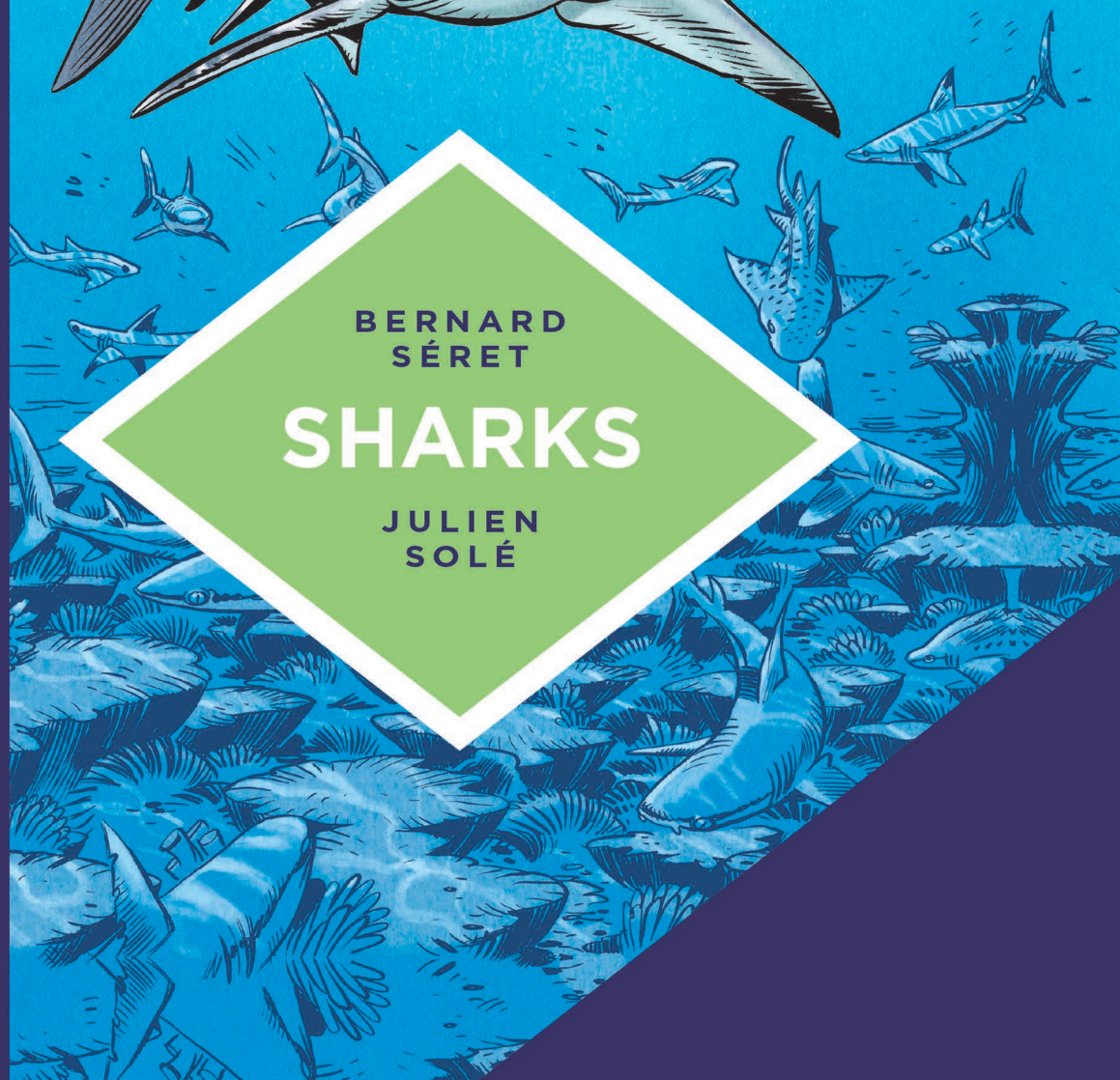


BERNARD  
SÉRET

# SHARKS

JULIEN  
SOLÉ





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ISBN: 978-1-68405-066-6

21 20 19 18 1 2 3 4

LITTLE BOOK OF KNOWLEDGE: SHARKS. JULY 2018. FIRST PRINTING.  
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Created for Editions Du Lombard by David Vandermeulen and

Nathalie Van Campenhoudt.

Original layout by Elhadi Yazi, Eric Laurin, and Rebekah Paulovich.

THE LITTLE BOOK  
OF KNOWLEDGE:

# SHARKS

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**BERNARD SÉRET**

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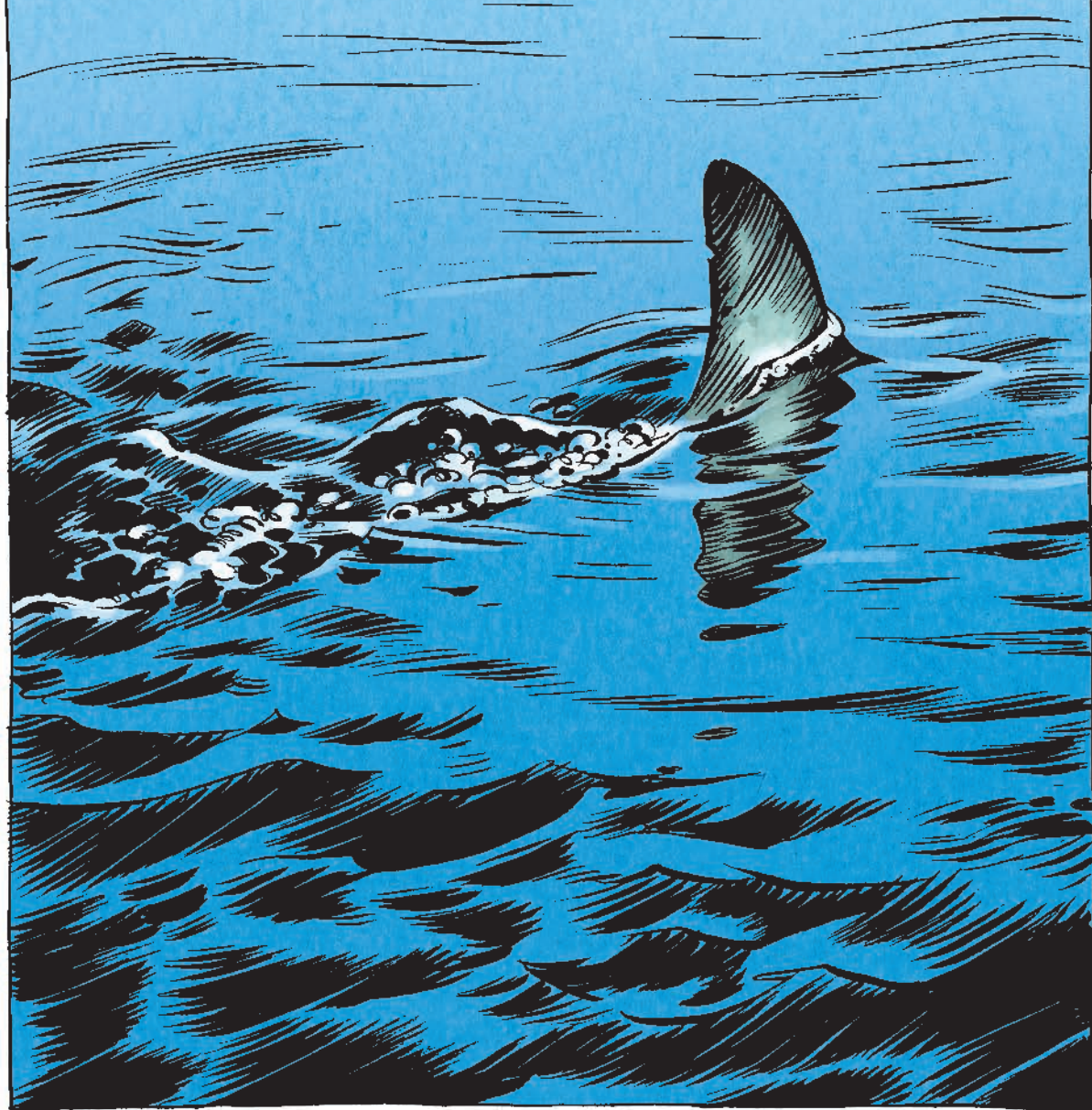
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PUBLISHER:  
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WHAT IS A SHARK?







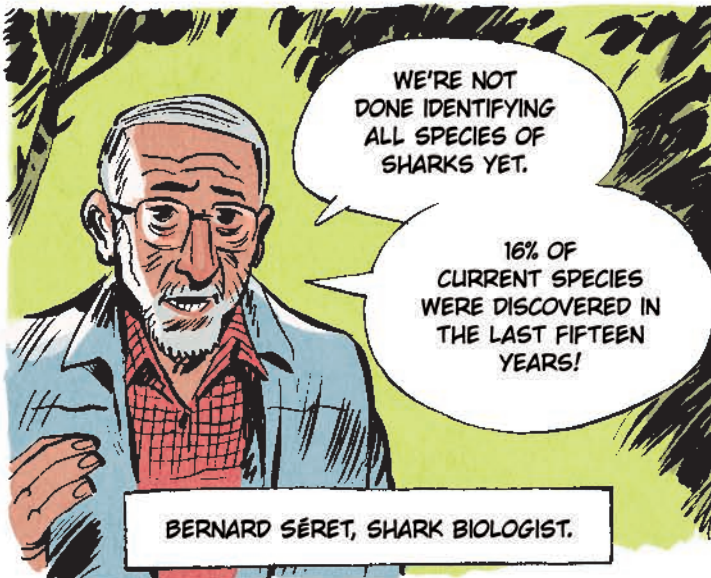
NATIONAL MUSEUM  
OF NATURAL HISTORY.

JARDIN DES  
PLANTES, PARIS.

DESPITE THEIR  
LEGENDARY POPULARITY,  
SHARKS HAVE ONLY BEEN  
A SERIOUS SUBJECT OF  
STUDY FOR THE LAST  
TWENTY YEARS.

WE'RE INTERESTED  
IN THEM FOR SEVERAL  
REASONS.

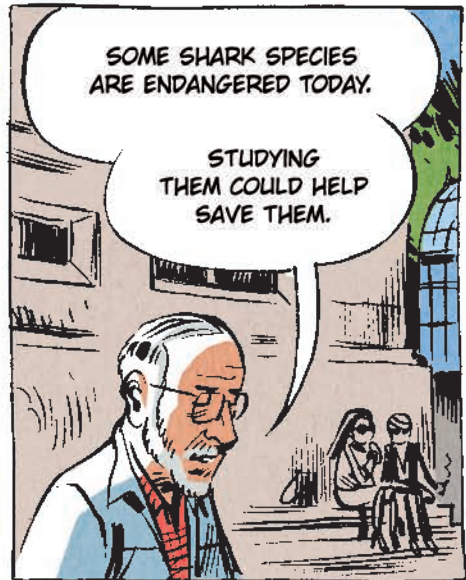
LEARNING MORE  
ABOUT SHARKS ALLOWS  
US TO LEARN MORE ABOUT OUR  
OWN ORIGINS, BECAUSE THEY  
BELONG TO CHONDRICHTHYES,  
AN ANIMAL CLASS AT THE  
FOUNDATION OF VERTEBRATE  
EVOLUTION.



WE'RE NOT  
DONE IDENTIFYING  
ALL SPECIES OF  
SHARKS YET.

16% OF  
CURRENT SPECIES  
WERE DISCOVERED IN  
THE LAST FIFTEEN  
YEARS!

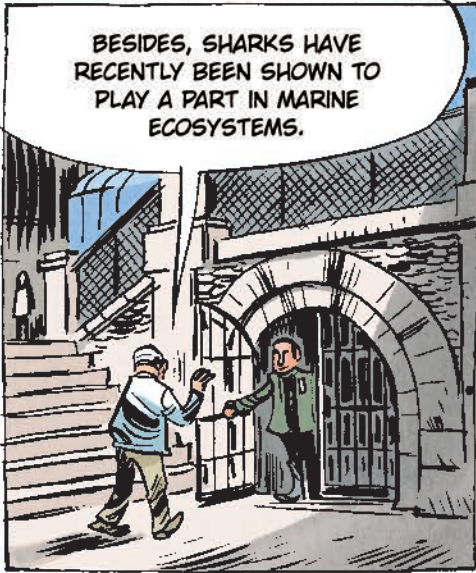
BERNARD SÉRET, SHARK BIOLOGIST.



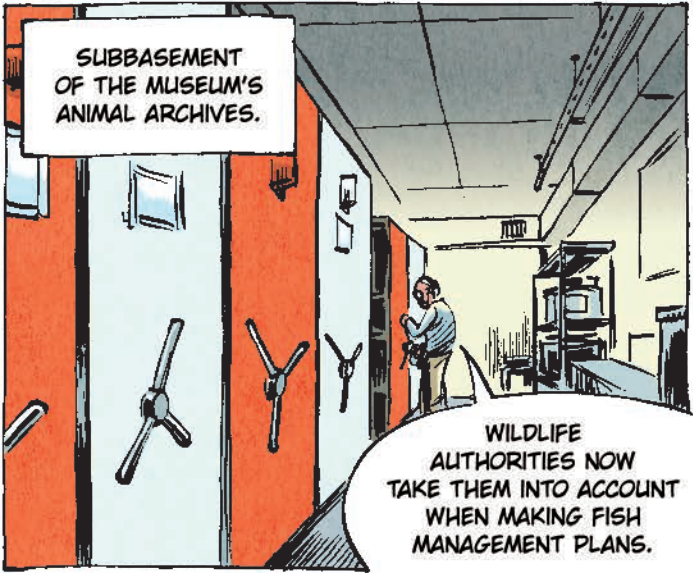
SOME SHARK SPECIES  
ARE ENDANGERED TODAY.

STUDYING  
THEM COULD HELP  
SAVE THEM.





BESIDES, SHARKS HAVE RECENTLY BEEN SHOWN TO PLAY A PART IN MARINE ECOSYSTEMS.



SUBBASEMENT OF THE MUSEUM'S ANIMAL ARCHIVES.

WILDLIFE AUTHORITIES NOW TAKE THEM INTO ACCOUNT WHEN MAKING FISH MANAGEMENT PLANS.



SOME SPECIES ARE USED FOR BIOLOGICAL TESTING.



SPOTTED DOGFISH ARE THE EQUIVALENT OF WHITE LAB MICE.

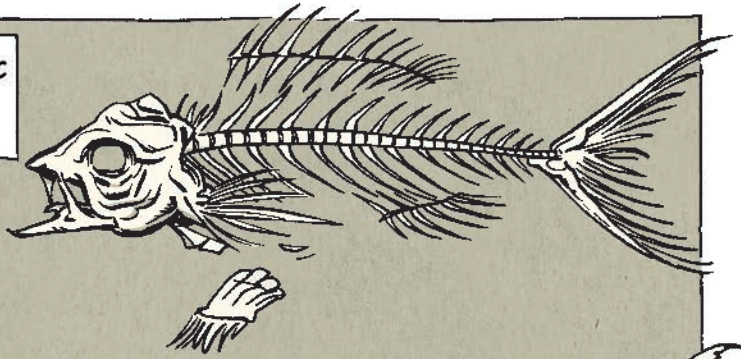


BUT THE BEST WAY TO DEFINE A SHARK IN ANY CONCRETE WAY IS TO COMPARE IT TO A "REGULAR" FISH.



THE PRIMARY IDENTIFYING CHARACTERISTIC IS THE NATURE OF THE SKELETON. THERE ARE TWO MAIN GROUPS.

BONY FISHES (TUNA, SARDINES, SOLES, ETC.) AND CARTILAGINOUS FISHES (SHARKS, RAYS, AND CHIMAERAS).



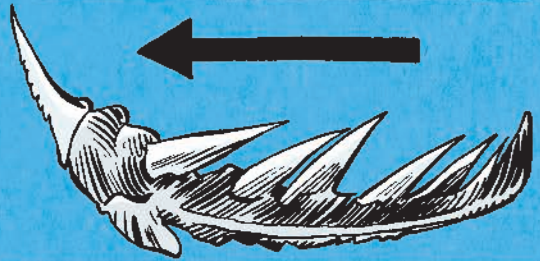
CARTILAGE IS A LIGHT, SUPPLE MATERIAL—USEFUL PROPERTIES FOR A PREDATOR.

SHARKS HAVE TEETH!

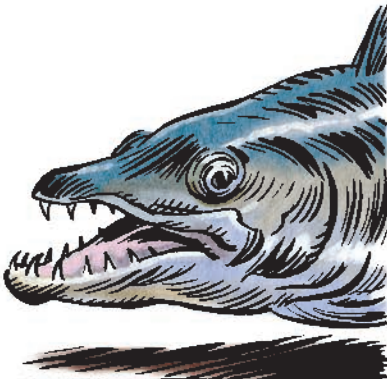


BONY FISH DO TOO, BUT SHARK TEETH ARE IMPLANTED IN THE GUMS. THE FRONT ROWS OF TEETH ARE FUNCTIONAL, AND SERVE TO CAPTURE PREY.

WHEN THEY BREAK OR FALL OUT NATURALLY, THEY ARE REPLACED BY NEW TEETH "CONTINUOUSLY GROWING" FROM THE GUMS.

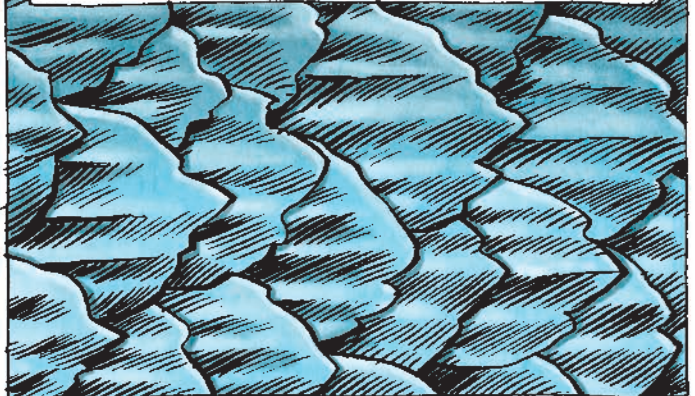


THE SYSTEM WORKS LIKE A MOVING WALKWAY. OVER THE COURSE OF ITS LIFE, A SHARK CAN PRODUCE THOUSANDS OF TEETH.



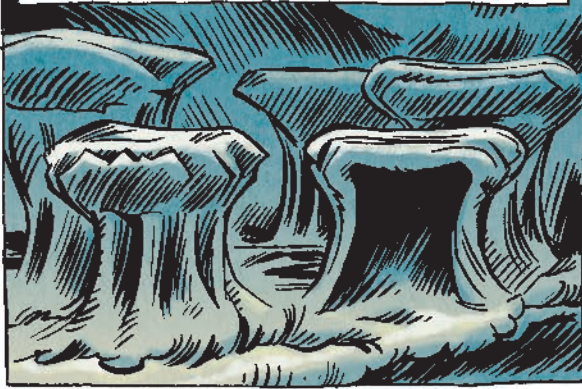
WITH BONY FISH, TEETH ARE IMPLANTED IN ALVEOLI, OR SOCKETS IN THE JAWBONE, JUST AS WITH HUMANS. THAT'S WHY IT HURTS SO MUCH WHEN THEY'RE PULLED!

UNLIKE MOST BONY FISH, SHARKS HAVE NO SCALES, BUT THEIR SKINS ARE COVERED WITH MILLIONS OF TINY TOOTHLIKE STRUCTURES: DERMAL DENTICLES.

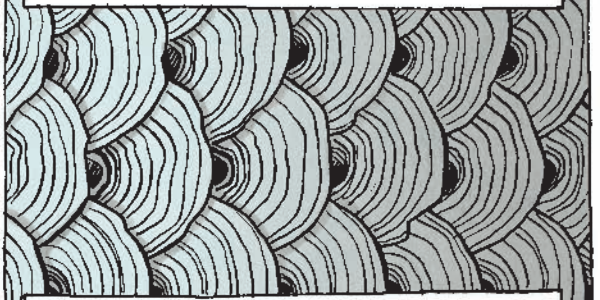




DENTICLES ARE MINIATURE TEETH AND, LIKE TEETH, HAVE A CENTRAL PULP CAVITY, WITH NERVES AND BLOOD VESSELS. IN FACT, TEETH THEMSELVES ARE OVERDEVELOPED DENTICLES.

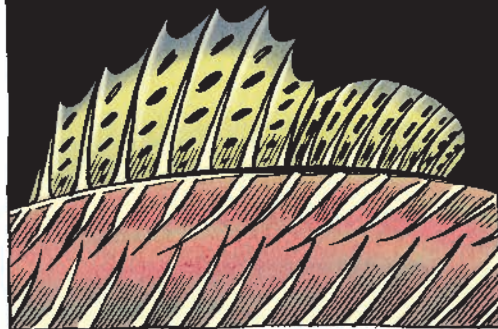


DENTICLES DO NOT GROW. THEY FALL OUT AND ARE REPLACED BY LARGER ONES.

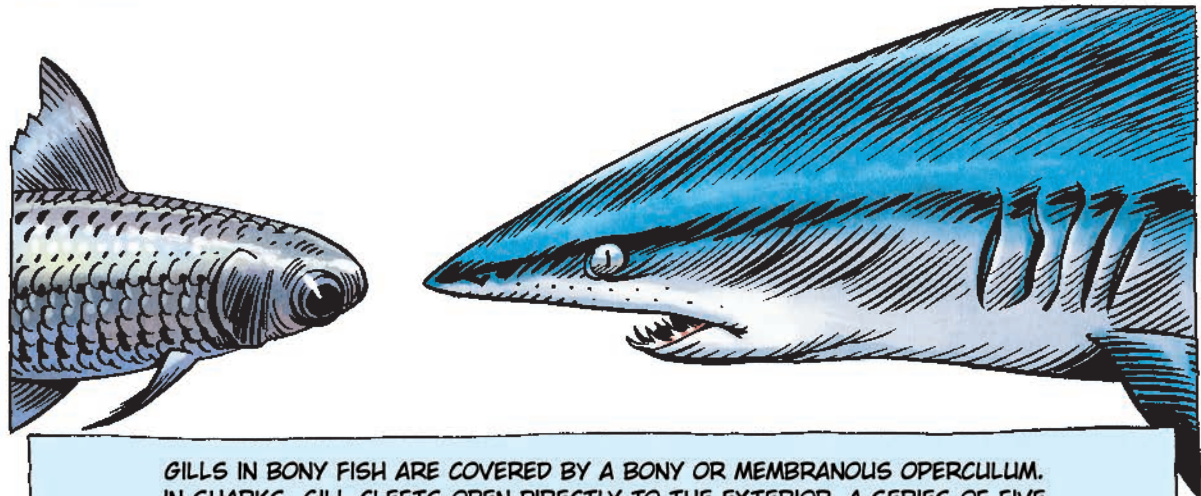
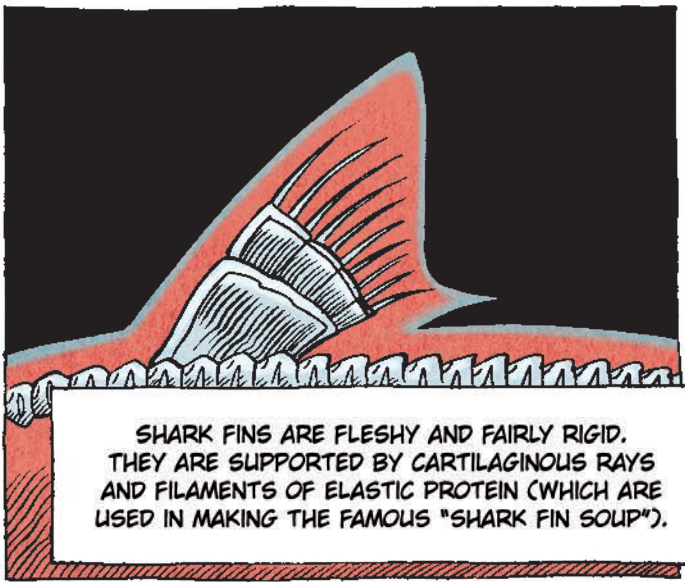


WITH BONY FISH, SCALES GROW AS THE ANIMAL ITSELF GROWS. COUNTING THE RINGS ON A SCALE TELLS US A FISH'S AGE.

THE FINS OF BONY FISH ARE WEBS OF SKIN SUPPORTED BY BONY OR HORNY SPINES THAT ARE HIGHLY FLEXIBLE.



SHARK FINS ARE FLESHY AND FAIRLY RIGID. THEY ARE SUPPORTED BY CARTILAGINOUS RAYS AND FILAMENTS OF ELASTIC PROTEIN (WHICH ARE USED IN MAKING THE FAMOUS "SHARK FIN SOUP").



GILLS IN BONY FISH ARE COVERED BY A BONY OR MEMBRANOUS OPERCULUM. IN SHARKS, GILL CLEFTS OPEN DIRECTLY TO THE EXTERIOR, A SERIES OF FIVE TO SEVEN PAIRS OF BRANCHIAL SLITS ON EITHER SIDE OF THE HEAD.