

features of Chinese cities—dirt, closeness, and absence of all sanitary arrangements; while the want of any building of architectural or antiquarian interest robs the city of any redeeming traits. On the eastern face of the city, between the walls and the river, stands the principal suburb, off which the native shipping lies anchored. The native town has thus nothing to recommend it except its geographical position. Situated in the extreme eastern

portion of the province of Kiang-soo, and possessing a good and commodious anchorage, as well as an easy access to the ocean, it forms the principal port of central China. From the western wall of the city there stretches away a rich alluvial plain extending over 45,000 square miles, which is intersected by numerous waterways and great chains of lakes. The products of this fertile district, as well as the teas and silks of more distant regions, find their natural outlet at Shanghai. The looms of Soochow and the tea plantations of Gan-hwuy, together with the rice

of this "garden of China," have for many years before treaty days supplied the Shanghai junks with their richest freight. But though thus favourably situated as an emporium of trade Shanghai did not attract the attention of foreign diplomatists until the outbreak of the war of 1841, when the inhabitants purchased protection from the bombarding propensities of Admiral Parker by the payment of a ransom of one million taels. In the Nanking treaty, which was signed in the following year, Shanghai was included among the four new ports which were thrown open to trade by the terms of that document. In 1843 Sir George Balfour, then Captain Balfour, was appointed British consul, and it was on his motion that the site of the present English settlement, which is bounded on the north by the Soochow creek, on the south by the Yang-king canal, and on the east by the river, was chosen. The site, thus defined on its three sides (on the west no boundary was marked out), is three-fifths of a mile in length, and was separated from the native city by a narrow strip of land which was subsequently selected as the site of the French settlement. Later again the Americans established themselves on the other side of the Soochow creek, on a piece of land fronting on the river, which there makes a sharp turn in an easterly direction. At first merchants appeared disinclined to take advantage of the opportunities offered them at Shanghai. "At the end of the first year of its history as an open port Shanghai could count only 23 foreign residents and families, 1 consular flag, 11 merchants' houses, and 2 Protestant missionaries. Only forty-four foreign vessels had arrived during the same period."¹ By degrees, however, the manifold advantages as a port of trade possessed by Shanghai attracted merchants of all nationalities; and from the banks of the Hwang-p'u arose lines of hongs and handsome dwelling-houses, which have converted a reed-covered swamp into one of the finest cities in the East.

¹ *The Treaty Ports of China and Japan*, by W. F. Mayer.



The number of foreigners, other than English, who took up their abode in the English settlement at Shanghai made it soon necessary to adopt some more catholic form of government than that supplied by an English consul who had control only over British subjects, and by common agreement a committee of residents, consisting of a chairman and six members, was elected by the renters of land for the purposes of general municipal administration. It was expected when the council was formed that the three settlements—the British, French, and Americans—would have been incorporated into one municipality, but international jealousy prevented the fulfilment of the scheme, and it was not until 1863 that the Americans threw in their lot with the British. In 1853 the prosperity of the settlements received a severe check in consequence of the capture of the native city by a band of insurgents, who held possession of the walls from September in that year to February 1855. This incident, though in many ways disastrous, was the exciting cause of the establishment of the foreign customs service, which has proved of such inestimable advantage to the Chinese Government. The confusion into which the customs system was thrown by the occupation of the city by the rebels induced the Chinese authorities to request the consuls of Great Britain, France, and the United States to nominate three officers to superintend the collection of the revenue. This arrangement was found to work so well that on the re-occupation of the city the native authorities proposed that it should be made permanent, and Mr H. N. Lay, of H.M.'s consular service, was in consequence appointed inspector of the Shanghai customs. The results of Mr Lay's administration proved so successful that when arranging the terms of the treaty of 1858 the Chinese willingly assented to the application of the same system to all the treaty ports, and Mr Lay was thereupon appointed inspector-general of maritime customs. On the retirement of Mr Lay in 1862 Sir Robert Hart was appointed to the post, which he still (1886) occupies.

During the period from 1856 to 1864 the trade of Shanghai increased by leaps and by bounds, and its prosperity culminated between 1860 and 1864, when, in addition to the ordinary commerce, the influx of Chinese into the foreign settlement in consequence of the advance eastward of the T'ai-p'ing rebels added enormously to the value of land and to the profits of the leaseholders. Both in 1860 and again in 1861 the rebels advanced to the walls of Shanghai, and on both occasions were driven back in confusion by the British troops and volunteers, aided by the naval forces of England and France. It was in connexion with this resistance to the rebels at Shanghai that General Gordon assumed the command of the Chinese force, which under his direction gave a meaning and reality to the hitherto somewhat boastful title of "ever-victorious army" it had assumed under the generalship of the two American adventurers Ward and Burgevine. To Shanghai the successful operations of Gordon against the rebels brought temporarily disastrous consequences. With the disappearance of the T'ai-p'ings the refugees who had sought safety in the foreign settlements returned to their homes, leaving whole streets and quarters deserted and empty. The loss thus inflicted on the municipality was very considerable, and was intensified by a commercial crisis in the markets of cotton and tea, in both of which articles there had been a great deal of over-speculation. But, though the abnormal prosperity produced by extraordinary circumstances was thus suddenly brought to an end, the genuine trade of the port has steadily advanced, subject of course to occasional fluctuations. For example, between the years 1878 and 1881 the gross value of the trade increased from 110,956,274 taels to 141,291,357 taels. In 1883, however, this amount fell to 110,433,531 taels, while in 1884 it rose again to 113,215,520 taels, although at this time, as will be remembered, hostilities were being carried on between France and China. In the same year 53,562 bales of silk were exported, as against 47,807 bales in 1883, and 27,084,675 lb of green tea, as against 25,336,041 lb in 1883. In black tea there was a falling off, the respective figures being 43,813,058 and 48,251,637 lb. The total burthen of foreign steamers which entered and cleared at Shanghai during 1884 was 3,145,242 tons. Of this amount 2,238,433 tons were British, 500,222 were American, 188,484 were Japanese, 93,226 were German, 88,963 were French, 24,572 were Russian, and 11,322 were Danish. According to the latest estimate the native population of the

city and suburbs of Shanghai amounts to 156,000. When to this number the local population, amounting to 11,000, and the mixed inhabitants of the foreign settlements, numbering 145,500, are added, a total is reached of 312,500 souls.

The vastness of English interests in China and the large British population at Shanghai gave rise in 1865 to the establishment of a British supreme court for China and Japan.—Sir Edmund Hornby, who was then the judge of the British court at Constantinople, being the first judge appointed to the new office. The court thus constituted not only exercises jurisdiction over the British subjects at Shanghai but acts as a court of appeal from all British consular courts in China and Japan. All charges against Chinamen within the settlement are tried before a mixed court, which sits daily, presided over by a Chinese official and an officer of the consular service. During the year 1884 2,304 criminal cases were tried before this tribunal, and 99 civil cases,—in 85 of which cases no less a sum than £60,000 was involved.

A handsome bund runs along the river frontage of the three foreign settlements, and the public buildings, especially in the British settlement, are large and fine. The cathedral, which is built in the Gothic style, is a notable example of Sir Gilbert Scott's skill as an architect, and the municipal offices, club-house, and hospitals are all admirable in their way. Shanghai is now connected with Peking by a telegraph, which will doubtless before long be supplemented by a railway. Some years ago a short railway was laid down between Shanghai and Woosung by some foreigners who wished to force the pace at which China was progressing. But the time had not come when such a step would be adopted by the Chinese, and after a few weeks' existence the plant was bought by the native authorities and shipped to Formosa, where it has since been allowed to rust and rot. The climate of Shanghai is essentially unhealthy. It lies low, and, though the early winter is enjoyable, snow and ice being occasionally seen, the summer months are swelteringly hot. Fever, dysentery, and cholera are unfortunately common complaints, and it is only by frequent trips to Japan and Chefoo that the residents are able to preserve health and strength. But, notwithstanding every disadvantage, the position occupied by Shanghai as a centre of trade, situated as it is at the mouth of the Yang-tze-kiang, in the immediate neighbourhood of the richest silk and tea districts, and in proximity to Japan and the newly-opened ports of Corea, insures for it an increasing volume of commerce and a widening prosperity in the future. (R. K. D.)

SHANNON. See IRELAND, vol. xiii. p. 216.

SHANS. This name is applied to a number of for the most part semi-independent communities occupying a region bounded on the W. by Burmah and Assam, N. and N.E. by the Chinese province of Yun-nan, E. by Tong-king, and S. by Siam (see Plate IX.). Ethnologically the race has a much wider extension, including the Siamese (see SIAM), and also, according to Garnier and Colquhoun, the hill tribes around the Tong-king delta and various tribes of Kwang-tung and Kwang-se, and extending across the north of Burmah into Assam. It is also widely diffused through south-western Yun-nan. Terrien de Lacouperie considers it allied to the Mon, the Mung, and the Pa, and places its early home in the mountains north of Sze-chuen, whence, not having amalgamated with the growing Chinese empire, it was gradually forced southwards. Although the level of civilization and the purity of their Buddhism vary considerably among the different branches of the race, there is everywhere a remarkable resemblance in appearance, manners, customs, and polity. The traditions current of their origin, too, though localized by each in its own habitat, are closely similar. This great homogeneity seems the more remarkable in that the race is found not only living under many different political systems,—i.e., either independent, or subject to Burmah, China, or Siam,—but often in communities isolated by mountain ranges, inhabited by tribes of different race and character. All this seems to point to a political unity in earlier times.

The Shans probably appeared on the upper Irawadi nearly two thousand years ago, but Burmese and Shan traditions agree that they were established some centuries earlier on the upper waters of the Shweli and on the Salwin and adjacent valleys on the south-west frontiers of Yun-nan. Here, at all events, in the 7th and 8th cen-

turies, we hear of the growth of that power which, temporarily broken by Burmah in the 11th century, reached its highest development in the 13th. This Suan empire, known by the classical Indian name of Kausambi, —corrupted after the punning Chinese fashion into Koshan-pyi, i.e., nine Shan states,—was a confederacy of about ten states, known among themselves by the name of the most powerful member, Mau, or Muang Mau. A great leader, Sam Lung Pha, brother of the king of Mau, overran and conquered Upper Assam from the Satiyas in 1229, the dynasty lasting until the British annexation. These Ahoms still inhabit the Assam districts of Sibsagar and south and east Lakhimpur, though pressed on from the south-west by the Bengalis, whom they despise as a black and inferior race, preferring to associate with the Chinese, whom they regard as congeners, and as the greatest race in the world.

This 13th and the following century also saw Tali to the east and Arakan to the west invaded, Burmah being then weakened by the Mongol invasion; Chieng Mai and other southern Shan states were also annexed, and "Ayuthia" (i.e., Siam), Cambodia, and Tavoy are claimed by the Shan historians as among their conquests, the Shan influence being felt even in Java. From the 14th to the 16th century wars with both Burmah and China were frequent, and Shan dynasties ruled at times in Burmah; but in 1556–62 the Burmese conquered Mogaung, the chief province of Mau, when Buddhism is recorded to have been introduced: probably only a reform of religion is meant. In 1604 the districts now known as the Chinese Shan States, i.e., the heart of the Mau empire, lying chiefly in the Ta-peng basin, east of Bamo,—a town whose population also is mainly Shan,—were finally conquered by China, Mogaung remaining independent on sufferance till absorbed by Burmah in 1796.

Zimmé or Chieng Mai (including Kiang Hai, Kiang Sen, Lagong, and Lapong), whose capital is now an important and well-built town, and Vien Chang on the east of the Me-kong, were both great Shan centres, warring, with various fortunes, with Burmah and Cambodia and with each other, till subjected by the growing power of Siam late in the last century.

The Burmese Shan States, especially those more remote from Mandalay, have latterly become practically independent; and, the tyranny which led to extensive southward migration having thus ceased, the stream is partly returning northwards. Descendants, too, of the population deported by Siam from Kiang Sen about a hundred years ago are now by the king's permission returning to people that fertile territory. The Burmese plan with the Shans was to govern by fostering internal dissensions, and they are bitterly hated, while the Chinese are in an equal degree liked and respected. The great Shan state of Kiang Hung has now accepted the dictation of China, to whom in fact, like some of its lesser neighbours, it has always paid certain taxes, while acknowledging the supremacy of Burmah. Kiang Tung to the south, which has been Burmese for over a century, has lately made overtures to Siam, though not forgetting the injuries inflicted by that power in 1854. The numerous ruins of great cities over the whole region from Chieng Mai to Kiang Tung testify to former wealth and prosperity, though they may not have all existed contemporaneously. In Luang Prabang in the north-east, on the other hand, tribes of a partly Chinese race are pressing southwards. It is remarkable how many of the conquering irruptions of south-east Asia were due mainly to the eviction of such conquerors by some stronger power. Incessant wars and vast deportations have tended to assimilate the various populations of all this region.

Each Shan state is governed by a *tsa* (*chao p'hya*), or supreme chief, aided by a council, and often by a *godjutor*. Where the Shans are in immediate contact with one of their great neighbours their habits and customs are necessarily modified; otherwise, speaking generally, civilization increases southwards. Religion is nominally Buddhist, and the priests, though their lives are usually far from correct, have great influence; temples, caves, and other localities sacred to Buddha are thronged with worshippers liberal with their offerings; but the practical exercise of religion consists chiefly in efforts to propitiate or avert the evil influence of the *nats* or *p'hees*, demons and spirits everywhere present, to whom all accidents and illnesses are attributed. Along with the Buddha, various images, among which the horse is not uncommon, are adored (though there are temples in which these are not found); and fetiches—natural objects of special form, e.g., of some part of the body—are kept in the house to avert disease. Medical treatment consists largely in magical practices, and individuals denounced by the sick as the cause of their illness frequently have their houses burned and are themselves deported to a distance. Thus, too, ordeals have a prominent place in legal practice. The Shans have no Buddhist prejudices against killing poultry or cattle for food, but like other Indo-Chinese and the Malays do not use milk. Slavery is general; the supply is recruited partly by raids on neighbouring hill tribes; the Indo-Chinese practice of slavery for debt also prevails. The slaves are not ill-treated, and are chiefly employed in field labour by the *chaos*, who own great numbers. In appearance the North Shans are sallow, but hardly darker than South Europeans, and are characterized by a short broad flat face, more elongated and nearer the Tartar type in the upper classes; they have red cheeks, brown eyes hardly oblique, black hair, nose almost aquiline, and are of medium height. The Chinese Shans are much smaller, with squat figures, prominent cheek-bones, and oblique eyes.

The practice of tattooing prevails in some districts, down to the upper waters of the Me-nam, and it occurs also among the Laos in the south-east, the tattooed being known as the black-bellied, the non-tattooed as the white-bellied. The Shans are all hardier and more manly than their congeners the Siamese, and they are also more sedate and more self-possessed than the Burmese. Most travellers speak of them as brave, friendly, social, and hospitable, but a good deal of the oppression and cruelty natural to a semi-barbarous condition prevails. They are cleanly and fond of bathing, the towns and villages being supplied with bamboo aqueducts. Drunkenness, except at festivals, is rare. Gambling is common, whole families being sold into slavery to pay debts thus contracted. Public gaming and the sale of spirits and opium are monopolies. They show much artistic taste in the beautiful colours of their textile fabrics, the needlework and embroidery of the women, and the designing and execution of the silver ornaments which are worn in profusion. They show great aptitude for trade, and are said by Mr Holt Hallett to welcome the prospect of the railway intended to connect their country with Maulmein, crossing thence to Raheng or some neighbouring point on the Me-nam, and on through the fertile valleys and plateaus on its upper tributaries to the Chinese frontier.

Tea is found, both wild and cultivated, from Zimme to Kiang Tung. Opium is exported to Mandalay and to China. Indian corn, sugar, and tobacco are grown in the low grounds, and excellent cotton and indigo (which also grows wild in the hills). Teak has long been worked by Anglo-Burmese in the eastern affluents of the Toong-yen and neighbouring valleys, and has become comparatively scarce west of the Me-ping; but it grows freely in the hills and valleys around Kiang Sen and Lagong, and in the hill region of eastern Siam, where, however, it is of inferior quality. Silk is produced, and iron, copper, and silver-lead (*galena*) ores are worked.

The Shan languages are classified by Dr Cushing as follows:—Ahom (*Assam*), extinct; Khamti, on the upper Irawadi and other valleys on the extreme north of Burmah; the Chinese (*Mau*) Shans, east from Bamo; Shans proper, between the mountains which bound the Burmese plains in the east and the Me-kong, and between 23° and 19° N. lat.; Laos to the south of this, from 19° north to the frontiers of Siam; and lastly, Siamese. The last two, as spoken, differ but little, and the three others may be grouped together. All have separate alphabets (related, however, in form), except the Siamese; and, the spelling being phonetic, the orthography is tolerably fixed. But it is a tonal language, and the vowel signs are few, so that some have two or three values assigned them. There are a good many Pali words due to Buddhism, many Burmese words in the districts under Burmese influence, and a large foreign element in the Chinese Shan state of Ho-tha, where the race is perhaps not fundamentally Shan.

See Ney Elias, *Introductory Sketch of the History of the Shans in Upper Burmah and West Fun-nan*, Calcutta, 1876; Yule, *Glossary of Anglo-Indian Words and Phrases* (1856), and *Narrative of the Mission to Ava* (1858); Anderson, *From Mandalay to Mowmen*; Colquhoun, *Among the Shans*; Cushing, *Shan Dictionary* (Introduction); Bock, *Temples and Elephants*; Sir A. Phayre, *History of Burmah* (C. 1.).

SHARK. The systematic position of the group of Sharks or *Selachoides* in the class of Fishes, their classification, and their general external and anatomical characteristics have been already sufficiently noticed under ICHTHYOLOGY (vol. xii. pp. 630 sq.), and we have here to supplement that article only by a fuller reference to the natural history of the more common and more important types of the group.

Sharks are almost exclusively inhabitants of the sea, but some species freely enter the mouths of large rivers, and one species (*Carcharias gangeticus*) occurs frequently high up in the large rivers of India, and in the Tigris about Baghdad, at a distance of 350 miles from the Persian Gulf in a straight line, and has even been reported from a lake in Viti Levu (Fiji Islands) which is shut off from the sea by a cataract. Sharks are found in all seas; most numerous between the tropics, they become scarcer beyond, a few only reaching the Arctic circle; it is not known how far they advance southwards in the Antarctic region. Altogether some hundred and fifty different species have been described.

With regard to their habits many are littoral species, the majority pelagic, and a few are known to belong to the bathyal fauna, having hitherto been obtained down to a depth of 500 fathoms.

Littoral Sharks.—The littoral forms are of small size, and generally known under the name of "dog-fishes," "hounds," &c. Some pelagic sharks of larger size also live near the shore on certain parts of a coast, but they are attracted to it by the abundance of food, and are as frequently found in the open sea, which is their birth-place; therefore we shall refer to them when we speak of the pelagic kinds.

The majority of the littoral species live on the bottom, sometimes close inshore, and feed on small marine animals or on any animal substance. The following are deserving of special notice.

The Tope (*Galeus*) is common on the coasts not only of England, Ireland, and of the more southern parts of Europe, but also of South Africa, California, Tasmania, and New Zealand. Its teeth are equal in both jaws, of rather small size, flat, triangular, with the point directed towards the one side, and with a notch and denticulations on the shorter side (fig. 1). It is of a uniform slaty-grey colour, and attains to a length of 6 feet. The female brings forth some thirty living young at one birth in May. It cannot be regarded as a very destructive fish, but becomes troublesome at times to fishermen by taking their bait and driving away other fish they desire to catch.

The Hounds proper (*Mustelus*) possess a very different dentition, the teeth being small, obtuse, numerous, arranged in several rows like pavement (fig. 2). Five or six species are known from the shores of the various temperate and subtropical seas, one (*M. vulgaris*) being common on the coasts of Great Britain and the United States on the Pacific as well as the Atlantic side. It is of a uniform grey colour or sparingly spotted with white, and attains to a length of 3 or 4 feet. The young, about twelve in number, are brought forth alive in November. It is a comparatively harmless fish, which feeds on shells, crustaceans, and decomposing animal substances.

Of the Dog-Fishes proper (*Scyllium*, *Chiloscyllium*, &c.) some twenty species are known, which are spread over nearly all the temperate and tropical seas. Their teeth are small, in several series, with a longer pointed cusp in the middle, and generally one or two smaller ones on each side (figs.



FIG. 1.—Teeth of Tope. a, upper; b, lower. (x 2.)



FIG. 2.—Teeth of Mustelus.

3 and 5). They are all oviparous, their oblong egg-shells being produced at each corner into a long thread by which the egg is fastened to some fixed object. Some of the tropical species are ornamented with a pretty pattern of coloration. The two British species, the Lesser and the Larger Spotted Dog-Fish (*Sc. canicula* and *Sc. catulus*), belong to the most common fishes of the coast, and are often confounded with each other. But the former is finely dotted with brown above, the latter having the same parts covered with larger rounded brown spots, some of which are nearly



FIG. 3.—Teeth of *Scyllium canicula*.



FIG. 4.—*Chiloscyllium trispeculare*.

as large as the eye. As regards size, the latter exceeds somewhat the other species, attaining to a length of 4 feet.

Dogfishes may become extremely troublesome by the large numbers in which they congregate at fishing stations; nor do they compensate for the injury they cause to fishermen, being but rarely used as food, except at certain seasons by the poorer classes of the Mediterranean countries, in China and Japan, and in the Orkneys, where they are dried for home consumption. The Black-mouthed Dog-Fish (*Pristiurus melanostomus*) is another European species which is rarely caught on the British coasts, and is recognized by a series of small, flat spines with which each side of the upper edge of the caudal fin is armed.



FIG. 5.—Confluent Nasal and Buccal Cavities of the same fish.

The Tiger-Shark (*Stegostoma tigrinum*) is one of the commonest and handsomest sharks in the Indian Ocean. The ground colour is a brownish-yellow, and the whole fish is ornamented with black or brown transverse bands or rounded spots. It is a littoral species, but adult specimens, which are from 10 to 15 feet long, are not rarely met far from land. It is easily recognized by its enormously long bladelike tail, which is half as long as the whole fish. The teeth are small, trilobed, in many series. The fourth and fifth gill-openings are close together.

The genus *Crossorhinus*, of which three species are known from the coasts of Australia and Japan, is remarkable as the only instance in this group of fishes in which the integuments give these inactive ground-sharks, whilst they lie concealed watching for their prey, what may be called a "relative" rather than a "protective" resemblance to their surroundings. Skinny frond-like appendages are developed near the angle of the mouth, or form a wreath round the side of the head, and the irregular and varied coloration of the whole body closely assimilates that of a rock covered with short vegetable and coralline growth. This peculiar development reminds us of the similar condition in the sea-devil (*Lophius*), where it serves also to conceal the fish from its prey, rather than to protect it from its enemies. The species of *Crossorhinus* grow to a length of 10 feet.

The so-called Port Jackson Shark (*Cestracion*) is likewise a littoral form. Besides the common species (*C. philippi*),

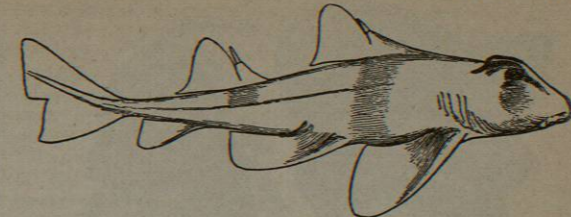


FIG. 6.—*Cestracion galeatus*.

three other closely allied kinds from the Indo-Pacific are known. This genus, which is the only existing type of a separate family, is one of special interest, as similar forms occur in Primary and Secondary strata. The jaws are armed with small obtuse teeth in front, which in young individuals are pointed, and provided with from three to five cusps. The lateral teeth are larger, pad-like, twice as broad as long and arranged in oblique series (fig. 7),—an

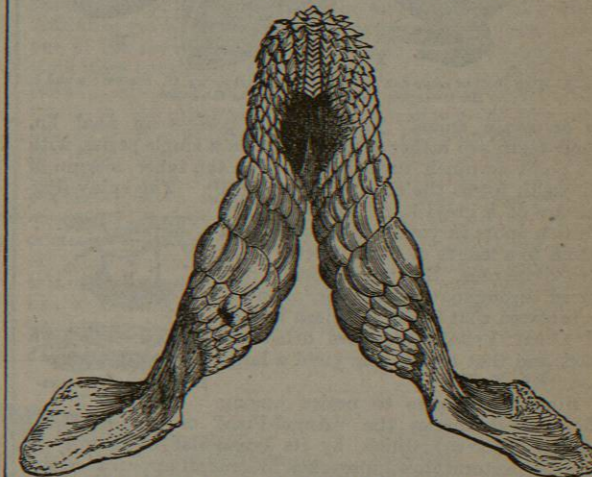


FIG. 7.—Upper Jaw of Port Jackson Shark (*Cestracion philippi*). (x 1.)

arrangement admirably adapted for the prehension and mastication of crustaceans and hard-shelled animals. The fossil forms far exceeded in size the living, which scarcely attain to a length of 5 feet. The shells of their eggs are not rare in collections, being found thrown ashore like those of our dog-fishes. The shell is pyriform, with two broad lamellar ridges each wound edgewise five times round it (fig. 8).

The Spiny or Piked Dog-Fish (*Acanthias*) inhabits, like the majority of littoral genera of sharks, the temperate seas of both the northern and southern hemispheres. For some part of the year it lives in deeper water than the sharks already noticed, but at uncertain irregular times it appears at the surface and close inshore in almost incredible numbers. Couch says that he has heard of 20,000 having been taken in a sea at one time; and in March 1858 the newspapers reported a prodigious shoal reaching westward to Uig, whence it extended from 20 to 30 miles seaward, and in an unbroken phalanx eastward to Moray, Banff, and Aberdeen. In the deep fjords of Norway, and indeed at every station of which a shoal of these fishes has taken temporary possession, line-fishing has to be suspended during the time of their visit, as they cut the lines with their scissors-like teeth. As expressed by the name, these

fishes are distinguished from the other British littoral sharks by each of the two dorsal fins being armed in front

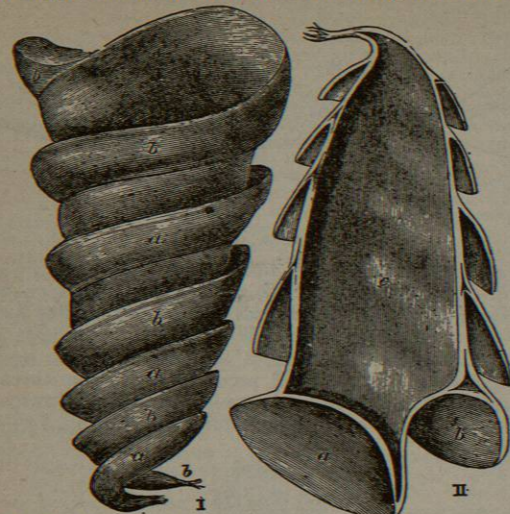


FIG. 8.—Egg-shell of same fish (x 4). I, external view; II, section; a and b, the two spiral ridges; c, cavity for the ovum.

by an acute spine. They do not possess an anal fin. Their teeth are rather small, placed in a single series, with the point so much turned aside that the inner margin of the tooth forms the cutting edge (fig. 9). The spiny dogfish are of a greyish colour, with some whitish spots in young specimens, and attain to a length of 2 or 3 feet. They are viviparous, the young being produced throughout the summer months. It is stated that in the northern islands of Great Britain they are dried for food, and that their livers yield a large quantity of oil.



Finally, we have to notice among the littoral sharks the "Angel-Fish" or "Monk-Fish" (*Rhina squatina*), which, by its broad flat head and expanded pectoral fins approaches in general appearance the rays. It occurs in the temperate seas of the southern as well as the northern hemisphere, and is not uncommon on sandy parts of the coast of England and Ireland. It does not seem to exceed a length of 5 feet, is not used as food, and is too rare to do any perceptible injury to other fish. It is said to produce about twenty young at a birth.

Pelagic Sharks.—All these are of large size, and some are surpassed in bulk and length only by the larger kinds of cetaceans. Those armed with powerful cutting teeth are the most formidable tyrants of the ocean and dangerous to man, whilst others, which are provided with numerous but very small teeth, feed on small fishes only or marine invertebrates, and are otherwise almost harmless and of a timid disposition, which causes them to retire into the solitudes of the open sea. On this account we know very little of their life; indeed, some are known from a few individuals only which have accidentally come ashore. All pelagic sharks have a wide geographical range, and many are found in all seas within the limits of the equatorial zone,—some being almost cosmopolitan. All seem to be viviparous.

Of the more remarkable forms which we propose to notice here the genus most abundantly represented in species and individuals is *Carcharias*. Perhaps nine-tenths of the sharks of which we read in books of travel belong

to this genus. Between thirty and forty species have been distinguished, all of which are found in tropical seas. They are the sharks which so readily attach themselves to sailing vessels, following them for weeks, and thus exhibiting an endurance of muscular power scarcely found in any other class of animals. Others affect more the neighbourhood of land, congregating at localities where nature or the vicinity of man provides them with an abundant supply of food. One of the most common species, and one of those which extend far into the temperate zones, is the Blue Shark (*Carcharias glaucus*), of which small specimens (4 to 6 feet long) are frequently caught on the south coasts of England and Ireland. Other species of *Carcharias* attain a length of 25 feet. The mouth of all is armed with a series of large flat triangular teeth, which have a sharp, smooth, or serrated edge (fig. 10).

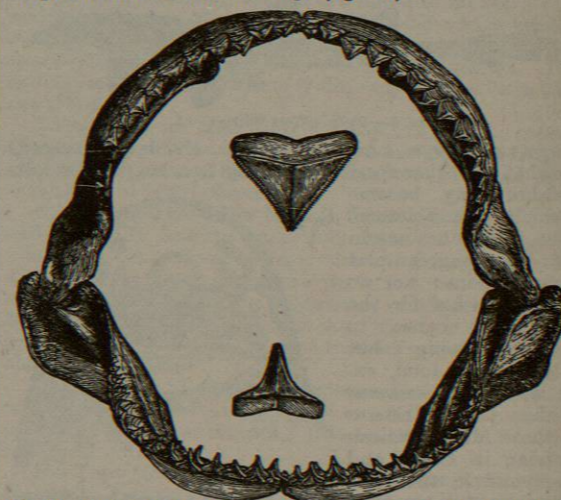


FIG. 10.—Dentition of the Blue Shark (*Carcharias glaucus*). The single teeth are of the natural size.

Galeocerdo is likewise a large shark very dangerous to man, differing from the preceding chiefly by having the outer side of its teeth deeply notched. It has long been known to occur in the North Atlantic, close to the Arctic Ocean (*G. arcticus*), but its existence in other parts has been ascertained within a recent period; in fact, it seems to be one of the most common and dangerous sharks of the Indo-Pacific, the British Museum having obtained specimens from Mauritius, Kurrachee, Madras, and the west coast of Australia.

Hammerheaded Sharks (*Zygana*) are sharks in which the anterior portion of the head is produced into a lobe on each side, the extremity of which is occupied by the eye. The relation of this unique configuration of the head to the economy of the fish is unknown. Otherwise these sharks resemble *Carcharias*, and are equally formidable, but seem to be more stationary in their habits. They occur in all tropical and subtropical seas, even in the Mediterranean, where *Z. malleus* is by no means rare. In the Indian Ocean it is common, and Cantor states that specimens of this species may be often seen ascending from the clear blue depths of the ocean like a great cloud.

The Porbeagles (*Lamna*) differ from the preceding sharks in their dentition (fig. 11), the teeth being large, lanceolate in shape, not adapted for cutting, but rather for seizing and holding the prey, which consists chiefly in fish. These sharks are therefore not dangerous



FIG. 11.—Teeth of *Lamna*.

to man; at least, there is no instance known of a person having been attacked by the species common on the British coast (*L. cornubica*). It grows to a length of 10 feet, and ranges to New Zealand and Japan. See vol. xix. p. 518.

To the genus *Carcharodon* particular interest is attached, because the single still existing species is the most formidable of all sharks, as were those which preceded it in Tertiary times. The existing species (*C. rondeletii*) occurs in almost all tropical and subtropical seas, but seems to be verging towards extinction. It is known to attain to a length of 40 feet. The tooth figured here of the natural size (fig. 12) is taken from a jaw much shrunk in drying, but still 20 inches wide in its transverse diameter, and taken from a specimen 36½ feet long. The extinct species must have been still more gigantic in bulk, as we may judge from teeth which are found in the crag or which have been dredged up from the bottom of the Pacific Ocean by the naturalists of the "Challenger" expedition, and which are 4 inches wide at the base and 5 inches long measured along their lateral margin. In some Tertiary strata these teeth are extremely abundant, so much so that—for instance, in Florida—the strata in which they occur are quarried to obtain the fossil remains for export to England, where they are converted into artificial manure.

The Fox-Shark or Thresher (*Alopias vulpes*), of which every year specimens

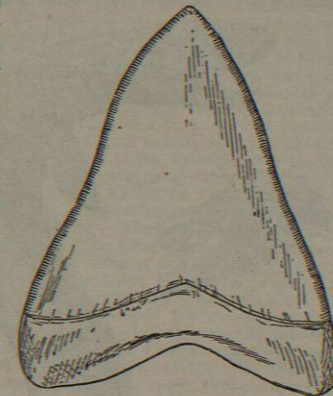


FIG. 12.—Tooth of *Carcharodon rondeletii*.

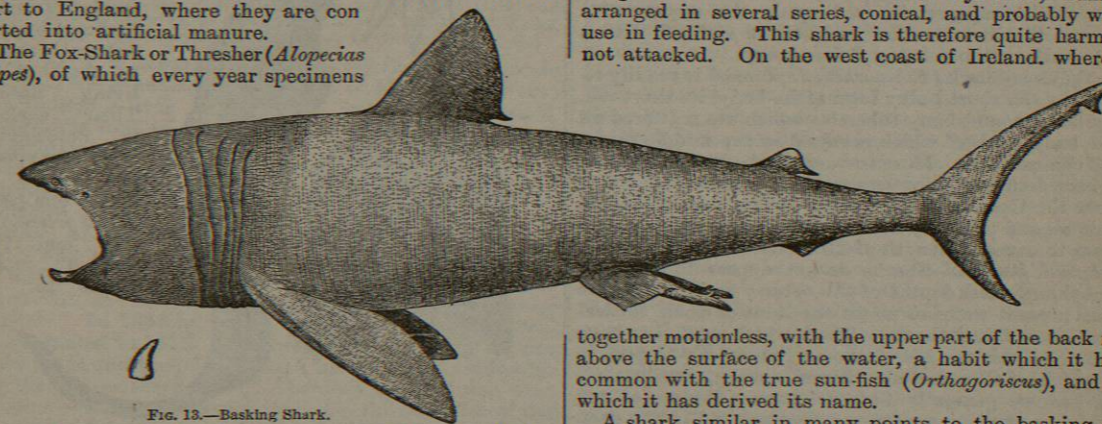


FIG. 13.—Basking Shark.

frequently seen during the summer months, generally in companies, at a distance of from three to a hundred miles off the shore, it is chased by the more courageous of the fishermen for the sake of the oil which is extracted from the liver, one fish yielding from a ton to a ton and a half. Its capture is not unattended with danger, as one blow from the enormously strong tail is sufficient to stave in the sides of a large boat. The simple method used at present of harpooning the fish entails much patience and loss of time upon the captors, as the fish generally sinks to the bottom and sulks for many hours before it rises again in a more or less exhausted condition; and the use of more modern appliances could not fail of securing more speedy and better success. The basking shark is gregarious, and many individuals may be seen in calm weather lying

are captured on the British coast, but which is common in all the temperate seas of the northern and southern hemispheres, is readily recognized by its extremely slender tail, the length of which exceeds that of the remainder of the body. Its teeth are small, flat, triangular, and without serrature (fig. 13; the single tooth is of the natural size). It follows the shoals of herrings, pilchards, and sprats in their migrations, destroying incredible numbers and frequently injuring the nets by getting entangled in them. When feeding it uses the long tail in splashing the surface of the water, whilst it swims in gradually decreasing circles round a shoal of fishes which are thus kept crowded together, falling an easy prey to their enemy. Sometimes two threshers may be seen working together. Statements that it has been seen to attack whales and other large cetaceans rest upon erroneous observations; its dentition is much too weak to bite through their skin, although, as Couch says, by one splash of its tail on the water it may put a herd of dolphins or porpoises to flight like so many hares. The same effect may be produced by the splash of an oar. The thresher attains to a length of 15 feet, the tail included.

The Basking Shark (*Selache maxima*), sometimes erroneously called "Sun-Fish," is the largest fish of the North Atlantic, growing to a length of more than 30 feet. It is one of the few types of sharks which up to a very recent time were considered to be peculiar to the North-Atlantic fauna; but Prof. F. M'Coy has just recorded its occurrence on the Australian coast, a specimen 30 feet long having been captured in November 1883 at Portland, on the west coast of Victoria. The mouth is of an extraordinary width, and, like the gill-cavity, capable of great expansion, so as to enable the fish to take at one gulp an enormous quantity of the small fish and other marine creatures on which it subsists. Also the gill-openings are of great width. The teeth are very small, numerous, arranged in several series, conical, and probably without use in feeding. This shark is therefore quite harmless if not attacked. On the west coast of Ireland, where it is

together motionless, with the upper part of the back raised above the surface of the water, a habit which it has in common with the true sun-fish (*Orthogoriscus*), and from which it has derived its name.

A shark similar in many points to the basking shark (which it exceeds in size), and an inhabitant of the Indo-Pacific Ocean, is *Rhinodon typicus*. In fact, so far as our present knowledge goes, it is the largest of all sharks, as it is known to exceed a length of 50 feet, but it is stated to attain that of 70. The captures of only a few specimens are on record, viz., one at the Cape of Good Hope, one or two near the Seychelles, where it is known as the "chagrin," one on the coast of California, and one (quite recently) on the coast of Peru. The snout is extremely short, broad, and flat, with the mouth and nostrils placed at its extremity; the gill-openings very wide, and the eye very small. The teeth are, as in the basking shark, extremely small and numerous, conical in shape. No opportunity should be lost of obtaining exact information on this shark.

The Greenland Shark (*Lamargus borealis*) belongs to the

same family as the spiked dog-fish, but grows to a much larger size, specimens 15 feet long being frequently met



FIG. 14.—Greenland Shark (*Lamna borealis*).

with. The two dorsal fins are small and destitute of spines. The teeth (fig. 11) in the upper jaw are small, narrow, conical in shape; those of the lower flat, arranged in several series, one on the top of the other, so that only the uppermost forms the sharp dental edge of the jaw. The points of these lower teeth are so much turned aside that the inner margin only enters the dental edge. The Greenland shark is an inhabitant of the Arctic regions, sometimes straying to the latitudes of Great Britain and of Cape Cod in

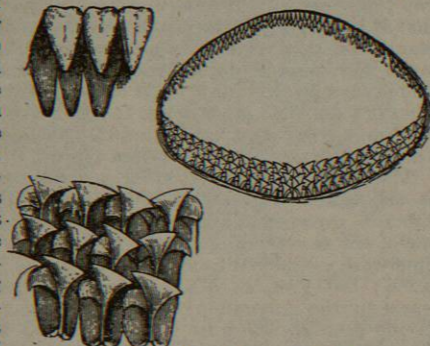


FIG. 15.—Dentition of Greenland Shark.

the western Atlantic; it is one of the greatest enemies of the whale, which is often found with large pieces bitten out of the tail by this shark. Its voracity is so great that, as Scoresby tells us, it is absolutely fearless in the presence of man whilst engaged in feeding on the carcase of a whale, and that it will allow itself to be stabbed with a lance or knife without being driven away.

The Spinous Shark (*Echinorhinus spinosus*) is readily recognized by the short bulky form of its body, its short tail, and the large round bony tubercles which are scattered all over its body, each of which is raised in the middle into a pointed conical spine. More frequent in the Mediterranean, it has been found also not very rarely on the English coasts and near the Cape of Good Hope. It is always living on the ground, and probably descends to some depth. It does not seem to exceed a length of 10 feet.

Bathybial Sharks.—Sharks do not appear to have yet reached the greatest depths of the ocean; and so far as we know at present we have to fix the limit of their vertical distribution at 500 fathoms. Those which we find to have reached or to pass the 100 fathoms line belong to generic types which, if they include littoral species, are ground-sharks,—as we generally find the bottom-feeders of our littoral fauna much more strongly represented in the deep sea than the surface swimmers. All belong to two families only, the *Scylliidae* and *Spinacidae*, the littoral members of which live for the greater part habitually on the bottom and probably frequently reach to the 100 fathoms line. Distinctly bathybial species are two small dog-fishes,—*Spinax granulatus* from 120 fathoms, and *Scyllium canescens* from 400 fathoms, both on the south-west coast of South America; also *Centrosyllium granulatum* from 245 fathoms in the Antarctic Ocean, whose congener from the coast of Greenland probably descends to a similar depth. The sharks which reach the greatest depth recorded hitherto belong to the genus *Centrophorus*, of which some ten species are known, all from deep water in the North Atlantic, Mediterranean, the Molucca and Japanese seas. The Japanese species were discovered by

the naturalists of the "Challenger" on the Hyalonema ground of Inosima in 345 fathoms. Dr E. P. Wright found *C. calolepis* at a still greater depth on the coast of Portugal. The fishermen of Setubal fish for these sharks in 400 or 500 fathoms, with a line of some 600 fathoms in length. "The sharks caught were from 3 to 4 feet long, and when they were hauled into the boat fell down into it like so many dead pigs"; in fact, on being rapidly withdrawn from the great pressure under which they lived they were killed, like other deep-sea fishes under similar circumstances. It is noteworthy that the organization of none of these deep-sea sharks has undergone such a modification as would lead us to infer that they are inhabitants of great depths.

One of the most interesting types of the division of sharks is the small family of *Notidanidae*, which is externally distinguished by the presence of a single dorsal fin only, without spine and opposite to the anal, and by having six or seven wide branchial openings. They represent an ancient type, the presence of which in Jurassic formations is shown by teeth extremely similar to those of the living species. Their skeleton is notochordal. Only four species are known, of which one (*Notidanus griseus*) has now and then strayed northwards to the



FIG. 16.—*Chlamydoselachus anguineus*.

English coast. A member of this family has been recently discovered in Japan, and is so scarce that only two specimens are known—one in the museum at Cambridge, U.S., and the other in the British Museum. It was named by its first describer, S. Garman, *Chlamydoselachus anguineus* (fig. 16). It resembles somewhat in shape a conger, and differs from the *Notidani* proper by its elongate body, wide lateral and terminal mouth, extremely wide gill-openings, and peculiarly formed teeth. The teeth are similar in both jaws, each composed of three slender curved cusps separated by a pair of rudimentary points, and with a broad base directed backwards. These teeth resemble some fossils of the Middle Devonian, described as *Cladodus*, and North-American

naturalists regard, therefore, this fish as "the oldest living type of vertebrate." The *Notidani* are very probably ground-sharks, perhaps descending into deep water; and, although nothing positive is known at present of the habits of *Chlamydoselachus*, the fact that this singular type has escaped so long the observation of the numerous collectors in Japan renders it probable that it inhabits depths the exploration of which has been initiated only recently.

A few words have to be added with reference to the economic uses of this group of fishes. Their utility to man is insignificant in comparison with the havoc they commit among food-fishes and at fisheries, and with the loss of life which is caused by the larger kinds. As mentioned above, some of the smaller dog-fishes are eaten at certain seasons by the captors, and by the poorer classes of the population. An inferior kind of oil, chiefly used for the adulteration of cod-liver oil, is extracted on some of the northern fishing-stations from the liver of the spiked dog-fishes, and occasionally of the larger sharks. Cabinet-makers make extensive use of shark's-skin under the name of "shagreen" for smoothing or polishing wood. This shagreen is obtained from species (such as our dog-fishes) whose skin is covered with small, pointed, closely-set, calcified papillae, whilst very rough skins, in which the papillae are large or blunt, are useless for this purpose. The dried fins of sharks (and of rays) form in India and China an important article of trade, the Chinese preparing gelatin from them, and using the better sort for culinary purposes. They are assorted in two kinds, viz., "white" and "black." The former consists exclusively of the dorsal fins, which are on both sides of the same light colour, and reputed to yield more gelatin than the other fins. The pectoral, ventral, and anal fins constitute the "black" sort; the caudal are not used. One of the principal places where shark fishing is practised as a profession is Kurrachee, and the principal kinds of sharks caught there are species of *Carcharias*, *Galeocerdo*, and *Zygæna*. Dr Buist, writing in 1850, states that there are thirteen large boats, with crews of twelve men each, constantly employed in this pursuit, that the value of the fins sent to the market varies from 15,000 to 18,000 rupees, that a boat will capture sometimes at a draught as many as a hundred sharks of various sizes, and that the number of sharks captured annually amounts probably to not less than 40,000. Large quantities are imported from the African coast and the Arabian Gulf, and various ports on the coast of India. In the year 1845-46 8770 cwt. of sharks' fins were exported from Bombay to China. (A. C. G.)

SHARON, a borough of the United States, in Mercer County, Pennsylvania, 14 miles west of Mercer, is the seat of considerable iron manufacture, with blast furnaces, rolling mills, foundries, and nail factories, and had in 1880 a population of 5684.

SHARP, JAMES (1618-1679), archbishop of St Andrews, was the son of William Sharp, sheriff-clerk of Banffshire, and of Isabel Leslie, daughter of Leslie of Kininvie, of the family of Halyburtons of Pitcar in Angus, and was born in Castle Banff on May 4, 1618. He was a clever boy, and his early disposition for the church led to his being called in jest "the young minister." In 1633 he went to King's College, Aberdeen, and graduated in 1637. He there studied divinity for one or two years, and probably derived his Episcopal tendencies from the "Aberdeen doctors," Aberdeen being at that time the home of Episcopal sentiment. On the outbreak of the Covenanting war he went to England (1639) and visited Oxford and perhaps Cambridge, becoming acquainted with the principal English divines. Upon his return he was chosen in 1643 through the influence of Lord Rothes to be one of the "regents" of philosophy in St Leonard's College, St Andrews. He appears to have continually risen in reputation until in December 1647 he went through his ordinary trials for the ministerial office before the presbytery of St Andrews, and was appointed minister of Crail in Fifeshire, on the presentation of the earl of Crawford, on January 27, 1648. In the great schism of Resolutions and Protestors, he, with the large majority of educated men, took active part with the former; he was the friend of Baillie, Douglas, Dickson, Wood, Blair, and others, and as early as March 1651 was recognized as one of the lead-

ing men of the party. His first public employment was in 1656, when he went to London on their behalf to endeavour to counteract with the Protector the influence of Warriston, who was acting for the Protestors. Here he became acquainted with Calamy, Ash, and other leading London Presbyterian ministers, and letters passed between him and Lauderdale, then prisoner in the Tower. He displayed all his undoubted talents for petty diplomacy and considerable subtlety in argument while on this service, and his mission was decidedly successful. He returned to Scotland in 1659, but upon Monk's march to London was again, in February 1660, sent by the Resolutions to watch over their interests in London, where he arrived on February 13. He was most favourably received by Monk, to whom it was of great importance to remain on good terms with the dominant party in Scotland. His letters to Douglas and others during this period, if they may be trusted, are useful towards following the intrigues of the time day by day. It must not be forgotten, however, that there is good reason for thinking that Sharp had already made up his mind not to throw away the chances he might have of prominent employment under the Restoration. In the beginning of May he was despatched by Monk to the king at Breda "to deal that he may be sent with a letter to the London Presbyterian ministers, showing his resolution to own the godly sober party." His letters on this occasion to Douglas show that he regarded himself equally as the emissary of the Scottish kirk. It is to be noticed that he was also the bearer of a secret letter from Lauderdale to the king. He was in fact playing a game admirably suited to his peculiar capacity for dark and crooked ways of dealing. There can be little doubt that while on this mission he was finally corrupted by Charles and Clarendon, not indeed so far as to make up his mind to betray the kirk, but at any rate to decide in no way to imperil his own chances by too firm an integrity. The first thing that aroused the jealousy of his brethren, who, as Baillie says, had trusted him as their own souls, was his writing from Holland in commendation of Clarendon. This jealousy was increased on his return to London (May 26) by his plausible endeavours to stop all coming of Presbyterian commissioners from Scotland and Ireland, though he professed to desire the presence of Douglas and Dickson, by his urgent advice that the Scots should not interfere in the restoration of Episcopacy in England, and by his endeavours to frustrate the proposed union of Resolutions and Protestors. He informed them that Presbyterianism was a lost cause in England, but as late as August 11 he intimated that, though there had been great danger for the Scottish kirk as well, this danger had been constantly and successfully warded off by his efforts. He returned to Scotland in this month, and busied himself in endeavouring to remove all suspicions of his loyalty to the kirk; but at the same time he successfully stopped all petitions from Scottish ministers to king, parliament, or council. His letters to Drummond, a Presbyterian minister in London, and to Lauderdale, without absolutely committing him, show clearly that he was certain that Episcopacy was about to be set up. How far he was actively a traitor in the matter had always been fairly disputed until the question was at last set at rest by the discovery of his letter, dated May 21, from London, whither he went in April 1661, to Middleton, the High Commissioner, whose chaplain he now was, from which it is proved that he was in confidential communication with Clarendon and the English bishops, that he was earnestly and eagerly co-operating in the restoration of Episcopacy in Scotland, that he had before leaving Scotland held frequent conferences with Middleton on the subject (a fact which he had explicitly and vehemently denied) and was aware that Middleton had