Plesiosaurian limbs superficially resemble those of ichthyosaurs, although in reality they were constructed very differently. Studies show that plesiosaurian limbs must have functioned much like those of modern turtles, whereby they were used to row or scull the animal along through the water. They could be used to move the owner forwards or backwards, and could even be "feathered". Being much broader than an ichthyosaur's body, and adapted to surface conditions, that of the plesiosaur needed fewer stabilizers than did the ichthyosaur, and was evidently stabilized to a large degree by its rather short but deep tail. Some evidence is known suggesting that plesiosaur tails were equipped with diamond-shaped terminal fins, which, if true, would have increased the tail's stabilizing and steering capacity. Other features of their structure, however, reveal plesiosaurs as much slower moving creatures than ichthyosaurs, any quicker movements probably being confined to sudden darts of their heads and necks.

Although it is obvious that plesiosaurs could not walk as such on dry land, it is equally obvious that they could haul themselves onto sandbars or up beaches just as do turtles in the tropics today, so that they were far less tied to a completely watery existence than the ichthyosaurs. Plesiosaurs probably laid eggs, and would have needed to come ashore from time to time to lay them. Thus, plesiosaurs and ichthyosaurs must have lived very different lives, the former probably preferring coastal and inshore waters, the latter the open sea. Not improbably this is the reason why relatively so few plesiosaurs are found in rocks that yield abundant ichthyosaur remains.

J.B. Delair 1978

Leptopterygius ?breviceps

PAINTINGS OF STREET AND VICINITY

Works by the following artists are shown:

Michael Ayrton
Derek Hill
Tristram Hillier
Felix Kelly
Richard Naish
Kenneth Rowntree
Adrian Ryan

THE ALFRED GILLETT COLLECTION OF FOSSIL SAURIANS FROM THE STREET LOWER LIAS ROCKS

ALSO PAINTINGS OF STREET AND VICINITY

THE BEAR HOTEL
STREET
SOMERSET

24 JULY – 28 AUGUST 1978

ICHTHYOSAURS AND PLESIOSAURS

Throughout the nineteenth century, and during the earlier decades of the present one, numerous stone quarries existed in and around Street. Today, however, few traces of these quarries are visible, most of the sites having long ago been abandoned and filled-in.

The quarries exploited local exposures of limestone rocks known geologically as the *Lias* – a formation actually stretching as a narrow band across England, from Cleveland in the north to Dorset in the south, and passing under the English Channel to mainland Europe where it is also much in evidence. In general the lias formation comprises beds of limestone variously alternating with laminated shales and clays, the whole being deposited at the bottom of the sea approximately 170 million years ago in early Jurassic times. The limestone beds furnish excellent building stone for walls and pavements or, if burnt, a superior builders' lime. It was for the extraction of these materials that the Street quarries were opened up.

At Street, the lias is represented by the lowermost (or oldest) beds of the formation, and has yielded an abundance of fossils, among which reptilian remains are especially noteworthy. The earliest records of discoveries of saurian fossils at Street date from about 1820, since when, at intervals, numerous more or less complete skeletons have come to light in the various quarries. The majority of these specimens, many of which are quite spectacular, are now preserved in the great collections of the British Museum (Natural History), and the university museums at Oxford and Cambridge.

With the gradual closure of the quarries, discoveries of this kind inevitably became rarer so that, today, such finds are no longer made at Street. The specimens of Street saurians in the aforementioned museums thus represent precious evidence for the former existence of these strange and often bizarre creatures, evidence that today is but seldom duplicated from other lias localities. The scientific importance of this collection of liassic skeletons is thus very high. Indeed, unless quarrying operations are resumed in the lias formation around Street it is unlikely that – some chance discovery excepted – the assembly of such a collection will ever again be possible.

The collection was amassed over a period of years last century by Alfred Gillett (1818–1908), who lived at Overleigh House, Street. Gillett seems to have collected most of the specimens personally and then, with great perseverance and patience, laboriously divested them of enveloping or obscuring stone.

For several years the collection was housed in a hall built at Street through the liberality of Mr William Stephens Clark, and, in August 1890, was the object of a special visit by the Geologists' Association. Not many years afterwards the specimens were removed from exhibition and put into store, the present occasion being the first for many decades since the Collection was on public display.

Without exception the saurian skeletons discovered at Street belong to two great groups of extinct reptiles – the *Ichthyosaurs* and the *Plesiosaurs.* Of these, ichthyosaurs have been encountered far more often than plesiosaurs, a fact consistently reflected by discoveries of these creatures in lias exposures elsewhere. The collection consists of one plesiosaur only but upwards of twenty ichthyosaurs, a similar ratio probably existing in liassic times when these reptiles were alive. Neither ichthyosaurs or plesiosaurs have modern reptilian counterparts.

The earliest known ichthyosaurs date from the Triassic period, and were even then widely distributed and fully adapted to an aquatic existence. Quite clearly ichthyosaurs already had a considerable evolutionary history before we meet with these oldest representatives, and it is possible that they originated from ancestral stock that flourished as far back as Permian times. These early representatives show unmistakable signs of having evolved from some land-living, but as yet unknown, reptile of carnivorous habits that nevertheless developed an amphibious mode of life. Gradually, with increasing adaptation to a watery environment, the earliest ichthyosaurs developed a strong tail used to propel them through the water and their limbs became modified into flipper-like units that ultimately became useless for progression on land. The limbs assumed a new role and functioned as stabilizing and directional control organs, becoming, in fact, fins very much as in modern dolphins. Once this stage of evolution had been reached ichthyosaurs lost all ties with the land and became fully fledged aquatic creatures – creatures that became eminently successful in their new habitat until their extinction in late Cretaceous times some 70 million years ago.

As a group, ichthyosaurs evolved into many different genera and species, each characterized by differences of proportion and internal skeletal structure. They appear to have enjoyed their heyday in liassic times, the specimens from which period usually being the best preserved of all, even to the preservation of body outlines, muscle fibres, and other soft parts such as skin and stomach contents. Liassic rocks have also yielded specimens ranging from a few inches to 30 feet or more in length, and others often regarded as embryos – a mode of birth which, though uncommon in reptiles (which usually lay eggs), had almost certainly been developed by these wholly aquatic animals.

All liassic ichthyosaurs possessed an efficient battery of teeth, and enormous eyes that rank among the largest known in Nature. Examination of fossilized stomachs show that ichthyosaurs generally fed upon fish and ammonites, of which abundant communities lived contemporaneously with them in the liassic seas. The skull structure of ichthyosaurs also reveals that they were adept at diving and accommodating the rapidly changing water pressures that such actions produced. These facts indicate that ichthyosaurs probably chased ammonites to considerable depths and through clouds of "ink" squirted out as a defensive mechanism by fleeing ammonites. Ammonites were closely akin to modern squids, which retain a similar ink-squirting capacity. The reason for unusually large eyes in ichthyosaurs thus assumes new significance; they would have been highly advantageous for gathering light in deep or ink-filled waters.

That ichthyosaurs were highly streamlined predators is demonstrated by the occasional discoveries in which the body outline has been preserved. Scientists find it convenient to classify ichthyosaurs according to the arrangement of their limb bones, and recognize two main sub-divisions. It has been noticed that ichthyosaur limbs, especially the forelimbs, are composed either of numerous rows of bones closely arranged side by side and generally forming a broad or oblong fin, or of fewer rows of bones set further apart and generally forming longer or tapered fins. Of these groups, the first has been called the *Latipinnate* and the second the *Longipinnate.* Representatives of both groups appear in the Alfred Gillett collection, the genus *Eurypterygius* being a latipinnate form and the genus *Leptopterygius* a longipinnate form.

The main reptilian competitors of the ichthyosaurs were the plesiosaurs, surface dwelling creatures that, like the ichthyosaurs, first appear in the geological record during Triassic times and disappear from it at the close of the Cretaceous period. While fairly numerous in the liassic seas, plesiosaurs did not reach their heyday until middle and late Jurassic times, when the seas swarmed with them. Nevertheless, several skeletons approaching 20 feet in length show that even by liassic times plesiosaurs had attained considerable size and that they must have been formidable creatures. Some small (presumably juvenile) specimens, a mere 2 or 3 feet in length, are also known.

As yet, no fossilized impressions of plesiosaur body outlines or other soft parts have been discovered, so rather less is known about the external appearance of these reptiles than is the case with ichthyosaurs. Some well preserved skeletons, however, show that plesiosaurs resembled, as one earlier writer put it, a turtle having the head, neck, and tail of a serpent. The extremely long necks of plesiosaurs were indeed their most characteristic feature. The plesiosaurian head was generally small in proportion to the rest of the creature, but was furnished with numerous small interlocking sharp teeth that were frequently directed outwards from the jaws. These must have given a most vicious-looking appearance, but were in effect most efficient fish-traps. The relatively small size of the teeth, however, suggests that only moderately sized fish could be caught and eaten.