

New York Waters Have Seven Groups of Sharks

Probably the True Man-eater, a Specimen of Which Was Caught Near Matawan Creek, Killed Bathers Along the Coast

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TWICE in twenty-four hours the silver flood of the tide swirls in from the sea, wiping out the muddy borders of innumerable channels, till it reaches the edge of the meadows or the permanent land beyond high-water mark. Occasionally a dark fin, like a drifting board, breaks for a few moments the glistening Summer surface of a Long Island or New Jersey tideway, or perhaps far within some bay a large shark suddenly appears.

Many an old bayman has encountered these uncanny visitors. Fishermen know them as habitués of certain localities during the warmer months, and not infrequently find them in their nets, where they are likely to have been fearfully destructive. The majority of the shore-visiting public seldom meets them, however, and, as a rule, reports of their presence are not taken too seriously. True, certain intelligent and conservative persons regard them with vague suspicion, even though no definite casualties can be laid at their door, and a smaller, more credulous proportion of the population has always professed to hold them in mortal fear. But in general the realization of the truth that those who have done the most investigating of sharks are the most skeptical regarding shark accidents in temperate waters has had in the past a far-reaching effect upon public opinion.

On July 12 the tide rose in Matawan Creek, just inside Sandy Hook, as it had on innumerable July afternoons in the past. Some boys were swimming there as undisturbed generations of boys had gone swimming before them. One was killed, a man who tried to recover him was attacked while standing in shallow water, the flesh of his thigh being torn away so that he died of the injury; and immediately afterward, further down the creek, a boy had his leg badly bitten—all in one tide. There seems to be no possibility that the attacks were by anything other than sharks, or a shark. Moreover, this chapter of accidents was preceded by a fatality from an attack by a shark six days before at Spring Lake, twenty miles down the Jersey coast, and by another four days before that at Beach Haven, forty miles further south.

It must be admitted that deaths from shark-bite within a short radius of New York City would seem to be one of those unaccountable happenings that take place from time to time to the confounding of savants and the justification of the wildest tradition. Nevertheless, the truly exceptional nature of the accidents should not be lost sight of. For, despite a multitude of shark legends from the waters about New York, it is surely significant that the much-cited award of the late Hermann Oelrichs, of \$500 for an authenticated instance of a human being having been attacked by a shark north of Cape Hatteras, was never claimed.

In attempting to fix responsibility upon the particular manner of shark guilty of recent fatalities, it will be of interest to consider the various species which regularly or occasionally visit the coasts in the neighborhood of New York. Of these there are no less than nineteen distinct kinds, but several of them are so rare as scarcely to be known to science. Such of the others as are important from our point of view fall into the following fairly natural groups:

Requin sharks, comprising the common, smooth dogfish, the various ground sharks, and the tropical-blue shark and tiger shark.

Spined dogfishes, of which only one species is found in our shallow coastal waters.

Hammerhead sharks, including the true hammerhead, and the small, Southern shovelhead shark which rarely reaches our latitude.

Thresher sharks, with one local species.

Sand sharks, with one local species.

Basking sharks, with a single, pelagic species that is at once the largest and most inoffensive of our sharks.

Mackerel sharks, a group including the white shark, or true man-eater, besides one or two smaller, commoner kinds.

The apparent simplicity of this arrangement is unfortunately complicated by confusion of the vernacular names. In the first place, almost any shark more than five feet long must be a "man-eater," especially if it gets its photograph into the daily papers. Again, the term "sand shark" is applied almost indiscriminately, while "basking shark," the correct appellation for the largest of all fishes, is often given to various requin sharks, which are sometimes seen floating at the surface.

Our familiar dogfishes are small species of sharks. The smooth dogfish, a sinuous and graceful animal much like a miniature ground shark, is in Summer one of the commonest and most generally distributed salt-water fishes in the vicinity of New York. It reaches a maximum length of about three feet. It may be readily distinguished from the young of larger sharks by the character of its teeth, which are small, blunt, and granular, well adapted for crushing crabs and young lobsters, of which it is very fond.

The smooth dogfish is thoroughly good to eat, its flesh being boneless, nutritious, and palatable, though prejudice acts against its use, and fishermen usually regard the fish as vermin.

The spined dogfish ("thorndog," "picked," or "spiked" dogfish, "cod shark," "bonefish") is unlike the smooth dogfish, except that it is about the same size. It differs from all our other sharks in having strong spines, one in each back fin. It occurs off shore during the colder months of the year, sometimes in schools of scores of thousands, which clog and destroy the nets of fishermen.

The commonest large sharks in the waters about New York are the ground sharks (*Carcharhinus*). Males of these fishes are rarely seen, but toward midsummer many of the females enter our bays, where they give birth to their young. When one catches a glimpse of a triangular fin moving along the edge of some sand flat, disappearing again when it reaches deeper water, the chances are that it is the sign of a ground shark in search of fish. Ordinarily ground sharks swim rather slowly. They probably count to a considerable extent upon coming on their finny prey unawares, while it is hiding in the mud or seaweed, and discovering it by the aid of their sense of smell.

Most of the captured sharks depicted in the newspapers as "man-eaters," since the casualties along the Jersey coast have focused attention on them, have been ground sharks.

The commonest ground shark near New York is the brown shark, (*Carcharhinus milberti*), known also as "blue-nose," "sand," or "Spanish" shark, and by several other names. Adults of the brown shark are seldom longer than seven or eight feet, but two or three allied species are somewhat larger. Ground sharks increase in numbers as one goes southward along the Atlantic Coast. One species or another is found in every tropical harbor, often abundantly. They feed greedily on fish, or refuse, or carrion, and congregate about the slaughter houses at the waterfronts of the towns. There are almost sure to be some of these sharks lurking about the wharves from which native small boys go diving for coins with impunity.

The cub shark (*C. lamia*) is the characteristic representative of the group at Key West. The model of this species in the American Museum of Natural History is from a specimen taken near the Key West wharves with heavy hook and chain and a piece of tarpon. It had been following the humble rôle of scavenger, its stomach containing nothing but two or three empty food cans, doubtless thrown overboard from yachts lying at anchor. Sharks of this type often get in fishing nets, to which their sharp teeth or powerful thrashing tails are

very destructive. When cornered they are ready enough to bite, and can inflict severe wounds or even splinter an oar-blade. In the water, nevertheless, West Indian natives hold them in utter contempt.

The theory, attributed by the press to several authorities on fishes, that the recent loss of life in New Jersey has been due to attacks of ordinary ground sharks rendered desperate through hunger is, in the writers' opinion, untenable for several good reasons. First, such sharks have always been common near New York, and in some seasons doubtless more numerous than at present, yet accidents have been unknown. Second, it is doubtful whether these sharks have enough mechanical vigor to have done the damage. Third, they are sufficiently multitudinous in many tropical waters to make a swim seemingly a matter of extreme risk, yet the well-nigh amphibious natives continue to enjoy life. Finally, an example of the true man-eater shark was captured suspiciously near the entrance of Matawan Creek on July 14. This specimen, which has been identified by one of the writers, will be referred to again.

Of other species found in our waters each Summer, perhaps the most extraordinary is the hammerhead, a fish related to the ground sharks, but having a peculiar, grotesque head, somewhat flattened, and extended on either side, like the outline of a double-headed hammer. It is more of a surface swimmer than the ground sharks, built on finer lines, more active, but less powerful in proportion to its length, which may equal twelve or fifteen feet.

Another freakish species, the thresher shark, ("whiptail," "swingletail,") is often caught in nets offshore, and is particularly abundant in the ocean around Block Island. Its tail is as long as its body, and is used to round up the fish upon which it preys.

A common fish that in our waters seldom grows to be more than four feet in length is the sand shark. This is apparently one of the species also called "Spanish shark." It is characterized by two large back fins instead of one large and one small one, and by sharp, though not very strong, catlike teeth, with which it does a great deal of damage to fishermen's nets. Its food is almost exclusively fish.

Contrasted with the sluggish ground sharks in structure and habits are the more compact, more vigorous, mackerel sharks. The tail of an ordinary shark is peculiar, its upper lobe being long, the lower one very short; the tail of a mackerel shark, on the other hand, has become almost equally forked, is firm, and adapted for swift, protracted swimming, like the similarly shaped tails of mackerels. There are several species of mackerel sharks, one or two of which occur here, generally well off shore, and it is not known just how common they are. They seem to live almost exclusively on fish.

This résumé covers fairly well the sharks found under ordinary circumstances in New York water. Besides these, several kinds straggle occasionally to this vicinity from their normal range. The blue shark, for instance, is a long, slender species of the ground shark type that at rare intervals wanders in from the surface of the warmer high seas, where it abounds. When whalers are cutting up a whale far from land, blue sharks often gather in droves to feast on the flesh, although their jaws are so weak that they can tear off a chunk only with difficulty. A good-sized blue shark was taken several years ago at City Island.

The tiger or leopard sharks also now and then straggle north from the tropics. This species, likewise related to the ground shark, is very slender, with a big, blunt head and wide mouth. It occasionally reaches a length of thirty feet. Small ones are spotted, but the largest are plain colored. The tiger shark is generally dreaded in West Indian waters, but, we suspect, rather from its ferocious appearance than from anything definitely known against it. A twelve-foot example

has been seen, however, completely to gut the body of a disabled member of its own species, the forty-pound liver of the latter being afterward taken from the first shark's stomach. A moderate-sized tiger shark was captured in a net at Islip, L. I., on Sept. 11, 1915.

Greatest of all the sharks is the northern basking shark, or "bone shark," stray individuals of which have found their way southward to New York. One was taken at Westhampton on June 29, 1915. This shark, and its tropical counterpart, the whale shark, are the largest of existing fishes, reaching a length of fifty feet, yet they are among the most helpless and inoffensive so far as tooth equipment is concerned. Although their teeth are functionless, they have greatly developed gill-rakers, which serve like the baleen of whales to strain small marine creatures from the ocean water. At certain seasons basking sharks are gregarious, shoals of them lying motionless with backs awash. Pairs also have a habit of swimming in tandem formation, one immediately behind the other. It is likely that two such great fishes, with their high dorsal fins showing like leg-o'-mutton sails forty or fifty feet apart, have more than once given rise to tales of the sea-serpent.

The last species to be considered is the truly "man-eating" white shark, *Carcharodon carcharias*, or "the biter with the jagged teeth." Large man-eaters are of a leaden white color, but young ones have a blue-gray back. According to Linnaeus, this shark was the leviathan that swallowed Jonah. It is closely allied to the swift-swimming mackerel shark, but it is stockier, more powerful, with somewhat different, stronger teeth, and it reaches the great length of from thirty to forty feet. Its closest affinities, indeed, are with the huge extinct sharks of the cretaceous period, which equaled in size the largest whales. The white shark is perhaps the rarest of all noteworthy sharks, being seldom met with even in the tropics, its natural home; but at intervals stray individuals find their way into temperate seas. It has been taken once or twice in this latitude, but never within fifty miles of New York City until a specimen was captured off South Amboy on July 14 by Michael Schleisser of the Bronx.

White sharks are so scarce that their habits are little known, but they are said to feed to some extent on big sea turtles, biting off their legs and even cutting through their shells. Of this species alone it may be said that, judging from its physical makeup, it would not hesitate to attack a man in the water. The debated question as to whether a fish of this kind could actually bite through the bone of a man's leg is not particularly important, because it is evident that even a relatively small white shark, weighing two or three hundred pounds, might readily snap the largest human bones by a jerk of its body, after it had bitten through the flesh. The occurrence of the white shark near New York being almost as unprecedented as the attacks on bathers, which happened simultaneously, the capture of a specimen by Mr. Schleisser confirms our belief that the white shark was responsible for the casualties. It is quite within the realm of reasonable conjecture, indeed, that a single fish was at the bottom of the successive attacks.

Whether sharks in general are more numerous in our waters this Summer than during previous years may be seriously questioned, notwithstanding the way in which local fishermen and the crews of incoming steamers have vied in frightening the public.

It is not impossible that this Summer sharks really are with us in unprecedented force, and that we are experiencing an extraordinary migration, a movement comparable with the sporadic abundance during certain years of army worms, or jellyfishes, or Western grasshoppers, or Northern lemmings—movements that all have their source in overproduction and other little-understood natural agencies.