

## Characteristic Species.

### 1. Lias.

1. LOWER SINEMURIAN. — *Ammonites* (*Ægoceras*) *planorbis*, *A.* (*Coroniceras*) *Bucklandi*, *Ostrea Liassica*, *Gryphæa arcuata*, *Lima gigantea*, *Hippopodium ponderosum*, *Spiriferina Walcottii*, *Isastræa Murchisoni*, *Pentacrinus* (*Extracrinus*) *Briareus*, *Ichthyosaurus*, *Plesiosaurus*. The "White Lias" or *Hettangian*, beneath the Sinemurian, or at the top of the Rhætic, contains *Ammonites planorbis*, *A. Burgundiæ*, *Cardinia Listeri*, *C. concinna*, *Pecten Valoniensis*.

2. MIDDLE LIASSIAN. — *Ammonites* (*Amaltheus*) *spinatus*, *A.* (*A.*) *ibex*, *A.* (*Ægoceras*) *Jamesoni*, *Belemnites paxillosus*, *B. clavatus*, *Gryphæa obliqua*, *Avicula inæquivalvis*, *Inoceramus substriatus*, *Plicatula spinosa*, *Pentacrinus subangularis*.

3. UPPER TOARCIAN. — *Ammonites* (*Harpoceras*) *serpentinus*, *A.* (*Harpoceras*) *bifrons*, *A.* (*Lytoceras*) *Jurensis*, *A.* (*Harpoceras*) *radians*, *Nautilus Jurensis*, *Belemnites vulgaris*, *Leda ovum*, *Posidonomya Bronni*, *Rhynchonella pigmæa*, *Cadomella*, *Spiriferina*, *Pseudodiadema Moorei*, *Extracrinus Briareus*, *Ichthyosaurs*, *Plesiosaurs*, *Teleosaurus Chapmanni* (at Whitby).

### 2. Oölyte.

1. LOWER OÖLYTE. — (1) *Bajocian*. The subdivisions recognized in England are those of *Ammonites* (*Harpoceras*) *Murchisonæ*, Lower; of *Stephanoceras Humphriesianum*, and *Cosmoceras Parkinsoni*, Upper. In Europe: (a) *Aalenian*, with *Amm.* (*Harpoceras*) *Murchisonæ*, *Rhynchonella subangulata*, *Terebratula perovalis*, *T. fimbria*, *Pecten lens*, *Pholadomya fidicula*. (b) *Bajocian*, with *Amm.* (*Stephanoceras*) *Humphriesianus*, *A.* (*Cosmoceras*) *Parkinsoni*, *Astarte obliqua*, *Trigonia costata*, *Gryphæa sublobata* (*Gryphæa* beds), *Ostrea Marshii*, *Rhynchonella spinosa*, *Terebratula perovalis*.

(2) *Bathonian*. (a) *Vesulian* or Fuller's Earth, with *Amm. discus* (and up to Cornbrash), *A. Herveyi* (and up to Forest Marble), *A. ferrugineus*, *Anabacia hemisphærica*, *Pecten vagans*, *Ostrea acuminata*, *Rhynchonella varians*. (b) *Bradfordian*, or Great (or Bath) Oölyte, with *Amm. macrocephalus*, *A. aspidioides*, *Ostrea Marshii*, *Pecten lens*, *Rhynchonella decorata*, *R. concinna*, *Megalosaurus*, *Cetiosaurus*, *Pterodactylus*, *Waldheimia digona*, *Steneosaurus*; and in the Stonesfield slate, at the base, with many plants, *Ostrea Sowerbyi*, *Rhynchonella obsoleta*, *Gervillia acuta*, *Ichthyosaurus*, *Plesiosaurus*, *Teliosaurus*, *Rhamphorhynchus*, *Testudo Stricklandi*, *Chelys Blakei*, *Mammals*. In Russia the Oxford Oölyte is overlaid by beds called the *Volgian*.

2. MIDDLE OÖLYTE. — (1) *Oxfordian*. (a) *Callovian* or Kellaways Rock, with *Amm. Gowerianus*, *A. macrocephalus*, *Belemnites Oweni*, *B. hastatus*, *Gryphæa bilobata*, *G. dilatata*, *Trigonia paucicosta*, *Terebratula digona*. (b) *Oxfordian* or Oxford Clay, with *Amm. Lamberti* (up to Kimmeridgian), *A. Mariæ*, *Trigonia clavellata*, *Pecten vagans*, *Avicula inæquivalvis*, *Rhynchonella socialis*.

(2) *Corallian*. (a) *Argovian*, Sponge-bearing beds, Scyphian-Kalk, and those of *Amm. canaliculatus*. (b) *Corallian*, divided into *Rauracian* or *Glyptician*, with *Glypticus hieroglyphicus*, *Amm. bimammatus*, *Thecosmilia annulata*. (c) *Isastræa explanata* and *Diceratian*, with *Diceras arietinum*, *Nerinea Defranci*. The Coral Rag and Corallian Oölyte of the Corallian contain *Amm. plicatilis*, *Thamnastræa gregaria*, *T. concinna*, *Cidaris florigemma*, *Hemicidaris intermedia*, *Pseudodiadema hemisphæricum*, *Avicula ovalis*, *Lima rudis*, *Perna myliloides*; and the underlying Lower limestones, *Amm. cordatus*, *Avicula ovalis*, *A. expansa*, *Pecten fibrosus*.

3. UPPER OÖLYTE. — (1) *Kimmeridgian*. (a) *Sequanian* or *Astartian*, with *Astarte minima*, *A. supracorallina*, *A. gregaria*, *Ostrea deltoidea*, *Rhynchonella corallina*, *Amm. mutabilis*, *A. decipiens*, *A. tenuilobatus*, *Pseudodiadema hemisphæricum*, *Cidaris*