CORRESPONDENCE.

NEWQUAY: FIFTEEN YEARS AFTER.

SIR,—Revisiting Newquay this summer after an interval of fifteen years, I found the sections which were described in the GEOLOGICAL MAGAZINE (1907, p. 10 *et seqq.*) so much changed that a note to that effect seems called for. No one now visiting the place could see or recognize the features then visible. To begin with sand has accumulated to such an extent in Fistral Bay that the 10 feet of killas formerly visible all round the little bay, is, save at the southern end, all concealed and instead of low cliffs only sand slopes exist. The miniature arched rock of indurated sand in Nun Cove is broken through, only the two side pillars remaining, while the seaward one has been slightly displaced.

The fallen material at the base of the little cliffs under the Headland Hotel being no longer removed by the sea the upper portions have simply crumbled down, obscuring the sections, and only in two small places was the *Helix nemoralis* zone properly recognizable. The two cooking sites and the hut platform have quite disappeared, and other sections not immediately next the sea are overgrown. Only on the west side of the Headland itself where the heavy surf beats in rough weather, was erosion obvious.

Perhaps this may be a fitting opportunity to put on record a pregnant suggestion which I received from Col. Godwin-Austen, namely, that the layers of mussel shells in the dunes might be accounted for otherwise than I suggested. The theory propounded in my paper was that in times of dearth of other food the mussels had been carried up by gulls and crows to devour their contents at leisure. The Colonel's hypothesis was that when very severe frost coincided with low tide, the molluscs would be killed off wholesale, and the empty shells thus released in quantities would be borne landwards periodically in subsequent gales.

B. B. WOODWARD.

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ORIGINAL ARTICLES.

Pliocene (Tertiary) and Early Pleistocene (Quaternary) Mammalia of East Anglia, Great Britain, in Relation to the Appearance of Man.

By HENRY FAIRFIELD OSBORN.

IN studying the evolution and distribution of the Proboscidea and the arrival of man in Great Britain (Osborn, 1922, 1922*a*, 1922*b*), the writer has recently had occasion to review the faunal researches of Lydekker and Newton, and the collection of Mr. A. C. Savin, in connexion with the very interesting question of the geologic correlation of Great Britain with the Upper Pliocene fauna of Europe to the south-east, and of the Scandinavian Glaciation I on the north, with the advent of the northern forest, the boreal, and the Arctic mammal fauna of Great Britain.

A résumé of the geologic conditions cited by Geikie (1882) and Prestwich (1871), more recently reviewed by Clement Reid (1890), is as follows :—

The south-eastern counties of England began to subside toward the close of the Pliocene and some fluviomarine sandbanks and shelly deposits were laid down, termed "Crag", and subdivided, according to their proportion of living species, into the following descending series :—

	Feet.
FOREST BED group	10 to 70
Exposed for many miles at the base of glacial deposits of cliffs on north-east coast of Norfolk.	
CHILLESFORD beds—Chillesford Clay [= Weybourn Crag].	1 „ 8
Chillesford Sand with shells . .	5 „ 8
A thin local deposit in Suffolk. Two-thirds of the Mollusca still live in Arctic waters.	
NORWICH CRAG	5 „ 10
Fluviomarine or Mammaliferous Crag: of Mollusca, 93 per cent still living; northern species of molluscs, e.g. *Astarte borealis*, forerunners of Arctic invasion.	
RED CRAG	25
Of Mollusca, 92 per cent still living; of corals, 14 out of 25 species still native.	
WHITE CRAG	40 „ 60
(Suffolk, Coralline, or Bryozoan Crag.)	

According to Prestwich (*fide* Geikie, 1882, p. 872), the evidence of change of climate derivable from the English Pliocene Mollusca may be grouped as follows :—

	Molluscan species now restricted to Northern Seas.	Southern Seas.
Norwich Crag . .	19	11
Red Crag . . .	23	32
White Crag . .	14	65

According to Clement Reid (1890, p. 6), "The 'Nodule Bed' seems to be nearly co-extensive with the Red Crag, and probably also with the Coralline Crag, though often too thin to be of any economic importance. . . . A large proportion of the [mammalian] fossils appears to belong to a period somewhat earlier than the Crag, though still truly Pliocene, . . ."

According to the same author (op. cit., p. 139), "The most probable view seems to be that the two deposits [Chillesford, Weybourn] are synchronous, and that the Chillesford Clay passes laterally into the Weybourn Crag, or, at any rate, that the Weybourn Crag is equivalent to the upper part of the Chillesford Clay."

During the writer's visit to Cromer, accompanied by Mr. J. Reid Moir, he had the good fortune to examine the remarkable collection made by Mr. A. C. Savin. The writer is indebted to Mr. Savin for a letter, dated 21st November, 1921, together with notes, from which the following quotations are taken.

Notes and Observations by Mr. A. C. Savin: Quoted with Slight Modifications and Omissions.

"I enclose a list of the *Forest Bed* vertebrates up to date, but there are still several forms to add later on. Mr. M. A. C. Hinton has a lot of my smaller things which he is now at work on. These include new voles, hare, hedgehog, etc. He hopes to publish the result shortly. One interesting addition is *Felis spelæa*, which is new to the Forest Bed.

"I have made a few notes relative to the horizon of the various species, from which you will gather that I do not think it possible to assign any particular level to any one species. I record in my catalogue the exact locality of each specimen, but cannot find a hard and fast horizon for any one species.

"*Proboscidea*.—At Mundesley some of the large bones of *Elephas meridionalis* in the 'Gunn Collection' were gotten out of the 'Pan' at a high level, i.e. 4 feet above the beach; on the other hand, others were obtained from a deep low or scour half-way down the beach, quite 15 feet lower down, and so on with most of the other animals. *Elephas meridionalis* is found generally all along the coast, but mainly at Mundesley and Bacton in the 'Pan' (gravel with oxide of iron) at the base of the cliff, also in the 'lows' or places scoured out half-way down the beach, in a greenish sandy clay. I do not think any definite horizon can be given; this applies also to *antiquus* and *primigenius*.

"No *Mastodon* remains have ever been found on the Norfolk coast; they only occur in the Red Crag of Suffolk and the Norwich Crag near that city. There is no Crag on the coast (except the Weybourn Crag) and the *Mastodon* has been found on this coast only near Norwich, in the Norwich Crag, which is quite distinct from the Weybourn Crag. The mammals and shells in the Norwich Crag are of a different period altogether. The Red Crag does not occur upon the coast of Cromer. It is found chiefly in Suffolk, where it rests upon the London Clay. Between the Red and the Weybourn Crags the Norwich Crag occurs.

"The lowest division of the Forest Bed series, i.e. the *Lower Freshwater Bed*, is only known from cakes of peat thrown up on the beach after storms. I believe there was a fragment of it showing years ago at low-water between East Runton and Cromer, a tough greenish clay resting on the Chalk, with a few fish-bones in it. It is either washed away or out to sea and not uncovered by the tide, as I have not seen it for many years. The Forest Bed on the foreshore at East Runton is often so mixed up with the shelly Weybourn Crag that it is very difficult to say which bed the bones are in. The vole, shrew, myogale, and other small forms are rarely found. The Weybourn Crag rests on a layer of large flints which are embedded in the Chalk.

"The *Upper Freshwater Bed*, West Runton, contains nearly all the Forest Bed land mammals, but only fragments of elephants' teeth, and up to the present no hippopotamus.

"The divisions of the Forest Bed do not occur in the cliffs at Cromer. Clement Reid shows only the Contorted Drift above the Pliocene beds at Cromer.

"The Chalky Boulder-clay, which in point of time comes after the Boulder gravels, does not occur in the cliffs of the Norfolk coast.

"The Arctic Freshwater Bed (*Leda myalis*) is on the approximate level of ordinary high tide."

Past and Present Faunal Lists of Crag and Forest Bed Vertebrates.

The accompanying faunal lists are those derived from the valuable papers of Lydekker (1886, 1887, 1891), Newton (1880, 1887, 1890), Reid (1890), Leney (1902), Hinton (1902–1914), a bibliography of the latter being given at the close of this paper. Most complete and most recent is the list prepared at the writer's request by Mr. A. C. Savin, largely based on his own collections and observations and carefully classified. To this list have been prefixed certain notes on synonymy according to American usage. This list is also amplified by a number of faunistic insertions kindly entered by Mr. Hinton, which are placed in square brackets [].

The writer is greatly indebted to the authorities of the British Museum, and especially to Mr. Martin A. C. Hinton, for the valuable notes, comments, and additions which he has inserted throughout the text, each of these notes being accompanied in the present printing by his initials (M. A. C. H.).

Mammals, Extinct.—Probably not one of the species occurring in the Forest Bed series, or in the older deposits mentioned in this paper, is identical with any form now existing. The references to recent species made by earlier writers on the subject were based either upon imperfect material or misconceptions. Each form as it becomes known by proper material proves to be extinct; but in the case of several of the species the material is still only sufficient to permit of a generic determination. This was the opinion of Dr. Forsyth Major, expressed about 1908 in the GEOLOGICAL MAGAZINE, and, after many years' work on Forest Bed remains, it has become my opinion also. (M. A. C. H.)

Reference should be made to Kennard, "The Pleistocene Succession in England," *Proc. Prehist. Soc. East Anglia*, vol. ii, part ii, 1916, and to the papers of Hinton and Forsyth Major cited therein.

Derived Specimens.—The faunal lists are complicated by the presence of *derived* specimens washed into these fluviatile formations from underlying beds, especially from such ancient beds as the Eocene London Clay, e.g. *Hyracotherium*, *Coryphodon*; also possibly from Pliocene beds, e.g. *Mastodon longirostris*, *Rhinoceros schleiermacheri*. These certainly derived specimens and species are also placed in square brackets [] to indicate that they are of older age or are species wrongly referred. There is, for example, no possibility that the Lower Pliocene species *Mastodon longirostris* Kaup occurs in the Red Crag.

These faunal lists are, therefore, of a preliminary character, but it is hoped that they will serve a useful purpose in the advance of our knowledge of Pliocene and Pleistocene correlation, on which the author has been engaged for many years.

MAMMAL FAUNA OF THE RED CRAG AND UNDERLYING NODULE-BED.

Newton, E. T., "On Some New Mammals from the Red and Norwich Crags": *Quart. Journ. Geol. Soc., London*, vol. xlvi, 1890, pp. 444–53.

Lutra dubia. Similar to Sansan species. (Nodule-bed.)

Phoca Moori Newt. Similar to Belgian form. (Nodule-bed.)

Phocanella minor Van Beneden. Similar to Belgian Pliocene specimens. (Nodule-bed.)

Trogontherium minus Newt. Similar to *T. Cuvieri*. (Nodule-bed.)

Mesoplodon floris Newt. Similar to *M. Floweri* of Red Crag of Suffolk.

M. scaphoides Newt. Similar to *Belemnoziphius* Huxley. (Nodule-bed.)

Ailurus anglicus Dawk. Similar to specimens Red Crag of Suffolk (racoon ?); also to *A. fulgens*. (Nodule-bed.)

MAMMAL FAUNA OF THE NORWICH CRAG.

Lutra Reevei Newt. Similar to *L. (Enhydriodon) sivalensis*.

[Referred to *Latax* by Pohle, *Archiv. f. Naturg.*, 1919 (1920), Abt. A, Heft 9, p. 167. M. A. C. H.]

Lydekker, R., "Note on Some Vertebrata from the Red Crag": *Quart. Journ. Geol. Soc., London*, vol. xlii, 1886, pp. 364–8; *Catalogue of the Fossil Mammalia in the British Museum*, Part IV, 1886, pp. 26, 55, 113.

Leney, Frank, "A List of the Type, Figured, and Described Fossils in the Norwich Castle Museum": GEOL. MAG., 1902, pp. 166–71, 220–31.

Hyæna antiqua Lank. = *H. striata* (*fide* Lyd.). Similar to *H. arvernensis*.

Mastodon arvernensis. Frequent (cf. Lyd. *Brit. Mus. Cat.*, 1886, pt. iv, p. 55).

[*M.* ? *longirostris* (*fide* Lyd.)] (Probably a "derived" specimen. H. F. O.)

M. Borsoni. Three specimens in Brit. Mus. (*fide* Lyd., *Brit. Mus. Cat.*, 1886, p. 26).

Sus palæochœrus. Similar to *S. erymanthius*, Pikermi. [Probably four species of "*Sus*", two derived and two possibly contemporaneous. M. A. C. H.]

Tapirus ? sp. *arvernensis.* Similar to *T. elegans*, Up. Plioc., S. France.

Hipparion ? sp. *gracile.* Similar to *H. crassum* Gerv., Plioc. of France. (Possibly a "derived" specimen. H. F. O.)

Rhinoceros ? *Schleiermacheri.* (Possibly a "derived" specimen or wrongly referred. H. F. O.)

R. etruscus ?

R. ? *incisivus.* (Certainly "derived" or wrongly identified. H. F. O.)

Diomedea ? sp. (albatross). Southern Ocean.

Elephas meridionalis. Two specimens in Brit. Mus. (*fide* Lyd., *Brit. Mus. Cat.*, 1886, p. 113). (Is this similar to the typical *E. meridionalis* of Nesti ? H. F. O.)

Suffolk Crag Cetacea.

Lydekker, R., "The Cetacea of the Suffolk Crag": *Quart. Journ. Geol. Soc.*, London, vol. xliii, Feb., 1887, pp. 7–18.

Belemnoziphius Huxley.

Balæna primigenia. Similar to Belgian form.

Balænoptera.

Herpetocetus.

Eucetus.

Balænodon.

Hyperoodon.

Squalodon.

Orca.

Uria troile (guillemot). Lyd., *Ibis*, vol. iii (6), 1891, p. 395.

Mastodon arvernensis. *Fide* Lyd. *Brit. Mus. Cat.*, 1886, pt. iv, pp. 54–5.

Elephas meridionalis. *Fide* Lyd. *Brit. Mus. Cat.*, pt. iv, 1886, p. 113; *Depéret, Mém. Soc. Geol. France Paléon.*, Mem. No. 3, 1890, pp. 190–1; two specimens in Norwich Castle Mus., Leney, GEOL. MAG., 1902, p. 171.

Cervus sp. Three specimens Gunn Coll., Norwich Castle Mus., Leney, GEOL. MAG., 1902, p. 168.

C. Sedgwickii. Norwich Castle Mus., Leney, GEOL. MAG., 1902, p. 167.

Delphinus delphis. Norwich Castle Mus., Leney, GEOL. MAG., 1902, p. 168.

Arvicola (*Evotomys*) *intermedius.* Norwich Castle Mus., Leney, GEOL. MAG., 1902, p. 166.

[*Arvicola* does not occur; all these remains are referable to *Mimomys* and most of them to *M. pliocænicus* Forsyth Major, *Proc. Zool. Soc.*, 1902, i, p. 102. M. A. C. H.]

Reid, Clement, "The Pliocene Deposits of Britain": *Mem. Geol. Surv. United Kingdom*, 1890, Appendix I, Table I (by E. T. Newton).

(Nodule-Bed.)

**Felis pardoides* Owen.
**Canis lupus* Linn.
C. ? *primigenius* Lank.
[*Pterodon* ? sp. (Eoc.).] (Derived. H.F.O.)
**Hyæna striata* Zimm.
Hyænarctos.
Ailurus anglicus Dawk.
Ursus arvernensis ? Cr. & Job.
Lutra dubia Blainv.
Antilope ?
Machærodus ?
**Lutra vulgaris* ?
L. Reevei Newt.
Gazella anglica Newt.
Cervus ardeus Cr. & Job.
C. carnutorum Lang.
C. Falconeri Dawk.
C. suttonensis Dawk.
Equus Stenonis Cocchi.
Mastodon arvernensis Cr. & Job.
Elephas [?] *antiquus* Falc.

* Important Note.—No *recent species really occur*; specimens referred to recent species are either misdetermined or else too fragmentary to permit of exact determination.—M. A. C. H.

Mammal, Bird, and Fish Fauna of the Norwich Crag.

Cervus dicranoceros Nesti.
C. Falconeri Dawk.
C. suttonensis Dawk.
C. verticornis Dawk.
Xiphodon platyceps Flower [Eoc.].
Sus antiquus ? Kaup.
S. palæochœrus Kaup.
**Equus caballus* Linn. ?
Hipparion gracile Kaup.
[*Rhinoceros* ? *incisivus* Kaup.] (Reference erroneous. H. F. O.)
[*R. Schleiermacheri* Kaup.] (Reference erroneous. H. F. O.)
Tapirus arvernensis Dev. & Bou.
[*Hyracotherium leporinum* Owen.] (Derived from London Clay. H. F. O.)
[*Coryphodon.*] (Derived from London Clay. H. F. O.)
Mastodon arvernensis Cr. & Job.
M. Borsoni Hays.
[*M.*? *longirostris* Kaup.] (Derived, or erroneous. H. F. O.)
Elephas meridionalis Nesti.
**Castor fiber* Linn.
C. veterior Lank.
Trogontherium minus Newt.
Acipenser.
Elephas meridionalis ?
Arvicola intermedius Newt.
Trogontherium Cuvieri Owen.
T. minus Newt.
Uria troile Linn.
Mergulus.
Acipenser.

Adams, A. Leith, *Monograph on the British Fossil Elephants*, 1877–81, London.

Elephas antiquus.
Elephas antiquus.

Partial Summary of the Above Lists.

Types of Animals which make their Last Appearance in the Upper Pliocene Red Crag and the Norwich Crag and do not Survive into the Forest Bed.	Upper Pliocene Red and Norwich Crag Types which Survive in the Forest Bed.	Pleistocene Types which First Appear in the Forest Bed.
Ailurus anglicus.	*Elephas meridionalis.*	*Elephas primigenius.*
Mastodon arvernensis.	*E. antiquus.*[1]	*Equus caballus fossilis.*
M. Borsoni.	*Hyæna striata.*	*Rhinoceros megarhinus.*
Hipparion ? *gracile.*	*H. antiqua.*	*Hippopotamus amphibius*
Rhinoceros ? *Schleiermacheri.*	*Rhinoceros etruscus.*	*Sus scrofa.*
Rhinoceros ?	*Equus stenonis.*	*Bison bonasus.*
Halitherium ? sp.	*Cervus carnutorum.*	*Caprovis Savinii.*
Felis ? *pardoides.*	*Machærodus* ? sp.	*Ovibos moschatus.*
Hyænarctos ? sp.	*Trogontherium Cuvieri.*	*Alces latifrons.*
Ursus ? *arvernensis.*		*Capreolus capreolus.*
Antilope ? sp.		*Cervus elaphus.*
Gazella anglica.		*Ursus spelæus.*
Trogontherium minus.		*Felis spelæa*
Sus palæochœrus.		*Macacus.*
Tapirus arvernensis.		Varied forest rodent fauna.
		Northern forest small carnivora.

Mammal fauna of East Anglia in Upper Pliocene time closely similar both in generic and specific types to the mammal fauna of northern Italy, Val d'Arno, also of the Upper Pliocene of southern France.

Conclusions.

The Norwich Crag presents a distinct advance over the Red Crag in its mammalian, as well as in its molluscan fauna; it is more modern. The correlation of the Red Crag and, in a less degree, of the Norwich Crag with the *Val d'Arno supérieur* of northern Italy, is very close indeed, as long ago observed by Hugh Falconer, and marks the close of Pliocene time in Great Britain.

(1) The two Crags contain the prevailing forest-loving fauna of a warm north temperate climate with certain African, south Eurasiatic, and a very few north Eurasiatic elements such as *Trogontherium*.

(2) The post-Crag extinction of at least fourteen types of mammals, notably *Mastodon arvernensis, M. Borsoni, Gazella, Tapirus*, marks the advent of a cold period in Great Britain as it does in northern Italy.

(3) The Forest Bed arrival of tundra and northern forest types, such as *Elephas primigenius, Ovibos moschatus, Alces latifrons*, is a feature of the northern latitude of East Anglia during the period of

[1] *Fide* A. Leith Adams, *British Fossil Elephants*, 1877–81, pp. 13, 14, pl. xxvi; Richard Lydekker, *Catalogue of Fossil Mammalia*, 1886, pt. iv, pp. 123, 124; Guy E. Pilgrim, "On the Occurrence of *Elephas Antiquus* (*Namadicus*) in the Godavari Alluvium, with Remarks on the Species, its Distribution, and the Age of the Associated Indian Deposits": *Rec. Geol. Surv., India*, xxxii, pt. iii, 1905, p. 217.

the first Scandinavian glaciation, which has no parallel in southern France or in northern Italy.

(4) The survival from the Red and Norwich Crags in the Forest Bed of warm temperate types, such as *Elephas meridionalis*, *E. antiquus*, *Hyæna striata*, *Rhinoceros etruscus*, *Equus stenonis*, *Machærodus*, is exactly paralleled by the same genera and species occurring in southern France and northern Italy during the long, warm First Interglacial period. During this period there appear for the first time in Great Britain certain African types, like the *Hippopotamus*, and there become more abundant in Great Britain the African elephant type, *Elephas* (*Loxodonta*) *antiquus*, as well as the *Hyæna*.

(5) Both in northern Italy and in East Anglia the forests become filled with a highly varied cervine fauna, including a great variety of species of deer. There is also a rich rodent fauna, and forest types of carnivores like the bear.

The Red and Norwich Crags and the successive faunal divisions of the Weybourn and Forest Bed wholly justify the conclusion of James Geikie that we have abundant proofs in East Anglia of the close of Pliocene and of the beginning of Pleistocene conditions. Man appears in Britain under true Tertiary conditions of the climate, of the fauna, of the flora. Two points are clearly established :—

First : The discovery of remains of human (Foxhallian) industry within and beneath the Red Crag *adds the highest Primate to this fauna*, namely, a species of man probably referable either to *Homo* or to *Eoanthropus*, as made known through the researches of J. Reid Moir and E. Ray Lankester. Second : The next appearance of man is in the Cromerian industry of the base of the Forest Bed, immediately overlying the Weybourn, also made known through the researches of Moir and of Lankester. This is no longer Tertiary man, but Quaternary man, found with a true Lower Quaternary fauna and flora closely comparable to that of southern France and of the 40th parallel in the United States.

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		Lepmnus aequus.	
Delphinus delphis.		*Delphinus* sp.	
Delphinus sp.		*Balæna biscayensis.*	
Balæna biscayensis.		*Physeter macrocephalus.*	
Physeter macrocephalus.		*Orca gladiator.*	
Orca gladiator.		*Ursus savini*,[1]	
Cave Bear.		*Ursus ferox fossilis.*	
Fossil Grizzly Bear.		*Gulo luscus.*	
Wolverine.		*Canis lupus.*	
Wolf ? sp.		*Canis vulpes.*	
Red Fox—*Vulpes vulpes crucigera.*		*Canis* sp.	
Canis sp.			
		Hyæna ? striata.	
Hyæna striata antiqua.		*Machærodus* sp.	
Sabre-tooth Tiger.		*Mustela martes.*	
Pine Marten—*Martes martes martes.*		*Mustela vulgaris.*	
Weasel—*Mustela nivalis nivalis.*		*Lutra vulgaris.*	
Otter—*Lutra lutra.*			
		Trichechus Huxleyi.	
Fossil Walrus—*Odobenus.*		*Phoca barbata.*	
Bearded Seal—*Erignathus barbatus.*		*Phoca* sp.	
Phoca sp.		*Felis spelæa.*	
Cave Lion.			
		Felis pardoides.	
Quadrumana.			
Macacus sp.[7]		*Macacus* sp.	

[1] Should be given full specific rank.—M. A. C. H.
[2] No determinable trace of this species.—M. A. C. H.
[3] *Newtoni* does not occur in the Upper F. B., but in the I East Runton, and perhaps in Norwich Crag.—M. A. C. H.
[4] For *Castor*, *Trogontherium*, and *Sciurus*, see Hinton (191 works therein cited.

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1890a. Tables of Fossils. Section I : Fauna and Flora of the Land, Lakes, and Rivers. Table I : Vertebrata. *In* Clement Reid's " The Pliocene Deposits of Britain ", Appendix I, pp. 225–8.

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1922. " The Pliocene Man of Foxhall in East Anglia " : Nat. Hist., xxi, 1921, pp. 565–76. [Published 1922.]
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1871. " On the Structure of the Crag-Beds of Suffolk and Norfolk, with some observations on their Organic Remains. Part II. The Red Crag of Essex and Sussex " : Quart. Journ. Geol. Soc., London, xxvii, pp. 325–56.

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Notes or Synonymies given by American Museum Zoologists. Also by Mr. Martin A. C. Hinton.	List by Mr. A. C. Savin.	Survivors from Nodule-Bed, Red Crag, and Norwich Crag.—H. F. O.	Weybourn Crag.	Lower Freshwater Bed.	Middle Freshwater Bed.	Upper Freshwater Bed.	Rarity—Frequency.	Notes by Mr. A. C. Savin.
PISCES.								
Perca fluviatilis.	*Perca fluviatilis.*				×	×	C.	Fairly common at W. Runton, Up. Freshwater Bed.
Acerina acerina.	*Acerina vulgaris.*					×	1	One otolith at W. Runton, Up. Freshwater Bed.
Esox lucius.	*Esox lucius.*					×	V.C.	Very common at W. Runton, Up. Freshwater Bed.
Barbus barbus.	*Barbus vulgaris.*					×	2	Found at W. Runton, Up. Freshwater Bed.
Leuciscus cephalus.	*Leuciscus cephalus.*					×	1	Jaw with two teeth from Ostend, Up. Freshwater Bed (near Bacton).
Rutilus rutilus.	*Leuciscus rutilus.*					×	V.C.	Very common at W. Runton, Up. Freshwater Bed.
Scardinius erythrophthalmus.	*Leuciscus erythrophthalmus.*					×	V.R.	Very rare at W. Runton, Up. Freshwater Bed.
Abramis brama.	*Abramis brama.*					×	2	Two teeth at W. Runton, Up. Freshwater Bed.
Tinca tinca.	*Tinca vulgaris.*					×	C.	Common at W. Runton, Up. Freshwater Bed.
Platax woodwardi.	*Platax woodwardi.*		×		×		C.	Common in both deposits.
Gadus morrhua.	*Gadus morrhua.*		×		×		R.	Rare, E. Runton, Overstrand, Trimingham, in both deposits.
Pollachius pollachius.	*Gadus pollachius.*		×				2	Two otoliths, E. Runton.
Thunnus thynnus.	*Thynnus thynnus.*		×				1	Vertebra, E. Runton.
Pleuronectes sp.	*Platessa* sp.				×		1	Left maxilla, Overstrand.
Acipenser sp.	*Acipenser* sp.	×			×		V.R.	A few dermal plates, E. Runton, Sidestrand, Mundesley.
Mustelus canis.	*Galeus canis.*		×				3	Teeth, E. Runton.
Squalus acanthias.	*Acanthias vulgaris.*		×				2	Teeth, E. Runton.
Raja batis.	*Raja batis.*		×				R.	Teeth.
Raja clavata.	*Raja clavata.*		×				R.	Teeth and dermal defenses, E. Runton.
Gadus pseudæglefinus.	*Gadus pseudæglefinus.*		×				1	One otolith, E. Runton.
AVES.								
Goose.	*Anser sp.*				×		1	One metacarpal, E. Runton.
Mallard.	*Anas boschas.*					×	R.	Several bones, W. Runton, Up. Freshwater Bed.
Shoveller Duck.	*Spatula clypeata.*					×	1	Coracoid, W. Runton, Up. Freshwater Bed.
Eagle Owl.	*Rubo maximus.*				×		1	Tarso-metatarsus, E. Runton.
Common Cormorant.	*Phalacrocorax carbo.*				×		1	Coracoid, W. Runton, Up. Freshwater Bed.
Bank Swallow—*Riparia riparia.*	*Hirundo riparia.*					×	1	Wing bone, W. Runton, Up. Freshwater Bed.
European Teal.	*Querquedula crecca.*					×	1	Left humerus, W. Runton, Up. Freshwater Bed.
European Wigeon.	*Mareca penelope.*					×	1	Wing bone, W. Runton, Up. Freshwater Bed.
Diomedea (albatross).								
Uria troile (guillemot).								
REPTILIA.								
Ringed Snake—*Natrix natrix.*	*Tropidonotus natrix.*					×	V.R.	Vertebræ, W. Runton, Up. Freshwater Bed.
Adder—*Vipera berus.*	*Pelias berus.*					×	2	Vertebræ, W. Runton, Up. Freshwater Bed.
Slow Worm.	*Anguis fragilis.*					×	2	Vertebræ, W. Runton, Up. Freshwater Bed.
AMPHIBIA.								
Common Frog.	*Rana temporaria.*					×	R.	Various bones, W. Runton, Up. Freshwater Bed.
Edible Frog.	*Rana esculenta.*					×	V.R.	Various bones, W. Runton, Up. Freshwater Bed.
Bufo sp.	*Bufo* sp.					×	V.R.	Various bones, W. Runton, Up. Freshwater Bed.
Great Warted Newt—*Triturus cristatus.*	*Triton cristatus.*					×	1	Femur, W. Runton, Up. Freshwater Bed.
INSECTIVORA.								
European Mole.	*Talpa Europæa.*					×	C.	W. Runton and Bacton, Up. Freshwater Bed.
Sorex Savini.	*Sorex Savini.*					×	C.	W. Runton.
Sorex Runtonensis.	*Sorex Runtonensis.*					×	C.	W. Runton.
Newton's Water Shrew.	*Neomys Newtoni.*					×	C.	W. Runton.
English Myogale = Galemys.								
Continental Myogale = Desman.	*Myogale moschata.*					×	R.	W. Runton, one jaw at Bacton, Up. Freshwater Bed.
Erinaceus new sp.	*Erinaceus* new sp.					×	1	One tooth, W. Runton.
CETACEA.								
Balænoptera sp.	*Balænoptera* sp.	×			×		V.R.	A few large vertebræ, Overstrand, Mundesley, Bacton, Forest Bed.
Monodon monoceros.	*Monodon monoceros.*				×		4	Part of snout with aborted tusk and three pieces tusk, Overstrand.
Delphinus delphis.	*Delphinus delphis.*	×			×		2	Vertebræ, Overstrand and Sidestrand, Forest Bed.
Delphinus sp.	*Delphinus* sp.				×		2	Vertebræ, Overstrand and Sidestrand, Forest Bed.
Balæna biscayensis.	*Balæna biscayensis.*				×		2	Tooth, Sidestrand, Forest Bed.
Physeter macrocephalus.	*Physeter macrocephalus.*		×		×		1	Cervical vertebra and tympanic bone, E. Runton.
Orca gladiator.	*Orca gladiator.*	×			×		2	Dorsal vertebræ, E. Runton, and tooth, Pakefield, Forest Bed.
Pseudorca crassidens.	*Pseudorca crassidens.*				×		1	Atlas vertebra, Mundesley.
Delphinapterus leucas.	*Delphinapterus leucas.*		×				1	Caudal vertebra, E. Runton.
Phocæna communis.	*Phocæna communis.*		×		×		1	Caudal vertebra, Sidestrand.
Tursiops tursio.	*Tursiops tursio.*				×		1	Vertebra.
Several vertebræ not identified.								
RODENTIA.								
Trogontherium Cuvieri.	*Trogontherium Cuvieri.*	×			×	×	V.R.	All along the coast in Up. Freshwater Bed and Forest Bed.
European Beaver.	*Castor Europæus* [*Castor veterior* Lankester.—M. A. C. H.]	×			×	×	V.R.	W. Runton, Overstrand, and Pakefield, Forest Bed and Up. Freshwater Bed.
Castor plicidens.	*Castor plicidens.*				×	×	V.R.	W. Runton, Up. Freshwater Bed, and E. Runton, Forest Bed.
Cricetus vulgaris runtonensis.[1]	*Cricetus vulgaris runtonensis.*					×	1	W. Runton, Up. Freshwater Bed, one upper jaw.
Common Squirrel; Eng. subsp. *leucourus.*[2]	*Sciurus vulgaris.*					×	1	Humerus, Ostend, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
Sciurus Whitei.	*Sciurus Whitei.*					×	1	One tooth, W. Runton, Up. Freshwater Bed.
Wood Mouse—*Apodemus sylvaticus.*	*Mus sylvaticus.*					×	V.R.	Jaws, teeth, and a few bones, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
Hare.	*Lepus* sp. Hare.					×	4	Two teeth and two bones, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
Mimomys intermedius.	*Mimomys intermedius.*				×	×	C.	W. Runton, E. Runton, and Bacton.
Mimomys Newtoni.[3]	*Mimomys Newtoni.*	×		×			R.	At E. Runton.
Mimomys Reidi.	*Mimomys Reidi.*		×				R.	At E. Runton.
Mimomys Savini.	*Mimomys Savini.*					×		W. Runton, Up. Freshwater Bed.
Mimomys majori.	*Mimomys majori.*					×		W. Runton, Up. Freshwater Bed.
Mimomys pliocænicus.	*Mimomys pliocænicus.*		×				R.	E. Runton, Weybourn Crag.
There are also about four species of *Microtus* at West Runton and two species of *Pitymys* all extinct.						×		
Evotomys sp.	*Evotomys* sp.					×		
[*Castor fiber* = *Castor* ? sp.][4]		×						
PROBOSCIDEA.								
Straight-tusked Elephant.	*Elephas antiquus.*	×			×	×	C.	One tooth, W. Runton, Up. Freshwater Bed and Forest Bed, all along the coast.
Southern Mammoth.	*Elephas meridionalis.*	×			×		C.	Mundesley and Bacton principally, but along the coast.
Hairy Mammoth.	*Elephas primigenius.*				×		V.R.	Overstrand, Sidestrand, Mundesley, and Bacton, Forest Bed.
UNGULATA (*Perissodactyla, Artiodactyla*).								
	Equus fossilis.	×			×	×	C.	Common all along the coast.
Steno's Horse.	*Equus stenonis.*	×			×	×	V.R.	Common all along the coast.
Etruscan Rhinoceros.	*Rhinoceros etruscus.*	×			×	×	C.	Common all along the coast.
Rhinoceros megarhinus.	*Rhinoceros megarhinus.*				×		1	Premolar, Cromer.
Hippopotamus.	*Hippopotamus amphibius.*				×		F.C.	All along the coast.
Wild Boar, *Sus antiquus.*	*Sus scrofa*[5] ? *palæochærus.*				×	×	V.R.	Four teeth Sidestrand, Forest Bed. A few teeth and bones E. Runton.
European Bison.	*Bison bonasus.*				×	×	F.C.	All along the coast.
Caprovis Savinii.	*Caprovis Savinii.*				×		1	Horn core, Overstrand.
Musk-ox.	*Ovibos moschatus.*				×		1	Part of skull and horn cores at Trimingham, Forest Bed.
Alces latifrons.	*Alces latifrons.*				×		R.	All along the coast.
Roe Deer—*Capreolus capreolus* ?	*Capreolus caprea.*				×		2	Two horns, Overstrand, Forest Bed.
Cervus carnutorum ?	*Cervus carnutorum* ?	×			×			A dredged specimen which may be Forest Bed.
Cervus Dawkinsi.	*Cervus Dawkinsi.*				×		V.R.	E. Runton, Overstrand, Mundesley, Forest Bed.
Red Deer.	*Cervus elaphus.*				×		R.	E. Runton, Overstrand, Mundesley, Forest Bed.
Cervus etueriarum.	*Cervus etueriarum.*				×		V.R.	Only E. Runton, Forest Bed.
Cervus Polignacus.	*Cervus Polignacus.*				×		R.	E. Runton, Overstrand, Trimingham, Mundesley.
Cervus Sedgwickii.	*Cervus Sedgwickii.*	×			×		R.	E. Runton, Overstrand, Trimingham, Mundesley.
Cervus verticornis.	*Cervus verticornis.*	×			×	×	C.	All along the coast. Skull and antlers, W. Runton, Up. Freshwater Bed.
Cervus Fitchii.	*Cervus Fitchii.*				×		V.R.	Mundesley.
Cervus tetraceros.	*Cervus tetraceros.*				×		V.R.	E. Runton, Forest Bed.
Cervus rectus.	*Cervus rectus.*				×		1	Sidestrand, Forest Bed.
Cervus Savini.	*Cervus Savini.*				×		C.	All along the coast.
	Gazella anglicas.	×						
	Gazella daviesii.	×						
CARNIVORA.								
Cave Bear.	*Ursus savini.*[6]				×	×	R.	Found all along the coast.
Fossil Grizzly Bear.	*Ursus ferox fossilis.*				×	×	2	W. Runton and Mundesley.
Wolverine.	*Gulo luscus.*				×		1	Jaw, Mundesley.
Wolf ? sp.	*Canis lupus.*	×			×	×	V.R.	W. Runton, Up. Freshwater Bed, and a few places along the coast.
Red Fox—*Vulpes vulpes crucigera.*	*Canis vulpes.*				×	×	V.R.	W. Runton, Up. Freshwater Bed, and a few places along the coast.
Canis sp.	*Canis* sp.	×					4	Jaw, tibia, pelvis, a premolar. E. T. Newton says dog or wolf, but some day will prove to be another species.
Hyæna striata antiqua.	*Hyæna* ? *striata.*	×			×	×	V.R.	W. Runton, E. Runton, Overstrand, Mundesley, and Corton, Suffolk.
Sabre-tooth Tiger.	*Machærodus* sp.	×			×	×	V.R.	W. Runton, E. Runton, Overstrand, and a jaw at Pakefield, Lowestoft.
Pine Marten—*Martes martes martes.*	*Mustela martes.*					×	1	W. Runton, Up. Freshwater Bed.
Weasel—*Mustela nivalis nivalis.*	*Mustela vulgaris.*					×	V.R.	W. Runton, Up. Freshwater Bed.
Otter—*Lutra lutra.*	*Lutra vulgaris.*	×						

	Scardinius erythrophthalmus.	*Leuciscus erythrophthalmus.*						
	Abramis brama.	*Abramis brama.*				×	V.R.	Very rare at W. Runton, Up. Freshwater Bed.
	Tinca tinca.	*Tinca vulgaris.*				×	2	Two teeth at W. Runton, Up. Freshwater Bed.
	Platax woodwardi.	*Platax woodwardi.*		×	×	×	C.	Common at W. Runton, Up. Freshwater Bed.
	Gadus morrhua.	*Gadus morrhua.*		×	×		C.	Common in both deposits.
	Pollachius pollachius.	*Gadus pollachius.*		×			R.	Rare, E. Runton, Overstrand, Trimingham, in both deposits.
	Thunnus thynnus.	*Thynnus thynnus.*		×			2	Two otoliths, E. Runton.
	Pleuronectes sp.	*Platessa* sp.			×		i	Vertebra, E. Runton.
	Acipenser sp.	*Acipenser* sp.	×		×		1	Left maxilla, Overstrand.
	Mustelus canis.	*Galeus canis.*		×			V.R.	A few dermal plates, E. Runton, Sidestrand, Mundesley.
	Squalus acanthias.	*Acanthias vulgaris.*		×			3	Teeth, E. Runton.
	Raja batis.	*Raja batis.*		×			2	Teeth, E. Runton.
	Raja clavata.	*Raja clavata.*		×			R.	Teeth.
	Gadus pseudæglefinus.	*Gadus pseudæglefinus.*		×			R.	Teeth and dermal defenses, E. Runton.
							1	One otolith, E. Runton.
AVES.								
	Goose.	*Anser sp.*			×		1	One metacarpal, E. Runton.
	Mallard.	*Anas boschas.*				×	R.	Several bones, W. Runton, Up. Freshwater Bed.
	Shoveller Duck.	*Spatula clypeata.*				×	1	Coracoid, W. Runton, Up. Freshwater Bed.
	Eagle Owl.	*Bubo maximus.*			×		1	Tarso-metatarsus, E. Runton.
	Common Cormorant.	*Phalacrocorax carbo.*			×		1	Coracoid, W. Runton, Up. Freshwater Bed.
	Bank Swallow—*Riparia riparia.*	*Hirundo riparia.*				×	1	Wing bone, W. Runton, Up. Freshwater Bed.
	European Teal.	*Querquedula crecca.*				×	1	Left humerus, W. Runton, Up. Freshwater Bed.
	European Wigeon.	*Mareca penelope.*				×	1	Wing bone, W. Runton, Up. Freshwater Bed.
	Diomedea (albatross).							
	Uria troile (guillemot).							
REPTILIA.								
	Ringed Snake—*Natrix natrix.*	*Tropidonotus natrix.*				×	V.R.	Vertebræ, W. Runton, Up. Freshwater Bed.
	Adder—*Vipera berus.*	*Pelias berus.*				×	2	Vertebræ, W. Runton, Up. Freshwater Bed.
	Slow Worm.	*Anguis fragilis.*				×	2	Vertebræ, W. Runton, Up. Freshwater Bed.
AMPHIBIA.								
	Common Frog.	*Rana temporaria.*				×	R.	Various bones, W. Runton, Up. Freshwater Bed.
	Edible Frog.	*Rana esculenta.*				×	V.R.	Various bones, W. Runton, Up. Freshwater Bed.
	Bufo sp.	*Bufo* sp.				×	V.R.	Various bones, W. Runton, Up. Freshwater Bed.
	Great Warted Newt—*Triturus cristatus.*	*Triton cristatus.*				×	1	Femur, W. Runton, Up. Freshwater Bed.
INSECTIVORA.								
	European Mole.	*Talpa Europæa.*				×	C.	W. Runton and Bacton, Up. Freshwater Bed.
	Sorex Savini.	*Sorex Savini.*				×	C.	W. Runton.
	Sorex Runtonensis.	*Sorex Runtonensis.*				×	C.	W. Runton.
	Newton's Water Shrew.	*Neomys Newtoni.*				×	C.	W. Runton.
	English Myogale = Galemys.							
	Continental Myogale = Desman.	*Myogale moschata.*				×	R.	W. Runton, one jaw at Bacton, Up. Freshwater Bed.
	Erinaceus new sp.	*Erinaceus* new sp.				×	1	One tooth, W. Runton.
CETACEA.								
	Balænoptera sp.	*Balænoptera* sp.	×		×		V.R.	A few large vertebræ, Overstrand, Mundesley, Bacton, Forest Bed.
	Monodon monoceros.	*Monodon monoceros.*			×		4	Part of snout with aborted tusk and three pieces tusk, Overstrand.
	Delphinus delphis.	*Delphinus delphis.*	×		×		2	Vertebræ, Overstrand and Sidestrand, Forest Bed.
	Delphinus sp.	*Delphinus* sp.			×		2	Vertebræ, Overstrand and Sidestrand, Forest Bed.
	Balæna biscayensis.	*Balæna biscayensis.*			×		2	Tooth, Sidestrand, Forest Bed.
	Physeter macrocephalus.	*Physeter macrocephalus.*		×	×		1	Cervical vertebra and tympanic bone, E. Runton.
	Orca gladiator.	*Orca gladiator.*	×		×		2	Dorsal vertebræ, E. Runton, and tooth, Pakefield, Forest Bed.
	Pseudorca crassidens.	*Pseudorca crassidens.*			×		1	Atlas vertebra, Mundesley.
	Delphinapterus leucas.	*Delphinapterus leucas.*		×			1	Caudal vertebra, E. Runton.
	Phocæna communis.	*Phocæna communis.*		×	×		1	Caudal vertebra, Sidestrand.
	Tursiops tursio.	*Tursiops tursio.*			×		1	Vertebra.
	Several vertebræ not identified.							
RODENTIA.								
	Trogontherium Cuvieri.	*Trogontherium Cuvieri.*	×		×	×	V.R.	All along the coast in Up. Freshwater Bed and Forest Bed.
	European Beaver.	*Castor Europæus* [*Castor veterior* Lankester.—M. A. C. H.]	×		×	×	V.R.	W. Runton, Overstrand, and Pakefield, Forest Bed and Up. Freshwater Bed.
	Castor plicidens.	*Castor plicidens.*			×	×	V.R.	W. Runton, Up. Freshwater Bed, and E. Runton, Forest Bed.
	Cricetus vulgaris runtonensis.[1]	*Cricetus vulgaris runtonensis.*				×	1	W. Runton, Up. Freshwater Bed, one upper jaw.
	Common Squirrel; Eng. subsp. *leucourus.*[2]	*Sciurus vulgaris.*				×	1	Humerus, Ostend, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
	Sciurus Whitei.	*Sciurus Whitei.*				×	1	One tooth, W. Runton, Up. Freshwater Bed.
	Wood Mouse—*Apodemus sylvaticus.*	*Mus sylvaticus.*				×	V.R.	Jaws, teeth, and a few bones, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
	Hare.	*Lepus* sp. Hare.				×	4	Two teeth and two bones, Up. Freshwater Bed, and gnawed fir-cones in Forest Bed.
	Mimomys intermedius.	*Mimomys intermedius.*			×	×	C.	W. Runton, E. Runton, and Bacton.
	Mimomys Newtoni.[3]	*Mimomys Newtoni.*	×	×			R.	At E. Runton.
	Mimomys Reidi.	*Mimomys Reidi.*		×			R.	At E. Runton.
	Mimomys Savini.	*Mimomys Savini.*				×		W. Runton, Up. Freshwater Bed.
	Mimomys majori.	*Mimomys majori.*				×		W. Runton, Up. Freshwater Bed.
	Mimomys pliocænicus.	*Mimomys pliocænicus.*		×			R.	E. Runton, Weybourn Crag.
	There are also about four species of *Microtus* at West Runton and two species of *Pitymys* all extinct.					×		
	Evotomys sp.	*Evotomys* sp.				×		
	[*Castor fiber* = *Castor* ? sp.][4]		×					
PROBOSCIDEA.								
	Straight-tusked Elephant.	*Elephas antiquus.*	×		×	×	C.	One tooth, W. Runton, Up. Freshwater Bed and Forest Bed, all along the coast.
	Southern Mammoth.	*Elephas meridionalis.*	×		×		C.	Mundesley and Bacton principally, but along the coast.
	Hairy Mammoth.	*Elephas primigenius.*			×		V.R.	Overstrand, Sidestrand, Mundesley, and Bacton, Forest Bed.
UNGULATA (*Perissodactyla, Artiodactyla*).								
		Equus fossilis.	×		×	×	C.	Common all along the coast.
	Steno's Horse.	*Equus stenonis.*	×		×	×	V.R.	Common all along the coast.
	Etruscan Rhinoceros.	*Rhinoceros etruscus.*	×		×	×	C.	Common all along the coast.
	Rhinoceros megarhinus.	*Rhinoceros megarhinus.*			×		1	Premolar, Cromer.
	Hippopotamus.	*Hippopotamus amphibius.*			×		F.C.	All along the coast.
	Wild Boar, *Sus antiquus.*	*Sus scrofa*[5] ? *palæochœrus.*			×	×	V.R.	Four teeth Sidestrand, Forest Bed. A few teeth and bones E. Runton.
	European Bison.	*Bison bonasus.*			×	×	F.C.	All along the coast.
	Caprovis Savinii.	*Caprovis Savinii.*			×		1	Horn core, Overstrand.
	Musk-ox.	*Ovibos moschatus.*			×		1	Part of skull and horn cores at Trimingham, Forest Bed.
	Alces latifrons.	*Alces latifrons.*			×		R.	All along the coast.
	Roe Deer—*Capreolus capreolus* ?	*Capreolus caprea.*			×		2	Two horns, Overstrand, Forest Bed.
	Cervus carnutorum ?	*Cervus carnutorum* ?	×		×			A dredged specimen which may be Forest Bed.
	Cervus Dawkinsi.	*Cervus Dawkinsi.*			×		V.R.	E. Runton, Overstrand, Mundesley, Forest Bed.
	Red Deer.	*Cervus elaphus.*			×		R.	E. Runton, Overstrand, Mundesley, Forest Bed.
	Cervus etueriarum.	*Cervus etueriarum.*			×		V.R.	Only E. Runton, Forest Bed.
	Cervus Polignacus.	*Cervus Polignacus.*			×		R.	E. Runton, Overstrand, Trimingham, Mundesley.
	Cervus Sedgwickii.	*Cervus Sedgwickii.*	×		×		R.	E. Runton, Overstrand, Trimingham, Mundesley.
	Cervus verticornis.	*Cervus verticornis.*	×		×	×	C.	All along the coast. Skull and antlers, W. Runton, Up. Freshwater Bed.
	Cervus Fitchii.	*Cervus Fitchii.*			×		V.R.	Mundesley.
	Cervus tetraceros.	*Cervus tetraceros.*			×		V.R.	E. Runton, Forest Bed.
	Cervus rectus.	*Cervus rectus.*			×		1	Sidestrand, Forest Bed.
	Cervus Savini.	*Cervus Savini.*			×		C.	All along the coast.
		Gazella anglicas.	×					
		Gazella daviesii.	×					
CARNIVORA.								
	Cave Bear.	*Ursus savini.*[6]			×	×	R.	Found all along the coast.
	Fossil Grizzly Bear.	*Ursus ferox fossilis.*			×	×	2	W. Runton and Mun[illegible]
	Wolverine.	*Gulo luscus.*			×		1	Jaw, Mundesley.
	Wolf ? sp.	*Canis lupus.*	×		×	×	V.R.	W. Runton, Up. Freshwater Bed, and a few places along the coast.
	Red Fox—*Vulpes vulpes crucigera.*	*Canis vulpes.*			×	×	V.R.	W. Runton, Up. Freshwater Bed, and a few places along the coast.
	Canis sp.	*Canis* sp.	×				4	Jaw, tibia, pelvis, a premolar. E. T. Newton says dog or wolf, but some day will prove to be another species.
	Hyæna striata antiqua.	*Hyæna* ? *striata.*	×		×	×	V.R.	W. Runton, E. Runton, Overstrand, Mundesley, and Corton, Suffolk.
	Sabre-tooth Tiger.	*Machærodus* sp.	×		×	×	V.R.	W. Runton, E. Runton, Overstrand, and a jaw at Pakefield, Lowestoft.
	Pine Marten—*Martes martes martes.*	*Mustela martes.*				×	1	W. Runton, Up. Freshwater Bed.
	Weasel—*Mustela nivalis nivalis.*	*Mustela vulgaris.*				×	V.R.	W. Runton, Up. Freshwater Bed.
	Otter—*Lutra lutra.*	*Lutra vulgaris.*	×		×	×	3	Jaw at E. Runton, and two bones from W. Runton, Up. Freshwater Bed, E. Runton, Forest Bed.
	Fossil Walrus—*Odobænus.*	*Trichechus Huxleyi.*			×		2	Tusk, Overstrand, and humerus, Mundesley.
	Bearded Seal—*Erignathus barbatus.*	*Phoca barbata.*			×		2	Humerus and radius, Overstrand.
	Phoca sp.	*Phoca* sp.	×		×	×	3	W. Runton, tooth. Two bones, E. Runton.
	Cave Lion.	*Felis spelæa.*			×		1	Lower Jaw from Pakefield, Suffolk, Forest Bed. Just received a letter from Dr. Smith Woodward stating that above specimen in my old collection is *F. spelæa*, new to the Forest Bed.
	Felis pardoides.							
QUADRUMANA.								
	Macacus sp.[7]	*Macacus* sp.				×	1	Distal end of humerus, W. Runton, Up. Freshwater Bed.

[1] Should be given full specific rank.—M. A. C. H.

[2] No determinable trace of this species.—M. A. C. H.

[3] *Newtoni* does not occur in the Upper F. B., but in the Lower F. B. at East Runton, and perhaps in Norwich Crag.—M. A. C. H.

[4] For *Castor*, *Trogontherium*, and *Sciurus*, see Hinton (1914, p. 186) and works therein cited.

[5] Not *scrofa*, described as a new species in a paper now in press. *Proc. Geol. Assoc.*, Hinton, 1922.—M. A. C. H.

[6] *Ursus savini* Andrews (*Ann. Mag. Nat. Hist.*, Ser. IX, vol. ix, p. 204, February, 1922).—M. A. C. H.

[7] See Hinton (1908, p. 440).

[*To face p. 440.*