

SOUTH AFRICAN ASSOCIATION FOR
MARINE BIOLOGICAL RESEARCH

OCEANOGRAPHIC RESEARCH INSTITUTE

Investigational Report No. 8

*Preliminary guide
to the sharks found off the
east coast of South Africa*

by

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Published by

THE OCEANOGRAPHIC RESEARCH INSTITUTE
2 WEST STREET, DURBAN
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

THE INCIDENCE of shark attack on humans off the east coast of the Republic of South Africa is high and, with a view to preventing attacks in the future, an extensive programme of research on protective measures is being conducted by the Oceanographic Research Institute in Durban. The first requirement in this investigation of the problem of shark attack was to determine the species responsible for attacking humans in this area and, in order to accomplish this, a survey of the potentially dangerous shark families was begun in 1959. Families in which the species grow to a large size and possess well-developed cutting or tearing teeth were considered to be potentially dangerous. These families include the *Carchariidae* (Ragged Tooth Sharks), *Isuridae* (Blue Pointer and Mako Sharks), *Alopiidae* (Thresher Sharks), *Carcharhinidae* (Tiger, Soupfin, Blue, Milk, Lemon, White-tipped, Black-tailed Grey, Sandbar, Bronze, Ridge-backed Grey, Silky, Bignose, Galapagos, Black, Zambezi, Java, Blackspot, Blackfin and Black-tipped Sharks) and *Sphyrnidae* (Hammerhead Sharks). Study material was collected from coastal and offshore waters between Lourenco Marques and Cape Town. The majority of specimens was obtained from coastal waters in the Durban area.

During the early part of the survey it became evident that considerable confusion existed in the identification of sharks and that, in view of this, a simplified method of identifying the sharks caught in this area might be of considerable value to anglers and spearfishermen. This preliminary guide has been compiled in an attempt to help in the identification of sharks belonging to the families included in the survey. The survey has recently been extended to include all sharks, rays, sawfishes and sandsharks and it is hoped that a comprehensive guide on these groups will be produced in the future. Before this is possible, however, it is necessary to examine large numbers of specimens of each species. This can only be done with the full co-operation

of anglers in making specimens (dead as well as alive) available to the Institute. It is therefore urgently requested that anglers should make *any sharks, rays, sawfishes or sandsharks* caught, available to the Institute for research.

Arrangements can be made for sharks caught within the Durban area to be collected by the Institute (Phone 68374 or 23432). Otherwise specimens can be brought to the Aquarium, 2 West Street, Durban or sent to the Oceanographic Research Institute, Box 736, Durban. Postage costs will be refunded. Should it be impossible to send complete specimens to the Institute, photographs similar to those included in this guide should be taken and sent to the Institute together with information as to when and where the specimen was caught, the dried jaws of the specimen (or detailed notes on the nature and number of teeth on each jaw), and measurements of the body length (from the tip of the snout to the beginning of the tail) and total length (from the tip of the snout to the tip of the tail when held in its natural position). It is hoped that this much-needed assistance in the collection of material and data will be forthcoming.



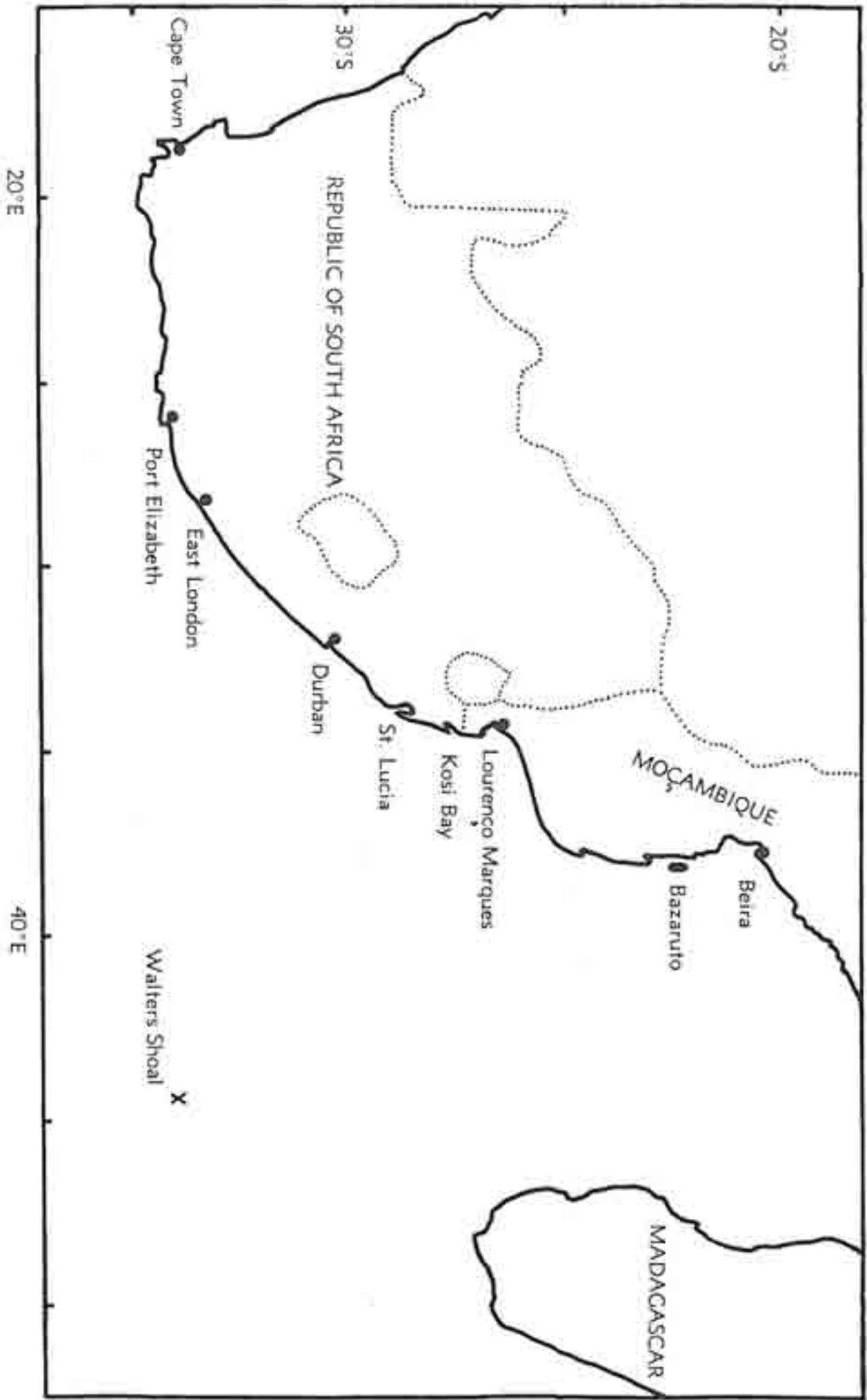


Fig. 1 — The East Coast of South Africa.

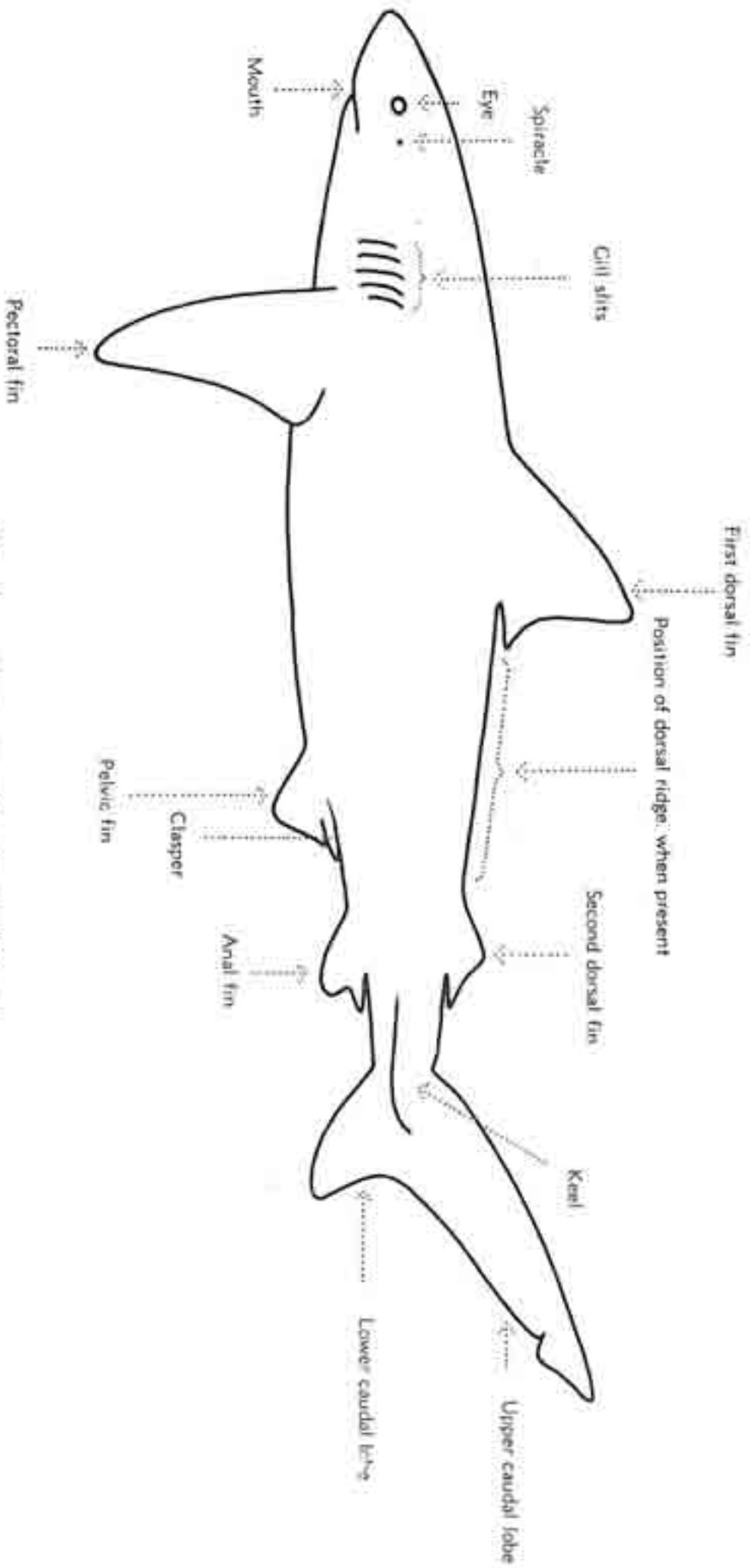


Fig. 2 — Diagram of a Typical Shark.

MAIN FEATURES USED IN IDENTIFICATION OF SHARKS

These are illustrated in Figs. 3 to 22 and consist of the following:

Head: Normal or hammershaped.

Snout: Long or short.
Pointed or rounded tip.

Nasal lobe: Long or short.

Teeth: Edges smooth or serrated
Shape
Basal denticles present or absent

Dental formula; The dental formula enables the number of rows of teeth on each side of each jaw to be simply expressed. It is written as follows:

No. of teeth on left side of upper jaw	No. of central teeth	No. of teeth on right side of upper jaw
No. of teeth on left side of lower jaw	No. of central teeth	No. of teeth on right side of lower jaw

Hence a dental formula of $\frac{16 - 2 - 16}{15 - 1 - 15}$ indicates that the specimen has 16 teeth on the left side of the upper jaw, 2 teeth in the centre of the jaw, 16 teeth on the right side of the upper jaw, 15 teeth on the left side of the lower jaw, 1 tooth in the centre of the lower jaw and 15 teeth on the right side of the lower jaw.

Spiracles: Present or absent.

When present these are very small in the species described. They consist of a small hole on each side situated between the eye and the first gill slit but nearer the eye than the first gill slit. They are only slightly larger than the pores found on the head in this region but may be distinguished from them as they do not exude mucus when squeezed.

Gill slits: Position of 5th gill slit (above or in front of pectoral fin).

Dorsal ridge: Present or absent.

Fins: Position, shape and size (particularly the two dorsal fins).

Caudal fin: Proportion of the lower lobe to the upper lobe (i.e. whether the lower lobe is almost as long as, or considerably shorter than the upper lobe).

Keel: Present or absent.

Colour: Although this is not always reliable it may be of some use in identification.

The overall colour of sharks may show considerable variation within the same species when alive or freshly caught. After death further colour changes take place. For this reason overall colour is usually an unreliable feature in the identification of sharks.

Markings on the fins or body may also vary. For example, adult specimens of the Black-tipped Shark (*Carcharhinus maculipinnis*) have very distinct black tips on their fins while the young have no markings at all. In a few species, e.g. the Black Shark (*Carcharhinus melanopterus*) and the Black-tailed Grey (*Carcharhinus spallanzani*), the markings are more reliable and may be used for identification.

HOW TO IDENTIFY THE SPECIES

The general appearance of many species of shark may be closely similar. As the differences between species are not always apparent in photographs, a brief description of each species has been included in this guide. Each description gives the main features by means of which each species can be identified but identification should be made by using the keys. Identification is likely to be more accurate when keys are used and, with a little practice, will be far quicker. The descriptions should be used as a means of checking the identification. If the identification is correct, the description should agree on every point for the shark concerned.

HOW TO USE THE KEYS

Each key consists of a number of paired statements. In order to identify a specimen, start with the first pair of statements (numbers 1a and 1b) and decide which of the two statements (a or b) applies to the specimen being identified. Should the statement chosen be directly followed by block type, this is the name of the group to which the specimen belongs. If the statement chosen is not followed directly by block type, refer to the pair of statements directly beneath and repeat the process.

This process of elimination is continued until the statement chosen is directly followed by a group name (in block type). Whenever a statement that is not followed by a group name is

chosen, refer to the pair of statements directly below and repeat the process.

For example: To identify a shark of the family *Carcharhinidae*, turn to the key to the genera of the family *Carcharhinidae* on page 19. If the shark in question has the following features: no spiracles, the midpoint of the base of the first dorsal nearer the pectorals than the pelvics, the cusps of the upper teeth serrated and a large first dorsal fin with a very broadly rounded apex, the identification will be made as follows:

The first pair of statements is always 1. Therefore choose between 1a and 1b, and, as the above described shark has no spiracles, 1b must be chosen.

There is no group name opposite 1b, so proceed to the pair of statements directly beneath it — in this case 3. Choose between 3a and 3b and, as the midpoint of the first dorsal is nearer the pectorals than the pelvics, the choice will be 3b.

There is no group name opposite 3b, so proceed to the pair of statements directly beneath — in this case, 4. Choose between 4 a and 4 b and, as the cusps of the upper teeth are serrated, the choice will be 4a.

There is a group name opposite 4a — in this case *Carcharhinus*. The specimen in question therefore belongs to the genus *Carcharhinus* (Grey Sharks). To determine which species of *Carcharhinus* it is, use the key to the species of the genus *Carcharhinus* on page 26—identification LONGIMANUS.

It is not necessary to use more than three keys to identify any one of the species described in this guide. The first key in the guide will indicate the family to which the species belongs. In the section dealing with the family there may be another key by means of which, except in the case of the genera *Carcharhinus* and *Galeorhinus*, it is possible to identify the species. To find the species of the genus *Carcharhinus* or *Galeorhinus* it is necessary to use a third key which is found at the beginning of the subsection dealing with the genus.

KEY TO THE FAMILIES CARCHARIIDAE, ISURIDAE, ALOPIIDAE, CARCHARHINIDAE AND SPHYRNIDAE.

- 1a HEAD hammer-shaped — — SPHYRNIDAE (26-28)
- 1b HEAD normal, not hammer-shaped
 - 2a CAUDAL FIN lunate, the lower lobe being almost as long as the upper lobe — ISURIDAE (3-4)

- 2b CAUDAL FIN not lunate, the lower lobe being considerably shorter than the upper lobe.
- 3a UPPER CAUDAL LOBE very long being equal in length to the distance from the tip of the snout to the beginning of the caudal
- ALOPHIDAE (5)**
- 3b UPPER CAUDAL LOBE less than $\frac{1}{2}$ the length from the snout to the beginning of the caudal.
- 4a 5th GILL SLIT in front of the pectoral fin ————— **CARCHARIIDAE (1-2)**
- 4b 5th GILL SLIT above the pectoral fin **CARCHARHINIDAE (6-25)**

FAMILY: CARCHARIIDAE

Key to the Species

- 1a EYE SMALL, the diameter considerably less than twice the length of the longest tooth **CARCHARIAS TAURUS (1)**
- 1b EYE LARGE, the diameter twice the length of the longest tooth or more — **CARCHARIAS KAMOHARAI (2)**

1. CARCHARIAS TAURUS

(PLATE 1)

Common Names:

RAGGED TOOTH SHARK, Sand Shark, Grey Nurse Shark, Sand Tiger, Brown Shark, Yellow Shark, Yellow Belly, Sarda.

Description:

- Head: Normal, not hammer-shaped. (Fig. 3a).
- Eye: Small, the diameter considerably less than twice the length of the longest tooth.
- Gill slits: Fifth gill slit in front of the pectoral fin. (Fig. 13b).
- First dorsal: Midpoint of base considerably nearer the pelvics than the pectorals. (Fig. 15a).
- Second dorsal: Almost as large as the first dorsal.
- Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe (Fig. 20b).
Length of upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal (Fig. 21a).

Teeth: A small basal denticle is present on each side of the cusp (Fig. 11a).

In both jaws the teeth are long in front but decrease in size towards the sides of the jaws where they form a cobblestone-like surface.

Dental formula:

$$\frac{17 \text{ to } 27 - 0 - 17 \text{ to } 27}{16 \text{ to } 25 - 0 - 16 \text{ to } 25}$$

Colour: Greyish-brown to yellowish-brown above and paler below. In young specimens the posterior part of the body is marked with irregular dark spots but these fade with age and are not always visible in large specimens.

Size: Reaches 10½ feet in length.

Habitat: They live on the bottom in shallow water and are usually found close inshore.

Locality: Not uncommon off the east coast of South Africa. Also found in the Mediterranean, eastern and western Atlantic.

***Season:** In Durban this species is most frequently caught between June and November although specimens have also been obtained in January and March. Gravid females have been caught in March, June and July.

Development: Ovoviviparous—the young are born alive and, prior to their birth, are nourished first on their yolk and later feed on the eggs lying near them in the uterus. Each female bears only two young which are born at a length of approximately 36 inches.

Habits: They are usually solitary and sluggish but are more active at night. They feed in inshore areas on fish and crabs.

Commercial importance: None.

†Records:

Natal Angling Board of Control:

55 lb. Line Test; 649 lbs. E. Scott, 1946.

***SEASON:** The seasonal notes are based on the specimens obtained by this Institute and the accuracy of these notes therefore rests mainly on the number of specimens obtained by the Institute from anglers. It is hoped that future co-operation of anglers and spearfishermen will enable greater accuracy in the records to be included in the more comprehensive guide to be compiled.

†RECORDS: The records of the Natal Angling Board of Control are as of November, 1963. Those of the South African Anglers Union are as of September, 1963. Those of the Game Fish Union of Africa are as of 31st December, 1963. Those of the International Game Fish Association are as of 31st December, 1963. The records of the Natal Underwater Union are as of October, 1963.

South African Angler's Union:

Caught by members from shore: 649 lbs. E. Scott,

Game Fish Union of Africa:

130 lb. Line Test: 649 lbs. E. Scott 1946.

Natal Underwater: 39 lbs. E. Franken.

2. CARCHARIAS KAMOHARAI

(PLATE 2)

Common names:

JAPANESE RAGGED TOOTH SHARK, Mizuwani.

Description:

Head: Normal, not hammer-shaped. (Fig 3a).

Eye: Large, the diameter twice the length of the longest tooth or more.

Gill slits: Fifth gill slit in front of the pectoral fin. (Fig. 13b).

First dorsal: Midpoint of base at least as near to the pelvics as the pectorals. (Fig. 15a).

Second dorsal: Considerably smaller than the first dorsal fin.

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: No small basal denticle on each side of the cusp. (Fig. 11a).

In both jaws the teeth are long and smooth-edged. They decrease in size towards the sides of the jaws.

Dental formula:

$$\frac{13 \text{ or } 14 \text{ — } 0 \text{ — } 13 \text{ or } 14}{12 \text{ or } 13 \text{ — } 0 \text{ — } 12 \text{ or } 13}$$

Colour: Brownish-grey above, paler beneath.

Size: Probably does not reach much more than 3 to 4 feet in length.

Habitat: Probably warm temperate waters.

Locality: One specimen caught close inshore at Clifton Beach, Cape Town. Also found in Japanese waters and off West Africa.

Season: The only specimen examined was caught off Cape Town in November.

Development: Unknown. Possibly similar to the Ragged Tooth Shark (*C. taurus*).

Habits: Unknown. The South African specimen was found close inshore swimming feebly.

Commercial importance: Probably marketed as food in Japanese waters.

Records:

No official South African or international angling records for this species could be found.

FAMILY: ISURIDAE

Key to the Species

- 1a TOOTH MARGINS smooth — — ISURUS GLAUCUS (3)
1b TOOTH MARGINS coarsely serrated — — — — CARCHARODON CARCHARIAS (4)

3. ISURUS GLAUCUS

(PLATE 3)

Common Names:

MAKO, Mambone, Sharp-nosed Mackerel Shark, Blue Pointer, Blue Porpoise Shark, Snapper Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Mouth: Narrow, the height being more than $\frac{2}{3}$ of the width.

Gill slits: Fifth gill slit in front of the pectoral fin. (Fig. 13b).

Caudal: Lunate, the lower lobe being almost as long as the upper lobe. (Fig. 20a).

Keels: Present. (Fig. 22a).

Teeth: Tooth margins smooth. (Fig. 9b).

No small basal denticles on each side of the cusp. (Fig. 11b).

Dental formula:

$$\frac{11 \text{ to } 13 \text{ — } 0 \text{ — } 11 \text{ to } 13}{12 \text{ to } 15 \text{ — } 0 \text{ — } 12 \text{ to } 15}$$

Colour: Deep blue above, white beneath.

Size: Probably reaches 12 feet in length.

Habitat: Usually found near the surface in warm, deep waters.

Locality: This species is found off the east coast of South Africa and off Madagascar but does not often come inshore. It is also found in tropical, sub-tropical and warm-temperate waters in the Pacific and Indian Oceans.

Season: Off Durban, specimens are usually caught between August and November although one specimen was obtained by this Institute in January. No gravid females have been obtained.

Development: Development is similar to that of the Ragged Tooth Shark (*Carcharias taurus*).

Habits: This solitary, fast-swimming species is well known as a game-fish and is noted for leaping out of the water when hooked as well as under natural conditions. Feeds on fish and squid. Said to be responsible for attacks on boats.

Commercial importance: Marketed as food.

Records:

Natal Angling Board of Control:

Deep Sea: 18½ lbs. R. Nipper 1960.

South African Angler's Union:

Caught by members from shore: 75 lbs. K. J. Lillie-crona.

Caught by non-members from craft at sea: 18½ lbs. R. Nipper.

Game Fish Union of Africa:

130 lb. Line Test: 602 lbs. Mrs. M. Marot 1962.

International Game Fish Association:

All Tackle: 1,000 lbs. B. Ross 1943 (New Zealand).

4. CARCHARODON CARCHARIAS

(PLATE 4)

Common Names:

MANEATER, Blue Pointer, Death Shark, White Death Shark, Great White Shark, White Shark, White Pointer, Tommy, Uptail, Sarda, Cowshark, Mudshark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Mouth: Broad, the height being less than $\frac{2}{3}$ of the width.

Gill slits: Fifth gill slit in front of the pectoral fin. (Fig. 13b).

Caudal: Lunate, the lower lobe being almost as long as the upper lobe. (Fig. 20a).

Keels: Present. (Fig. 22a).

Teeth: Tooth margins coarsely serrated. (Fig. 9a).

Dental formula:

$$\frac{12 \text{ to } 14 \text{ — } 0 \text{ — } 12 \text{ to } 14}{10 \text{ to } 13 \text{ — } 0 \text{ — } 10 \text{ to } 13}$$

Colour: Blue-black above and white beneath; the undertips of the pectorals are black. This is the colouration observed at this Institute but this species has also been reported as being "slaty-brown" and, in large specimens, "leaden-white" above.

Size: May reach 40 feet in length. Large fossil teeth similar to those of this species come from an extinct species, *Carcharodon megalodon*, which is estimated to have reached 90 feet in length.

Habitat: The Maneater (*Carcharodon carcharias*) is a deep water species, where it is usually found near the surface, but may frequently come inshore, sometimes even into very shallow water.

Locality: Specimens are caught in the Durban area (from South Pier and in the shark nets) and elsewhere off the east coast of South Africa but are nowhere abundant. This species is widely distributed in tropical and warm temperate waters and is found in the Mediterranean, the Atlantic and off Australia.

Season: Off Durban, specimens are usually caught between July and December but they have also been obtained in February and March. No gravid females have been caught.

Development: No account of the developmental stages of this species has been published. Unborn young are said to reach 48 inches in length.

Habits: Usually solitary but sometimes found in groups, this is a swift, strong-swimming species. It feeds on a wide variety of prey including other sharks, large and small fish, seals, turtles, squid and crabs. It is also a scavenger and eats a wide variety of dead animals washed from the shore. Strange objects such as potatoes, coal, etc., have also been found in their stomachs. This species has been proved responsible for attacks on humans and attacks on small boats. In both cases identification has been made possible by tooth fragments broken off in the attack.

Commercial importance: May be eaten.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 880 lbs. M. Geerdts 1934.

All Tackle: 1660 lbs. R. Harrison 1953.

South African Angler's Union:

Caught by members from shore: 880 lbs. M. R. Geerdts and G. T. Bush.

Caught by non-members from shore: 1660 lbs. R. S. Harrison.

Game Fish Union of Africa:

130 lb. Line Test: 1660 lbs. R. Harrison 1953.

International Game Fish Association:

All Tackle: 2664 lbs. A. Dean 1959 (Australia).

FAMILY: ALOPIIDAE

Only one species of this family has been found off the east coast of South Africa.

5. ALOPIAS PELAGICUS

(PLATE 5)

Common Names:

THRESHER SHARK, Thrasher Shark, Whiptail, Fox Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Upper lobe very long, being equal in length to the distance from the tip of the snout to the beginning of the caudal. (Fig. 21b).

Teeth: Smooth-edged (Fig. 9b) with one or two small lateral denticles towards the edge of the base on each side of the cusp. (Fig. 11a).

Dental formula:

$$\frac{21 - 2 - 20}{24 - 2 - 22} \text{ but may vary slightly.}$$

Colour: Dark blue-grey above, white beneath.

Size: Probably reaches 18 feet in length.

Habitat: A deep water species, found near the surface in tropical and sub-tropical areas but very seldom comes inshore.

Locality: Found off the East Coast of South Africa and off Japan. Probably also occurs elsewhere in the Pacific and Indian Oceans.

Season: The only specimen obtained by this Institute was caught off Margate, Natal South Coast in February.

Development: Ovoviviparous—the young are born alive but do not have a placental connection with their mother. It is said that small numbers of large young are born but no evidence is available.

Habits: An active species, which preys mainly on small shoal fish which it rounds up into tight, easily-attacked shoals using its elongated tail.

Commercial importance: None.

Records: There are apparently no official South African or International angling records for this species.

FAMILY: CARCHARHINIDAE

In this family a number of species are found in South Africa. These are grouped into 5 genera, the key to which is shown below:—

Key to the Genera

- 1a SPIRACLES present
 - 2a SNOUT very short and blunt — **GALEOCERDO** (6)
 - 2b SNOUT pointed at tip and of moderate length —
GALEORHINUS (7-8)
- 1b SPIRACLES absent
 - 3a MIDPOINT OF THE FIRST DORSAL FIN
BASE is considerably nearer to the pelvics than
the pectorals — — — — — **PRIONACE** (10)
 - 3b MIDPOINT OF THE FIRST DORSAL FIN
BASE is as close (or closer) to the pectorals as
the pelvics.
 - 4a CUSPS of the upper teeth serrated —
CARCHARHINUS (12-25)
 - 4b CUSPS of upper teeth smooth-edged.
 - 5a SECOND DORSAL BASE at least $\frac{3}{4}$ length
of first dorsal base — — **NEGAPRION** (9)
 - 5b SECOND DORSAL BASE less than $\frac{1}{2}$ as
long as first dorsal base — —
RHIZOPRIONODON (11)

GENUS: GALEOCERDO

Only one species found off South Africa.

6. GALEOCERDO CUVIERI

(PLATE 6)

Common Names:

TIGER SHARK, Leopard Shark, Requin Renard, Requin demoiselle, Sora Min, Pez Zorro.

Description:

Head: Normal, not hammershaped. (Fig 3a).

Snout: Short and blunt. (Fig. 5a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Present. (Fig. 12b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Characteristically cockscomb-shaped. (Plate 6c).

Dental formula:

$$\frac{10 \text{ to } 12 - 1 \text{ or } 2 - 10 \text{ to } 12}{10 \text{ to } 12 - 1 - 10 \text{ to } 12}$$

Colour: Greyish-brown above with darker markings in the form of spots or bands giving a "tiger-like" appearance. These markings fade with age and may not be apparent in very large specimens. The lower surface is white or off-white.

Size: Reaches at least 18 feet in length.

Habitat: Found in tropical and sub-tropical waters both offshore and inshore where it may enter bays and river mouths and sometimes very shallow water.

Locality: Found off the east coast of Africa but is not very common. This species is widely distributed and is also found on the east and west coasts of North and South America, in the eastern Atlantic and from Japan to New Zealand.

Season: Has been caught in Durban between May and December. No gravid females have been obtained.

Development: Ovoviviparous—the young are born alive but do not have a placental connection with their mother. There may be from 10 to 82 young in a litter. It is likely that the number of young in the litter increases with the size of the mother. The young are relatively small and may be 18 to 28 inches in length at birth.

Habits: Apparently solitary, these are strong-swimming, active sharks. They are voracious and omnivorous and feed on fish, sharks, rays, squid and crabs. They are also well known for the wide variety of dead animals and extraneous articles found in their stomachs. They are reputed to attack man.

Commercial importance: The liver oil contains a higher vitamin A content than that of most other warm water sharks. Excellent leather can be made from the skin.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 680 lbs. D. Boyes 1963.

All Tackle: 1034 lbs. H. Roseveare 1954.

South African Angler's Union:

Caught by members from shore: 680 lbs. D. L. Boyes.

Caught by non-members from shore: 1034 lbs. H. Roseveare.

Game Fish Union of Africa:

130 lb. Line Test: 1034 lbs. H. Roseveare 1954.

International Game Fish Association:

All Tackle: 1422 lbs. J. Robinson 1958 (Australia).

GENUS: GALEORHINUS

Key to the Species

- 1a SECOND DORSAL and anal fins about equal in size **GALEUS (7)**
1b SECOND DORSAL about twice the size of the anal — **ZANZIBARENSIS (8)**

7. GALEORHINUS GALEUS

(PLATE 7)

Common Names:

SOUPFIN, Liver Oil Shark, Oil Shark, School Shark, Tope, Speareye, Spierhaai, Vaalhaai.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Moderately long and pointed. (Fig. 6b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Present. (Fig. 12b).

Second dorsal: About equal in size to anal.

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Oblique, but noticeably different from those of the Tiger Shark (*Galeocerdo cuvier*).

Dental formula:

$$\frac{16 \text{ to } 22 \text{ — } 0 \text{ to } 2 \text{ — } 16 \text{ to } 22}{16 \text{ to } 18 \text{ — } 1 \text{ or } 2 \text{ — } 16 \text{ to } 18}$$

Colour: Dark grey above and whitish beneath. The fins may be dusky tipped.

Size: May attain 6 feet in length.

Habitat: Usually found in deep water.

Locality: Common off Port Elizabeth and the south eastern coast of South Africa. Also found off the west coast of South Africa, the east coast of South America and from Japan to New Zealand. It is also common off Lower California.

Development: No account of the development of this species has been obtained.

Habits: This species is found in groups when pursuing food and is said to be more active at night. It feeds on small fish including bottom-dwelling fish, squid and crustaceans (crabs, etc.). It is almost certainly harmless to humans.

Commercial importance: This is one of the most important commercial species. Its fins are used in the preparation of shark fin soup by the Chinese, the liver oil is rich in Vitamin A and its hide may be used for leather.

Records: There are apparently no official South African or International angling records for this species.

8. GALEORHINUS ZANZIBARENSIS

(PLATE 8)

Common Names:

ZANZIBAR SOUPFIN.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Moderately long and pointed. (Fig. 6b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Present. (Fig. 12b).

Second dorsal: About twice the size of the anal.

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal (Fig. 21a).

Teeth: Oblique, but noticeably different from those of the Tiger Shark (*Galeocerdo cuvier*).

Dental formula:

$$\frac{23 \text{ to } 25 \text{ — } 2 \text{ — } 23 \text{ to } 25}{20 \text{ to } 21 \text{ — } 1 \text{ or } 2 \text{ — } 20 \text{ to } 21}$$

Colour: Grey above, lighter beneath. Rear margin of dorsals dark and that of pectorals, pelvics and anal light.

Size: Does not reach $6\frac{1}{2}$ feet in length.

Habitat: Probably in slightly offshore waters.

Locality: Recorded from off Zanzibar and off the Durban and Kenya coasts.

Development: No account of the developmental stages of this species has been obtained.

Habits: Probably similar to those of the Soupfin (*Galeorhinus galeus*).

Records: There are apparently no official South African or International Angling records for this species.

GENUS: NEGAPRION

Only one species has been found off South Africa.

9. NEGAPRION ACUTIDENS

(PLATE 9)

Common Names:

LEMON SHARK, Kosi Bay Shark, Kosi Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

First dorsal: Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Base is at least $\frac{3}{4}$ the length of the first dorsal base.

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth are smooth-edged. The teeth are slender and may have a basal denticle (Fig. 11a) on the outer side of the cusp.

Dental formula:

$$\frac{13 \text{ to } 15 - 1 - 13 \text{ to } 15}{13 \text{ or } 14 - 1 - 13 \text{ or } 14}$$

Colour: Grey above, white beneath.

Size: Reaches 10 feet in length.

Habitat: Found inshore in warm seas.

Locality: Specimens have been caught at Kosi Bay and Mapelane, Zululand. It is unlikely that this species is found as far south as Durban.

Season: The specimen from Mapelane was caught in May.

Development: No account of the developmental stages of this species has been obtained.

Habits: Nothing is known of the habits or diet of this species.

Commercial importance: Apparently none.

Records:

South African Angler's Union:

Caught by members from shore: 253 lbs. H. E. Keen.

GENUS: PRIONACE

Only one species is found off South Africa.

10. PRIONACE GLAUCA

(Also known as *Glyphis glaucus*)

(PLATE 10)

Common Names:

BLUE SHARK, Great Blue Shark, Blue Whaler, Requin Bleu, Janiquin.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

First dorsal: Midpoint of base nearer to the pelvics than the pectorals. (Fig. 15a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Tooth margins coarsely serrated. (Fig. 9a).

Dental formula:

$$\frac{12 \text{ to } 15 \text{ — } 0 \text{ or } 1 \text{ — } 12 \text{ to } 15}{12 \text{ to } 14 \text{ — } 1 \text{ or } 2 \text{ — } 12 \text{ to } 14}$$

Colour: Deep blue above becoming black on death, white beneath. The pectorals may be dusky tipped.

Size: Said to reach 20 feet in length but there is no positive evidence for this. It does, however, reach a length of 13 feet.

Habitat: Found in tropical to warm temperate offshore waters near the surface.

Locality: Off the east and west coasts of South Africa where it is probably one of the most abundant offshore species. It is widely distributed in all oceans, being found off the east coast of America from Newfoundland to Brazil, off the west coast of America near California, Chile, Hawaii and off Japan and Australia.

Season: Owing to the lack of regular offshore shark-catching activities the exact season in the Durban area is not known.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be from 28 to 58 young in a litter and these are born at a length of not less than 20 inches.

Habits: Solitary. Said to be sluggish except when in pursuit of prey when it is a strong, fast swimmer. It usually feeds on small fish and squid but may cause considerable

damage to whales killed by whaling ships. There is no authenticated evidence of this species being responsible for attacks on humans, and as these sharks do not come inshore it is most unlikely that they are responsible for attacks on bathers.

Commercial importance: The meat is smoked and marketed in California. It is also eaten in Japan and Morocco.

Records:

International Game Fish Association:

All Tackle: 410 lbs. R. Webster 1960 (U.S.A.)

GENUS: RHIZOPRIONODON

Only one species has been found off South Africa.

11. RHIZOPRIONODON ACUTUS

(Also known as *Scoliodon walbeehmi*)

(PLATE 11)

Common Names:

MILK SHARK, Milky, Sharpnosed Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

First dorsal: Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Base less than $\frac{1}{2}$ the length of the first dorsal base.

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of upper lobe less than $\frac{1}{4}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth smooth-edged. (Fig. 10b).

Dental formula:

$$\frac{12 \text{ or } 13 \text{ — } 0 \text{ or } 1 \text{ — } 12 \text{ or } 13}{10 \text{ to } 12 \text{ — } 2 \text{ — } 10 \text{ to } 12}$$

Colour: Light to dark grey above, white beneath. There are no conspicuous markings.

Size: Specimens seldom reach more than 3 feet in length.

Habitat: Close inshore in warm waters.

Locality: Common off Durban. Also caught off Lourenco Marques and probably Madagascar. The distribution of this species is probably fairly wide but cannot be ascertained until its nomenclature has been settled.

Season: Caught off Durban throughout the year. Gravid females have been caught in May, July, August and September.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. The litters are small, there being 3 and 5 embryos respectively in each of the two gravid females examined. The young are born at a length of approximately 12 inches.

Habits: Often found in groups and generally active. They feed on small fish and squid. Too small to inflict severe wounds on humans.

Commercial importance: May be eaten.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 10 $\frac{3}{4}$ lbs. J. Blamey 1953.

South African Anglers Union:

Caught by members from shore: 10 $\frac{3}{4}$ lbs. J. O. Blamey.

GENUS: CARCHARHINUS

15 species belonging to this genus are found off South Africa.

Key to the Species

- 1a FIRST DORSAL noticeably large with a very broadly rounded apex — — — — **LONGIMANUS (12)**
- 1b FIRST DORSAL with a pointed or moderately rounded apex.
 - 2a FIRST DORSAL white-tipped and the entire trailing edge of caudals deep black — — — — **SPALLANZANI (13)**
 - 2b FIRST DORSAL may be white-tipped or not or the trailing edge deep black or not but these do not occur in combination.
 - 3a RIDGE on back between the dorsal fins.
 - 4a FIRST DORSAL vertical height twice the length of the snout or more — **MILBERTI (14)**
 - 4b FIRST DORSAL vertical height less than twice the length of the snout.
 - 5a SECOND DORSAL low, its posterior margin almost straight.
 - 6a UPPER TEETH consist of narrow cusps on broad bases. **AHENEAE (15)**

- 6b UPPER TEETH triangular, the cusps not distinct from their bases.
- 7a SNOUT broadly rounded at tip — — — **OBSCURUS (16)**
- 7b SNOUT pointed or narrowly rounded at tip — — — **FALCIFORMIS (17)**
- 5b SECOND DORSAL erect, its posterior margin concave.
- 8a NASAL FLAP long — **ALTIMUS (18)**
- 8b NASAL FLAP short — — — **GALAPAGENSIS (19)**
- 3b NO RIDGE on back between dorsal fins.
- 9a SNOUT very short and blunt.
- 10a TIPS of all fins deep black — — — **MELANOPTERUS (20)**
- 10b TIPS of fins may be dark but not deep black.
- 11a FIRST DORSAL vertical height less than $3\frac{1}{2}$ times that of second dorsal — — — **LEUCAS (21)**
- 11b FIRST DORSAL vertical height more than $3\frac{1}{2}$ times that of second dorsal — — — **AMBOINENSIS (22)**
- 9b SNOUT long to moderately long.
- 12a SNOUT moderately rounded at tip.
- 13a SECOND DORSAL erect, its posterior margin concave — — — **TJUTJOT (23)**
- 13b SECOND DORSAL low, its posterior margin almost straight — — — **AHENEAE (15)**
- 12b SNOUT pointed or narrowly rounded at tip.
- 14a SECOND DORSAL erect, its posterior margin deeply concave — — — **LIMBATUS (24)**
- 14b SECOND DORSAL low, its posterior margin almost straight — — — **MACULIPINNIS (25)**

12. CARCHARHINUS LONGIMANUS

(Also known as *Pterolamiops magnipinnis*)

(PLATE 12)

Common Name:

WHITE TIPPED SHARK, Requin Canal.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

First dorsal: Noticeably large with a very broadly rounded apex. (Fig. 16a).

Midpoint of the base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth are serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{14 \text{ or } 15 - 1 \text{ or } 2 - 13 \text{ to } 15}{13 \text{ or } 14 - 1 \text{ or } 2 - 13 \text{ or } 14}$$

Colour: Grey to brown above, off-white beneath. In adults the first dorsal, lower caudal and pectoral fins are tipped with white but in young specimens the fins are tipped with dark grey or black.

Size: Reaches at least 13 feet in length.

Habitat: This species is found near the surface in deep water. It is seldom found in less than 100 fathoms of water.

Locality: Specimens have been caught at the surface approximately 40 miles east of Durban and off Lourenco Marques. A cosmopolitan species, it also occurs in the Mediterranean, Red and Australian Seas and the tropical and sub-tropical Atlantic, Pacific and Indian Oceans.

Season: Owing to lack of regular offshore shark-catching activities the exact season off Durban is not known.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There are 6 to 9 young in a litter and these are born at approximately 27 inches in length.

Habits: Because this species is found so far offshore, little is known of its habits. However, it is probably solitary and active. It feeds on both large and small fish and is

also said to feed on turtles. Said to attack humans but there is no definite evidence. As it does not come inshore it is unlikely to be responsible for attacks on bathers.

Commercial importance: Has not been used commercially.

Records: There are apparently no official South African or International records for this species.

13. CARCHARHINUS SPALLANZANI

(PLATE 13)

Common Names:

BLACK-TAILED GREY, Black Shark, Requin Bar.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

First dorsal: Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth are serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{13 \text{ or } 14 - 1 - 13 \text{ or } 14}{12 \text{ or } 13 - 1 - 12 \text{ or } 13}$$

Colour: The colour is distinctive for this species in that the posterior part of the lower caudal and the entire rear margin of the upper and lower caudal lobes are deep black and the first dorsal is tipped with white. The body is grey above, white beneath but, when freshly caught, the upper surface is bronze.

Note: This species is most easily distinguished by the white-tipped first dorsal—black-edged caudal colour combination.

Size: Reaches at least $5\frac{1}{2}$ feet in length.

Habitat: Found inshore in warm shallow waters where it may be found in the vicinity of reefs. Also enters deep water where it is quite common between 40 to 50 fathoms.

Locality: Specimens have been recorded from Madagascar, the Mauritius-Seychelles area, Bazaruto and Sordwana Bay. It is unlikely that this species is found as far south as Durban.

It is found in the Red Sea as well as the Indian Ocean.

Season: The only specimen obtained at this Institute was speared at Sordwana Bay in January.

Development: Probably viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 1 to 4 young in a litter and it is likely that the number of young in a litter increases with the size of the mother. The young are born at a length of 20 to 28 inches.

Habits: Unlike most sharks, this species is said to be more active during the day. It is a strong fighter when hooked. It feeds on both surface and bottom-dwelling fish and on squid and octopus.

Commercial importance: It is not known whether the flesh of this shark is marketed.

Records: There are apparently no official South African or International angling records for this species.

14. CARCHARHINUS MILBERTI

(PLATE 14)

Common Names:

SANDBAR SHARK, Brown Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: Present on the back between the dorsal fins. (Fig. 14a).

First dorsal: Vertical height twice the length of the snout or more.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of the base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth are serrated as well as the bases. (Fig. 10a).

Dental formula:

14 to 16 — 1 or 2 — 14 to 16

12 to 15 — 1 — 12 to 15

Colour: Grey to brown above, off-white beneath. There are no conspicuous markings.

Size: May reach 8 feet in length.

Habitat: Found in warm waters. This is an inshore species which enters bays and river mouths, sometimes coming right into very shallow water. Except in shallow water it rarely occurs near the surface.

Locality: Caught off Durban. Also found off Madagascar, Mauritius and the Seychelles as well as off the east coast of America from New England to Brazil, in the Mediterranean Sea and off the west coast of Africa.

Season: Only 3 specimens have been obtained, one of which was caught in April while the other two were caught in December.

Development: Probably viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. The gestation period is estimated as 8-12 months. There may be 1 to 27 young in a litter. They are born at approximately 24 inches in length.

Habits: Mainly solitary but may congregate in schools at times. Said to be more active at night and feed mainly on small bottom fish and invertebrates.

Commercial importance: Vitamin A may be obtained from the liver oil and good quality leather from the skin.

Records: There are apparently no official South African or International angling records for this species.

15. CARCHARHINUS AHENEA

(Also known as *Carcharhinus improvisus*)

(PLATE 15)

Common Names:

BRONZE SHARK, Bronze Whaler, Spear-eye, Spierhaai, Requin.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Moderately long and rounded at the tip. (Fig. 5b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: May or may not be present on the back between the dorsal fins. (Fig. 14).

First dorsal: Vertical height less than twice the length of the snout.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Low (Fig. 18b), its posterior margin almost straight. (Fig. 19b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Upper, as well as lower, teeth consist of narrow cusps on broad bases. (Fig. 8a).

Dental formula:

$$\frac{15 \text{ or } 16 - 2 - 15 \text{ or } 16}{14 \text{ or } 15 - 1 - 14 \text{ or } 15}$$

Colour: When fresh, bronze above and cream beneath. Later becomes grey-brown above and off-white beneath. There are no conspicuous markings.

Size: The largest specimen recorded was 9 feet in length.

Habitat: Found offshore in warm seas.

Locality: Rare off Durban but more common in the Port Elizabeth area. Also found in False Bay in the Cape, off the Seychelles, Australia and the Philippines.

Season: The only specimen obtained off Durban was a gravid female caught in March.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 10 to 20 young which are born at a length of approximately 24 inches.

Habits: Solitary or found in small groups. Said to be a strong fighter when hooked. Feeds on fish (including bottom-dwelling fish), small sharks and squid.

Commercial importance: Apparently none.

Records: There are apparently no official South African or International angling records for this species.

The 364 lb. and 722 lb. "Square-nose" specimens caught by D. E. Damp and G. J. Schmidt are incorrectly recorded by the South African Anglers Union as Smith No. 6a.

16. CARCHARHINUS OBSCURUS

(PLATE 16)

Common Names:

DUSKY SHARK, Ridge-Backed Grey, Lazy Grey, Brown Shark (Cape Town), Shovelnose (U.S.A.), Farqueita, Tiburon.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Broadly rounded at tip. (Fig. 6a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: Present on back between the dorsal fins. (Fig. 14a).

First dorsal: Vertical height less than twice the length of the snout.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Low (Fig. 18b) its posterior margin almost straight. (Fig. 19b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of upper teeth serrated as well as the bases. (Fig. 10a).

Upper teeth triangular, the cusps not distinct from the bases. (Fig. 10a).

Dental formula:

$$\frac{14 \text{ or } 15 - 2 - 14 \text{ or } 15}{13 \text{ to } 15 - 1 - 13 \text{ to } 15}$$

Colour: Grey to grey-brown above and white to off-white beneath. Adults usually appear darker than juveniles. The fins are dusky-tipped.

Size: Reaches 12 feet in length and is reputed to grow longer although there is no positive evidence for this.

Habitat: A warm water shark which is found both inshore and offshore.

Locality: Off Durban specimens of less than 4 feet are common in the Umgeni mouth area and along the coast, while females of over 10 feet are caught in the shark nets and from the South Pier. The intermediate sizes, however, are rare and no adult males have been recorded at this Institute. This species is also found in tropical and sub-tropical waters off the east coast of Africa, Madagascar and both sides of the Atlantic.

Season: Caught off Durban mainly between July and December. Specimens have also been obtained in January, April and June. Gravid females have been caught in April, September (1 in each) and 2 in December.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 9 to 12 young (usually 10) which are born at a length of approximately 36 inches. As adult females, some of

which are gravid, and very young specimens are common in Durban, while intermediate sizes and males are absent, it is assumed that this species drops its young near Durban.

Habits: Young specimens usually occur in groups although the adults may be solitary. Feeds on fish (including bottom-dwelling fish), sharks and squid.

Commercial importance: May be utilized for leather.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 620 lbs. G. Ledingham 1956.

All Tackle: 720 lbs. T. Low 1946.

South African Anglers Union:

Caught by members from shore: 625 lbs. E. B. Downing.

Caught by non-members from shore: 720 lbs. T. Low.

Game Fish Union of Africa:

130 lbs. Line Test: 257 lbs. T. D. van der Merwe 1962.

Note: At least some of the early records for "Black Sharks" probably refer to this species.

17. CARCHARHINUS FALCIFORMIS

(PLATE 17)

Common Name:

SILKY SHARK.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Pointed or narrowly rounded at tip. (Fig. 6b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: Present on back between the dorsal fins. (Fig. 14a).

First dorsal: Vertical height less than twice the length of the snout.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Low (Fig. 18b) its posterior margin almost straight. (Fig. 19b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of upper teeth serrated as well as the bases. (Fig. 10a).

Upper teeth triangular, the cusps not distinct from the bases. (Fig. 8a).

Dental formula:

$$\frac{14 \text{ to } 16 \text{ — } 1 \text{ to } 3 \text{ — } 14 \text{ to } 16}{14 \text{ or } 15 \text{ — } 1 \text{ to } 3 \text{ — } 14 \text{ or } 15}$$

Colour: Dark grey above, off-white beneath. The fins may be dusky-tipped.

Size: May reach a length of 10 feet.

Habitat: Found in tropical and sub-tropical waters. This is an offshore species but occasionally enters inshore waters. Young specimens may occur near shallow offshore banks.

Locality: Only one specimen has been obtained from the Durban area. Also found off West Africa and from Delaware Bay in the U.S.A., to the West Indies.

Season: The only specimen examined at this Institute was 4 feet in length and was caught in September.

Development: The young are born at approximately 30 inches in length. No further details of the development of this species have been obtained.

Habits: Nothing definite known of its habits or diet.

Commercial importance: Used for leather and Vitamin A.

Records: There are apparently no official South African or International records for this species.

18. CARCHARHINUS ALTIMUS

(PLATE 18)

Common Name:

BIGNOSE SHARK.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Nasal flap: Long. (Fig. 7a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: Present on the back between the dorsal fins. (Fig. 14a).

First dorsal: Vertical height less than twice the length of the snout.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Erect (Fig. 18a), its posterior margin concave. (Fig. 19a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{14 \text{ to } 16 - 1 \text{ or } 2 - 14 \text{ to } 16}{14 \text{ or } 15 - 1 - 14 \text{ or } 15}$$

Colour: Light grey above, off-white beneath. The fins may be dusky-tipped.

Size: This species may reach over 11 feet in length.

Habitat: Towards the edge of continental shelves in tropical and sub-tropical waters.

Locality: This species has been caught in 50 fathoms off Durban where specimens of less than 5 feet in length are not uncommon. Also found off Madagascar, West Africa and in the West Indian region.

Season: Owing to the lack of regular fishing activities in this area no exact season is known. In three years, however, all specimens obtained at this Institute were caught between the months of July and November. No gravid females have been obtained.

Development: There are 6 to 8 young in a litter and they are born at a length of approximately 26 inches. No further details of the development have been obtained.

Habits: Feeds largely on fish and small sharks.

Commercial importance: May be utilised for leather and Vitamin A.

Records: There are apparently no official South African or International angling records for this species.

19. CARCHARHINUS GALAPAGENSIS

(PLATE 19)

Common Name:

GALAPAGOS SHARK.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Nasal flap: Short. (Fig. 7b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: Present on the back between the dorsal fins. (Fig. 14a).

First dorsal: Vertical height less than twice the length of the snout.

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Erect (Fig. 18a), its posterior margin concave. (Fig. 19a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{14 - 1 - 14}{14 - 1 - 14} \text{ but may vary slightly.}$$

Colour: Grey above, off-white beneath. Often mottled with grey. The fins may be dusky-tipped.

Size: Attains a length of 11 feet or more.

Habitat: This species is typically found in warm waters surrounding oceanic islands of volcanic origin. Usually found 3 to 10 feet above the sea bottom.

Locality: The only known locality off the east coast of South Africa is in the region of the Walters Shoal in the South Madagascar Ridge. It is also found in the eastern Pacific in the vicinity of the Revilla Gigedo, Clipperton, Coco and Galapagos Islands off the west coast of Central America.

Season: Only 4 specimens have been obtained by this Institute and these were caught on the Walters Shoal in February 1963.

Development: No account of the development of this species has been obtained.

Habits: Although often present in large numbers, there appears to be no schooling behaviour. Said to feed at the surface and at midwater but not on the sea bottom where they often swim. May act aggressively towards divers.

Commercial importance: Probably do not occur in sufficient numbers within reach of shark fisheries to be of much importance.

Records: There are no official South African or International angling records for this species.

20. CARCHARHINUS MELANOPTERUS

(PLATE 20)

Common names:

BLACK SHARK, Blackfin Shark, Nilow, Requin noir.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Short and blunt. (Fig. 5a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: No ridge on the back between the dorsal fins. (Fig. 14b).

First dorsal: Apex pointed or moderately rounded. (Fig. 16b). Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: The cusps of the upper teeth are serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{13 - 2 - 13}{12 - 1 - 12} \text{ but may vary slightly.}$$

Colour: The colour is characteristic of this species in that the tips of all the fins are dark black. The lower caudal lobe may be almost entirely black.

Size: Seldom exceeds 5 feet in length.

Habitat: Found in warm waters, both shallow (in the vicinity of coral reefs and inside harbours) and deep, where it is often found at 25 fathoms.

Locality: The only specimen examined at this Institute was caught at Bazaruto and it seems unlikely that this species occurs as far south as Durban. It is likely that the "Black Sharks" repeatedly recorded before World War II were what are known today as "Grey Sharks", viz. Ridge-backed-grey (*Carcharhinus obscurus*) and Slipway-grey or Zambezi Sharks (*Carcharhinus leucas*). It is found off the tropical east coast of Africa, Madagascar, Hawaiian Islands, western Pacific and Australia.

Season: Only one specimen has been obtained by this Institute. It was caught off Bazaruto in November 1960.

Development: There are 2 to 4 young in a litter and these are born at 18 to 20 inches in length.

Habits: Said to be migratory and to swim strongly. Feeds on fish. Is said to be aggressive and a nuisance to shell collectors near coral reefs.

Commercial importance: Too small to be of commercial importance off Madagascar. Its importance elsewhere is not known.

Records: The Natal Angling Board of Control and South African Anglers Union records for this species probably apply to *C. obscurus* and possibly *C. leucas* (see locality notes).

21. CARCHARHINUS LEUCAS

(Also known as *Carcharhinus zambezensis* and *Carcharhinus vanrooyeni*)

(PLATE 21)

Common Names:

ZAMBEZI SHARK, Shovelnose Grey, Slipway Grey (Durban), Bull Shark, Cub Shark, Ground Shark, River Shark, Lake Nicaragua Shark, Van Rooyen's Shark, Square-nose Shark.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Short and blunt. (Fig. 5a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: No ridge on the back between the dorsal fins. (Fig. 14b).

First dorsal: Vertical height less than $3\frac{1}{2}$ times that of the second dorsal.*

Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{12 \text{ or } 13 - 1 - 12 \text{ to } 14}{12 \text{ or } 13 - 1 \text{ or } 2 - 12 \text{ or } 13}$$

Colour: Grey above, off-white beneath. The fins are dusky-tipped, more darkly so in juveniles.

Size: Reaches 10 feet in length. Probably does not exceed 450lb.

Habitat: Found close inshore often in shoal water. They enter harbours, estuaries and may be found in fresh water.

Locality: Specimens longer than 5 feet are common off Durban while smaller specimens are caught at St. Lucia Estuary. It has been caught off the east coast of Africa from the Zambezi River to Algoa Bay and has been reported from Knysna. Small specimens have been caught over 300 miles from the sea in the Zambezi River. It is also found off Madagascar, Australia and in the western Atlantic from Brazil to the vicinity of New York.

*This proportion is the feature which distinguishes *C. amboinensis* from *C. leucas*.

Season: Specimens are caught off Durban throughout the year, the catches being higher between December and March. The only gravid female obtained by this Institute was caught in June 1963.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There are 5 or 6 young in a litter and they are born at a little more than 24 inches in length.

Habits: Feeds on fish, other sharks, rays, squid, and is a scavenger feeding on dead animals and whale meat washed from the shore. An aggressive species, has been proved responsible for an attack on a human off the Natal South Coast and is probably responsible for most of the attacks in this area.

Commercial importance: May be utilized for fish meal, leather and liver oil.

Records:

The Natal Angling Board of Control:

55 lb. Line Test: 518 lbs. G. Ledingham 1956.

All Tackle: 722 lbs. G. Schmidt 1950.

South African Anglers Union:

Caught by members from shore: 364 lbs. D. E. Damp.

Caught by non-members from shore: 722 lbs. G. J. Schmidt.

There is some doubt concerning the identification of the 518 lb. and 722 lb. specimens as the Zambezi Shark (*C. leucas*).

22. *CARCHARHINUS AMBOINENSIS*

(Also known as *Carcharhinus zambezensis*)

(PLATE 22)

Common Name:

JAVA SHARK.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Short and blunt. (Fig. 5a).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracles: Absent. (Fig. 12a).

Ridge: No ridge on the back between the dorsal fins. (Fig. 14b).

First dorsal: Vertical height more than $3\frac{1}{2}$ times that of the second dorsal.*

Apex pointed or moderately rounded. (Fig. 16b).

*This proportion is the feature which distinguishes *C. amboinensis* from *C. leucas*.

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{12 \text{ or } 13 - 1 - 12 \text{ or } 13}{11 \text{ or } 12 - 1 - 11 \text{ or } 12}$$

Colour: Grey above, off-white beneath. The fins are dusky-tipped.

Habitat: Found in warm waters and may come inshore. Otherwise not known.

Locality: This species has been caught in the Swartkops River, Algoa Bay and off Durban and Winklespruit. It also occurs in the Batavian Seas and off Java.

Season: Specimens have been caught off Durban in every month except April, October and November. There have been no gravid females.

Development: No account of the development has been obtained.

Habits: Feeds on fish, other sharks and squid.

Commercial importance: No records are available.

Records: There are no official angling records for this species.

23. CARCHARHINUS TJUTJOT

(PLATE 23)

Common Names:

BLACKSPOT SHARK, Lesser Black Shark, Requin nene pointe.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Long and broadly rounded at the tip. (Fig. 5b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracles: Absent. (Fig. 12a).

Ridge: No ridge on back between the dorsal fins. (Fig. 14b).

First dorsal: Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Erect, (Fig. 18a) its posterior margin concave. (Fig 19a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: The cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{11 \text{ to } 13 \text{ — } 2 \text{ or } 3 \text{ — } 11 \text{ to } 13}{11 \text{ to } 13 \text{ — } 1 \text{ — } 11 \text{ to } 13}$$

Colour: Pale grey above, white beneath. The apex of the second dorsal is black.

Size: These are small sharks and it is unlikely that they reach 4 feet in length.

Habitat: Found close inshore in warm waters.

Locality: Occasionally caught off Durban. Also found off Zanzibar and Bazaruto.

Season: Specimens have only been caught off Durban during August and September. There have been no gravid females.

Development: The young are born at a length greater than 9 inches. No further details of the development have been obtained.

Habits: No account of its habits or diet has been obtained.

Commercial importance: Probably marketed as food.

Records: Included in the records of the Natal Angling Board of Control is a 9lb. specimen caught off the Seychelles. South African Anglers Union:

Caught by members from shore: 9 lbs. A. R. Thorpe. The South African Angler's Union record this specimen as Smith No. 7a. This is incorrect for the new edition of Smith "The Sea Fishes of Southern Africa" in which no number is given for this species.

24. CARCHARHINUS LIMBATUS

(PLATE 24)

Common Names:

BLACK FIN, Small Black-tipped Shark, Lesser Black-tipped Shark, Spierhaai.

Description:

Head: Normal, not hammershaped. (Fig. 3a).

Snout: Long to moderately long and pointed or narrowly rounded at tip. (Fig. 6b).

Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).

Spiracle: Absent. (Fig. 12a).

Ridge: No ridge on back between dorsal fins. (Fig. 14b).

First dorsal: Apex pointed or moderately rounded. (Fig. 16b).

Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).

Second dorsal: Erect (Fig. 18a) its posterior margin concave. (Fig. 19a).

Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).

Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).

Teeth: Cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{15 \text{ or } 16 - 2 \text{ or more} - 15 \text{ or } 16}{14 \text{ to } 16 \text{ — } 1 \text{ — } 14 \text{ to } 16}$$

Colour: Grey above, off-white beneath. The fins are dusky-tipped, more darkly so in juveniles.

Size: Reaches 8 feet in length.

Habitat: Found in warm waters both inshore and offshore.

Locality: Caught from Durban to Knysna. Also found in tropical and sub-tropical seas off Madagascar, the Canaries, Cape Verde Islands and West Africa and in the western Atlantic and eastern Pacific Oceans.

Season: Specimens have been caught off Durban throughout the year. Gravid females have been caught in August, September and November.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 3 to 10 young in a litter and they are born at a length of about 27 inches.

Habits: These sharks often school; they are active and swift-swimming and may leap out of the water. They feed on fish, sharks, rays and squid.

Commercial importance: Can be eaten and are used for hides and oil.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 320 lbs. G. Germishuys 1949.

South African Anglers Union:

Caught by members from shore: 340 lbs. W. H. Berndt. The 735 lb. specimen caught by J. B. Steek is incorrectly recorded by the South African Angler's Union as a Blackfin, Smith No. 5. This specimen has previously been recorded as a "Black Shark", the identity of which is probably the Dusky Shark (*C. obscurus*)—see locality notes of the Black Shark (*C. melanopterus*).

Natal Underwater: 44 lbs. P. N. Malherbe.

25. CARCHARHINUS MACULIPINNIS

(Also known as *Carcharhinus johnsoni*)

(PLATE 25)

Common Names:

BLACK TIPPED SHARK, Long Nosed Grey, Long Nosed Blackfin, Sharp-nosed Blackfin, Requin nene pointe.

Description:

- Head: Normal, not hammershaped. (Fig. 3a).
Snout: Long to moderately long and pointed to narrowly rounded at tip. (Fig. 6b).
Gill slits: Fifth gill slit above the pectoral fin. (Fig. 13a).
Spiracle: Absent. (Fig. 12a).
Ridge: No ridge on back between dorsal fins. (Fig. 14b).
First dorsal: Apex pointed or moderately rounded. (Fig. 16b).
Midpoint of base is as close (or closer) to the pectorals as the pelvics. (Fig. 15b).
Second dorsal: Low (Fig. 18b) its posterior margin almost straight. (Fig. 19b).
Caudal: Not lunate, the lower lobe being considerably shorter than the upper lobe. (Fig. 20b).
Length of the upper lobe less than $\frac{1}{2}$ the distance from the tip of the snout to the beginning of the caudal. (Fig. 21a).
Teeth: Cusps of the upper teeth serrated as well as the bases. (Fig. 10a).

Dental formula:

$$\frac{16 \text{ to } 18 \text{ — } 1 \text{ or } 2 \text{ — } 16 \text{ to } 18}{15 \text{ to } 17 \text{ — } 1 \text{ or } 2 \text{ — } 15 \text{ to } 17}$$

Colour: Grey above off-white beneath. In young specimens there are no markings but in specimens of between 2 and 3 feet in length the second dorsal becomes tipped with black while the anal, lower caudal and pectoral fins are dusky-tipped. In specimens of over 4 feet in length the tips of the second dorsal, anal, lower caudal and underside of the pectorals are black. The pelvics usually have no markings.

Size: Specimens may reach 9 feet in length.

Habitat: Found in warm waters apparently both inshore and offshore.

Locality: Caught off Durban but not abundant. Also found off Port Elizabeth, Madagascar, Southern Florida, Cuba and possibly Puerto Rico.

Season: Specimens have been caught off Durban in every month except February. Gravid females have been caught in April and September.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 6 to 15 young in a litter and they are born at 24 to 31 inches in length.

Habits: May be seen in schools, leaping at the surface. It feeds on fish. Other prey have not been reported.

Commercial importance: May be utilised for fishmeal, hides and liver oil.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 142 lbs. R. Heslop 1954.

South African Anglers Union:

Caught by members from shore: 142 lbs. R. M. Heslop.

Natal Underwater: 64 lbs. G. Askew.

FAMILY: SPHYRNIDAE

Key to the Species

- 1a CENTRE of anterior edge of hammer not notched —
SPHYRNA ZYGAENA (26)
- 1b CENTRE of anterior edge of hammer notched
- 2a CUSPS of upper teeth smooth-edged — — — —
SPHYRNA LEWINI (27)
- 2b CUSPS of upper teeth serrated — — — —
SPHYRNA MOKARRAN (28)

26. SPHYRNA ZYGAENA

(PLATE 26)

Common Names:

HAMMERHEAD, Balance Fish, Cornuda.

Description:

Head: Hammershaped. (Fig. 3b).

Centre of anterior edge of hammer not notched.
(Fig. 4b).

Dental formula:

$$\frac{13 \text{ to } 15 \text{ — } 0 \text{ or } 1 \text{ — } 13 \text{ to } 15}{12 \text{ to } 14 \text{ — } 1 \text{ — } 12 \text{ to } 14}$$

Colour: Grey above, white beneath. The fins may be dusky-tipped.

Size: May reach 13 feet in length.

- Habitat:** Are found in tropical to warm temperate seas and may be found inshore but more commonly offshore. Usually swim near the surface.
- Locality:** Specimens have been obtained from off Lourenco Marques, Durban and Port Elizabeth. It is also found in tropical and warm temperate waters in the Atlantic and Pacific Oceans.
- Season:** Specimens have been caught off Durban from May to January. No adult specimens have been obtained.
- Development:** Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 29 to 37 young in a litter. They are born at about 19 inches in length.
- Habits:** This is a strong-swimming species, which feeds on fish, sharks, rays, crustaceans (crabs, etc.) and squid. At least one Hammerhead species is known to attack man.
- Commercial importance:** May be used for fish meal, leather and liver oil.
- Records:** There are apparently no official International angling records for this species. The South African record hammerhead was misidentified as the Hammerhead (*S. zygaena*) and is actually the Great Hammerhead (*S. mokarran*).

27. SPHYRNA LEWINI

(Also confused with *Sphyrna zygaena*)

(PLATE 27)

Common Name:

BRONZE HAMMERHEAD.

Description:

Head: Hammershaped. (Fig. 3b).

Centre of anterior edge of hammer notched. (Fig. 4a).

Teeth: Cusps of upper teeth smooth-edged. (Fig. 10b).

Dental formula:

$$\frac{15 \text{ or } 16 \text{ — } 0 \text{ to } 2 \text{ — } 15 \text{ or } 16}{15 \text{ or } 16 \text{ — } 1 \text{ or } 2 \text{ — } 15 \text{ or } 16}$$

Colour: Bronze when fresh, or grey above, white beneath. The pectorals and lower caudal may be dark-tipped.

Size: Reaches at least 10 feet in length.

Habitat: Are found in tropical to warm temperate seas and may be found inshore and offshore. Usually swim near the surface.

Locality: In Durban, males are caught off the South Pier while small specimens are not uncommon off the Umgeni mouth. This species is also found off Madagascar and in the tropical and warm temperate waters of the Atlantic and Indo-Pacific Oceans.

Season: Specimens have been caught off Durban from May to January. The maximum number of specimens being caught in December. No adult females have been obtained.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. The number of young in a litter is not known. At birth they may be about 15 inches in length.

Habits: This is a fast-swimming species. It feeds on fish, crustaceans (crabs, etc.) and squid. Large specimens also probably feed on other sharks and rays. At least one Hammerhead species is known to attack man.

Commercial importance: Probably used for fish meal, leather and liver oil as well as for food.

Records: No records have been claimed for this species.

28. SPHYRNA MOKARRAN

(PLATE 28)

Common Name:

GREAT HAMMERHEAD.

Description:

Head: Hammershaped. (Fig. 3b).

Centre of anterior edge of hammer notched. (Fig. 4a).

Adult specimens can be distinguished from both the Bronze Hammerhead (*lewini*) and the Hammerhead (*zygaena*) by means of the very straight hammer the edges of which are on a level with, and not behind the centre of the hammer. In young specimens, however, the hammer is very similar to that of the Bronze Hammerhead (*lewini*).

Teeth: Cusps of upper teeth finely serrated. (Fig. 10a).

Dental formula:

$$\frac{17 \text{ — } 2 \text{ or } 3 \text{ — } 17}{16 \text{ or } 17 \text{ — } 1 \text{ to } 3 \text{ — } 16 \text{ or } 17}$$

Colour: Very dark above, white beneath. Has also been described as "brownish" and "dark olive" above.

Size: Reaches at least 15 feet in length.

Habitat: Found in tropical to warm-temperate seas and may be found both inshore and offshore. Usually swims near the surface.

Locality: In the Durban area this species is not uncommon off the South Pier, although only one specimen has been obtained by this Institute. Also found off Madagascar and in the tropical and subtropical areas of the Atlantic.

Season: The only specimen obtained by this Institute was caught in August.

Development: Viviparous—the unborn young absorb nutriment from their mother by means of a yolk sac placenta. There may be 30 to 38 young in a litter. They are born at about 24 inches in length.

Habits: These are strong-swimming sharks. Their diet is probably similar to that of the Bronze Hammerhead (*S. lewini*) and the Hammerhead (*S. zygaena*). At least one Hammerhead species is known to attack man.

Commercial importance: Some specimens are very rich in Vitamin A. Can also be utilized for leather, fish-meal, etc.

Records:

Natal Angling Board of Control:

55 lb. Line Test: 295 lbs. G. Ledingham 1962.

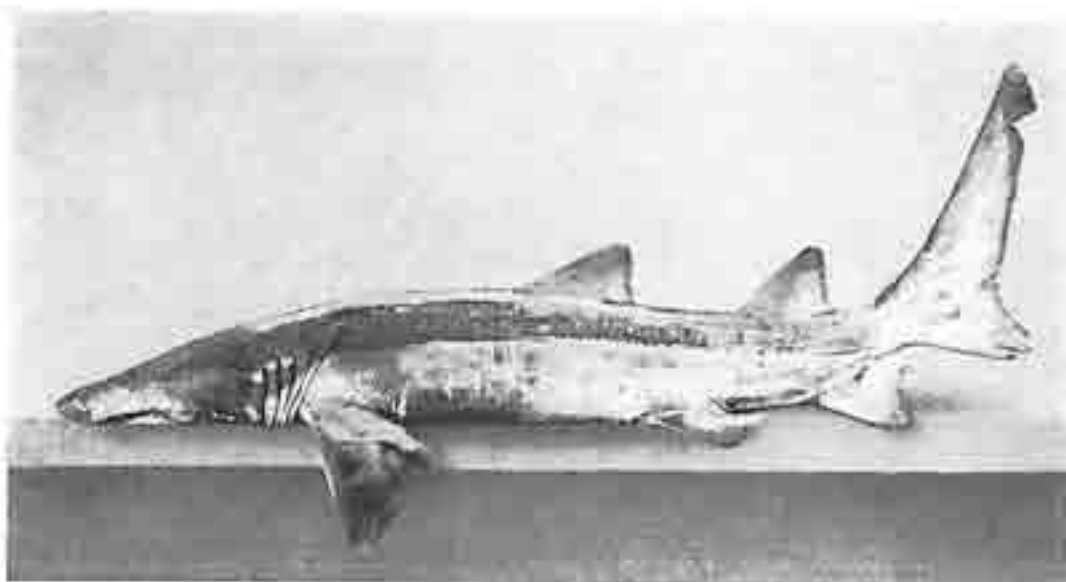
All Tackle: 664 lbs. B. Blaine 1936.

Game Fish Union of South Africa:

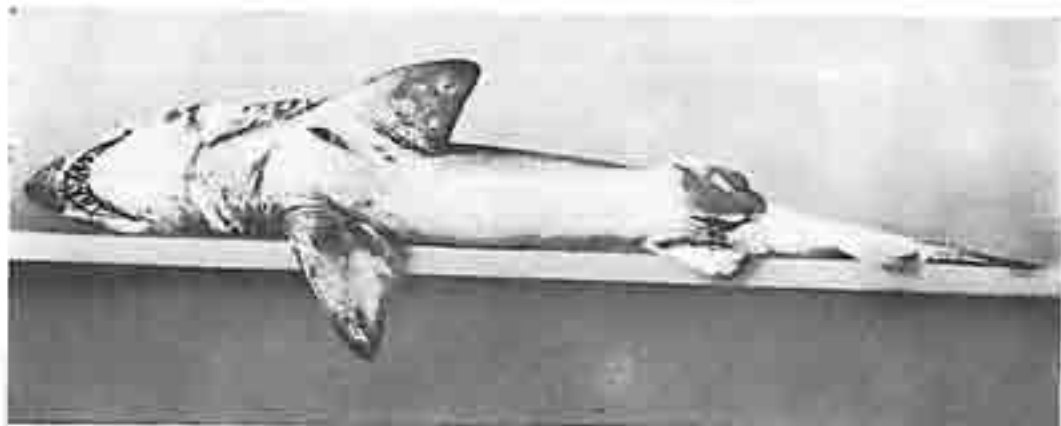
130 lb. Line Test: 664 lbs. B. Blaine 1936.

(This shark was misidentified as the Hammerhead, *S. zygaena*).

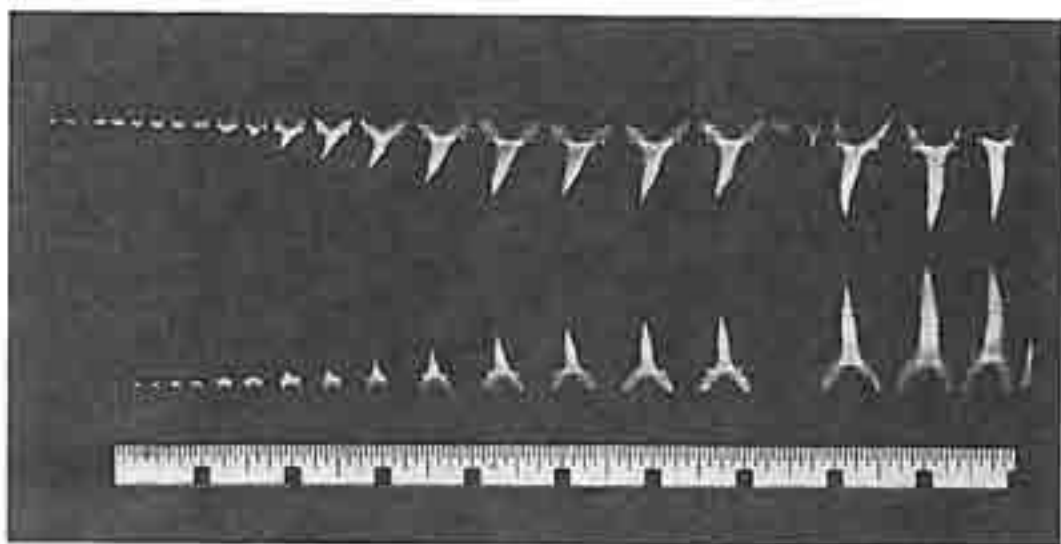




(a) Lateral view. Total length 9 feet.



(b) Ventral view. Total length 9 feet.

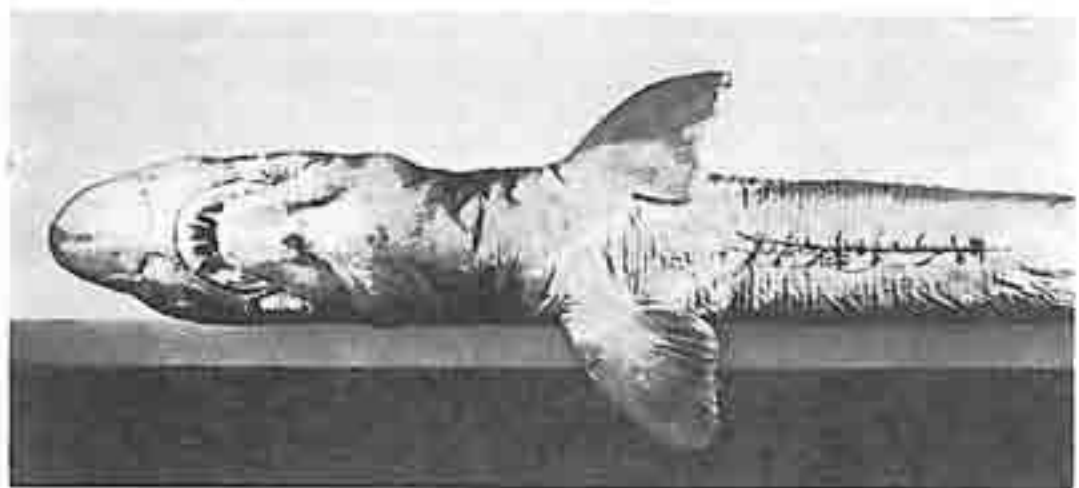


(c) Teeth of left side of upper and lower jaws.

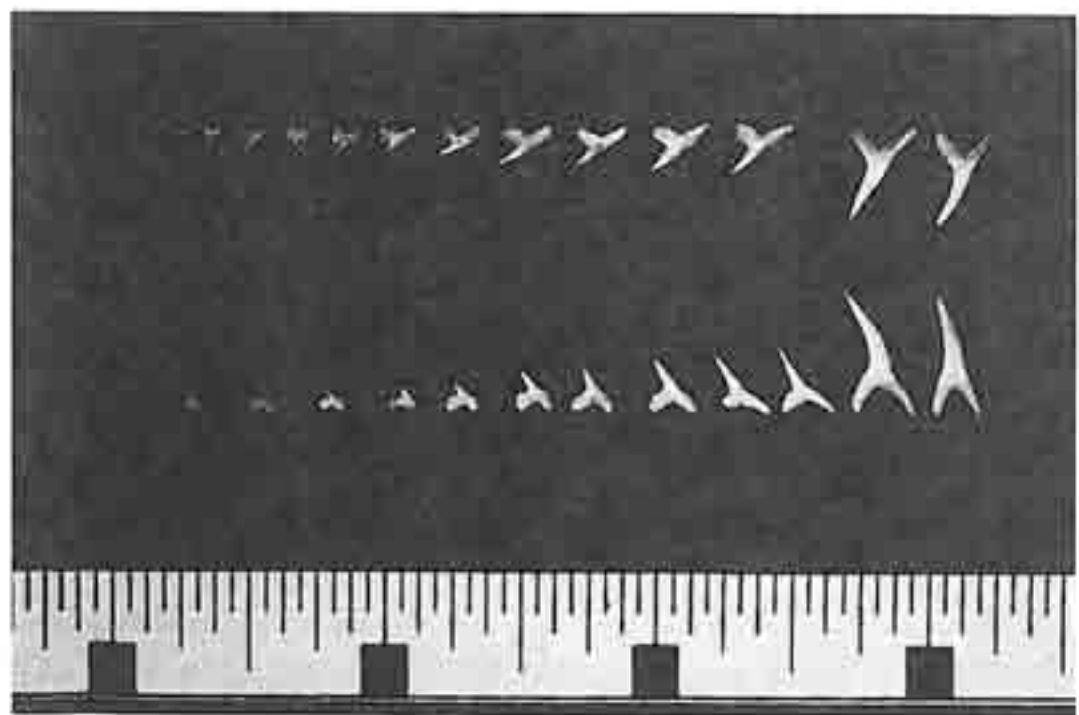
PLATE 1 — *CARCHARIAS TAURUS*.
THE RAGGED TOOTH SHARK



(a) Lateral view. Total length 2 feet 8 inches.

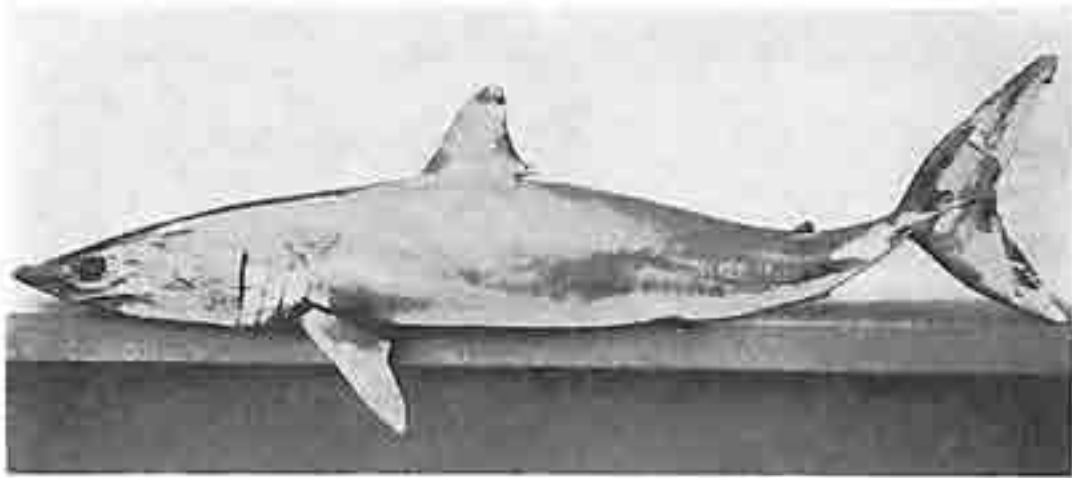


(b) Ventral view. Total length 2 feet 8 inches.

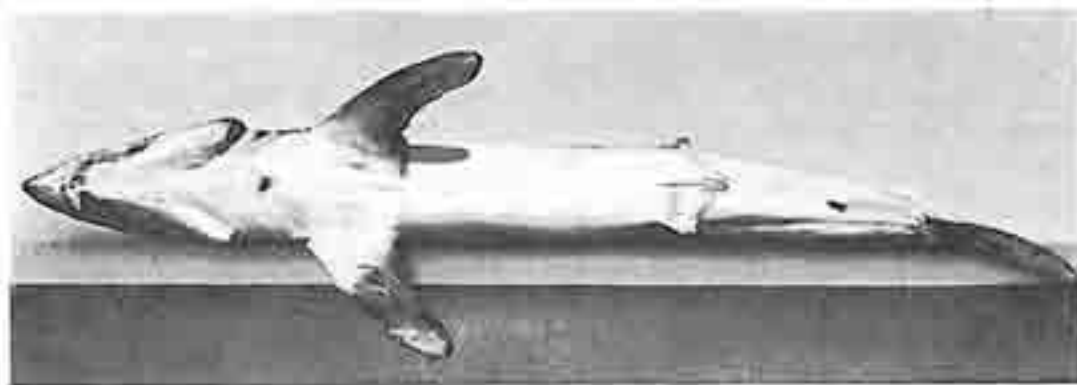


(c) Teeth of left side of upper and lower jaws.

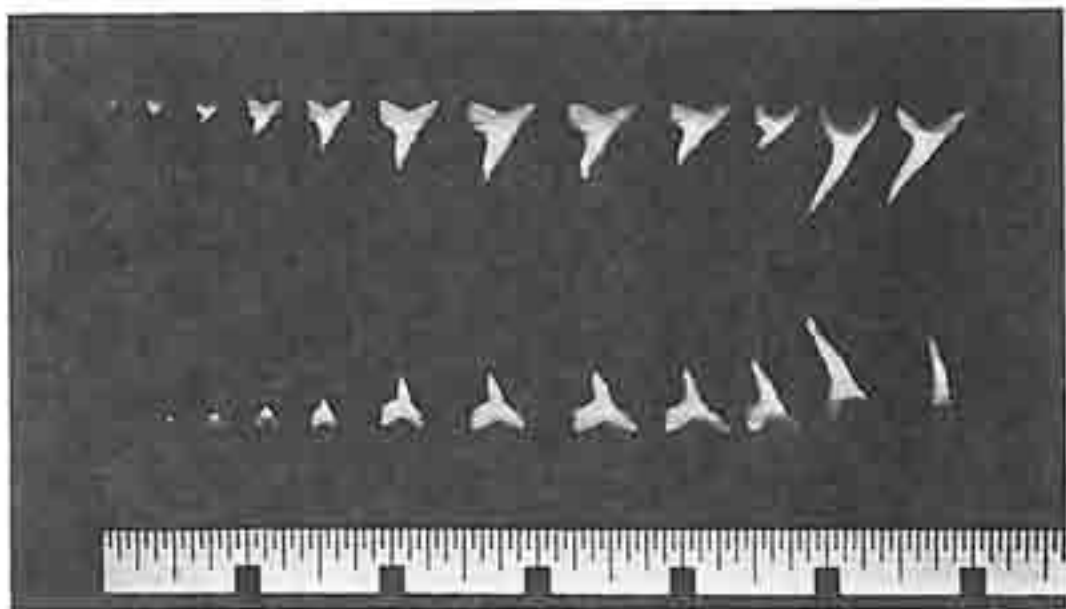
PLATE 2 — CARCHARIAS KAMOHARAI. MIZUWANI



(a) Lateral view. Total length 3 feet 10 inches.

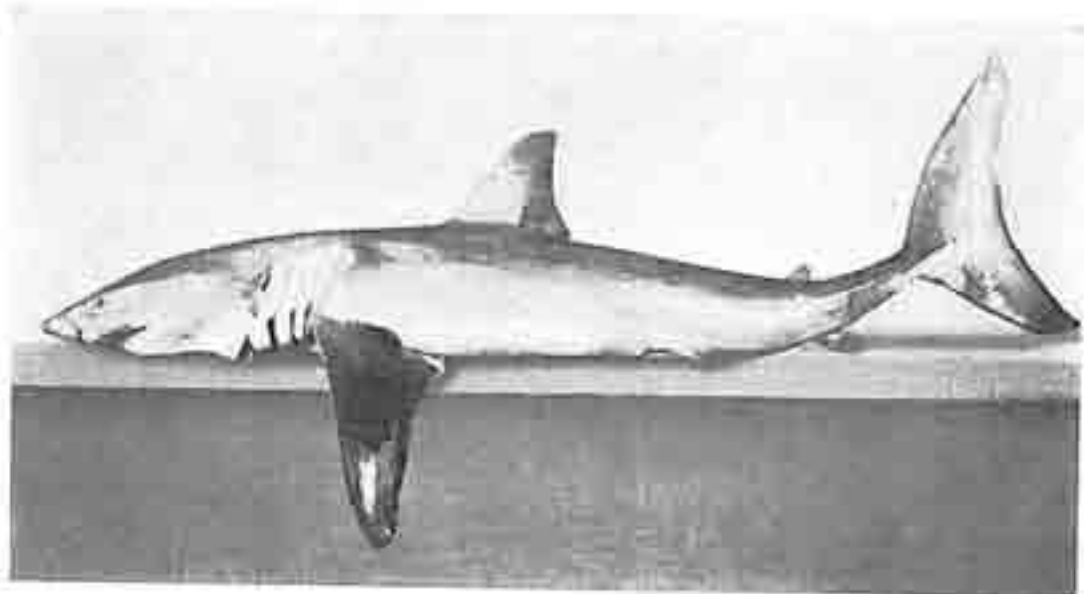


(b) Ventral view. Total length 3 feet 4 inches.



(c) Teeth of left side of upper and lower jaws.

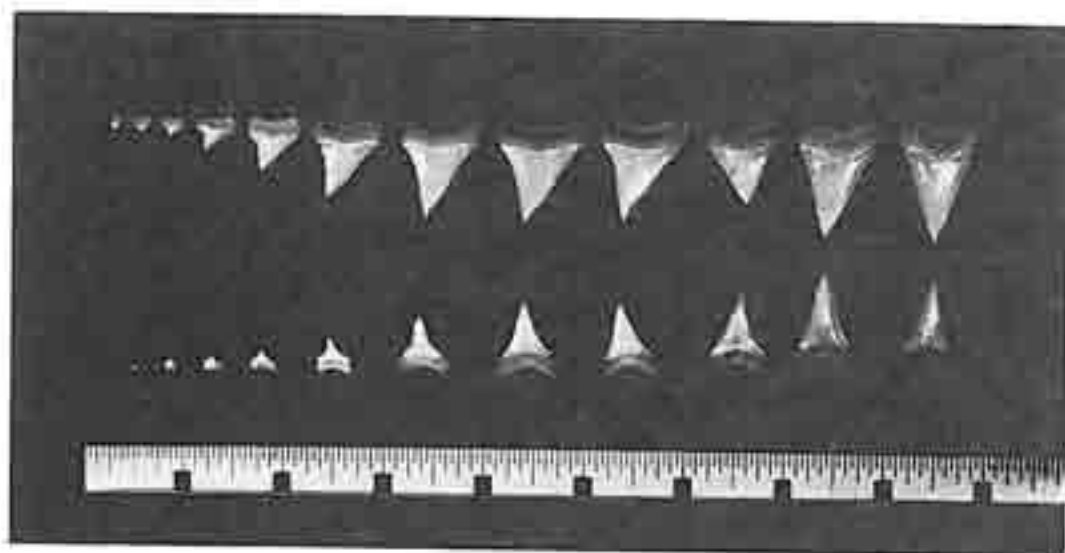
PLATE 3 — ISURUS GLAUCUS. MAKO



(a) Lateral view. Total length 7 feet 3 inches.

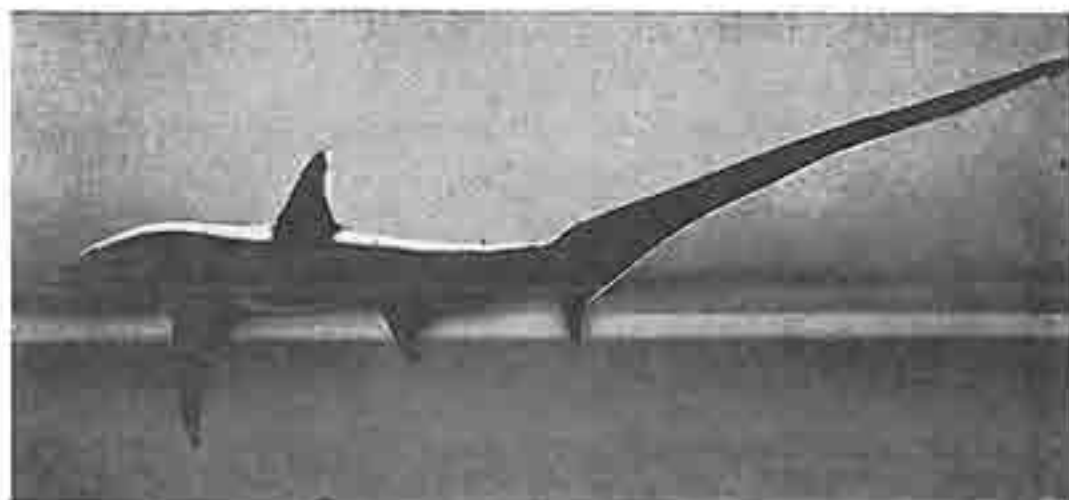


(b) Ventral view. Total length 7 feet 3 inches.

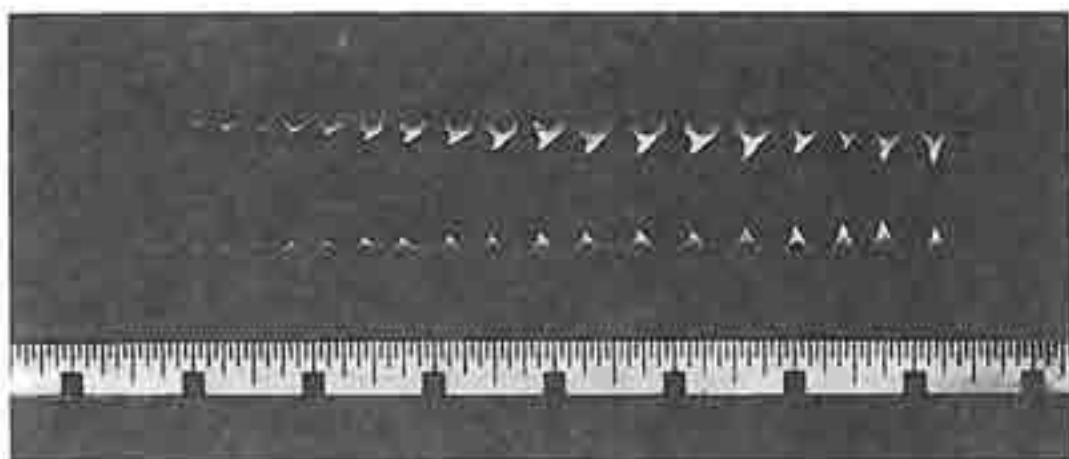


(c) Teeth of left side of upper and lower jaws.

PLATE 4 — CARCHARODON CARCHARIAS. MANEATER.

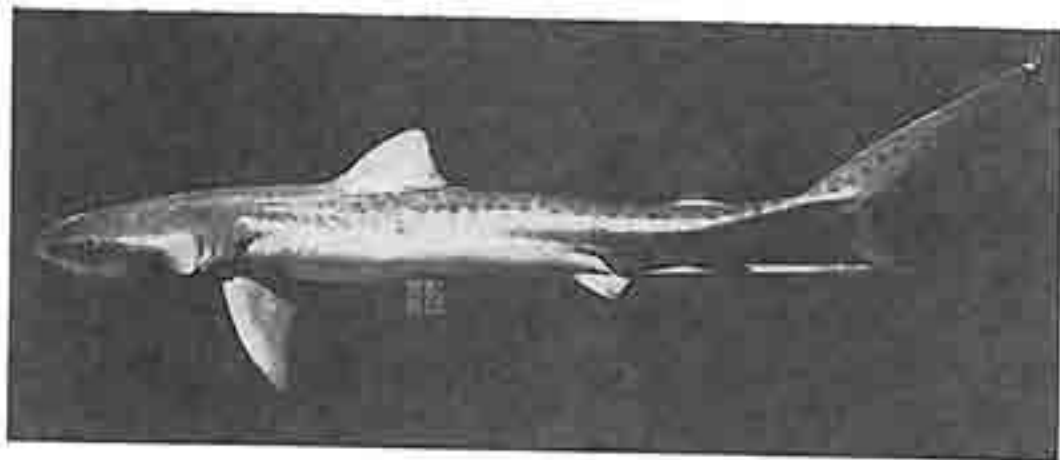


(a) Lateral view. Total length 12 feet 6 inches.

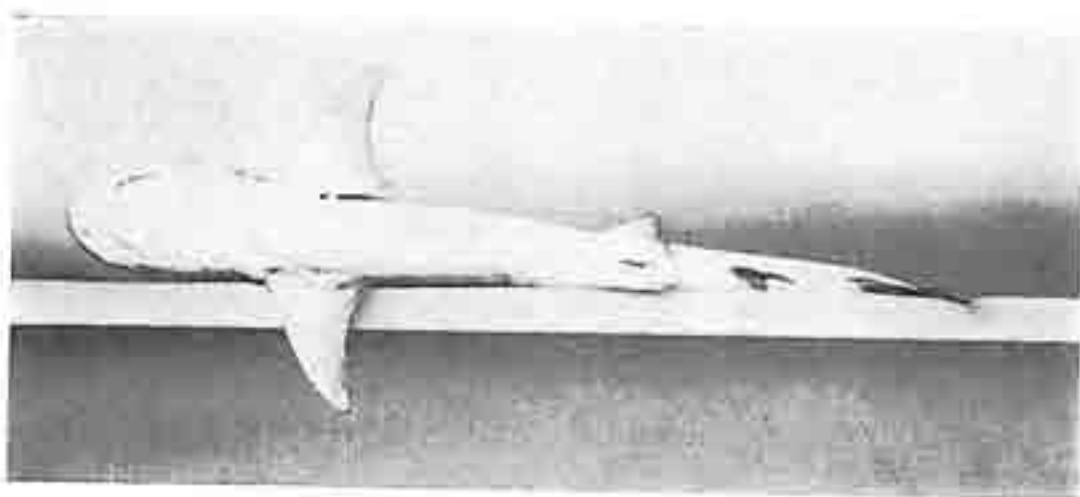


(c) Teeth of left side of upper and lower jaws.

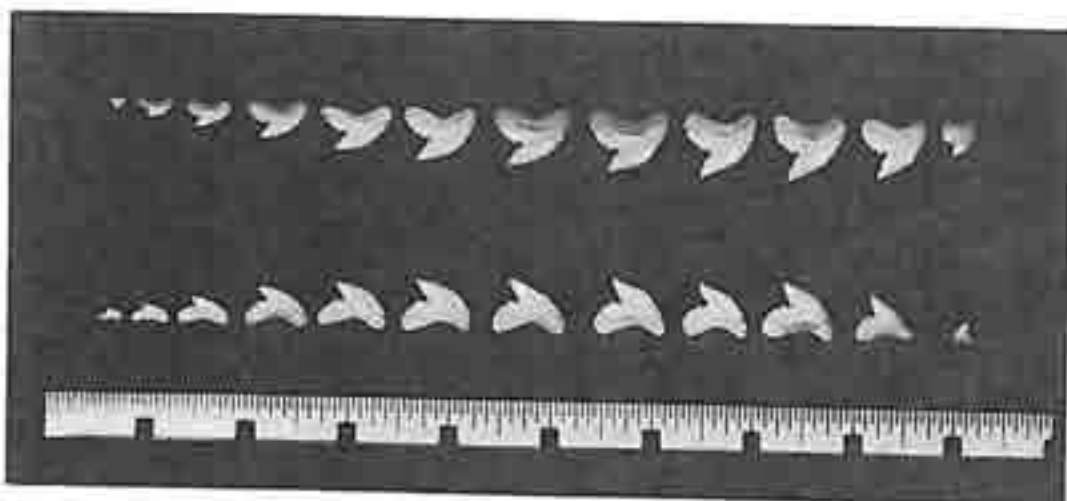
PLATE 5 — ALOPIAS PELAGICUS. THRESHER SHARK



(a) Lateral view. Total length 5 feet.

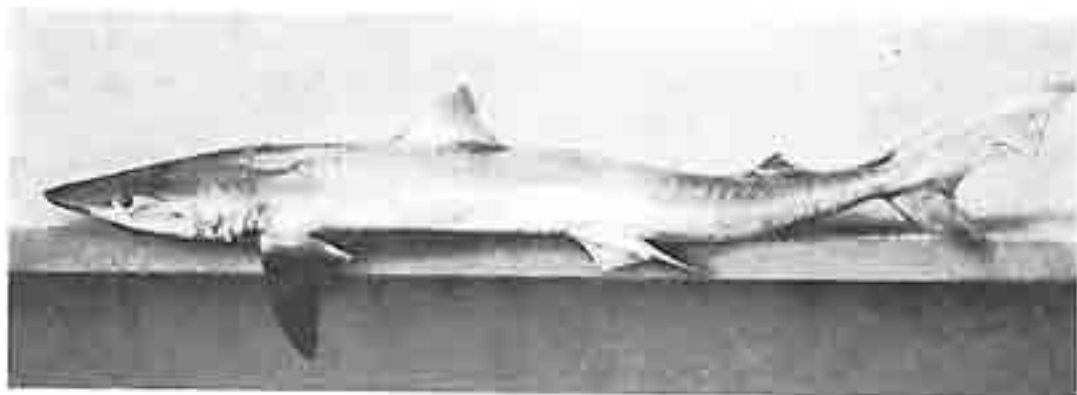


(b) Ventral view. Total length 5 feet 6 inches.

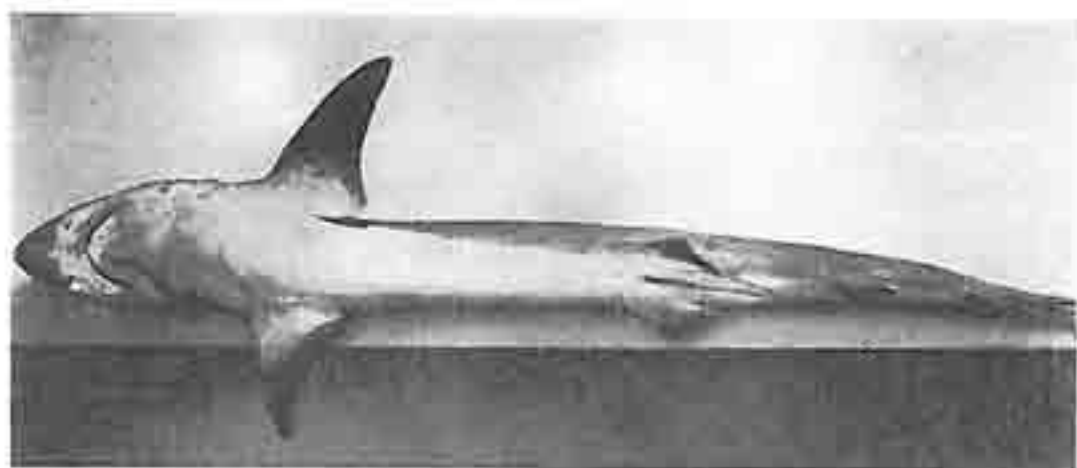


(c) Teeth of left side of upper and lower jaws.

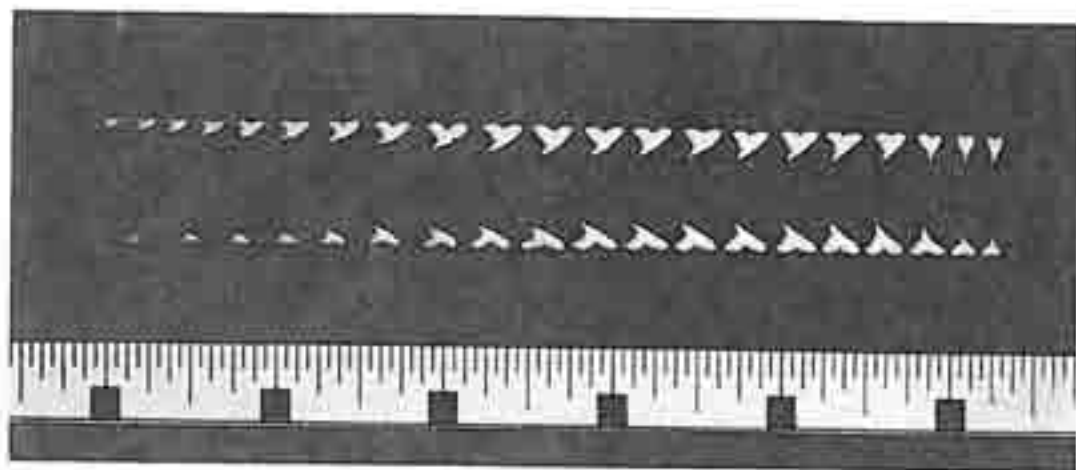
PLATE 6 — GALEORCERDO CUVIERI. TIGER SHARK



(a) Lateral view. Total length 4 feet 6 inches

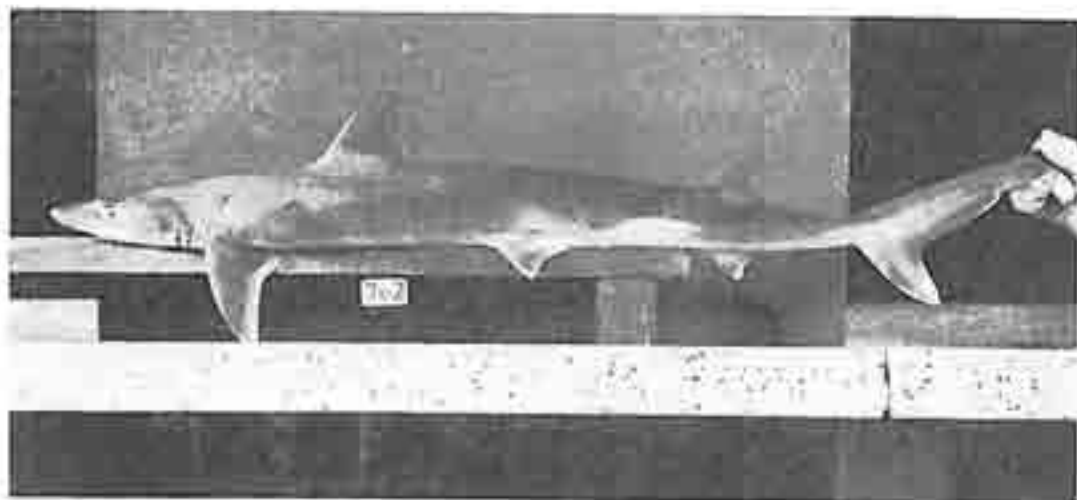


(b) Ventral view. Total length 4 feet 6 inches.

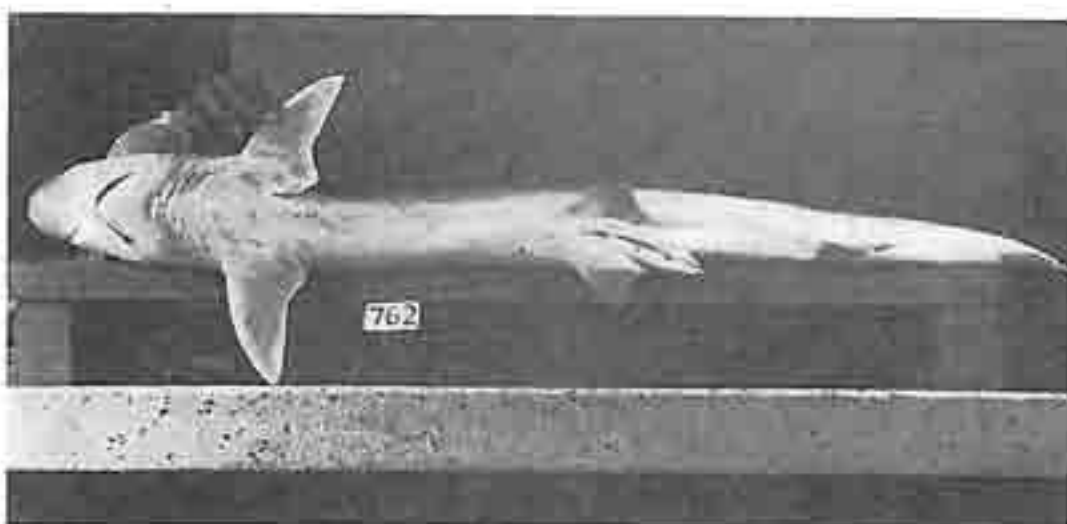


(c) Teeth of left side of upper and lower jaws.

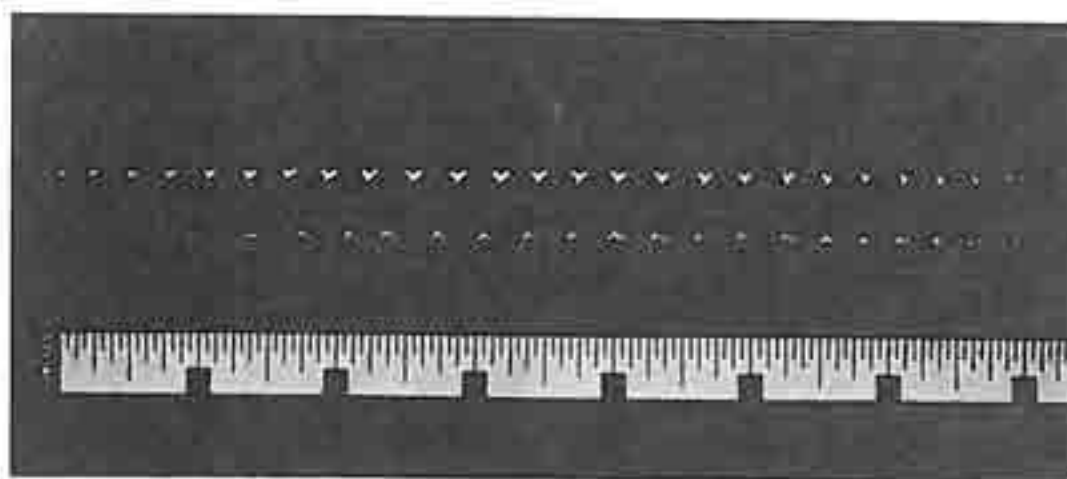
PLATE 7 — GALEORHINUS GALEUS. SOUPFIN SHARK



(a) Lateral view. Total length 4 feet.

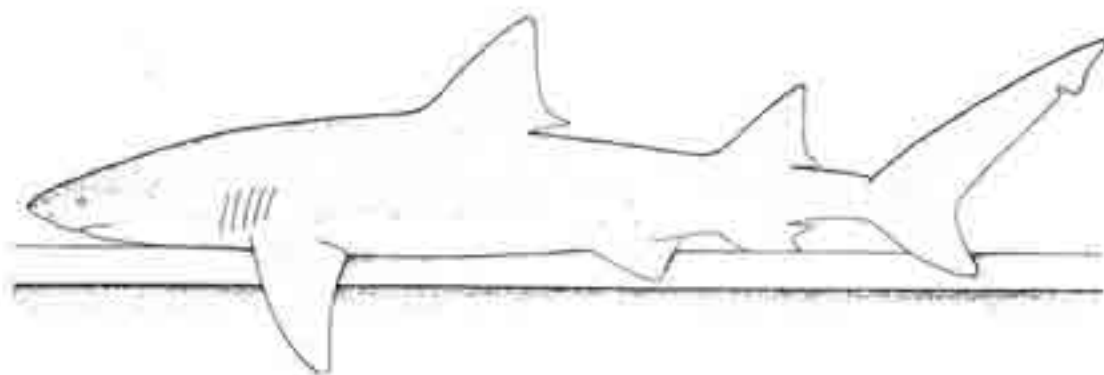


(b) Ventral view. Total length 4 feet.



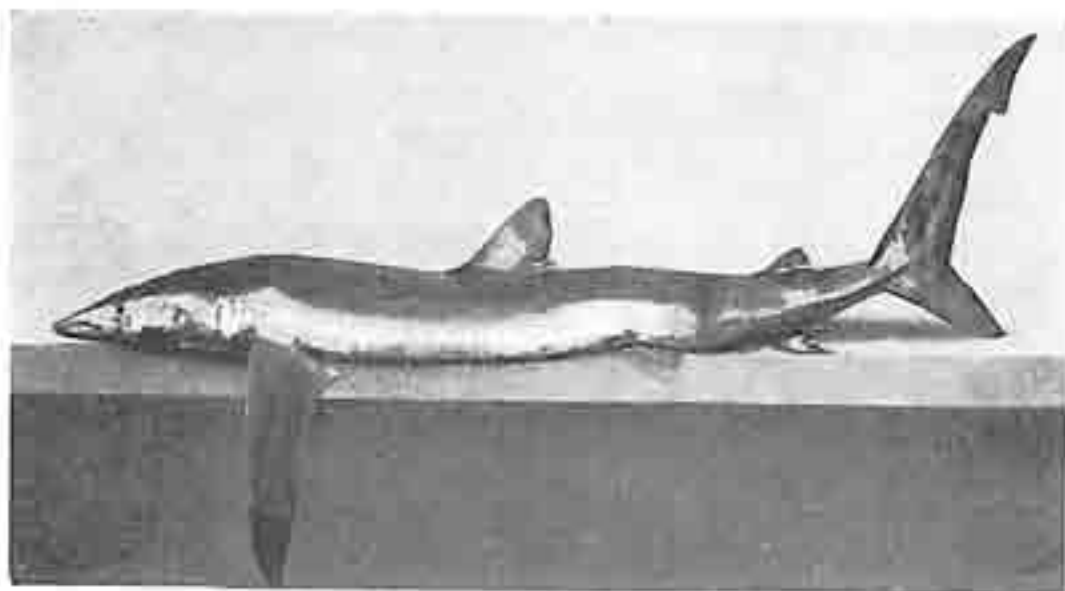
(c) Teeth of left side of upper and lower jaws.

**PLATE 8 — GALEORHINUS ZANZIBARENSIS.
ZANZIBAR SOUPFIN**

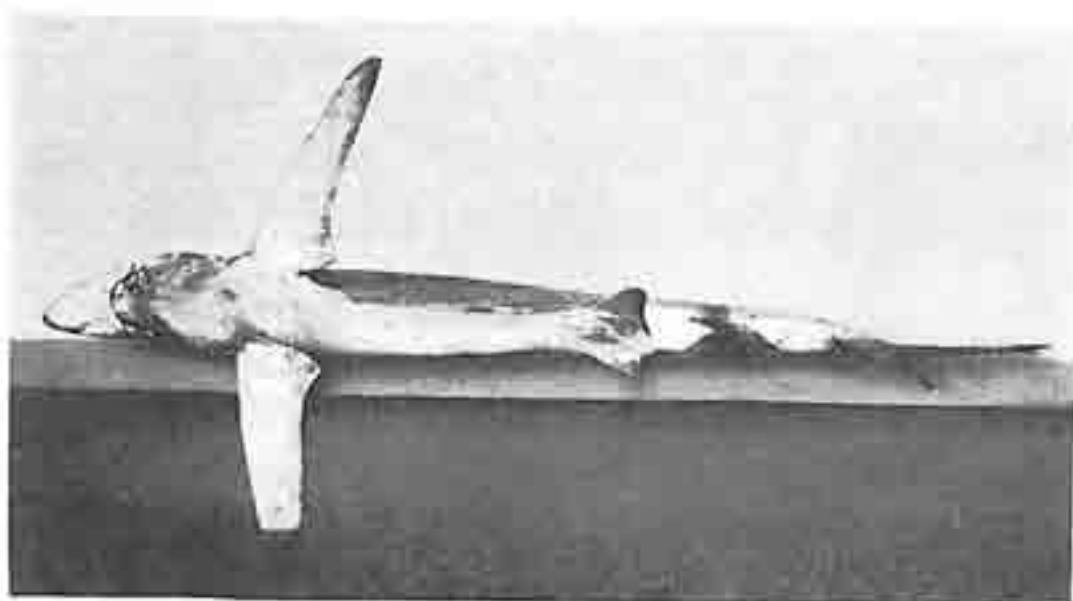


(a) Lateral view.

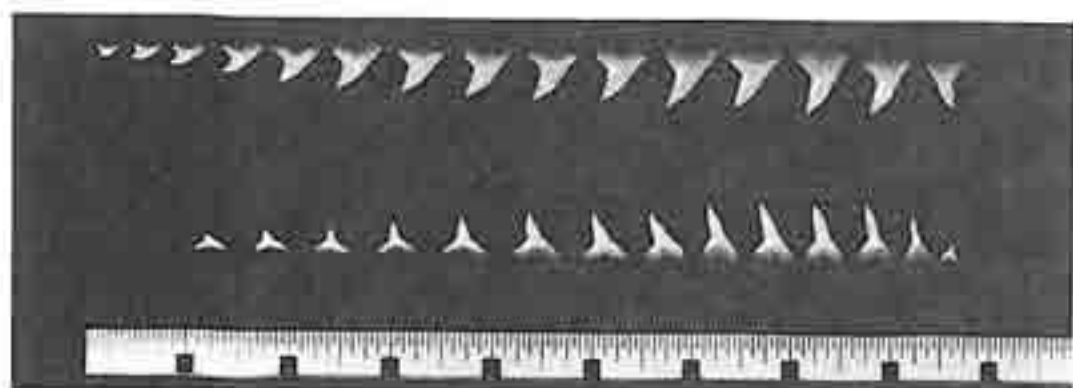
PLATE 9 — *NEGAPRION ACUTIDENS*. LEMON SHARK



(a) Lateral view. Total length 9 feet 4 inches.

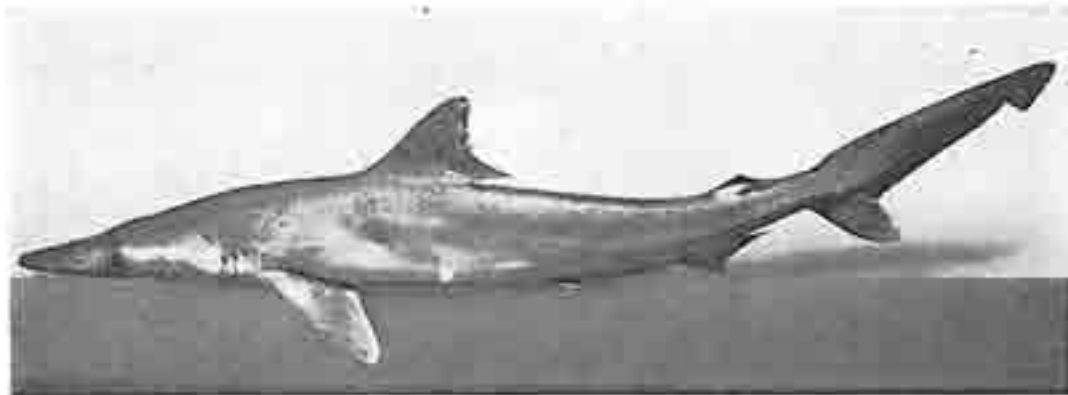


(b) Ventral view. Total length 9 feet 4 inches.

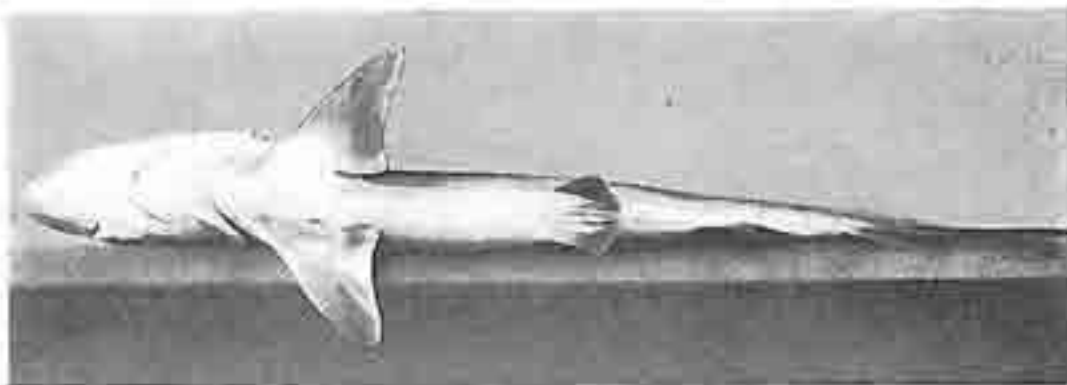


(c) Teeth of left side of upper and lower jaws.

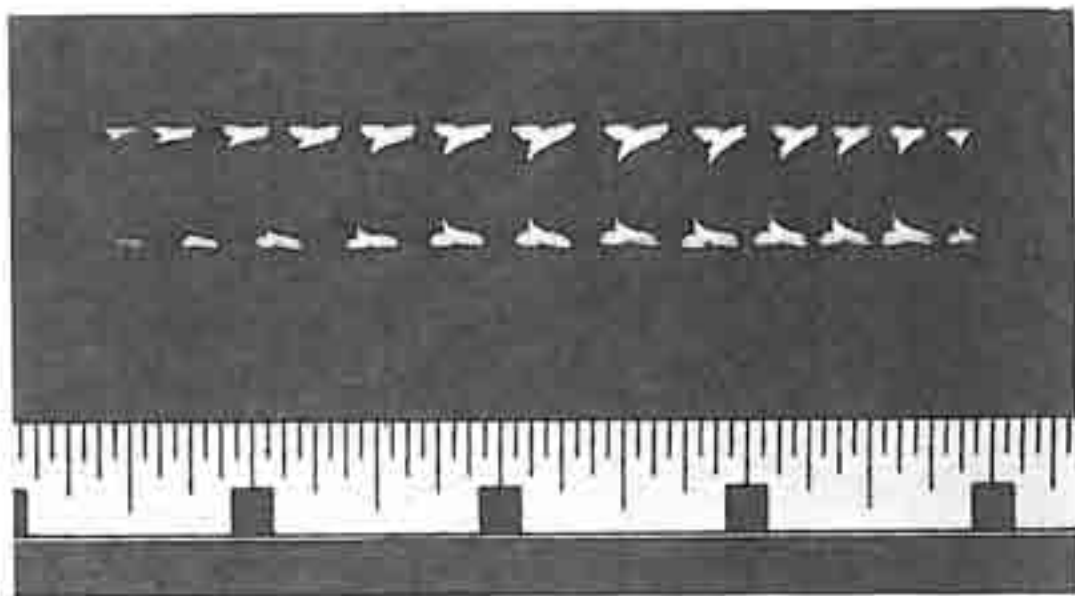
PLATE 10 — PRIONACE GLAUCA. BLUE SHARK



(a) Lateral view. Total length 1 ft. 9 inches.

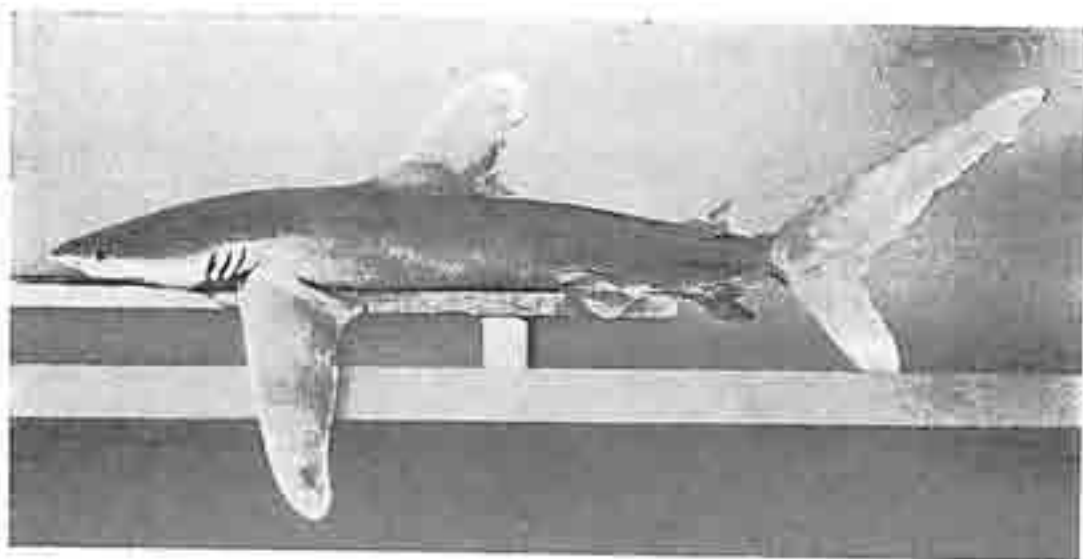


(b) Ventral view. Total length 2 feet.

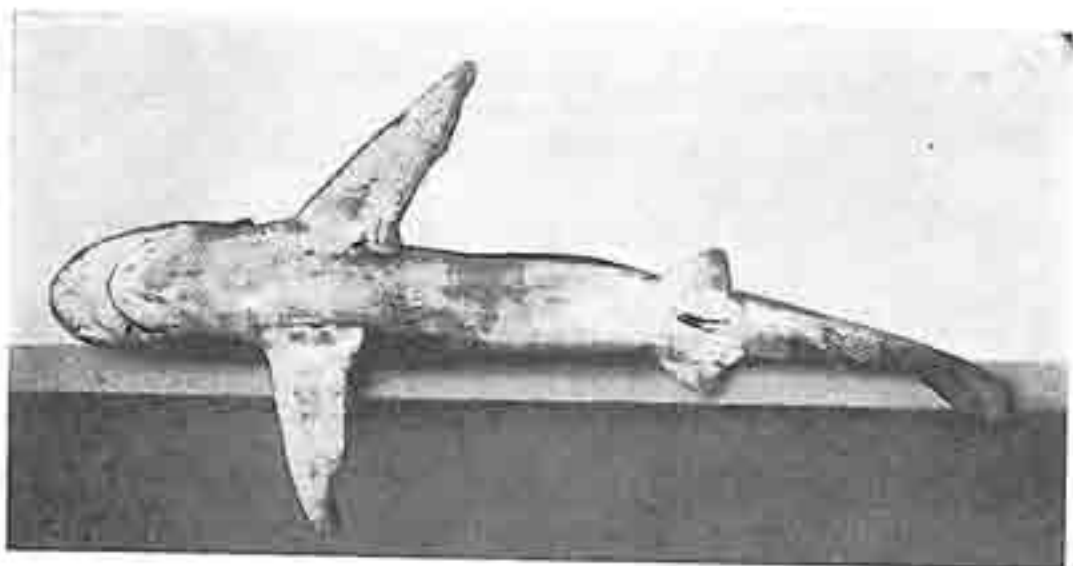


(c) Teeth of left side of upper and lower jaws.

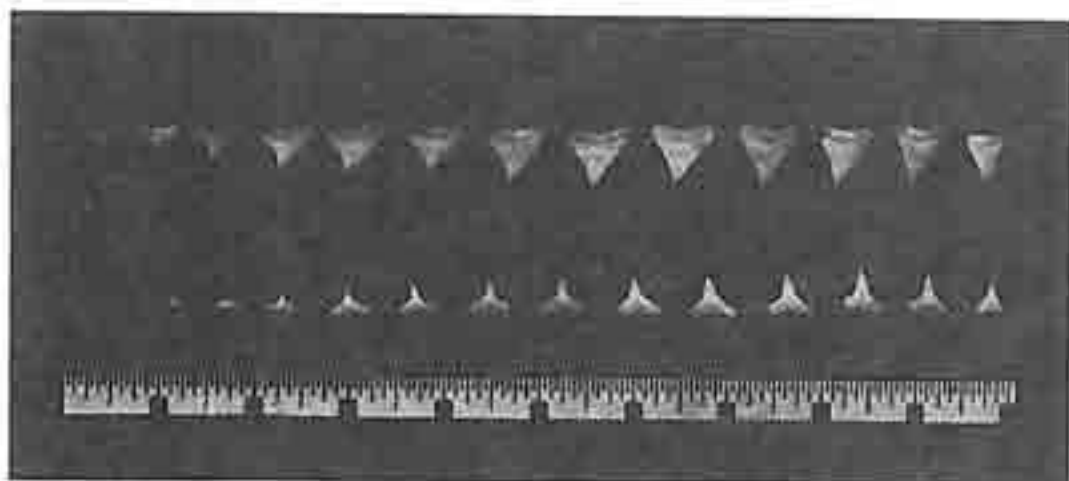
PLATE 11 — RHIZOPRIONODON ACUTUS. MILK SHARK



(a) Lateral view. Total length 5 feet.

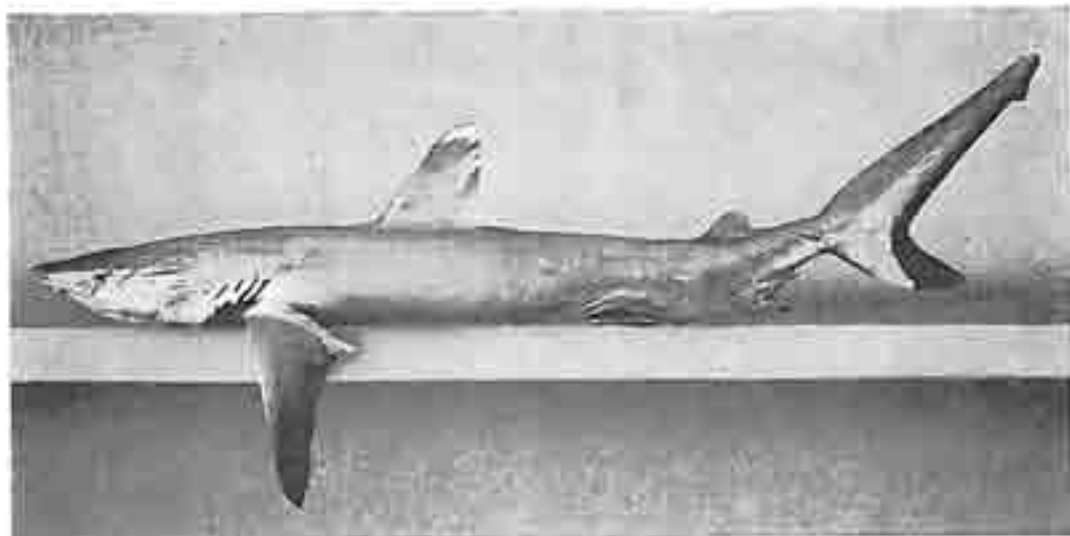


(b) Ventral view. Total length 7 feet 8 inches.

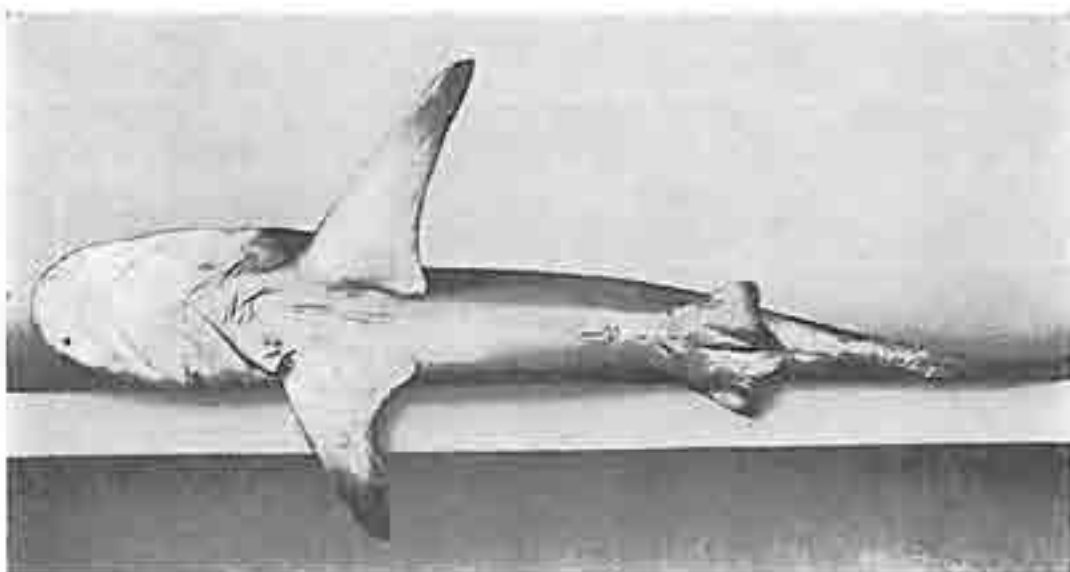


(c) Teeth of left side of upper and lower jaws.

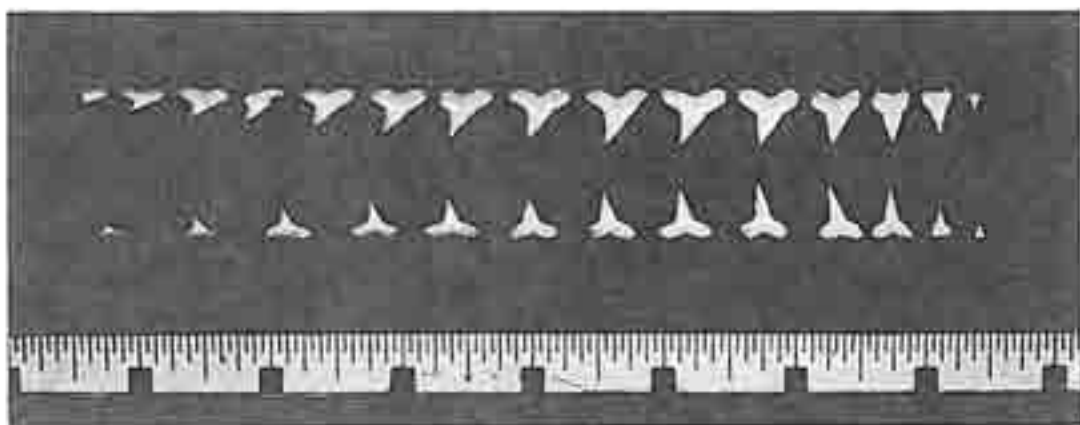
**PLATE 12 — CARCHARHINUS LONGIMANUS
WHITE TIPPED SHARK**



(a) Lateral view. Total length 4 feet 8 inches.

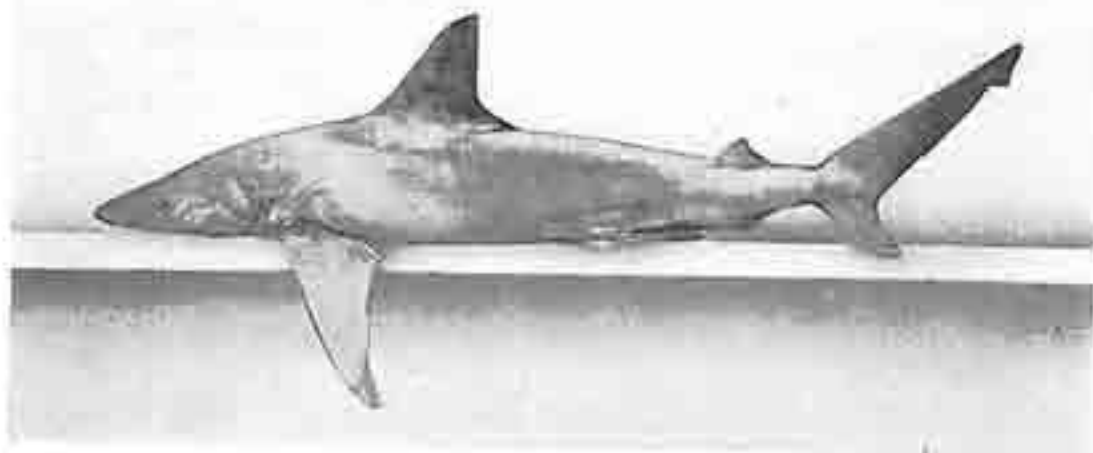


(b) Ventral view. Total length 4 feet 8 inches.

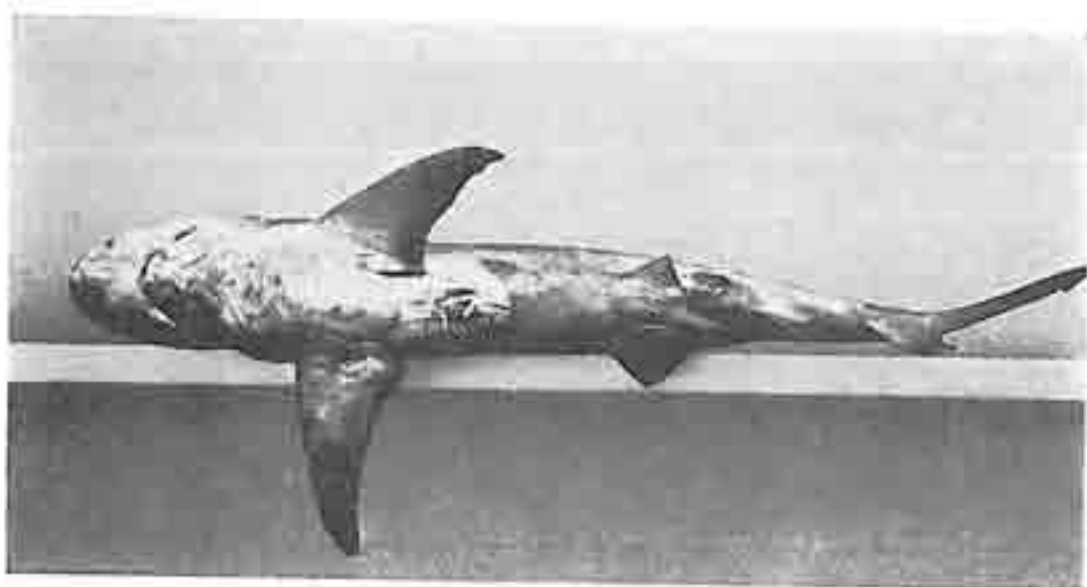


(c) Teeth of left side of upper and lower jaws.

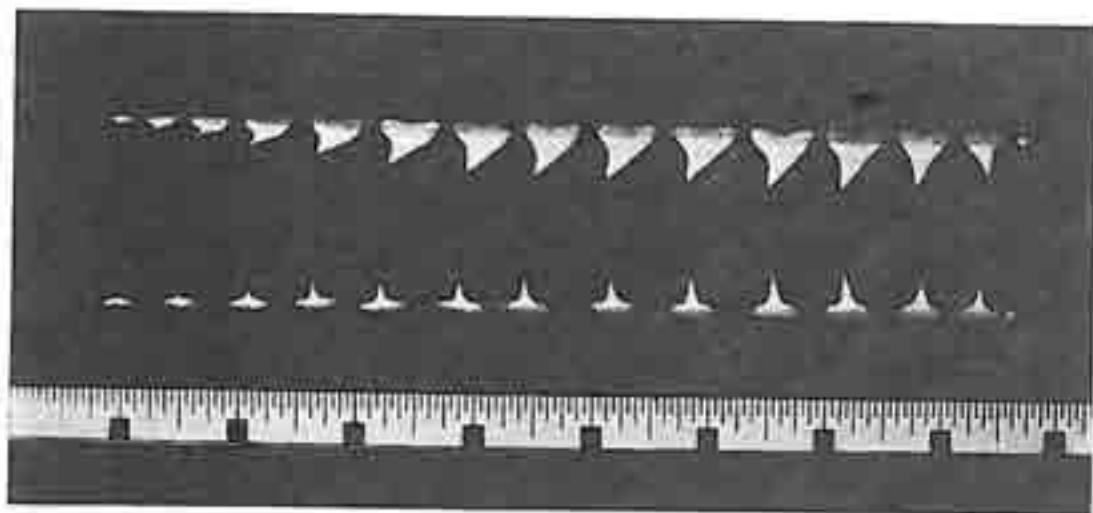
**PLATE 13 — CARCHARHINUS SPALLANZANI.
BLACK-TAILED GREY**



(a) Lateral view. Total length 6 feet.

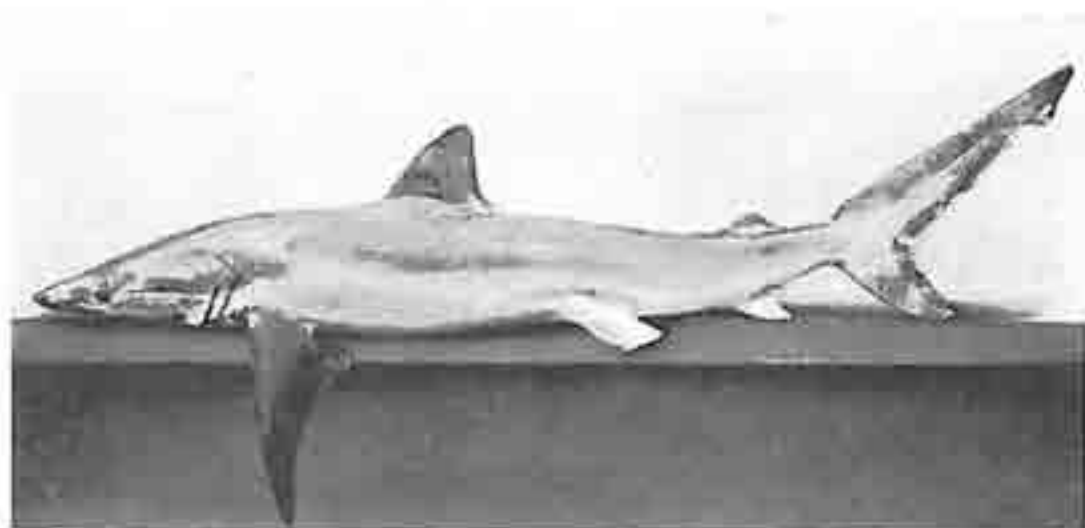


(b) Ventral view, Total length 6 feet.

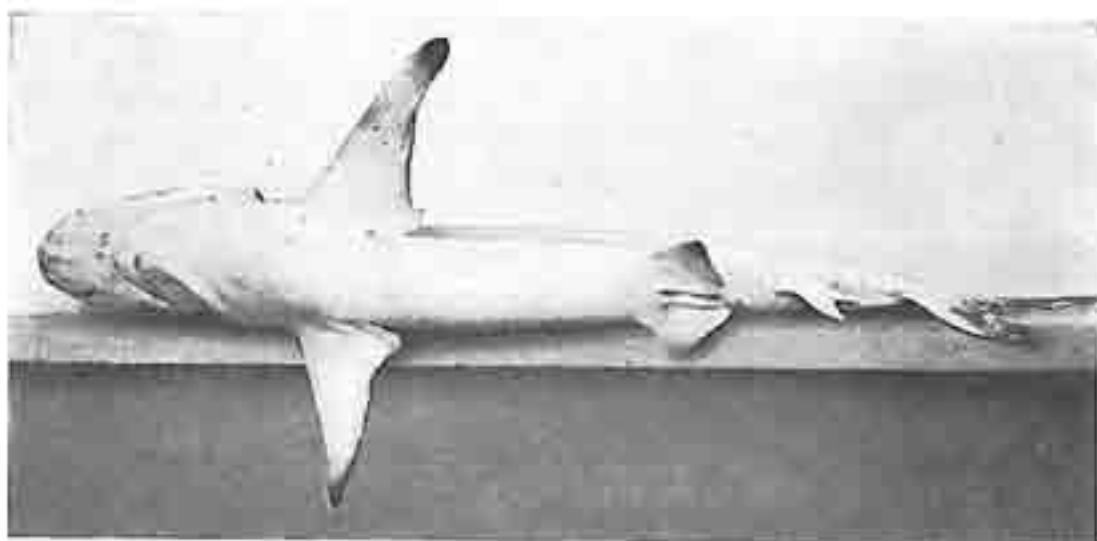


(c) Teeth of left side of upper and lower jaws.

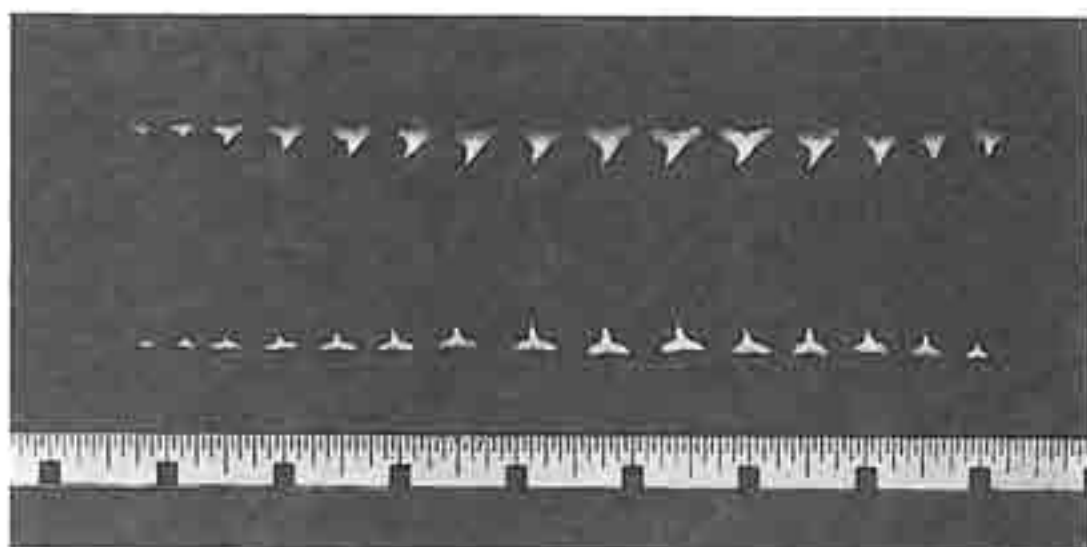
PLATE 14 — *CARCHARHINUS MILBERTI*. SANDBAR SHARK.



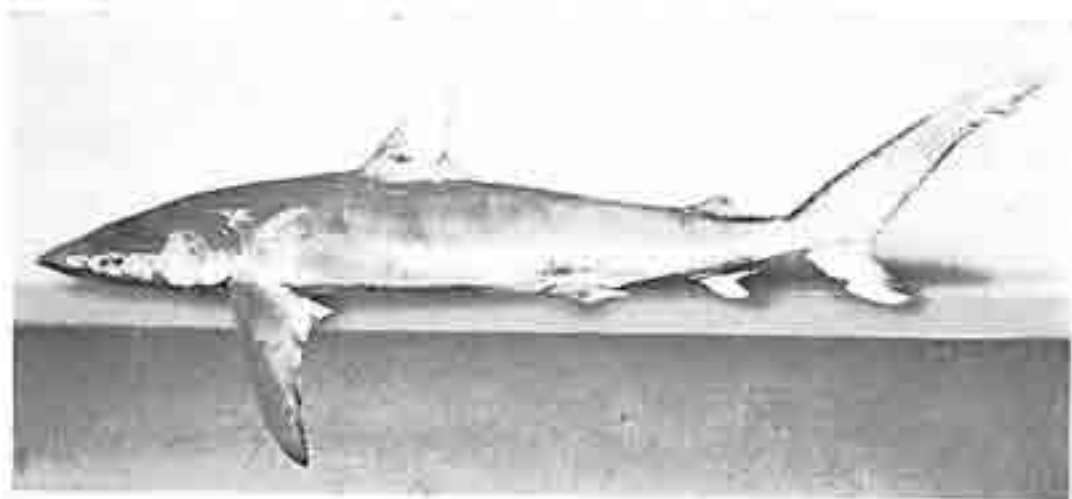
(a) Lateral view. Total length 5 feet.



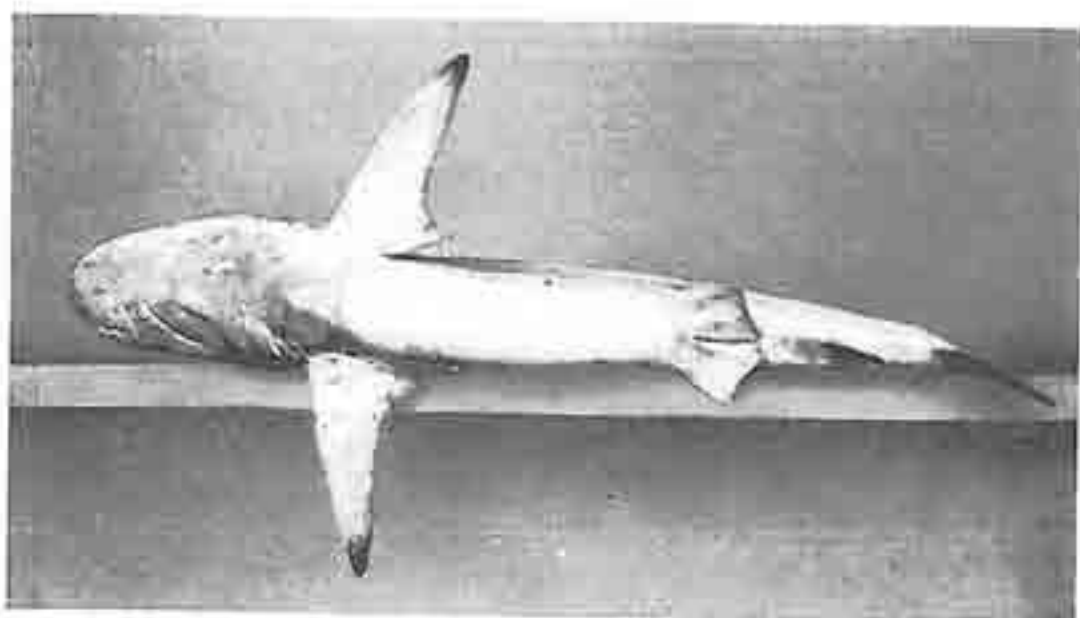
(b) Ventral view. Total length 5 feet.



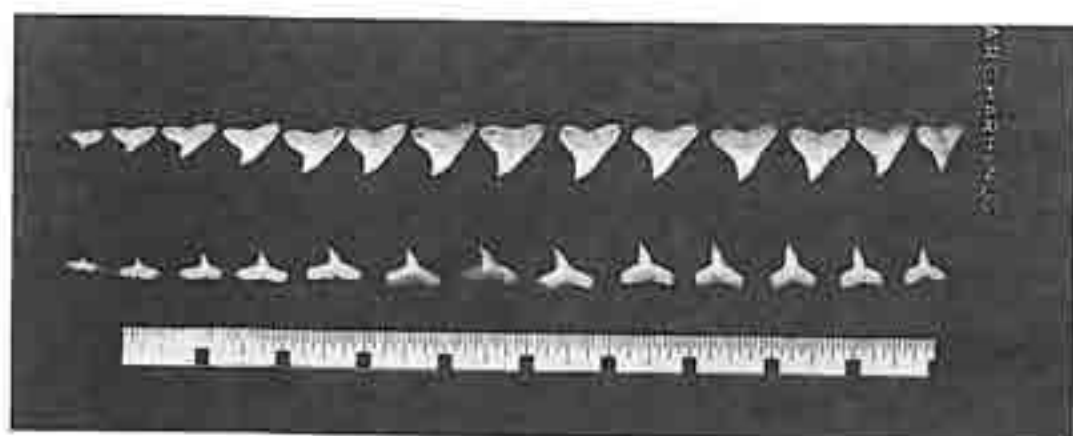
(c) Teeth of left side of upper and lower jaws.



(a) Lateral view. Total length 5 feet 6 inches.

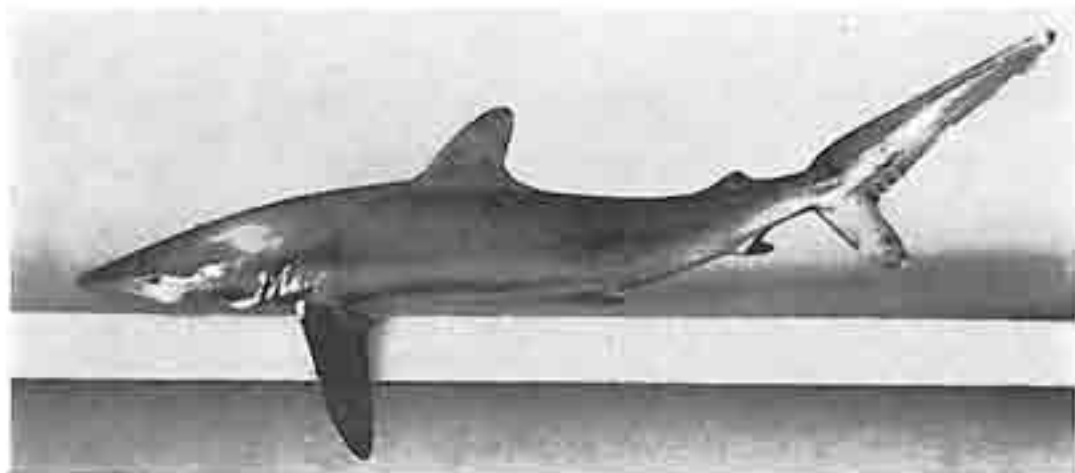


(b) Ventral view. Total length 5 feet 6 inches.

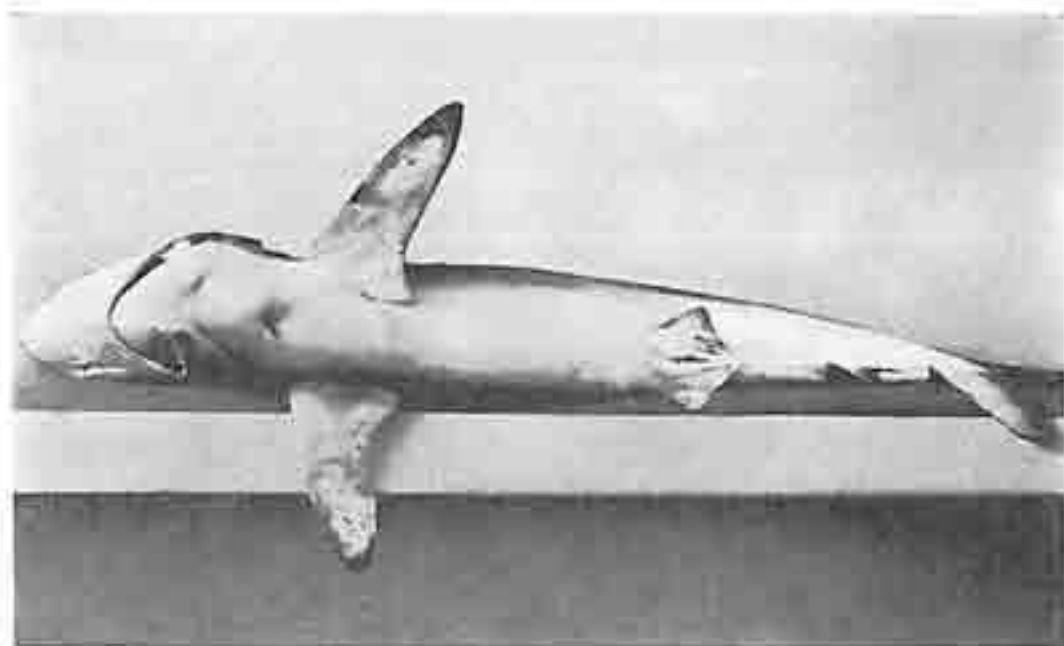


(c) Teeth of left side of upper and lower jaws.

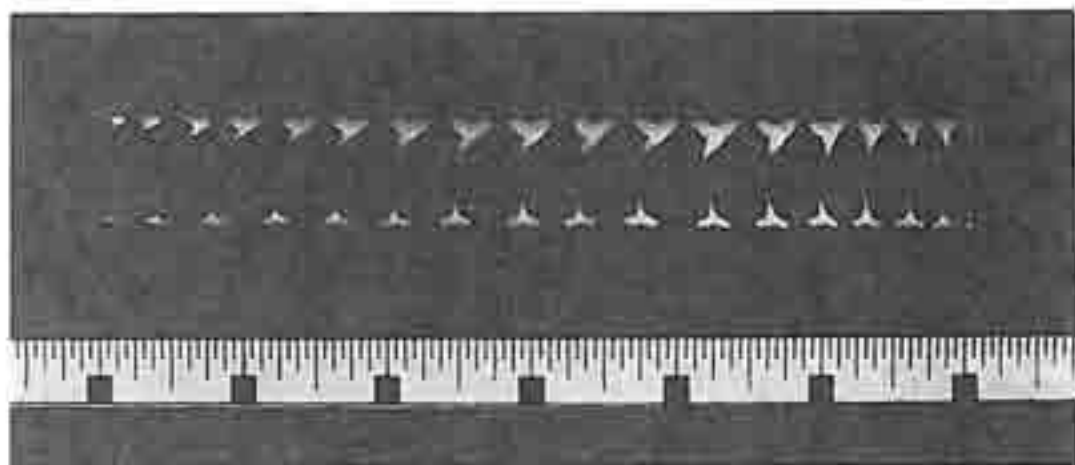
PLATE 18 — **CARCHARHINUS OBSCURUS.**
RIDGE-BACKED GREY



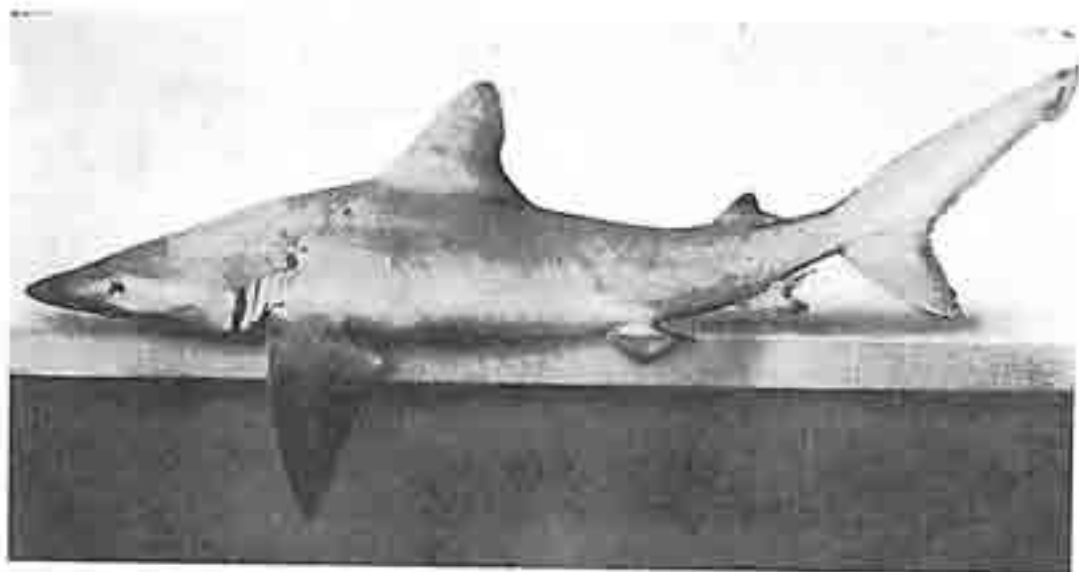
(a) Lateral view. Total length 4 feet.



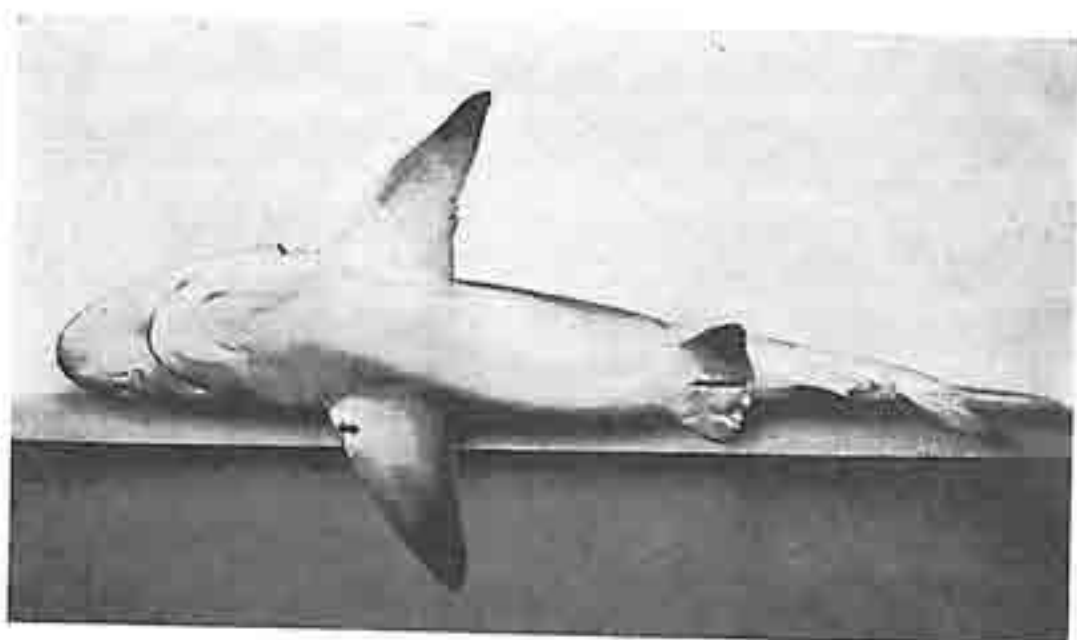
(b) Ventral view. Total length 4 feet.



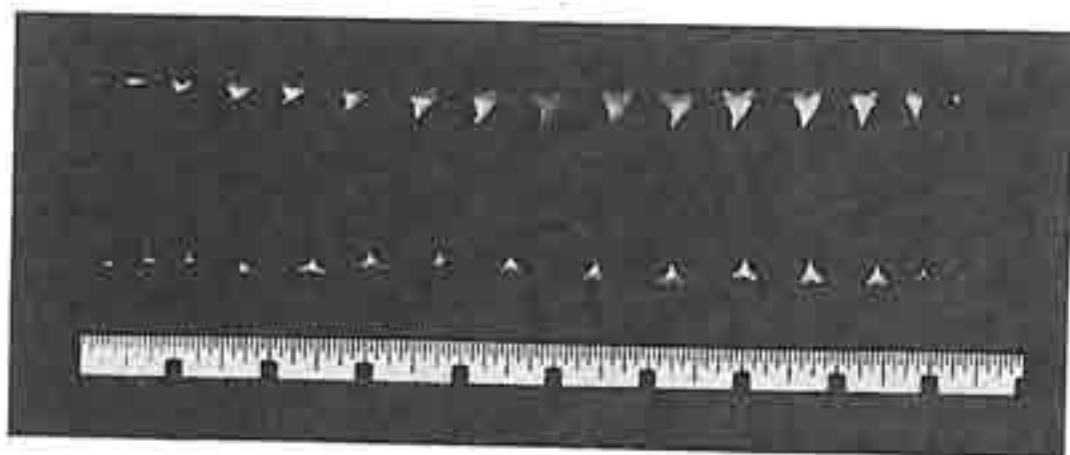
(c) Teeth of left side of upper and lower jaws.



(a) Lateral view. Total length 4 feet.

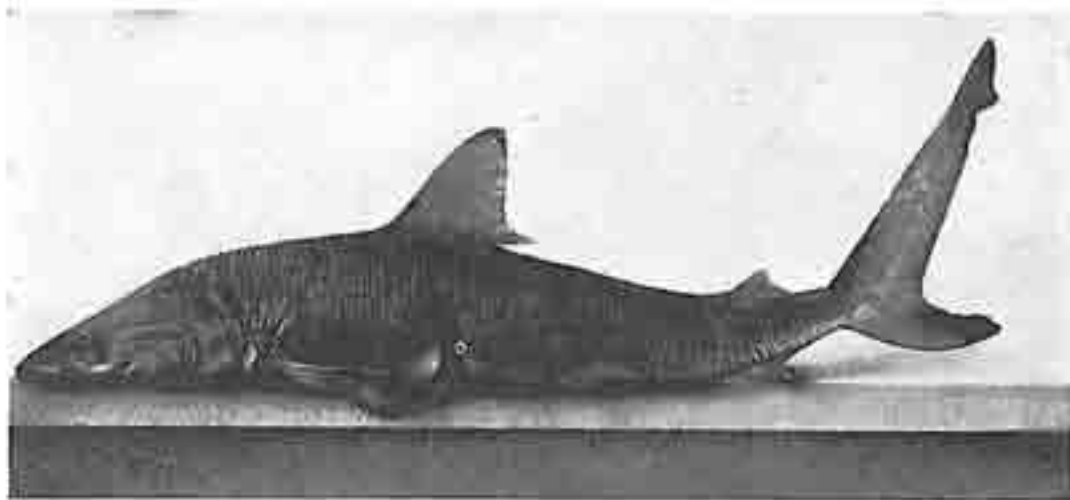


(b) Ventral view. Total length 4 feet.

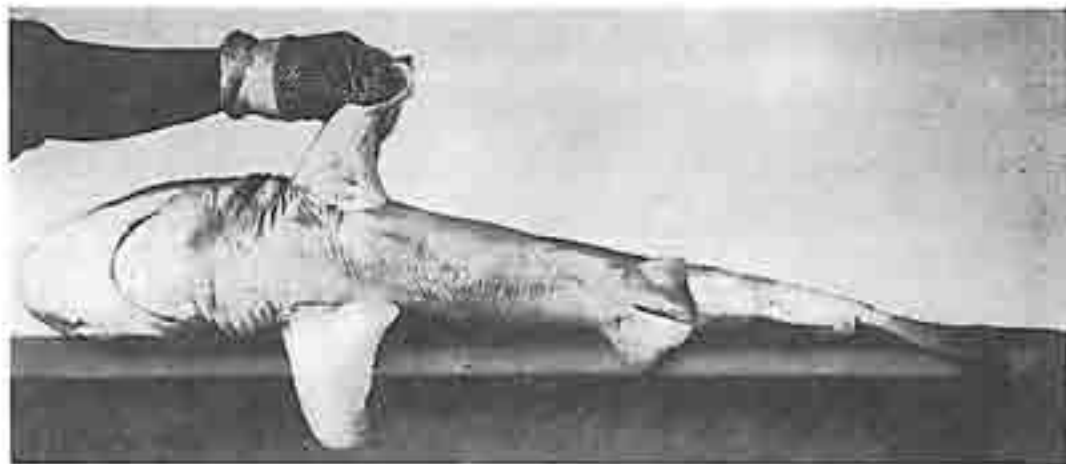


(c) Teeth of left side of upper and lower jaws.

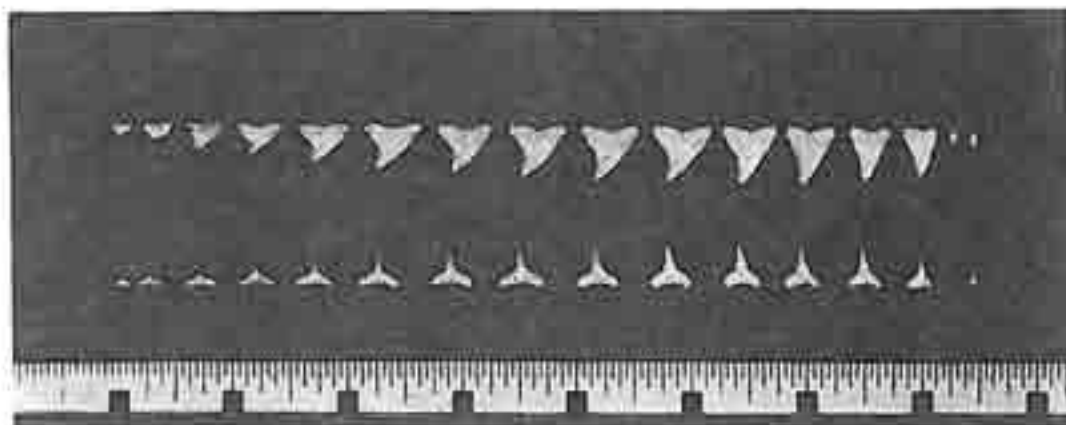
PLATE 18 — *CARCHARHINUS ALTIMUS*. BIGNOSE SHARK



(a) Lateral view. Total length 3 feet.

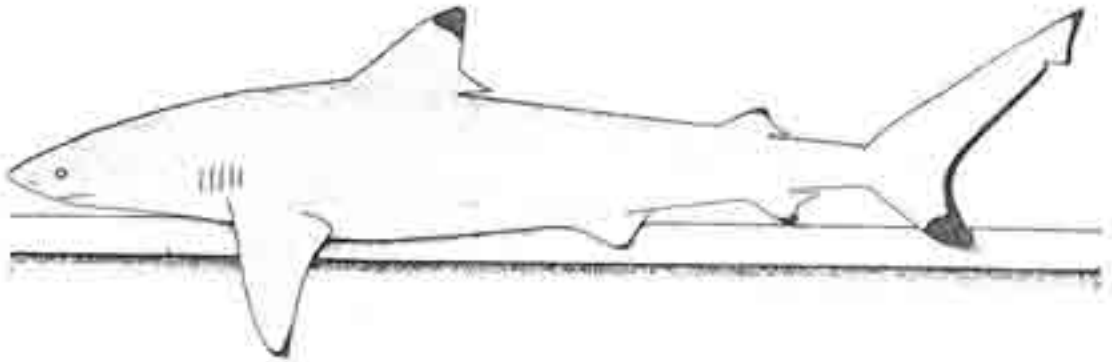


(b) Ventral view. Total length 3 feet.



(c) Teeth of left side of upper and lower jaws.

**PLATE 19 — CARCHARHINUS GALAPAGENSIS,
GALAPAGOS SHARK**

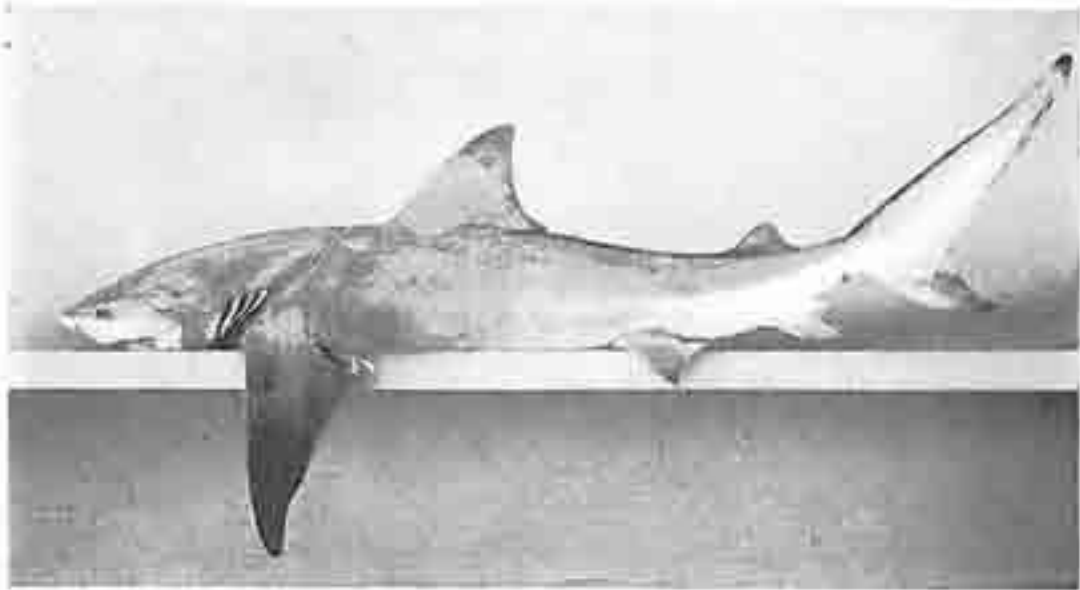


(a) Lateral view.

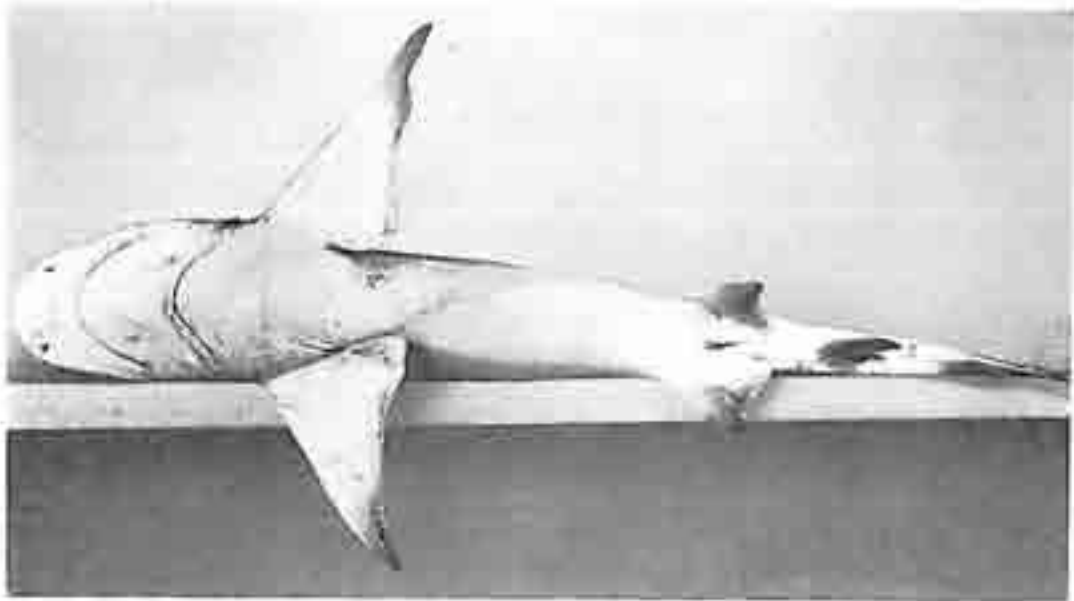


(c) Teeth of left side of upper jaw.

PLATE 20 — **CARCHARHINUS MELANOPTERUS.**
BLACK SHARK



(a) Lateral view. Total length 6 feet.

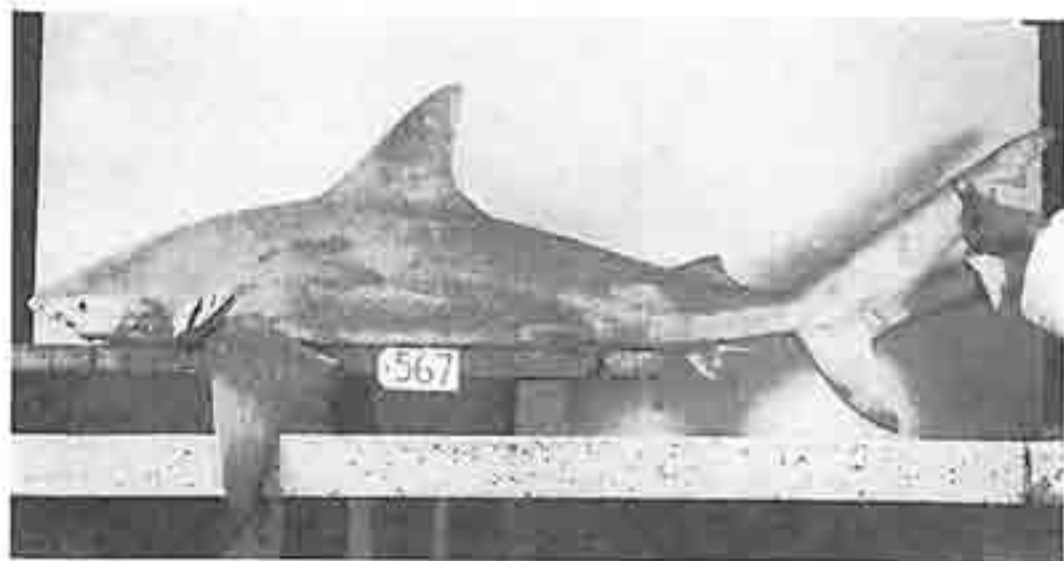


(b) Ventral view. Total length 6 feet.

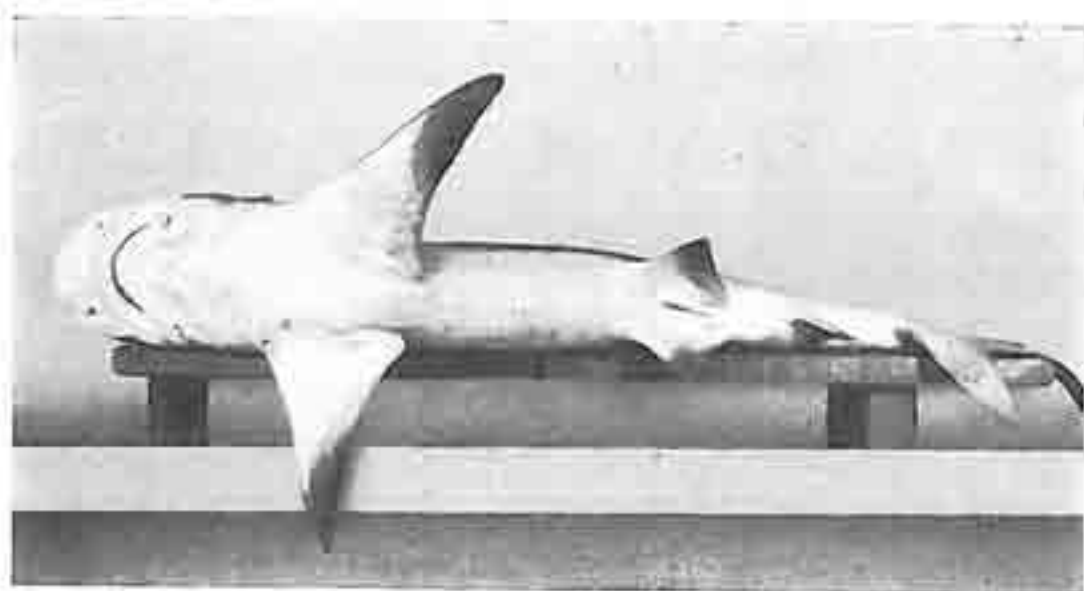


(c) Teeth of left side of upper and lower jaws.

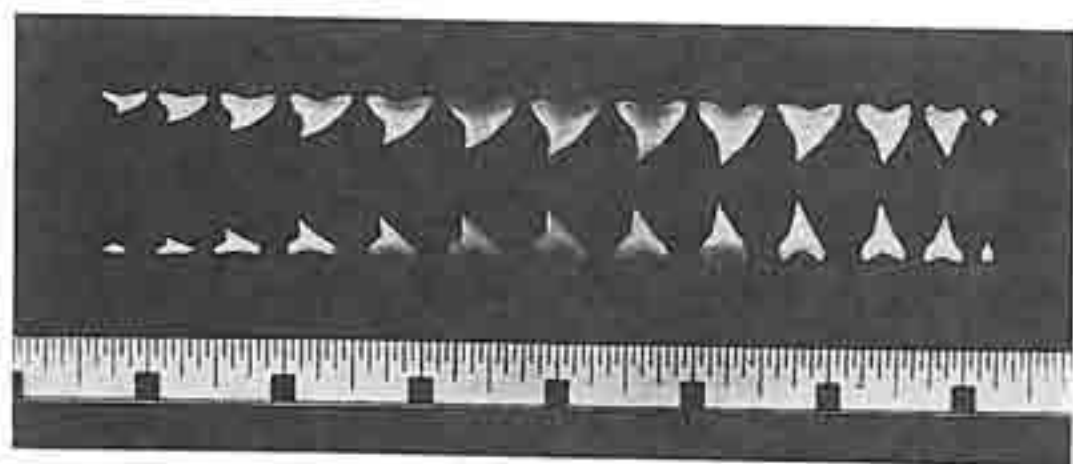
PLATE 21 — *CARCHARHINUS LEUCAS*. ZAMBEZI SHARK



(a) Lateral view. Total length 4 feet 7 inches.

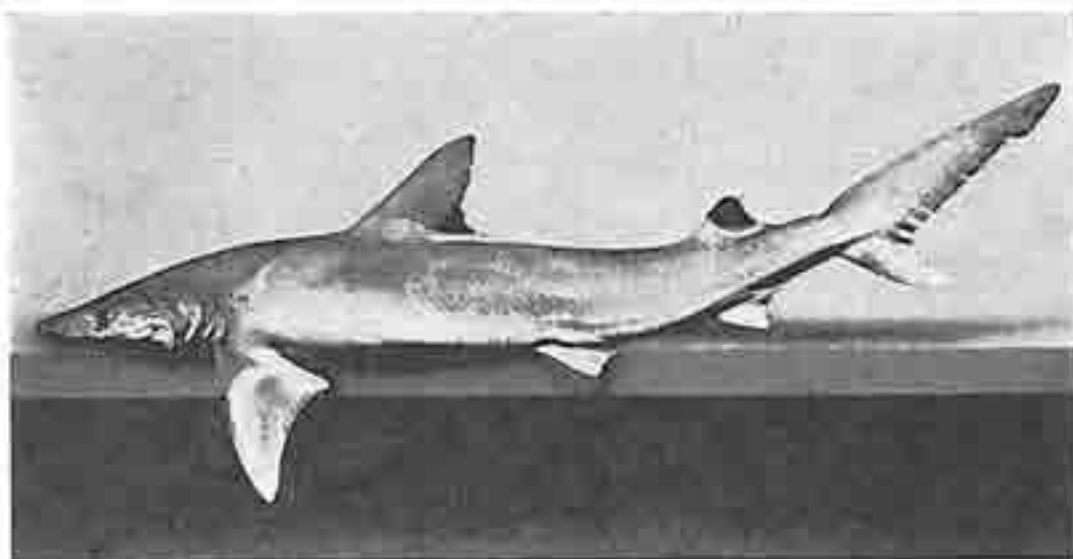


(b) Ventral view. Total length 4 feet 7 inches.

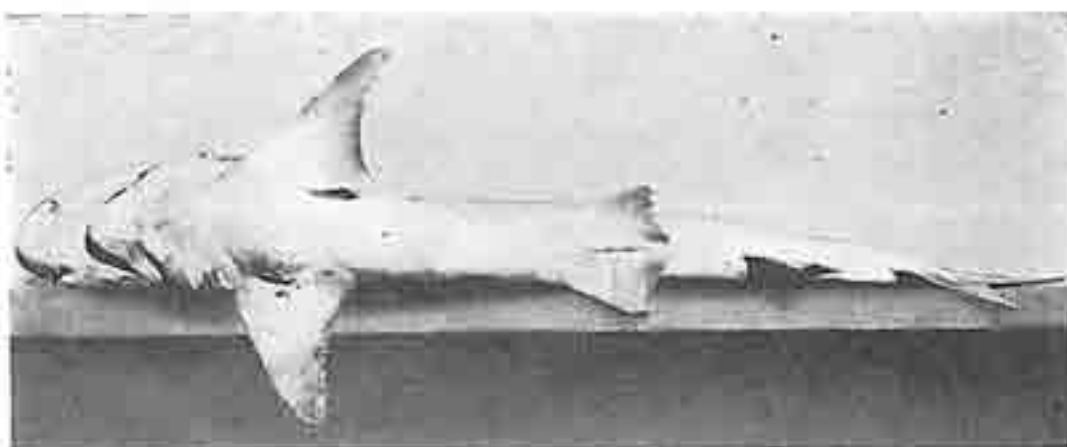


(c) Teeth of left side of upper and lower jaws.

PLATE 22 — *CARCHARHINUS AMBOINENSIS*. JAVA SHARK



(a) Lateral view. Total length 2 feet 9 inches.

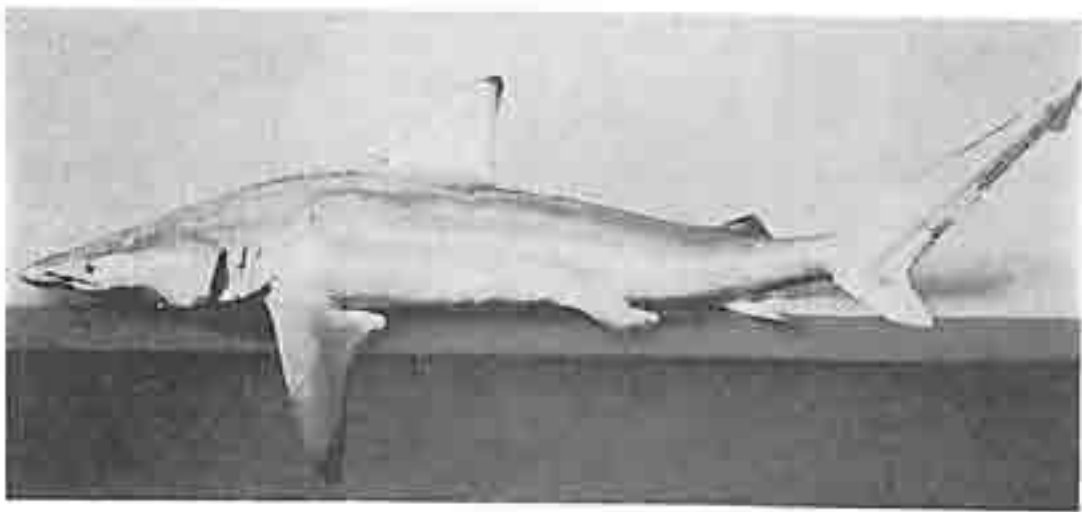


(b) Ventral view. Total length 2 feet 9 inches.

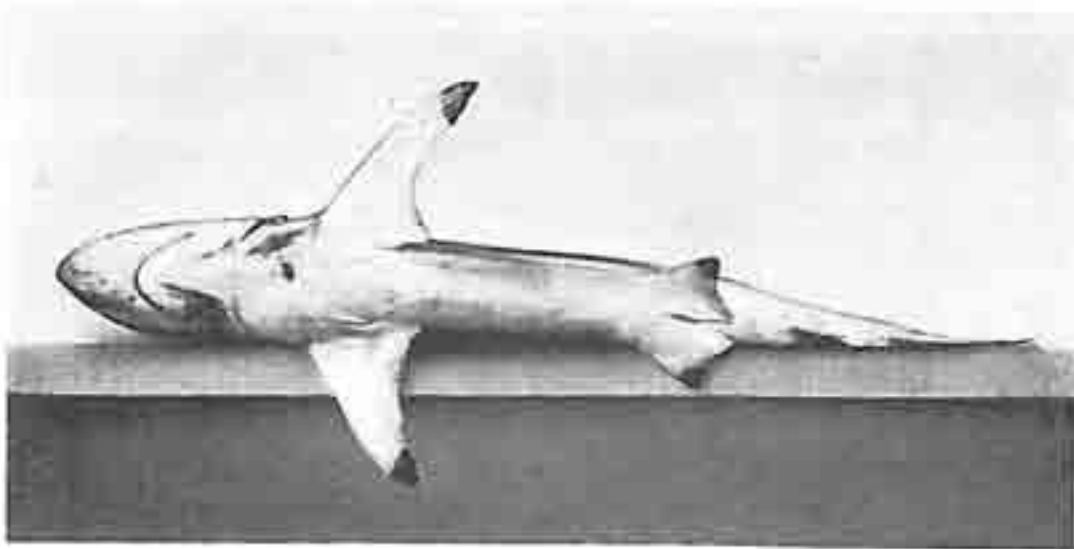


(c) Teeth of left side of upper and lower jaws.

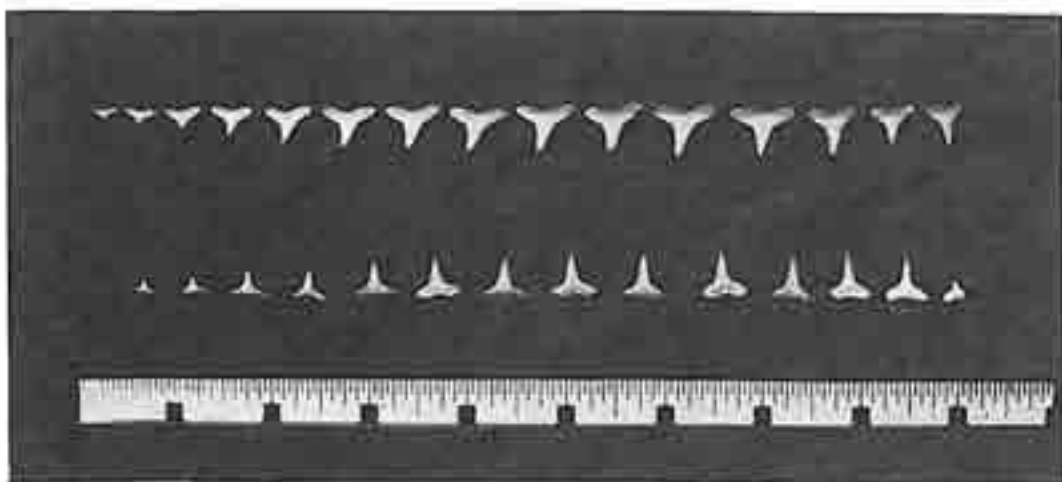
PLATE 23 — *CARCHARHINUS TJUTJOT*. BLACKSPOT SHARK



(a) Lateral view. Total length 4 feet 6 inches.

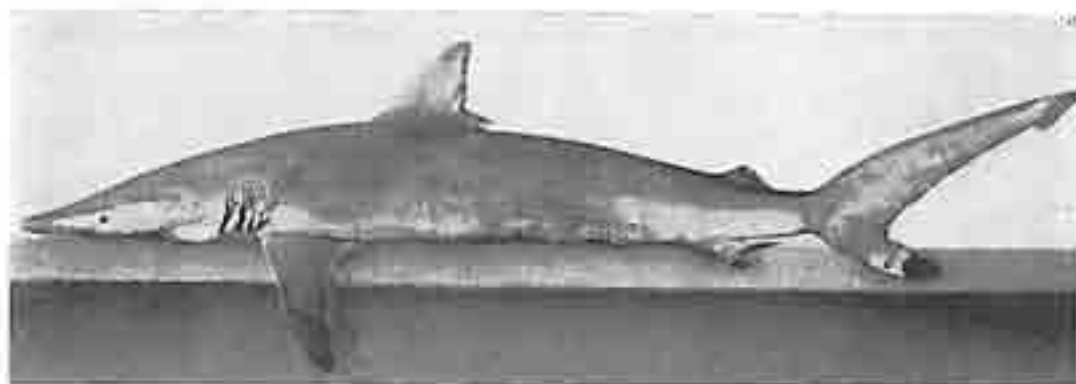


(b) Ventral view. Total length 5 feet.

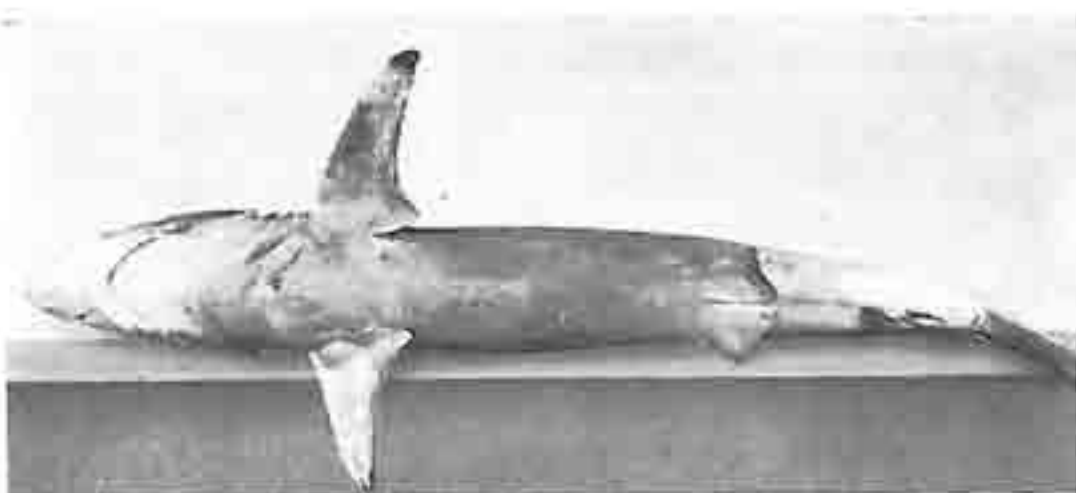


(c) Teeth of left side of upper and lower jaws.

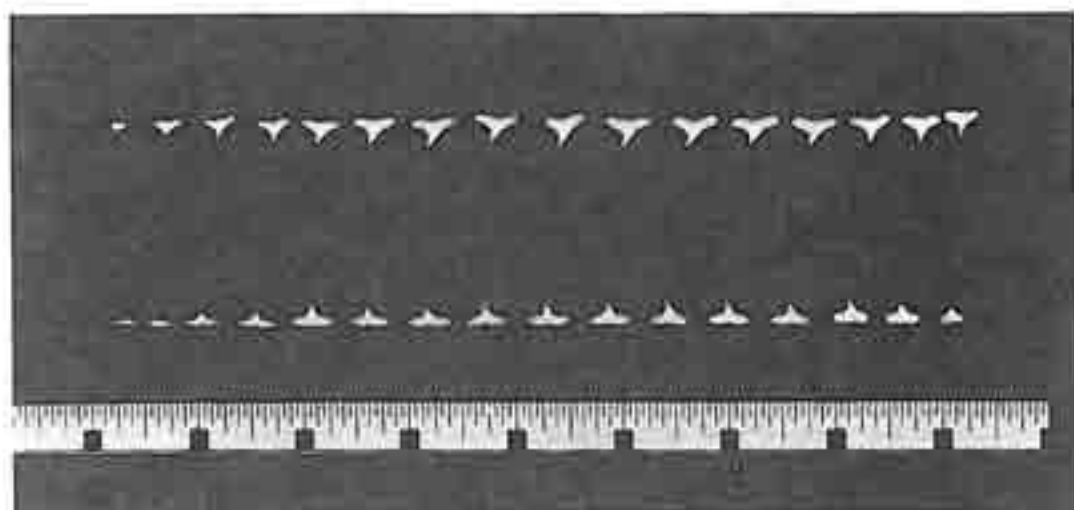
PLATE 24 — *CARCHARHINUS LIMBATUS*, BLACK FIN



(a) Lateral view. Total length 6 feet.

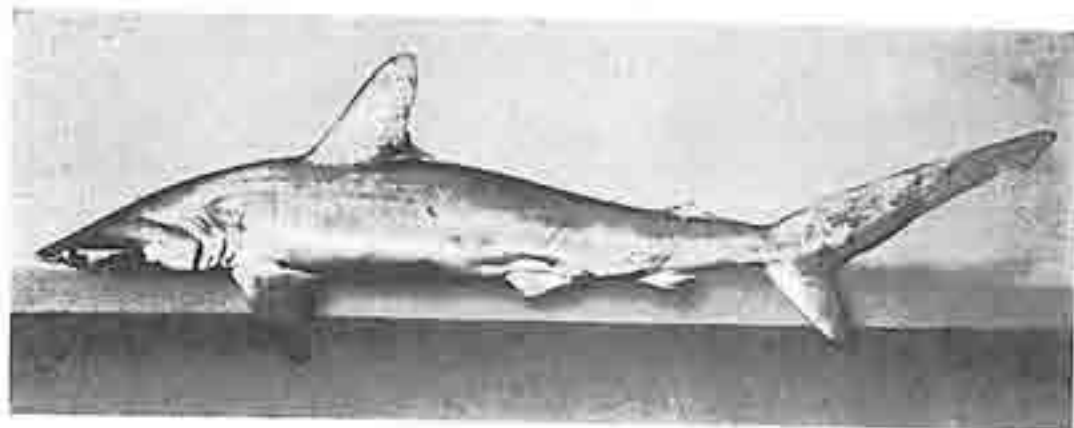


(b) Ventral view. Total length 6 feet.

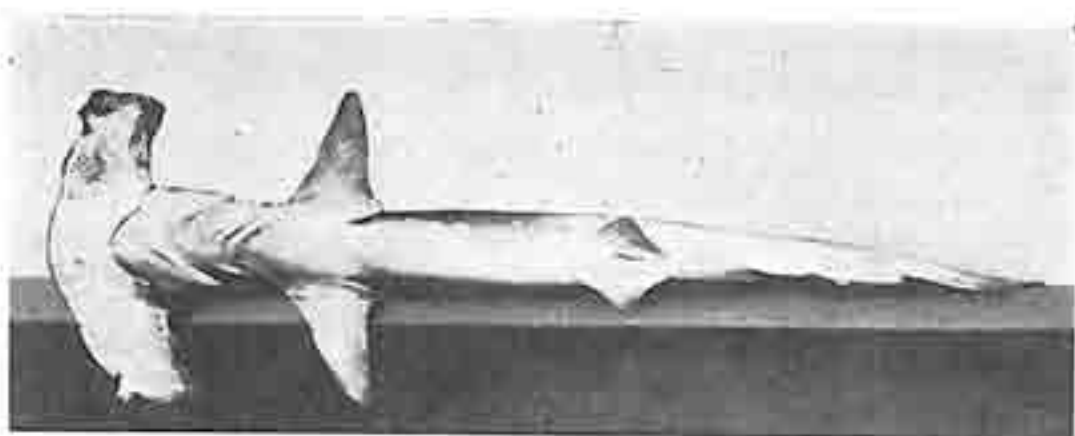


(c) Teeth of left side of upper and lower jaws.

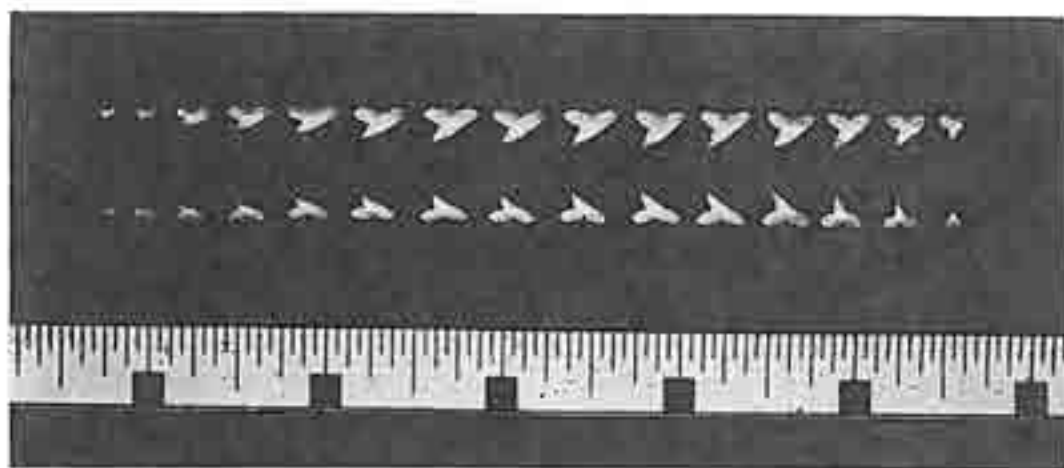
PLATE 25 — *CARCHARHINUS MACULIPINNIS*.
BLACK-TIPPED SHARK



(a) Lateral view. Total length 2 feet 6 inches.

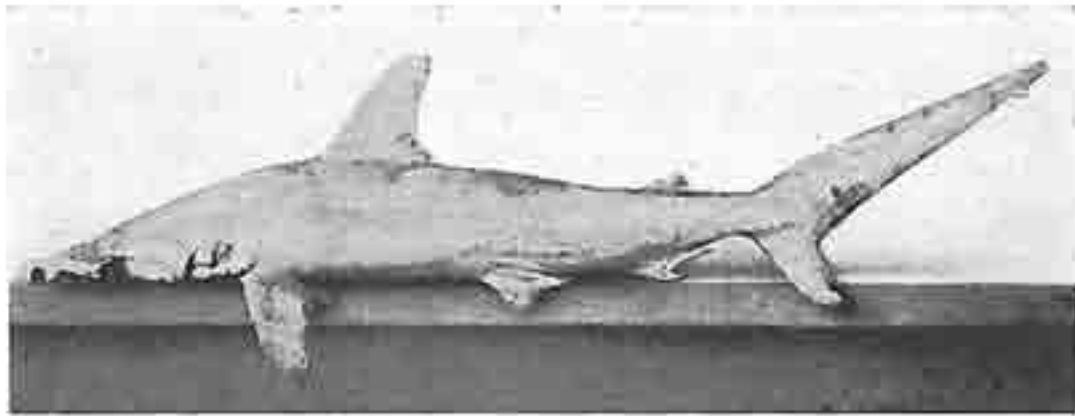


(b) Ventral view. Total length 3 feet.

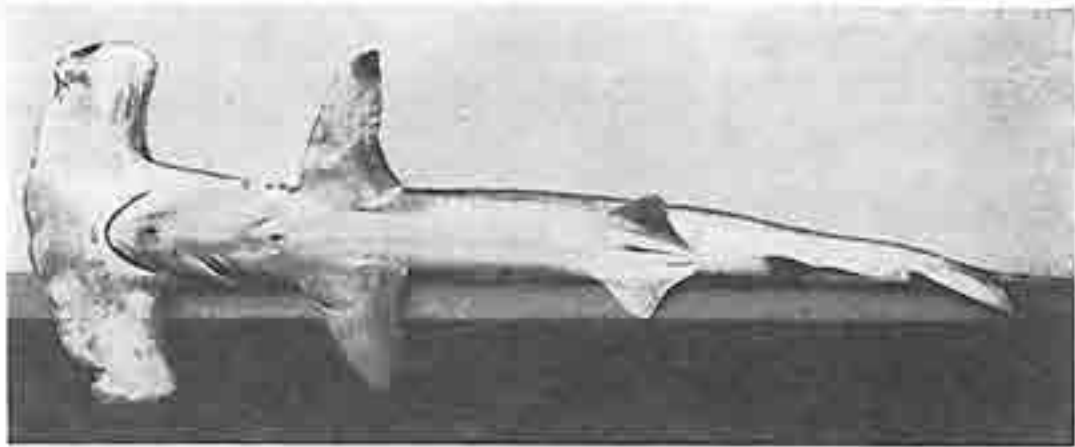


(c) Teeth of left side of upper and lower jaws.

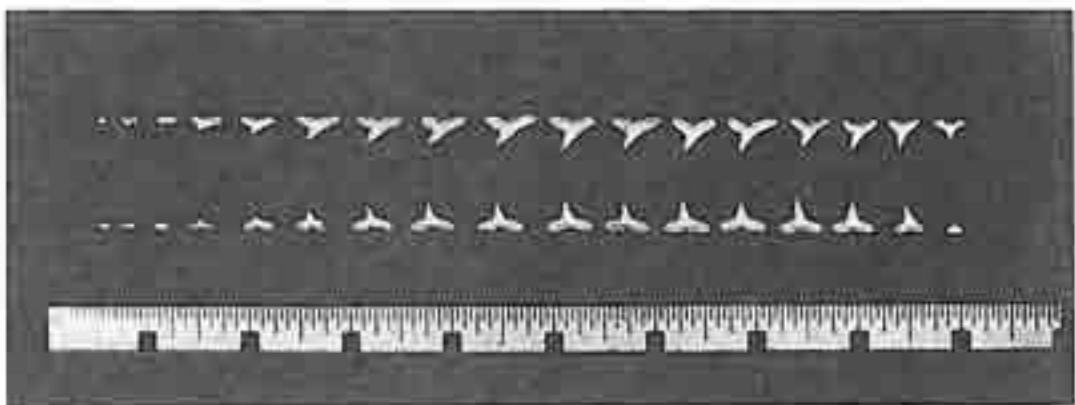
PLATE 26 — SPHYRNA ZYGAENA. HAMMERHEAD



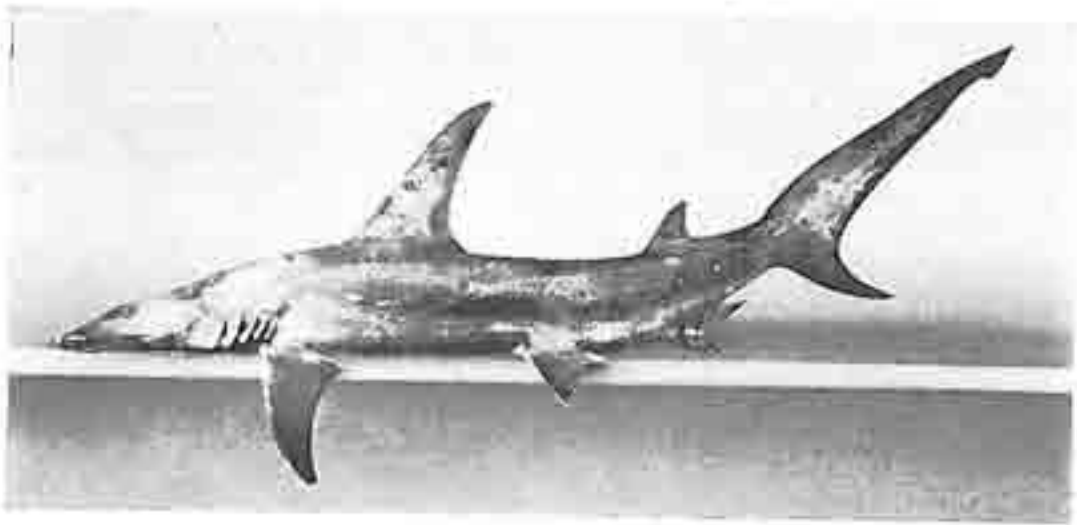
(a) Lateral view. Total length 4 feet 6 inches.



(b) Ventral view. Total length 3 feet 6 inches.



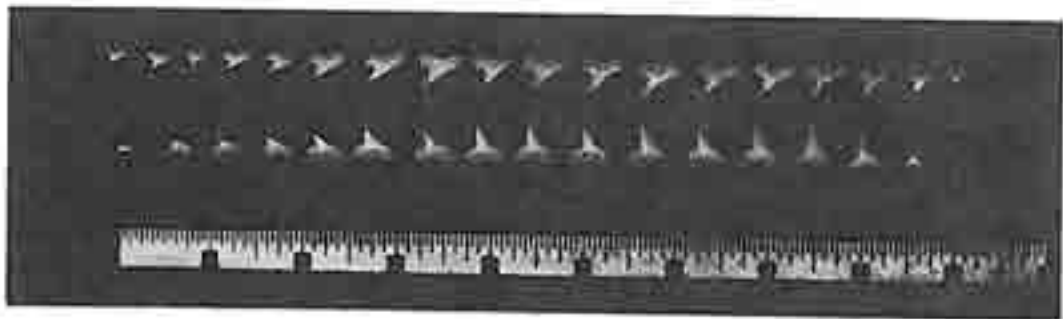
(c) Teeth of left side of upper and lower jaws.



(a) Lateral view. Total length 9 feet 8 inches.



(b) Ventral view. Total length 9 feet 8 inches.



(c) Teeth of left side of upper and lower jaws.

PLATE 28 — SPHYRNA MOKARRAN. GREAT HAMMERHEAD



Fig. 3a—HEAD: Normal, not hammershaped.

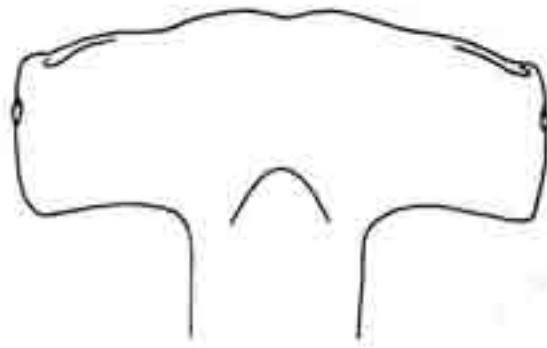


Fig. 3b—HEAD: Hammershaped.

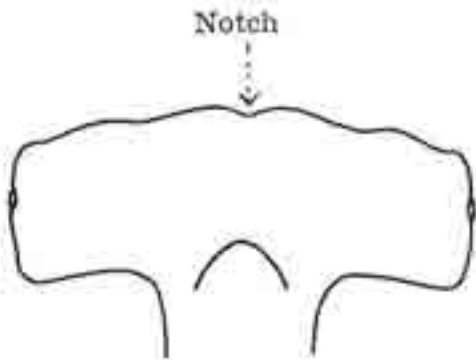


Fig. 4a—HEAD: Centre of anterior edge of "hammer" notched.

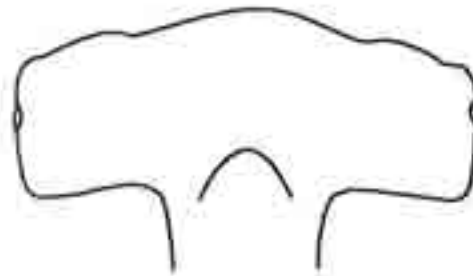


Fig. 4b—HEAD: Centre of anterior edge of "hammer" not notched.



Fig. 5a—SNOUT, short.



Fig. 5b—SNOUT, long.



Fig. 6a—SNOUT: Broadly rounded at tip.

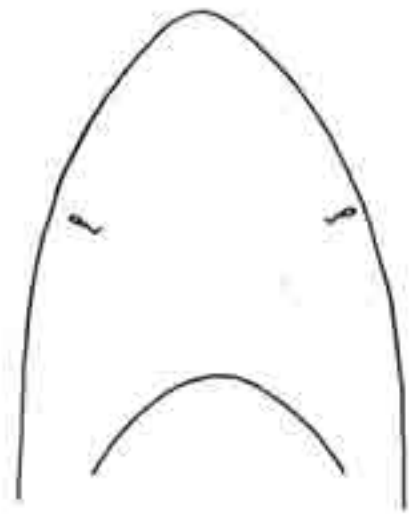


Fig. 6b—SNOUT: Pointed at tip.

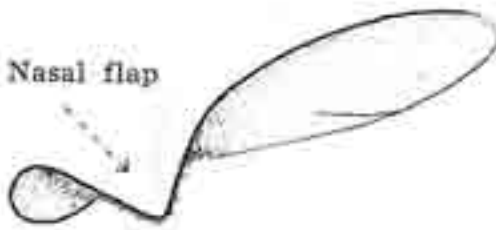


Fig. 7a—NOSTRIL with long nasal flap.

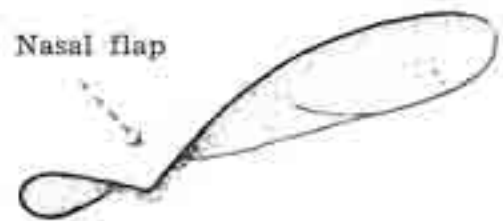


Fig. 7b—NOSTRIL with short nasal flap.

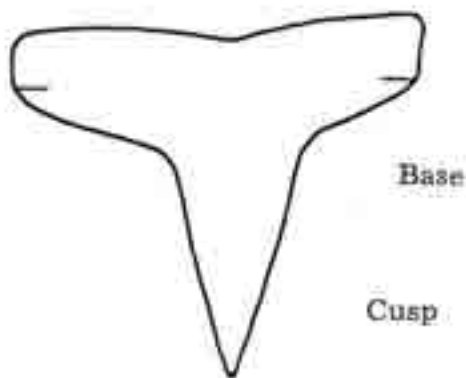


Fig. 8a—TEETH: Upper, as well as lower, teeth consist of narrow cusps on broad bases.

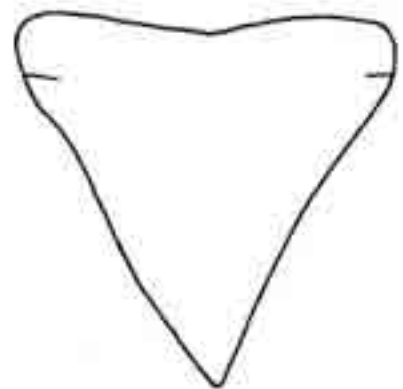


Fig. 8b—TEETH: Upper teeth triangular, the cusps not distinct from their bases.

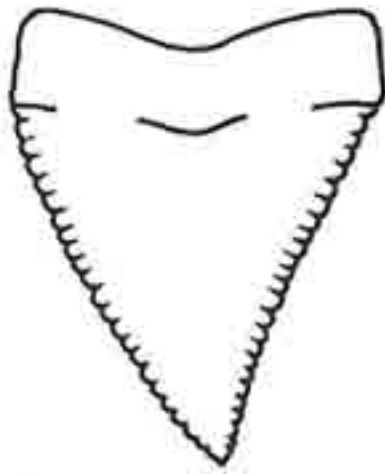


Fig. 9a—TEETH: Tooth margins coarsely serrated.

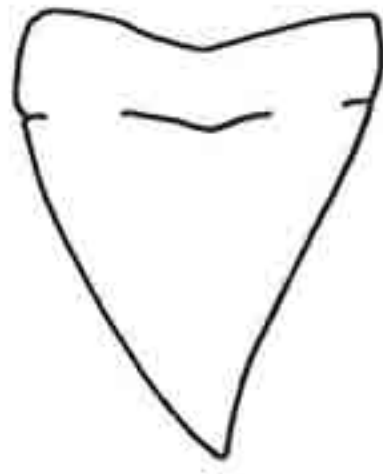


Fig. 9b—TEETH: Tooth margins smooth.

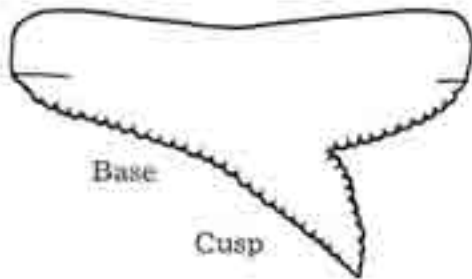


Fig. 10a—TEETH: Cusps of upper teeth serrated as well as bases.

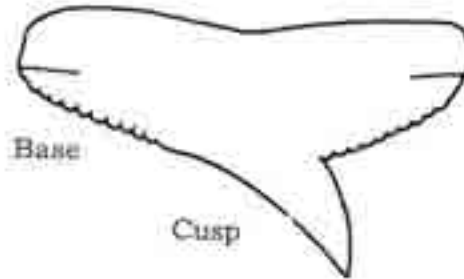


Fig. 10b—TEETH: Cusps of upper teeth smooth-edged.

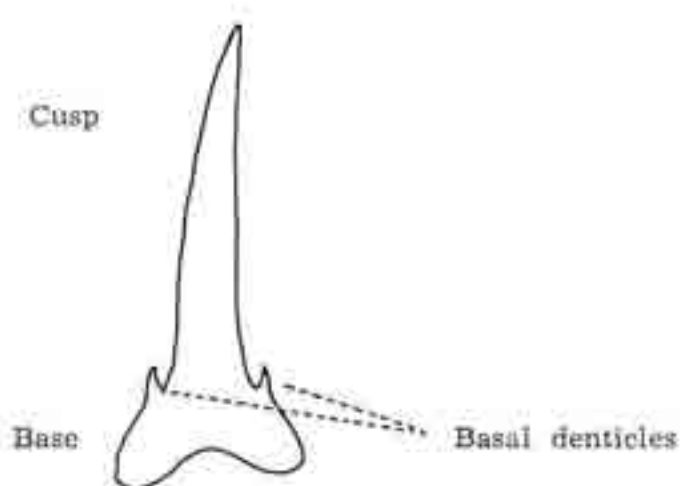


Fig. 11a—TEETH: A small basal denticle present on each side of the cusp.

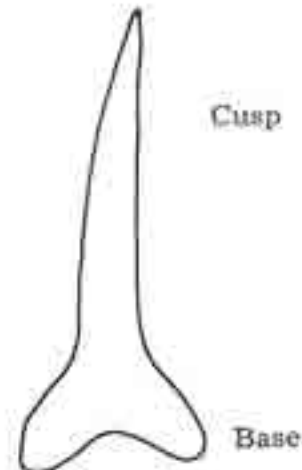


Fig. 11b—TEETH: No small basal denticle on each side of the cusp.

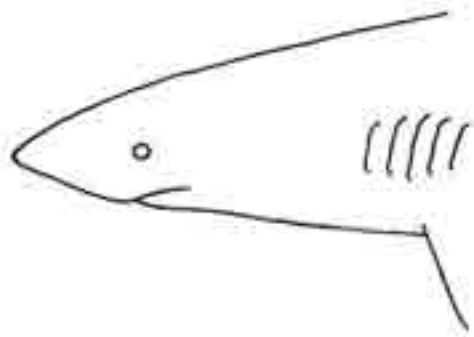


Fig. 12a—SPIRACLE: Absent.

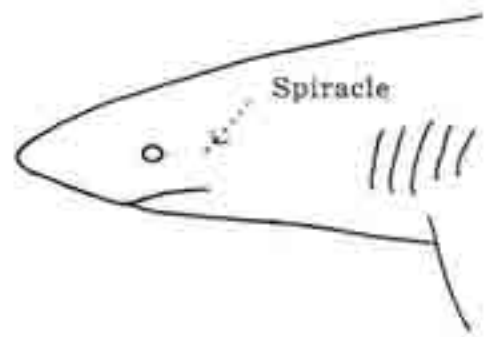


Fig. 12b—SPIRACLE: Present.

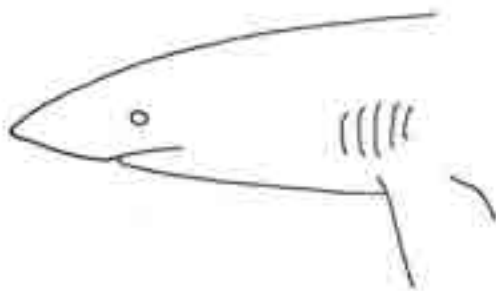


Fig. 13a—FIFTH GILL slit above the pectoral fin.

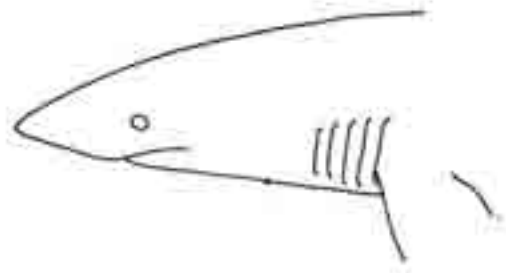


Fig. 13b—FIFTH GILL slit in front of pectoral fin.

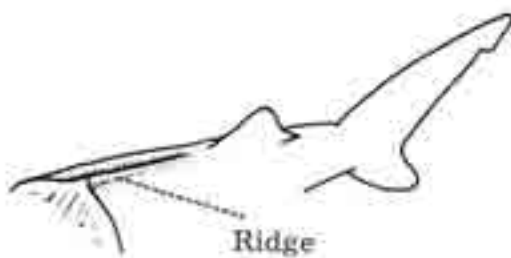


Fig. 14a—RIDGE: Present on back between the dorsal fins.

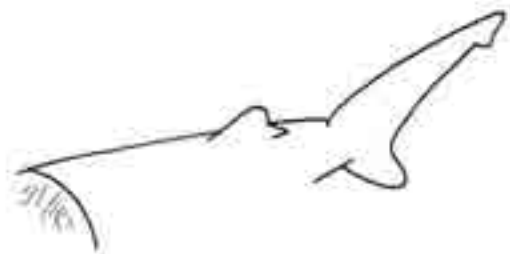


Fig. 14b—No Ridge on back between dorsal fins.

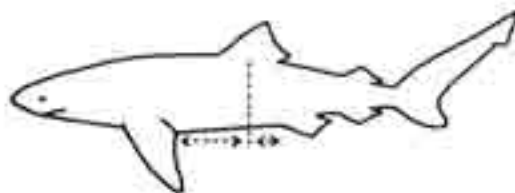


Fig. 15a—FIRST DORSAL: Midpoint of base considerably nearer the pelvics than the pectorals.

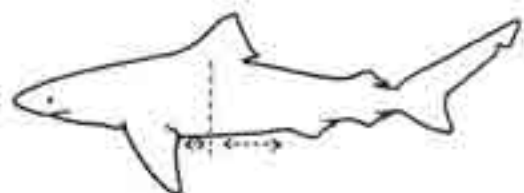


Fig. 15b—FIRST DORSAL: Midpoint of base as close (or closer) to the pectorals as the pelvics.



Fig. 16a—FIRST DORSAL: Noticeably large with a very broadly rounded apex.



Fig. 16b—FIRST DORSAL: Apex pointed or moderately rounded.

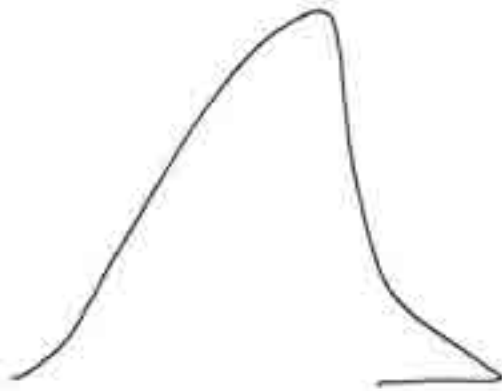


Fig. 17a—FIRST DORSAL: High.



Fig. 17b—FIRST DORSAL: Low.



Fig. 18a—SECOND DORSAL: Erect.



Fig. 18b—SECOND DORSAL: Low.



Fig. 19a — SECOND DORSAL: Posterior margin concave.



Fig. 19b — SECOND DORSAL: Posterior margin almost straight.

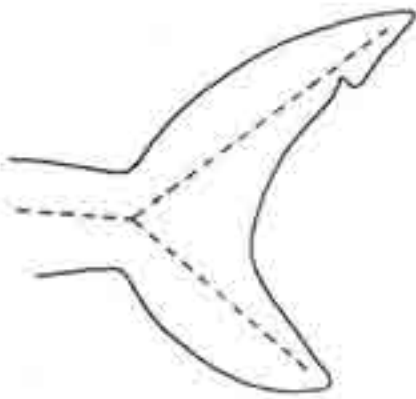


Fig. 20a—CAUDAL: Lunate, the lower lobe being almost as long as the upper lobe.

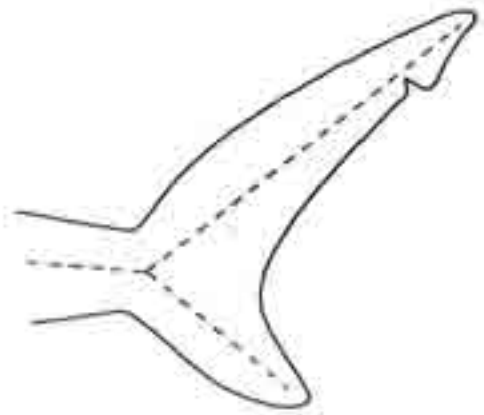


Fig. 20b—CAUDAL: Not lunate, the lower lobe being considerably shorter than the upper lobe.

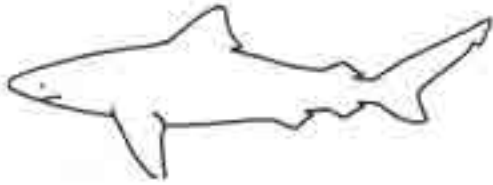


Fig. 21a—CAUDAL: Length of upper lobe less than half the distance from the tip of the snout to the beginning of the caudal.



Fig. 21b—CAUDAL: Upper lobe very long being equal in length to the distance from the tip of the snout to the beginning of the caudal.

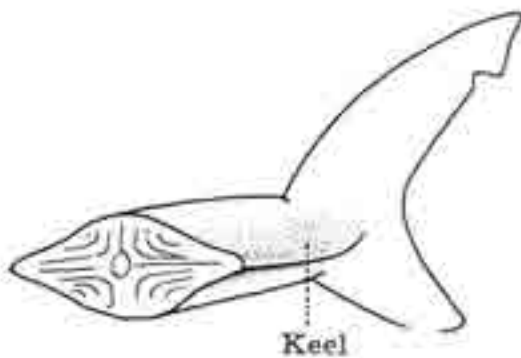


Fig. 22a—KEELS: Present.

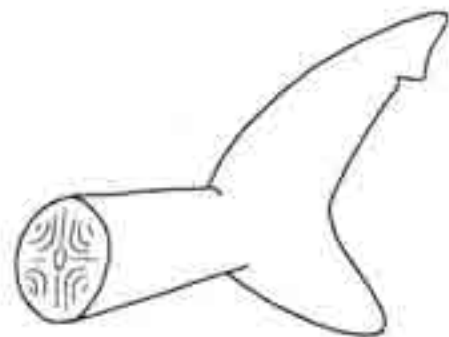


Fig. 22b—KEELS: Absent.

ACKNOWLEDGMENTS

I am very deeply indebted to Dr. D. H. Davies, Director of the Oceanographic Research Institute, Durban, who initiated this project, for his constant encouragement and guidance and for critically reading the manuscript.

I also wish to record my sincere thanks to Dr. J. A. F. Garrick for his valuable assistance in the identification of species and for the unpublished data which he made available and to Prof. and Mrs. J. L. B. Smith for access to their collection of shark specimens.

Grateful acknowledgment is made to Messrs. A. R. Thorpe and C. Jacobs for the Natal Angling Board of Control record weights and for the common names of local species; the City Engineer of Durban for the specimens obtained in the shark nets; Irvin and Johnson (Natal) Ltd., for supplying deep freeze facilities during the early part of the survey and for specimens caught by their trawlers; the Durban Harbour Police for towing specimens across the harbour entrance; the many shark anglers who have supplied specimens; Messrs. A. de Freitas, N. Naicker, M. Penrith, B. Roets and J. Wallace for the collection of data and specimens and my colleagues at the Oceanographic Research Institute for their constructive suggestions and criticism.

Finally, I wish to make full acknowledgment to the Council for Scientific and Industrial Research, Pretoria, for their financial support during the past four years.

REFERENCES

- BACKUS, RICHARD H., STEWART SPRINGER and EDGAR L. ARNOLD Jr. 1956. A Contribution to the Natural History of the White-tipped shark, *Pterolamiops longimanus* (Poey). Deep Sea Research Vol. 3 pp 178-188. London.
- BARNARD K. H. 1927. A Monograph of the Marine Fishes of South Africa. Parts 1 and 2. Ann. S.A. Mus. pp 1-1065. Edinburgh.
- BARNARD, K. H. A Pictorial Guide to South African Fishes. Marine and Freshwater. pp 1-266. Cape Town.
- BEEBE, WILLIAM and JOHN TEEVAN, 1941. Fishes from the Tropical Eastern Pacific. Part 2. Sharks. Zoologica, Vol. 26, pp 26-29.
- BIGELOW, HENRY B. and WILLIAM C. SCHROEDER. 1948. Fishes of the Western North Atlantic. Part 1. Lancelets, Cyclostomes and Sharks. Mem. Sears. Found. Mar. Res. pp 1-576. New Haven.
- BIGELOW, HENRY B. and WILLIAM C. SCHROEDER 1961. *Carcharhinus nicaraguensis*. A Synonym of the Bull Shark, *C. leucas*. Copeia No. 3 p 359, U.S.A.
- BOULENGER, G. A. 1909. Freshwater Fishes of Africa. Vol. 1.
- CADENAT, JEAN 1963. Notes d'Ichtyologie ouest-africaine. XXXIX.—Notes sur les Requins de la famille des *Carchariidae* et formes apparentees de l'Atlantique ouest-africain (avec la description d'une espece nouvelle: *Pseudocarcharias pelagicus*, classée dans un sous-genre nouveau). Bull. de l'Inst. Franc. d'Afr. Noire. Tome XXV, ser. A., no. 2, pp 526-537. Dakar.
- FOURMANOIR, P. 1961. Sharks of the West coast of Madagascar and Supplement to the List of Sharks in the Mocambique Channel. Mem. Sci. Institut. Madagascar. Set F. Vol IV pp 1-81.
- FOWLER, HENRY W. 1941. Contributions to the Biology of the Philippine Archipelago and Adjacent Regions. The Fishes of the groups Elasmobranchii, Holocephali, Isospondyli and Ostarophsi, obtained by the United States Bureau of Fisheries steamer "Albatross" in 1907 to 1910, chiefly in the Philippine Islands and Adjacent Seas. U.S. Nat. Mus. Bull. 100. Vol. 13. pp 1-879.

- GARRICK, J. A. F. Numerous personal communications.
- GOADBY, PETER, 1959. Sharks and Other Predatory Fish of Australia. pp 1-116. Brisbane.
- JUBB, REX A. 1961. An Illustrated Guide to the Freshwater Fishes of the Zambezi River, Lake Kariba, Pungwe, Sabi, Lundi, and Limpopo Rivers. pp 1-171. Bulawayo.
- LA MONTE, FRANCESCA. 1952. Marine Game Fishes of the World. pp 1-190. New York.
- LIMBAUGH, CONRAD. 1958. Abstracts from Field Notes on Sharks. pp 1-15.
- MATSUBARA, K. 1936. Fauna Nipponica. Vol. XV. Fas. II No. 1. pp 1-160. Japan.
- MULLER, J. and J. HENLE. 1841. Systematische Beschreibung der Plagiostomen. pp 1-200. Berlin.
- PETERS, W. C. H. 1868. Naturwissenschaftliche Reise nach Mossambique. Vol. IV pp 1-116. Berlin.
- RADCLIFFE, LEWIS. 1914. The Sharks and Rays of Beaufort, North Carolina. Bull. Bur. Fish. Vol. XXXIV.
- ROBINSON, ROMER and J. S. DUNN, 1923. Salt Water Angling in South Africa. pp 1-315, Durban.
- ROSENBLATT, RICHARD H. and WAYNE J. BALDWIN. 1958. A review of the Eastern Pacific Sharks of the genus *Carcharhinus* with a redescription of *C. malpeloensis* (Fowler) and California Records of *C. remotus* (Dumeril). Calif. Fish and Game Vol. 44, No. 2 pp 137-159. California.
- SCHUCK, HOWARD A. and JOHN R. CLARK, 1951. Record of a White-tipped Shark, *Carcharhinus longimanus*, from the North Western Atlantic. Copeia, No. 2 p 172. U.S.A.
- SCHWARTZ, FRANK J. 1960. Measurements and Occurrence of Young Sandbar Shark, *Carcharhinus milberti*, in Chesapeake Bay, Maryland. Chesapeake Science Vol. 1, No. 3-4. pp 204-206. U.S.A.
- SMITH, J. L. B. 1951. A New Galeorhinid Shark from South Africa, with Notes on other Species. Ann. and Mag. Nat. Hist. Ser. 12. Vol. V pp 857-863. London.
- SMITH, J. L. B. 1952. *Carcharhinus zambezensis* Peters 1852 with Notes on other Chondrichthyan Fishes. Ann. and Mag. Nat. Hist. Ser. 12. Vol. V pp. 760-765. London.

- SMITH, J. L. B. 1953. The shark *Isurus oxyrinchus* in South African Waters. Nature Vol. 171. pp 977-978. Great Britain.
- SMITH, J. L. B. 1957. A New Shark from Zanzibar, with notes on *Galeorhinus* Blainville. Ann. and Mag. Nat. Hist. Ser. 12, Vol. X pp 585-592. London.
- SMITH, J. L. B. 1957. Sharks of the genus *Isurus* Rafinesque 1810. Rhodes University Ichthyological Bulletin No. 6, pp 91-96.
- SMITH, J. L. B. 1958. The Mystery Killer. Veld and Vlei. Vol. 3, No. 9, pp 12-14 and 28. Durban.
- SMITH, J. L. B. 1961. Bronze Whaler: Shark of Australia comes to South Africa. Field and Tide. Vol. 4 No. 1, p 28. Durban.
- SMITH, J. L. B. 1961. The Sea Fishes of Southern Africa. pp 1-580. Cape Town.
- SMITH, J. L. B. 1963. The Fishes of Seychelles. pp 1-215 Cape Town.
- SPRINGER, STEWART. 1950. A Revision of North American Sharks Allied to the genus *Carcharhinus*. Am. Mus. Novit. No. 1451. pp 1-13. New York.
- SPRINGER, STEWART. 1960. Natural History of the Sandbar Shark *Eulamia milberti*. U.S. Dept. Int. Fish and Wildlife Service. Fish Bull. 178. Vol. 61. pp 1-38. Washington D.C.
- STEAD, DAVID G. 1938. The "Bronze Whaler". An Undescribed Australian Shark. The Australian Naturalist. Vol. 10. Part 3, pp 98-105.
- STRASBURG, DONALD W. 1958. Description, Abundance and Habits of Pelagic Sharks in the Central Pacific Ocean. U.S. Dept. Int. Fish and Wildlife Service. Fish Bull. 138. Vol 58. pp 335-361. Washington.
- WHEELER, J. F. G. 1960. Notes on the Three Common Species of Sharks in the Mauritius-Seychelles area. Proc. Roy. Soc. Arts. Sci. Mauritius. Vol. II. Part 2. 1962. pp 146-160.
- WHEELER, J. F. G. 1960. Sharks of the Western Indian Ocean. III *Carcharhinus menisorrah* (Muller and Henle). East African Agric. Journ. Vol. XXV. No. 4, pp 271-273.
- WHITLEY, GILBERT P. 1943. Ichthyological Descriptions and Notes. Proc. Linn. Soc. N.S.W. Vol. 68. Parts 3-4. pp 114-144.
- WHITLEY, GILBERT P. The Fishes of Australia. Part I. The Sharks, Rays, Devilfish and other Primitive Fishes of Australia and New Zealand. Roy. Zoo. Soc. N.S.W. pp 1-280.

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