudbrook.

Putting on one side Dr. Stukeley's unsupported theory that it signified "The Old Oak by the Temple," we turn to the various spellings of the name which occur in various documents. Thus we find Nastok, Nastoke, Nasestocha, Nasingstock, etc., and possibly Astoca, of Domesday. Morant suggests Nafis or Nœfis, without giving its signification, and *stocce*, felled timber. Unfortunately, the name is not referred to in Isaac Taylor's "Words and Places." He only tells us that stoke or stowe was a common suffix, and signified a place stockaded with stocks or piles, like a New Zealand Pah.

So much for the name. I pass on to notice one of the most interesting relics of Saxon times to be met with in our Parochial History. This is to be found in the ceremony of Watch and Ward, known throughout the Hundred of Ongar as the Tale, Tallying, or Cutting, of the Wardstaffe, at a certain period of the year known as Hocktide. This festival commenced a fortnight after Easter. We gather from documents of the 13th century that it was one of the most important business seasons of the year. Thus at this period Parliaments were wont to assemble, weights and measures were adjusted, rents and other dues were called in, and the above ceremony of the Wardstaffe was performed.

An account of this Tale or Tallying of the Wardstaffe occurs in Blount's "Ancient Tenures" and in many other authors, but they are all more or less copied from the particulars furnished by Morant in his "History of Essex."

As the subject is one of great interest, I venture, even at the risk of wearying you, to repeat the greater part of Morant's description, omitting only such particulars as may be unnecessary to the subject in hand, and making only a few additions and alterations suggested by Mr. Singer in "Notes and Queries."[10]

"This description is taken from an account of the rents of the Hundred in the time of John Stoner (of Loughton) who had a grant of it in his life time 34 Henry VIII. and died in 1556, and in which grant the above mentioned ceremonies are said to have been such as have been executed, done, paid, used, and observed and kept not only in the time of Edw^d 3rd and Robert Bruce some time King of Scots but also in the time of his noble progenitors Kings of England long before when the Saxons inhabited this realm as manifestly may appear more at length by ancient records thereof made by Humphrey de Bohun then Earl of Hereford and Essex and Constable of England, Lord of the said Hundred dated at Pleashy 10. July xi of same King Edward as also by divers other ancient and sundrie notable Records, the same remaining written in the Saxon tongue.

10 3rd Vol., 1st Series, p. 57.

"Aungr Hundred. The order of the gathering and yearly making of the Wardstaffe of the King there, with the due course and circumstance of the yearly Watch Ward and Service Royall incident to the same, *i.e.*, First, The Bailiffe of the said Libertie or Hundred shall gather and yearly make the Wardstaffe of some Willow Bough growing in Abbasse Roothing Wood, the Sunday next before Hock Monday,[11] which shall containe in length three quarters of a yard and eight inches round in compasse or thereabouts. And hee shall convey the same ymediately unto the Mannor Place of Ruckwood Hall in Abbasse Roothing aforesaid where the Lord of the said Manor for the tyme being shall reverently the same receive into his house, and shall rowlle itt upp in a fair lynnen cloth or towell, and so lay it upon some Pillowe or Cushion on a table or cubberd standing in the chiefe or highest place in the Hall of the said Maner Place, there to remain until the said Bailiffe shall have refreshed himself. And when the said Bailiffe shall see convenient tyme to departe he shall convey the same Staffe by sunne shineing unto Wardhatch Lane beside Long Barnes in Roothing aforesaid, when and where the said Lord of Ruckwood Hall and all and everie other tennant and tennants, landowners, which by reason of their Tenure doe hould their lands likewise by service Royall, to watch and warde the said staff there upon convenient summons and warning to be given unto them yearly by the said Lord of Ruckwood Hall for the time being with their full ordinarie number of able men well harnished with sufficient weapon shall attend. Where uppon the Lord of Ruckwood Hall shall then and there yearly, at his proper costs and charges, have ready prepared a great Rope called a Barr, with a Bell hanging on the end of the same—which he shall cause to be extended overthwart the said Lane as the custom hath beene to stay and arrest such people as would pass by. Att the end of which said Barr, not far from the said Bell, shall be laid down reverently the said Staffe upon a Pillowe or Cushion on the grounde, which done forthwith the said Bailiffe shall call the names of all the aforesaid tenants, landowners who shall present their said ordinarie number of men accordingly. Then shall the said Bailiffe in the King our soveraigne Lord's name, straightlie charge and command them and everie of them to watch and keep the Ward in due silence, soe that the King be harmless and the Countree scapeless until the sunne arising, when good houre shall be for the said Lord of Ruckwood Hall to repaire unto the said Staffe, who in the presence of the whole Watch shall take the same Staffe into his hand, and shall make uppon the upper rind of the same with a knife a score or notch as a mark or token declaring their loyall service done for that year in this behalfe. And soe shall deliver the said Staffe unto the Bailiffe, sending it unto the Lord or Land Owner of the Mannor of Fifhield, or unto the Tennant resiant, saying this notable narracion of the Ward-staffe, hereafter written in the Saxon tongue, which done they may hale up the said Barr and depart at their pleasure.

THE TALE, TALLYING OR CUTTING OF THE WARDSTAFFE.

The Bailiffe of the Liberty

Iche athied[12] the staffe byleve
Thanne staffe iche toke byleve
Byleve iche will tellen[13]
Now the staffe have Iche got

11 2nd Sun. after Easter.
12 cut.
13 tally or score.

Lord of Ruckwood Hall

Tho the staffe to me com
Als he hoveon for to don
Faire and well iche him underfing
Als iche hoveon for to don

Bailiffe

All iche thereon challenged
That theron was for to challenge
Nameliche,—this :—and—this :
And all that ther was for to challenge

Lord

Fayer iche him nppdede
Als iche hoveon for to don

Bailiffe

All iche warnyd to the Ward to cum
That therto hoveon for to cum
By Sunne Shining.

Lord

We our roope theder brouhton
A roope beltan[14]
Als we hoveon for don
And there waren & wakeden
And the Ward soe kept
That the King was harmless
And the country scatheless

Bailiffe

And a morn when itt day was
And the sun arisen was
Faier honour weren to us toke
Als us hoveon for to don

Lord & Tenants

Fayre on the staffe we scorden
Als we hoveon for to don
Fayre we him senden
Theder we hoveon for to sende

Bailiffe

And zif ther is any man
That this wittsiggen can
Iche am here ready for to don
Azens himself, iche one
Other mid him on
Other mid twyn feren
Als we ther weren
Sir byleve take this staffe
This is the Tale of the Wardstaffe

The Munday following called Hock Monday the said Staffe shall be presented yearly unto the Lord and Owner of the Manor of Fiffield for the time being, or his resient who shall ymediately unfold the clothes it is wrapped in, that it may appear by the score made thereon how the aforesaid Lord of Ruckwood Hall and other Tennants which by reason of their Tenures of their lands owe suit and service to watch the said staffe at Abbass Roothing aforesaid have done their Watch and Service Royall accordingly the night before. Then shall he clothe it

14 A rope with a bell appended.

again, lay it in order, and use it in every degree as the Lord of Ruckwood Hall hath done &c. . . . [Here I omit the various other Watches.]

This is called Navestock Watch.

Wednesday following the same is yearly presented to the Lord of the Manner of Loft Hall in Navestock &c. The Watch is kept in Three Wants Lane.

Morant goes on to say:

"This procession seems to have been a yearly muster of fencible men who were appointed to guard the Hundred against murders and robberies for both of which it was liable to pay a fine. If by preventing these the King receives no harm as in the loss of a subject or the felonious breach of his peace the subject escapes a fine otherwise due for suffering a murderer or thief to escape."

The ceremony began at Abbasse Roothing, as we have seen, as at the extremity of the Hundred, went on to Chigwell, the other extreme, and returned to High Laver, which is in the neighbourhood of Ruckwood Hall. At one of these two Manor Houses we may suppose it deposited, with due regard to Royal authority. What we learn from the records concerning the design of this ceremony of the Wardstaffe is—that it was to represent the King's person and to keep the King's peace, as is illustrated by the following records:

Inquisition 15 Henry 8. Margaret Nynge held 4 acres of pasture 2 of meadow & 3 of wood in Bobbingworthe of our Lord the King by the service of keeping the Rod of our Lord the King called the Wardstaffe at Bobbingworth annually when it shall come there by which particular the person of the King is represented.

Some lands were held by the service of finding two men to watch with the Wardstaffe: others of keeping the Wardstaffe and of paying Wardsilver and doing white service at the Wardstaffe. Thus John Wright. 6 Jas. 1st held the manor of Kelvedon Hatch of Robert Lord Riche as of the Wardstaffe and by the the service of finding 2 men to watch with the aforesaid Staffe for all services.

Reginald Rysmere 22nd Henry 7th held the manor of Daweshall in Lambourne of the Duke of Buckingham as of the Castle of Ongar by fealty and the payment of 2s. per annum called Wardsilver and to make white service for the Lord Duke at the Wardstaffe.

Cecelia Walis 23rd Henry 7th held the Manor of Madale in Epping of the same Duke by the service of keeping the Wardstaffe and this in lieu of all other services.

Lastly, Morant, quoting from the Rolls of Assize 36 Henry 3rd, tells us that the wardstaffe was to be carried through the Towns and Hundreds of Essex as far as to a place called Attewode near the sea, and be thrown there into the sea.

The only light thrown upon this account of the ceremony that I have been able to meet with is that furnished by Sir Francis Palgrave in his "Rise of the English Commonwealth," from which work I have gathered the following information.

It is remarkable that on the Continent there appear to be very few subsisting traces of popular courts being held in the open air, save and except in a few of the strongholds of Teutonic liberty. On the contrary, in England, the ancient mode of assembling the suitors of the Hundred "beneath the sky," continued to be retained with remarkable steadiness, and "The Tale of the Wardstaffe" appears as a strange and uncouth fragment of the earliest customs of the Teutons. Thus we learn that the Free Field Court of the Abbey of Corbey was in Pagan times under the supremacy of the Priests of the Eresburg—the temple which contained the Irminsule or Pillar of Irmin the Olympus of Teutonic belief. This court consisted of sixteen persons. The Senior member presided as Gerefa or Graff. The Junior was called Frohner or Summoner. The remaining fourteen acted as the Echevins or judges.

The seat of judgment, "the King's Seat," was always on the green sward; the tribunal, the common fields; and the purpose, decisions relating to land. The King's seat was a plot sixteen feet in length and breadth, and when the ground was first consecrated the Frohner dug a grave in the centre, in which each of the free Echevins threw a handful of ashes, a coal and a tile.

It was also the very essence of the Court that it should be held beneath the sky and by the light of the sun. All the ancient Teutonic judicial assemblies were held in the open air, and some relic of their solar worship may perhaps be traced in the usage and in the language of this tribunal.

When a criminal was to be judged or cause to be decided, the Graff and the Free Echevins assembled round the King's seat, and the Frohner having proclaimed silence opened the proceedings by reciting the following rhymes:

"Sir Graff, with permission
I beg you to say
According to law, and without delay
If I, your Knave
Who judgment crave
With your good grace
Upon the King's seat, this seat may place."

To this address the Graff replied:

"While the sun shines with even light
Upon masters and Knaves I shall declare
The law of might, according to right,
Place the King's seat true and square;

Let even measure, for justice sake
Be given in sight of God and man;
That the plaintiff his complaint may make,
And the defendant answer—if he can."

The Frohner, having placed the seat in the middle of the plot, proceeds:

"Sir Graff, Master brave
I remind you of your honour here,
And moreover that I am your Knave;
Tell me, therefore, for law sincere,
If these mete-wands are even and sure,
Fit for the rich and fit for the poor,
Both to measure land and condition,
Tell me as you would eschew perdition."

And, so speaking, he laid the mete-wand on the ground. The Graff then began to try the measure, by placing his right foot against the wand, and he was followed by the other Free Echevins in rank and order, according to seniority. The length of the mete-wand being thus proved, the Frohner spoke for the third time:

"Sir Graff, I ask by permission
If I with your mete-wand may mete,
Openly and without displeasure,
Here the King's free judgment seat."

And the Graff replied:

"I permit right,
And I forbid wrong,
Under the pains and penalties
That to the old known laws belong."

Now was the time of measuring the mystic plot: it was measured by the mete-wand along and athwart, and when the dimensions were found to be true, the Graff placed himself in the seat of judgment and gave the charge to the assembled Free Echevins, warning them to pronounce judgment according to right and justice:

"On this day with consent,
And under the clear firmament,
A free field court is established here
In the open eye of day;
Enter soberly ye who may.
The seat in its place is pight,
The mete-wand is found to be right,
Declare your judgments without delay,
And let the doom be truly given
While yet the Sun shines bright in heaven."

Judgment was given by the Free Echevins, according to plurality of votes. The jurisdiction of the Court extended to all crimes committed in the open air—thefts of cattle or agricultural implements, trespasses, and even murder.

Corrupted by the errors of the transcriber, "The Tale of the Wardstaffe" was also, without doubt, modernised in the mouths of the Churls who repeated it; and yet we can still recognise the tone and the phraseology of the Courts of the Eresburgh. The Irminsule itself has been described as the trunk of a tree. Thor was worshipped under the same rude symbol, and it may be suspected that the singular respect and reverence shown to the Ward Staffe of the East Saxons is not without its relation to the rites and ceremonies of the heathen time, though innocently and unconsciously retained.[15]

We may now consider the time of year when this ceremony was performed, viz.: at Hocktide. This season is well worthy of notice. In times later than that of the Saxons, as we have already seen, it was connected more or less with the payment of dues. But we also find it celebrated as a period of festivity, and in particular with the performance of the "Historical and Ancient Coventry Play of Hock Tuesday," the subject of which was the Massacre of the Danes on St. Brice's night, November 13th, 1002, and which play was originally expressed in actions or rhymes, but when performed before Queen Elizabeth was without any recitation, in mere dumb show, and consisted of hot skirmishes and furious encounters between the English and Danish forces, first by the launce knights on horseback armed with spears and shields, who, being many of them dismounted, fought with swords and targets. Then followed two hosts of footmen, one after the other, first marching in ranks, then turning about in warlike manner they changed their form from ranks into squadrons, then into triangles, then into rings, and then winding out again they joined in battle—twice the Danes had the better, but at the last conflict they were beaten down, overcome, and many of them led captive for triumph by our *English women*.[16]

I must confess to having been much struck by the resemblance of this description, coupled with what has gone before, to the performance of the historical play of Husain and Hosain, popularly called the "Tazia," as I have witnessed it enacted by East Indian

15 Palgrave "Rise of the English Commonwealth," vol. ii., pp. 144-162.
16 Strutt's "Sports and Pastimes," article, *Hoke-Day*.

Mussalman Coolies in our West India sugar plantations, wherein the model of a Tomb is carried about from place to place with great pomp and ceremony, and, whenever stationary, a fight taking place, ending in the precipitation of the Tazia or Tomb (like the Wardstaffe) either into the sea or some other watercourse; a play well known in India as commemorating a memorable defeat and a martyr's death, both of which find an important place in Muhammadan annals.

John Rouse, quoted by Strutt, says that Hock-Tuesday was distinguished by various sportive pastimes, in which the townspeople, divided into parties, were accustomed to draw each other with ropes. Spelman speaks of men and women binding each other, and especially the women the men, and Cowel of the men hocking the women on Monday and the women the men on Tuesday.

Three origins for this Hock-tide custom have been suggested by Mr. Denne in the 7th volume of the "Archæologia" (from which, indeed, Strutt gained most of his information on the subject), viz. (1) the remains of heathen customs introduced by the Romans and afterwards kept up by the Saxons; (2) the defeat of the Danes by the English, A.D. 1002; and (3) the death of Hardicanute in 1041, by which England was finally delivered from the Danes.

The records, then, all more or less agree in assigning the origin of Hock-tide to Saxon times and the ceremony of The Cutting or Tallying of the Wardstaffe to the same period.

In Navestock, as we have already noticed, the ceremony took place at "Three Wants Lane," a spot which up to the present I have been unable to identify with any degree of certainty.

One other fact in connection with the Wardstaffe remains to be noted, and that is the place to which such staffe was wont to be carried, presumably to the most important Manor House in the district. Now, so far back as the records carry us, that would be Navestock Manor. But we find that the Wardstaffe, as a matter of fact, was lodged with the Lord of the Manor of Loft Hall, the site of which is now represented by the farmhouse situated upon our Heath, and known as "Loft Hall." This house, as I am informed by Mr. Pratt of Loft Hall, is still *bounded* if not *surrounded* by the remains of an ancient moat.

I am not at present in a position to quote any earlier reference to Loft Hall than the year 1356, when James de Barwe released to Master John Barnet, Canon of St. Paul's, all his right in certain

lands there after the death of his aunt, Isabella Atte Loft. John Atte Loft resided here in 1415, and that it was still a manor in 1543 is evidenced from the fact of the lord being mentioned in the record referred to by Morant. It would almost appear that as it was then comparatively of insignificant rank, the staffe could have only been carried there as a survival of its chief rank in ancient days, *i.e.*, considerably prior to the Conquest, and that possibly it was one of the two referred to in Domesday as being held by Howard and Ulsi, and afterwards in the St. Paul's records called Nastocha Edwini and Nastocha Aldwini.

At what period the Christian religion first prevailed in Navestock I am unable to tell you, but we have evidence from the great Survey to prove that a presbiter or priest was located here in Saxon times, and that he then held some 90 acres of land, presumably as an endowment, which brought him in an income of 10s. per annum.

The Records of St. Paul's Cathedral include a charter of King Edgar (whether authentic or not I leave others to judge) wherein he bestows the manor or manors of Navestock upon the Dean and Chapter of St. Paul's, the date of which is about 958 ; and again in this and other records he is spoken of, if not as the founder of the Church, at least as the contributor of a sum of 60 mancas of gold, possibly if not probably for Church purposes.

But even should the authenticity of this charter be disputed we have another (the authenticity of which I believe to be admitted on all hands) to prove the fact that the Dean and Chapter possessed the manor or manors of Navestock in Saxon times. Thus among the Cathedral records we find a charter of King William the Conqueror, granted as from the very day of his consecration, wherein he *restored* their property to the Dean and Chapter, adding that it had been taken away and unjustly retained by others during the time of his predecessors. It is of considerable interest to note that he mentions the then existence of a like number of holdings (presumably of free tenants) as are mentioned in the charter of Edgar, viz., fifteen. It is true he gives to these a different name—Cassata, whilst Edgar's charter describes them as Mansiones. Some may call the words synonymous, as probably they were in this case, but it is obvious that the word cassata at least, if not the mansiones, refers to houses with land around them sufficient to maintain a family of some little position.

Thus, when we reckon the number of villeins, bordarii, serfs, etc., who would be gathered around these fifteen cassata, we must conclude that there was for that time a large and influential population in the place, and we cannot suppose either that the Dean and Chapter in the times of King William's predecessors, or that the state of the times, would have allowed such population to remain without the ministrations of religion. Thus the presence of a presbiter, with what appears to have been an endowment of 90 acres of land, during the period when the property had been taken away and unjustly retained from the Dean and Chapter, goes far to prove that such presbiter was not the first of his order to be found in Navestock, and that he was but the successor of those who had occupied his cure when the Dean and Chapter first held the property. Moreover, the fact of the endowment, already alluded to, justifies the supposition that as England began to be divided into parishes as early as the seventh century, the presbiter in question was already provided with a church.

No evidences, it is true, as to the erection of such a building are forthcoming, but when we read of the existence of such a church, as we do in 1181, as a building referred to as a matter of course, and with no shade of novelty about it—together with the fact that the same endowment of 90 acres of land is referred to as the income of the sacerdos, whom we now find in place of the former presbiter—we have strong proof in favour of the supposition that a church had existed here for a lengthened period, and, as such, was founded in Saxon times.

As to the condition of Navestock prior to its re-bestowal on the Dean and Chapter by the Conqueror, we gain some interesting particulars from the Domesday Survey. The land at that time was reckoned as containing 3 manors, occupied by Howard, Ulsi, and Turstinus Ruffus; 2 hides, occupied by seven freemen—*liberi homines*; and half a hide and 20 acres by the presbiter. The two manors, held more or less jointly by Howard and Ulsi, contained 5 hides less 20 acres, and we shall find that these two manors did not become merged into one until after 1152, and probably under the Firmarius Richard Ruffus.

The population of Navestock in the days of Edward the Confessor, as described in Domesday, consisted, beside Howard and Ulsi, Turstinus Ruffus, the seven liberi homines, and the presbiter, of 12 villeins, 17 bordarii, and 4 servi, in all 44 persons who with

their wives and children would represent a total bordering closely upon 200 persons. There were 15 plough trains, 13 animalia, 2 horses, 116 sheep, 24 goats, woods sufficient to feed 934 pigs, and, be it noted, 4 hives of bees. The total rental amounted to £14 per annum.

In reference to the seven liberi homines above spoken of, it is interesting to note that they were probably *Danes*. Seebohm says: "In the Domesday Survey for the greater part of England there is no mention of free tenants, whether liberi homines *or* tenentes. Nor, considering the extreme completeness of the Survey, is it easy to explain their absence or any other hypothesis than that of their non-existence." A glance at the map (in Seebohm's work) will show that throughout those counties of England most completely under Danish influence there were plenty of liberi homines, but *nowhere else*. And that they and the sochmanni were distinctly and exceptionally Danish there is evidence in a passage in the laws of the Confessor.[17] We may therefore assume that the taking away and unjust retention of the property of the Dean and Chapter had been the work of Danish invaders, and thus the peculiar propriety of the Hocktide ceremonies so far as Navestock was concerned.

An interesting note, occurring in "Liber L," of S. Paul's Cathedral library, informs us that a certain Ralph de Marci acquired a hide of land from a villein named Liverus, of Nastok S. Paul, had seized half a hide, which was Sevul's, another villein, of the same Manor, and had acted in like sort with the lands of Edwin and Winim, etc. Mr. Round shows in his "Domesday Studies" that this entry refers to aggressions of a very early date, but subsequent to Domesday, say about or before 1120, the period of Ralph's death. Whether such aggressions were prior or subsequent to that survey, the entry no doubt gives us the names of two of the twelve villeins referred to as settled in Navestock prior to the conquest, viz., Liverus and Sevul. Of Edwin and Winim I hope to speak again later on.

But note further that Mr. Chisendale Marsh in his translation of the Domesday of Essex expresses his belief that Navestock is further referred to in that survey under the name Astoca. Thus after describing certain possessions of Hamo he proceeds as follows:

"Astoca is held by the same Radulfus [de Marci] of Hamo. It was held by Gotil or Gotild for a Manor, and for 80 acres in the time of King Edward. Then

17 Seebohm, pp. 86, etc.

2 bordarii now 5. Then 1 team now none, but there might be one there. Wood for 50 swine, 2 acres of meadow. It was then worth 12s., and when he got possession 8s., now 15s."

Should Mr. Marsh's surmise be correct that Astoca in this place represents Navestock (and the fact that Ralph de Marci belonged to both adds strength to his theory) we gain further information concerning the population of this parish in Saxon times in the name of Gotil and the presence of two more bordarii, together with the additional land and stock just described.

In 1043, the time approximately of which I am speaking, wheat was sold at 60 pence the quarter, but 80 years later, owing to a scarcity, it fetched 20s., and then fell again to 4s. in the following century. I am not prepared to give you a quotation as to the value of live stock in these days, but you may in some measure estimate such value from the prices fetched early in the next century, *e.g.*, horses, 3s. to 10s.; oxen, 2s. 4d. to 3s.; goats, 4d.; sheep, 4d. to 6d.; pigs, 4d. to 1s.; a sow with 9 pigs, 19d.

IV. NAVESTOCK IN NORMAN TIMES.

The chief feature in the change experienced by Navestock after the conquest is to be found in the return of the Dean and Chapter to their possessions as Lords of the Manor.

As they could only occupy that position by deputy they at a very early date let out their property on lease to a duly qualified tenant termed the Firmarius, who, as Archdeacon Hale tells us, exercising all the duties of the Chapter as the Lord of the Manor, took to his own use all the profits of such manor which were over and above the firmæ, which it was his due to render and which consisted of certain fixed money payments and so many quarters of wheat, oats, and barley. The Firmarius thus held a beneficial lease. The Anglo-Saxon noun feorme is not a farm but food, and the verb *feormian* is not to farm or cultivate, but to supply with food, and the Firmarius was so termed not because he cultivated the land but because he was bound to furnish feorme or food of a certain amount for the supply of the Cathedral body.[18] Thus we find that in about 1100 Navestock was called upon to supply firmæ for S. Paul's for three weeks and three and a half days in the course of the year to be made in three instalments, viz., the first on the 10th Sunday after the Feast of S. Faith, October 6th, the second on the 22nd, and the

18 Hale's S. P. D. p. xxxviii.

third on the 42nd Sunday after the same festival. The proportions are thus assigned in or about the year 1100. Nastoca Edwini firmæ for one week and one and a half days, and Nastoca Aldwini for two weeks and two days. Each of such three firmæ consisted of sixteen quarters of wheat, sixteen of oats, and three of barley, together with a fixed sum of money.

Possibly Edwin and Aldwin were the two first joint Firmarii of S. Paul's, and succeeded to the joint manors of Howard and Ulsi; at any rate, they seem to be the same persons as the Edwin and *Wnim*, whose lands were seized by Ralph de Marci. They also, in all probability, represent the Edwin and Aldwin, of S. Paul's Domesday, both of whom, strange to say, are there spoken of as bishops. Thus in 1222 Jordanus Blundus held one messuage sometime belonging to Aldwin, the bishop, at the rent of one plough share and paid for the land of Edwin, the bishop, havedsot, but there was no messuage there. Now it so happens that amongst the list of Ornaments in our Church taken in 1251, two old rochets are enumerated. Could these be the identical garments of Edwin and Aldwin as *Bishops*? [19]

The next two joint Firmarii whom we meet with were Theodoric and Robert de Turri with whom the Dean and Chapter concluded a lease in 1152, whereby they were to hold the Manor as long as they should live and serve them well. There is nothing, as Archdeacon Hale remarks, to show that these were Canons, but during the thirteenth and fourteenth centuries the Residentiary Canons or Stagiarii were, without exception, the Firmarii of the Manors of S. Paul. Upon the death or removal of one of their body each of them, according to seniority, either chose or declined the lease, and again the office of Firmarius was a source of wealth, and was thus limited to those who were Canons.

Concerning Robert de Turri, I have no further information at hand beyond the coupling of his name with that of Theodoric; but as regards the latter we have gained some few scraps of further information. He had three sons, Walter who, in 1222, held half a hide of land for 5s., and was required to mow and to come to the precaria, and to plough in winter and at Quadragesima if he had yoked animals. He was one of the eight tenants who were required to pay Wardpenny.

19 The appearance of Rochets among a list of Ornaments by no means implies the presence of a Bishop.

A second son of Theodoric was Robert, concerning whom we learn that he held a small portion of land in Wattele for 1d. That he paid 5d. to the Firmarius, but for what purpose the Firmarius John de Barnes reported he did not know. It is further recorded of him that he left a widow, Ediva or Edith by name, who held half an acre for various services. She also held two curtilages, as well as the lands of Saverich and Ailward, for both of which latter she paid havedsot—a payment which gave her the right to wood and water in the demesne, and leave to quit the Manor whenever she desired for business or other purposes without obtaining the special licence otherwise required from the Lord.

The third son of Theodoric was Gilbert the Palmer. He is mentioned as the holder of various small portions of land, but is only once spoken of as *the* palmer, but this one entry is sufficient to prove a connection between Navestock and the Holy Land. In connection with Ralph le Bunde he held half an acre of land by the rent of two ploughshares and an auk or goose. This is the only instance in the Manor of such a payment as the auca. The tracing of its origin might prove interesting.

Probably Richard Ruffus was the next and first sole Firmarius. At any rate, certain lands in Navestock are referred to as being let by him. He was a Canon of S. Paul's and Prebendary of Twyford, and afterwards Archdeacon of Essex, and it may be noted that one of the S. Paul's tenants at Belchamp in 1222 was Matilda, relict of Richard Ruffus. This should be remembered when we speak a little later concerning a married clergy.

Archdeacon Hale, curiously enough, in one place says: "Newcourt was in error in assigning the name of Ruffus to the Archdeacon, and that Richard Ruffus is to be distinguished from Richard the Archdeacon, but in another place he deliberately refers to *Richard Ruffus as Archdeacon.*

Richard Ruffus (later on Archdeacon) may therefore be assumed to be the very person who let the land at Navestock as before asserted, and the first Sole Firmarius under whom the two Manors of N. Edwini and N. Aldwini were merged into the Manor of Navestock, but whether or not he was the husband of Matilda I am not prepared to say.

John de Marigni was Firmarius in 1181. His name appears as such in the Inquisition of Ralph de Deceto. According to Bracton's Notes he was the nephew of Hugh the Dean, being the son of

Mabille, the sister of Hugh. He was probably the Firmarius referred to as John Primus.

John de Barnes succeeded, and was in office in 1222, being referred to in the Inquisition of that date as John Secundus.

William de Chadelshunt (who was certainly a Canon) became Firmarius in 1315, and was succeeded by Master Adam Murymouth, also a Canon, and to whom the Dean and Chapter in 1335 granted the residence of the Manor of Navestock with its tithes and all its appurtenances, to hold so long as he shall be a Canon and shall serve them well, and shall not be elected and confirmed a Bishop, rendering yearly three firmæ to the bakehouse, the brewhouse, and the almonry of S. Paul's, and with each firma 40s., and for the tithes and revenue of the church of Navestock 20 marks a year to the Chamberlain.[20]

From the Firmarii we may turn to the free tenants of the day. These, in S. Paul's Domesday of 1222, are described as holding about 800 acres between them, viz.:

1. William De Breante, 1 hide for 16s.

2. Stephen, son of Robert, son of Richard, 1 hide for 16s., and for certain services, such as ploughing, mowing, etc., at certain stated seasons on the demesne lands of the Firmarius. This Stephen also held a mill, of which more hereafter, and which mill he held for 8s. and certain services.

3. Walter, son of Peter, 80 acres for 5s. 4d. and certain services.

4. Thomas, son of Adam, 40 acres for 4s. 4d. „ „

5. Richard, son of Adam, 80 acres for 5s. 4d. „ „

6. Walter, son of Theodoric, 70 acres for 5s. „ „

7. Walter de Coderee and Willm le Bel, 40 acres for 4s. and certain services.

8. Nichol de Ho (heir of Gunnore Vidue), 40 acres for 20s. „

9. Richard, son of Edwin, and Ralph, son of Ailward and Ascelina Vidua, 40 acres for certain services.

10. Henry Hareng, 40 acres for 7s. and certain services.

11. Walter, son of Henry, with daughter and heir of Adam, son of Hugo, 25 acres for 7s. and certain services.

12. Richard, son of Sabernus, 10 acres for 3s. and certain services.

13. William, son of Dolfinus, 5 acres for 18s. „ „

14. John, son of Wiger, 6 acres for 3s., 2 acres for 6d., 40 acres for 12d., and certain services.

These holdings, with that of the Firmarius, represented the 15 cassata, or mansiones, already spoken of. William de Breante's holding possesses peculiar interest as representing that of the De Marci's, of whom I have already had occasion to speak. His wife, Joan, is described in 1222 as the daughter and heir of Ralph de

20 Hist. MSS. 9th Report.

Marci. This William, as we have seen, held one hide of land for 16s., and was accustomed to defend it against the king, *i.e.*, he and not the Chapter had to pay all the king's dues.

A certain Ralph de Marci, already referred to, held land at Astoca for a manor and 80 acres at the time of the Domesday Survey. This Ralph, or another bearing the same name, entered upon lands of the Dean and Chapter as we have already seen. In or before 1120, when Ralph died, the Chapter granted to his son William and his heirs, all the lands which his father, Ralph, held in Navestock on the day of his death, for a yearly payment of 16s. in full.

William's son or grandson, Ralph de Marci in 1152, refused to pay his just dues, and the then Firmarii—Theodoric and Robert de Turri—stipulated that the Chapter should consequently release them from all loss which they might sustain thereby.

We have no information as to the compromise which was made, but it was evident that the dispute had been settled in some form, inasmuch, as de Breante—Ralph's son-in-law, and in right of his wife, is now represented as holding one hide of the aforesaid property acquired by the first Ralph of the Domesday period. It is worthy of note, however, that the Dean and Chapter were sufficiently tired of the de Marci family, and, therefore, took the precaution to make William de Breante responsible for satisfying the Crown for all demands upon such one hide to which allusion has been made.

But William de Breante and his wife lend additional interest to their holding, from the fact that between 1218 and 1222, William in right of his wife, had liberty given him by Robert, Dean of S. Paul's, with the consent of Walter Niger, the then Vicar (and likewise Prebendary of Rugmere) to found a Chapel and a Chantry in his Court at Navestock, provided he and his heirs maintained a Chaplain at his own charge, sworn to preserve the liberty of the mother Church and to pay the Vicar all the profits he should then receive and admit none of the Parishioners to confess or other holy offices there under pain of being suspended by the Vicar. The Founder also and the heirs of the said Joan his wife, or whoever else had the said Chapel under his lordship, were also sworn to preserve the rights of the mother Church under like pain. In which Chapel the Chaplain was to administer the Mass only with Bread and Holy Water forbearing all other Holy Offices saving that at Easter the Founder and his Wife and heirs, with their family and

guests were to be admitted to the Sacrament of the Altar, but all his servants were to go to the mother Church throughout the year. And for this grant, the said Founder and his wife and heirs were yearly to give to the mother Church, two wax candles, each weighing a pound, one of which was ordered to be offered in the Vigil of the Purification and the other in the Vigil of the Assumption of our Blessed Lady before Vespers.[21]

In 1255, *i.e.*, in the next generation, we find the same William and Joan, paying to Ralph son of Stephen de Navestock, of whom more hereafter, a certain sum of money in lieu of customary services due from land which they held from him. The original dedication of the mother church above referred to was probably lost sight of—an additional proof of its antiquity. It was no doubt either re-dedicated early in the thirteenth century in the name of St. Thomas-à-Becket or the name of that Saint was then assigned to it. In later years, as in the case of so many other Churches, "à-Becket" was either forgotten or purposely put on one side and "Apostle" illegally substituted. We may gain some idea of the condition of the Church and its services during the lifetime of William de Breante, who, as we have seen, was still living in 1255, from a list of the ornaments described in a Visitation made in 1251.[22]

Thus we find, beside the high altar, it contained two others, dedicated respectively in the names of the Blessed Virgin and St. James. Some of the vestments were even then so *old* as to be useless. The Books in use were the "Missal," the "Legends," the "Antiphonal," the "Graduale," and the "Manuale." Among the vessels are enumerated a silver chalice and an ivory pyx, ampullae, a thurible, and a chrismatory. I have evidence in favour of my supposition that the chancel of such church was pulled down and rebuilt and a south aisle added in or about 1350.

The holding of Stephen de Navestock, son of Robert, son of Richard, is again interesting in more ways than one. Thus in the first place Richard de Navestock carries us back to the period of William de Marci—only a generation after the Conquest—when in all probability he was the lessee or occupier of the water-mill which stood on the site of that now, and since the sixteenth century, known as Shonke's Mill, and situated in this parish. At any rate, such

[21] Liber A. S. Paul's, as quoted by Morant.

[22] Since reading this present paper I have learned that Dr. Sparrow Simpson, the well-known Librarian of St. Paul's, is about to edit for the Camden Society a volume of ancient documents connected with his Cathedral, in which the full text of such Ornaments will appear.

mill was granted to his son Robert before 1181. This mill, as we have seen, was afterwards in the hands of Stephen. It then descended in succession to Ralph and his son John, the former of whom sold a half share, whilst the remaining half was sold by his son John. In the fourteenth century the two halves were re-purchased and bestowed on the Dean and Chapter by Canon, afterwards Bishop, Barnet, whom I take to be the restorer and enlarger of our Church. In later years the mill was occupied by Thomas Shonke, and has ever since carried his name.

We shall to-day pass Shonke's Mill, which, though doubtlessly rebuilt, probably stands on the site of that occupied, if not by Richard, at least by Robert de Navestock before 1181.

Richard, son of Sabernus, bore a name which still survives in Saberne's, Sabine's, or Savage Green.

Of John Wigar we find that he was one of the Jurors on the Survey, that he claimed hereditary right in the forest or wood called Westwood, and possessed like privileges therein as Stephen did in the Defence of Navestock. He held the Serjeantry of guarding the woods of the D. and C. in Navestock, with which he parted to Geoffrey the Dean some few years after the Survey.

We now come to the lands let out to the villeins and others and called villenagium. Land was held in villenage, says Seebohm,[23] at the will of the lord and at customary services, but, as a matter of fact, the entries in the rolls prove that these holdings were hereditary.[24] The common form of surrender[25] recited that the holding had reverted to the lord, who regranted it to new tenants as before in villenage. The land in villenage was held mostly in virgates and half-virgates (consisting in Navestock of 20 and 10 acres respectively), and below these bordarii held smaller holdings, also in villenage. In describing the tenants in villenage there is first a statement that such an one holds a virgate (or as the case may be) in villenage at such and such payments and services.[26]

The chief services may be classed under two heads:

1. The weekly work at ploughing, reaping, and carrying two days each week and more at harvest time.

2. The precariæ, or boon-days—sometimes called bene-works—special or extra services which the lord has a right to require; sometimes the lord providing food for the day and sometimes the tenant providing for himself.

23 p. 22. 24 p. 32. 25 p. [illegible]
26 Seebohm, 33 and 34, 41.

The payments in kind or in money were various, as, *e.g.*, *havedsot*, *chevagium*, or *head money* already referred to. Next came *Wardpenny*, which was a payment due to the Crown, but payable at the County Court. Navestock was required to pay 16d., which was collected by requiring eight tenants to pay 2d. each.; but whether as a commutation for any, and what kind of guard, there is no distinct evidence to prove.[27] It was, however, payable at Hocktide, and was thus in some degree connected with the ceremony of the Wardstaffe. We learn, at any rate, that both at Navestock and Sutton in Middlesex it was payable where the Wardstaffe watch was kept. In connection with wardpenny, the following note is worthy of your consideration: John Aldred, a customary tenant on one of the manors of St. Paul's, was bound, with others of the same rank, to keep watch at the Court from Christmas to Twelfth Day, and have a good fire in the hall, one white loaf, one cooked dish, and a gallon of ale; and, if any damage was done, he that watched was to make it good unless he had raised the hue and cry for the village to go in pursuit. "Probably," adds Archdeacon Hale, "when service was commuted by the lord, the money paid in lieu was termed wardpenny." This would account for the fact of only eight tenants paying that tax in Navestock, viz., that the remainder performed their service in person. Landgable, or landgafol, was a tax levied on seven of the nativi at Navestock, at the rate of 5d. per virgate. It was a tribute or tax upon the house; though why it should have been levied on these seven only does not appear. Amongst other payments in kind we found poultry and eggs, and under the head of service, carriage of produce to the granary of St. Paul's and the carriage of wood to the Court House of the Manor are expressly mentioned. It is to be noted that the smith, William Faber, in lieu of rent for his holding of 5 acres, was required to make horse-shoes for the Court, being allowed one oak per annum for his assistance.

The lands thus let out were divided into numerous parcels, and were apparently at first assigned for the occupation respectively of the various classes into which the society of the day was divided; each such parcel carrying with *it* its respective dues. The land assigned to the freeman carried with it *its* dues, obligations, rights, and privileges, and so with the rest. A serf willing to pay the lawful dues of land assigned for the use of freemen could hire such land, and without removing from his position in society as a serf, could

27 S. P. Domesday, p. lxxvii, 2 civ., 3 lxxiii.

enjoy all the privileges to which the possession of such land gave him a title. So a freeman could hire land originally assigned to a serf, but he must descend to the obligation required from a serf in connection with that land. To illustrate my point, let me put it to you in this way. A serf, as a serf, hires the land originally assigned to a freeman, yet he cannot leave the manor without permission of his lord or the payment of havedsot. A freeman, as a freeman, who requires no such leave, yet having the land originally assigned to a serf, requires for that land the same permission as a serf to absent himself. This he would meet by payment of havedsot.

There is frequent mention of the clergy in connection with Navestock. Next to the two Bishops, Edwin and Aldwin, Walter Niger, Vicar, is the first to be mentioned by name. To him apparently Jordanus succeeded. He is distinctly referred to as *the* Vikere in 1222. He is reported to have held a small meadow at the rent of two plough shares, a curtilage for 1d., a half acre of meadow in Brademead, a field the name of which survives in the Broad Mead, opposite Rose Hall, for 1d., a purpresture in the wood for 1d., half a virgate for prædial services as a nativus a principio, or a villein by blood, and the payment in money of havedsot and malt silver, and in kind, of one egg at Easter and Christmas, etc., etc. He also held a second half virgate at a similar rent. Beside Jordan the Vikere, in 1222, there must have been the private chaplain of William de Breante, who was evidently the Richard Clericus of S. P. Domesday. He was nephew of Jordan, the Vikere, and held six acres of old assarted land for 3s., and paid havedsot. He also held a virgate for the usual prædial services.

But beyond these the same Survey refers to Gilbert the Presbiter as a late tenant, as also to Ralph the Presbiter, whose wife and daughter are both mentioned. Editha after his death is spoken of as his relict. Walter is described both as the son of Henry the Presbiter and Henry the Clerk, and we also see an entry concerning the relict of the Sacerdos. From these entries we gather that other free tenants beside de Breante in all probability employed private chaplains, and that celibacy was not so strictly imposed on the clergy in those days as is generally imagined.

Thus, within the compass of this Survey of the Manors of St. Paul only, we find reference made to 1 Bishop with a son, 1 Sacerdos with 4 sons, 1 Sacerdos with a relict, 4 Clerks with sons, 1 Clerk with a relict, 1 Presbiter with a relict, 1 Presbiter with a daughter,

and 1 Presbiter with a son. The Editor of the Survey adds, whether matrimony was allowed or not to priests, it is certain that in that age they did not disown their children.[28]

I regret that I have as yet been unable to secure a list of the field names throughout the parish,[29] but I cannot conclude this paper without referring to a list of the thirteenth century of those which existed in the demesne of that date. Liber I. of S. Paul, as quoted by Hale, reads as follows:

Watele, Wodecroft, Northfild, Colinessedene, Crokereslond, Parva Holihoke.

Askelmesdowne, Sherdailond, Surylye, Magna Holihoke, Wolsebregge, Efelde.

Hareford, Langelond, Horsecroft, Heringeslond, Magna Downe, Sandhegge, Blakecroft, Gameneslond.

Brodefeld, Parva Downe, Bernfeld Parsoncroft, and Crofta ante portam.

I trust the particulars which I have brought before you may have, in some measure, justified the somewhat pretentious title which I have given to this paper, viz., Navestock in Olden Times; Stray Notes, Prehistoric, Saxon, and Norman.

ADDITIONS TO THE LIST OF EPPING FOREST FUNGI.

AT the Fungus Foray on October 13th, 1894, seven species of Fungi new to the Forest were gathered in the neighbourhood of High Beach, and were determined by Dr. M. C. Cooke. As noticed in the report of the meeting, the season was an unusually prolific one for the larger Fungi, and this will account for the fact that these interesting additions to our Forest Flora were observed, notwithstanding the thorough searches which had been made over the same ground in former years.

The following species should be added to the revised list of the Forest Hymenomycetal Fungi, printed in THE ESSEX NATURALIST for 1889, (vol. iii., pp. 248–271.) References are added to the figures of Agaricini in Cooke's "Illustrations of British Fungi":

28 S. P. D., p. xc.

29 A list of Field names throughout the Hundred of Ongar was published in "Essex Archæological Society's Transactions," vol. v., pt. 3, New Series, 1875.

AGARICINI.

Agaricus (Mycena) rosellus, Fries., Cooke, "Illus." t. 131 A.

Agaricus (Psathyrella) subatratus, Batsch., Cooke, "Illus." t. 633.

Bolbitius fragilis, Fries., Cooke, "Illus." t. 720 A.

Cortinarius (Hydrocybe) castaneus, Bull., Cooke, "Illus." t. 842.

Hygrophorus (Camarophyllus) niveus, Fries., Cooke, "Illus." t. 900 A.

Lactarius (Piperites) pubescens, Fries., Cooke, "Illus." t. 974.

POLYPOREI.

Meruleus pallens, Berk.

It may be useful to add that coloured figures of nearly all the Epping Forest Hymenomycetal Fungi, together with a copy of the new edition of Dr. Cooke's "Handbook," will be placed in the Forest Museum at Chingford.

NOTES—ORIGINAL AND SELECTED.

Albino Weasel near Colchester.—Late in December, 1892, I had brought to me for preservation, a pure white specimen of the Common Weasel (*Mustela vulgaris*) which had been shot near Colchester about the 20th of that month. It was a genuine albino, as the eyes were pink and the flesh was unusually light in colour. Although white, or partly white, specimens of the Stoat (*Mustela erminea*) —not, however, true albinos—are common in cold winters, white specimens of the weasel are very rare.—JOHN PETTITT, 108, North Station Road, Colchester.

Puffin at Billericay.—According to the "Essex County Chronicle," a fine specimen of the Puffin (*Fratercula arctica*), was caught alive at the end of the year, by a lad in Water-lane Meadows, near the Congregational Church. It measures 13 inches in length. It was purchased by Mr. Ramsey, of Billericay. The Puffin is by no means common on the Essex coast from autumn to spring, and its occurrence inland is, therefore, worth recording.

Rooks.—Dwellers in my corner of the Forest are noting with great interest that a colony of rooks has, apparently, decided to settle in the fine old elm trees in Organ Lane, Chingford. This is flattering to the inhabitants of the houses which abut on the lane, and we must hope that the confidence shown by the birds will be merited. An excuse has often been given by speculative builders in the forest districts that elm trees are generally unsound, and should, therefore, as a matter of safety, be cut down. Is there not an old country legend that rooks will not select unsound trees to build in? I would much prefer the honest judgment of the birds to any sayings of a "jerry builder." Since writing the above I have received from Mr. T. V. Holmes the following note: "There was a small rookery in two or three tall elms in Greenwich Park, opposite my house, in 1861 and

1862, but a year or two later they ceased to build there, and the two trees in which they chiefly used to build have since been topped, and are now little more than half their former height; the birds evidently left because they detected unsoundness in them."—T. HAY WILSON, "Crawcrook," Endlebury Lane, Chingford.

The Hornbeams in Epping Forest.—The following interesting letter from a correspondent signing as "Expert, Manchester," appeared in *The Times* of September 8th: "Although the hornbeam is not a tree much cultivated in this country it covers no less than two-thirds of the ground occupied in the 6,000 acres of the Forest of Epping. Why it should have been so, raises an important question as to its economical value. During all these centuries that pollarding has been going on, it stands an object-lesson to foresters of the present that our forefathers have appreciated it, and found it to be useful—more useful, indeed, than the oak and the beech, which are its most important fellows, and, consequently, if there was any conservancy at all, it must have been directed to that particular species of tree. What adds to one's wonderment is that it has been looked upon by many as an exotic tree, brought over either from France or Germany early in the sixteenth century. It matters little for our purpose the time of its introduction, although in passing we might say that it looks like a native tree not suited for all conditions of climate and soils, and might be mistaken by inattentive observers in days gone by as allied to the beech. In fact, Gerarde, in his 'Herbal,' mixes it up with not only the beech but the maple and the elm, from the rugose surface of its leaf. That it has been a good and useful tree for domestic purposes goes without saying, as the tens of thousands of pollards to be seen throughout the forest testify, particularly in the Lower Forest, in Epping Thicks, in Theydon Forest, in St. Thomas and Honey Lane quarters, in a great portion of Sewardstone Manor towards the sloping ground to the river Lea, and on the other side of the New Road, in the wide area of Loughton Manor. So pronounced has the work of pollarding gone on of these hornbeams, that scarcely a single 'spear' tree has been left to show the true character of growth.

"Now, why has this been so? Because the parties pollarding have found out that it is the most inflammable of woods, and that it has no equal in the forest for fuel or for duration in the hearth in presence of fire—as Boutcher says: 'It burns like a candle.' But its utility does not rest here; it is so hard and close in the grain as to resemble horn itself—hence, doubtless, its Anglicised name—and it is white withal in the wood as holly itself. It is more adapted for the saw than the axe because of its cross-grained nature, and hence a special wood for the turning-lathe, used in ancient times both in this and foreign countries for the yoke of oxen, for the cogs of mill wheels, and nowadays, where get-at-able, for handles of tools, for skittles, and for props where strength and durability tell.

"The pollarding has ceased since Epping Forest has become the patrimony of the people, and thinning has to be adopted in its stead. The thinnings, so far as they have gone, have effected a ready sale, and no wonder, because the whole of those pollards can be used up for some one or other of the purposes above-named—even the branches can be readily disposed of for pea-rods. Although the forest is considered outside of a profitable return view, it is no breach of faith on the part of the conservators to turn these thinnings into profit. More than that, it is highly desirable that the hornbeam as a tree should be encouraged; every youngster in a proper place should be allowed room to raise its head upwards, and where the thicket becomes dense, as dense it is, unseemly individuals ought to be cut out to make room for the coming seedlings. No one outside of forestry

knowledge can appreciate the 'gloom' of these wide-spreading branches, and but for judicious thinning, adopted by the conservators and recommended by the experts in their recent report, no young trees could live even if they were to sprout up from mother earth. In the desire for the conservation and extension of the oak and the beech, it is clearly good policy not to stifle out the hornbeam.

"But the lesson does not end here. Why is such a tree, eminently valuable for domestic and other purposes, not cultivated more generally? The agricultural cry in Essex is very sad, and several other counties are giving barely remunerative returns. Why should not this tree be more planted on the lands of Essex, Kent, Norfolk, and other places where it is found to do well? The greatest drawback that foresters and forestry has to contend with is that there is scant return in the lifetime of a man, and the want of capital. Here is a species of tree that will give something like an adequate return, if under good cultivation, after twenty years' growth. True, it must be planted on flat lands, or the London clay, or some cool subsoil, not on the chalk, to flourish at its best; but there are thousands of acres of that kind that are not paying a living wage to anybody. A portion of those acres might be so utilised. The timber question is a national one, and must be dealt with from a national point of view. The powers that be may delay, but it is only a question of time. Our waste and unproductive lands, both highland and lowland, must be turned to some practical account. There are plenty of competent foresters to carry out the work. There is a good bit of moonshine in ascribing our deficiency to the want of science and art schools of forestry. Find the money, and those of us who have toiled to be proficient will easily find the men."

To this, another correspondent, "G.H.," adds: "Your correspondent, 'Expert,' has not noticed one purpose which this tree may serve with advantage. It makes a most admirable hedge. In the place from which I write (Kenmure Castle, New Galloway), there is a hornbeam hedge fencing one side of a large garden. It is 32 feet high, and can only be trimmed by the aid of special scaffolding which is provided for it. This fence is attractive in appearance, and thoroughly effective. There is a smaller one a short distance away."

Notes from Curtis's "Flora Londinensis."—In this fine work, published in two volumes, folio, 1777-1787, are two notes of interest to Essex botanists. The first relates to *Sambucus ebulis*, the Dwarf Elder or Danewort, which is now rare in most parts of the county. Curtis says: "In most Physic Gardens this plant is cultivated, but is rarely met with wild about London. I have observed it two places only, the one in a hedge which surrounds a part of Mr. Beaufoy's garden, Cupers Bridge, Lambeth Marsh; the other in a lane leading down to Opton, Essex, by the garden wall of the late Dr. Fothergill." He gives the following quaint account of the "Stinking Morell," Tennyson's "fungus in the holt," *Phallus impudicus*, which so commonly reveals itself by its evil odour in parts of Epping Forest, particularly in Lodge Bushes. "In the months of August, September, and October, this singular phenomenon of the Fungus tribe makes its appearance in woods, hedgerows, and hedges, in some places abundantly, in others rarely; near London it has been found in Combwood and Norwood, but more plentifully in a small fir wood near the 'Spaniard,' Hampstead Heath, before remarked for producing the *Hydnum auriscalpium*; in this wood, on the 24th September, 1780, I discovered nearly a dozen growing within a small space of each other, some were full-grown, others in their egg state, risen about half-

way out of the ground, and when taken up appearing like so many small tennis balls; several of these I carefully carried home, one, which was in its greatest perfection, my draughtsman, for the sake of more conveniently drawing, took with him to the 'Spaniard,' (a place of entertainment on the spot), but the fetor arising from it quickly pervaded every part of the house and rendering it intolerable we were obliged to get rid of it." Something like the above has been our experience at more than on one Fungus meeting.—Ed.

Queen Boadicea's Tomb.—This mound, on Parliament Hill, Hampstead, so long a spot of interest to London antiquaries, has recently been explored by Mr. C. H. Read, of the British Museum, under the authority and cost of the London County Council. The "London Standard" of November 7th gave the following preliminary account of the explorations. We understand that Mr. Read is of opinion that the mound is probably a British Tumulus of the Early Bronze period. It is interesting to visitors to Epping Forest, inasmuch as Ambresbury Banks were also commonly associated with Cowper's "British Warrior Queen" in local tradition:—"The exploration which has been in progress during the past eight days at the tumulus in Parliament-hill-fields, known as 'Boadicea's Tomb,' has now been virtually brought to a close. Except the musket bullet, the old Indian coin, and a few scraps of broken china, all found near the surface, nothing has rewarded the labours of the explorers. The second trench, which was cut at right angles to the original trench, was still further dug into yesterday, and several borings were made in other parts of the mound, without, as already stated, any result. Notwithstanding the negative consequences of the investigation, it does not follow that the mound has no historical significance. That it is artificial is beyond doubt. It is shapely in outline; it has the appearance of a perfect barrow, and it is surrounded with a well-defined ditch, from which the loam of which it is formed has been taken. It could be intended neither as a place for a signal beacon, nor as a point of observation in rude times, for it has been constructed on the slope of one of the many undulations of that picturesque amphitheatre which is shut in by the lofty and wooded heights of Highgate on the east, the high grounds of Hampstead and its heath on the west, and the ridge of Lord Mansfield's park on the north as a background. Several of the undulations of this amphitheatre—one of them Parliament Hill itself—are much loftier than the site of the mound; so that, viewed from any of the points named, the tumulus, though upon high ground, seems to lie on the side of a small eminence in the centre of a great basin, and is by no means a conspicuous object in the landscape. The very peculiarity of the spot on which the mound has been erected naturally suggests that it possesses an unquestionable historic character. That it is the tomb of the famous British Queen there is nothing whatever to show. Nobody seems to be able to trace the origin of the legend which connects it with her. The proverbial oldest inhabitants remember it from their boyhood as Queen Boadicea's Tomb; but old biographers of the beginning of the Seventeenth Century, while they retail a legend which was current in their day to the effect that Stonehenge was erected as a monument to Boadicea, make no reference to the Hampstead myth. Other biographers, writing a century later, quote the same legend about Stonehenge, and keep silence as to Hampstead's claim to her burial place. Many will probably be slow to abandon the claim, and the mound, for want of any other appellation, will probably continue to be called by its legendary title of 'Queen Boadicea's Tomb.'"

Publications of the Essex Field Club.—*Contd.*

ESSEX FIELD CLUB, SPECIAL MEMOIRS, VOL. I.

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