

preparation of this book would have been out of the question without their help.

Finally, we have ourselves gathered a large body of data as to distribution, habits, spawning seasons, and like matters, through many years, at many localities, both inshore and on the offshore banks.

## USE OF THE KEYS

The various fins and other structures mentioned in the keys are named in the accompanying outlines of a haddock and of a typical shark (fig. 1). A simple way to explain the use of the keys is to use the haddock as an example, running it down with the illustration at hand for reference.

Turning to Key A (p. 5), we find that our fish fits the second alternative under section 1, since it has bony jaws and pectoral fins, and is not shaped like an eel. This refers us to section 3.

There being only one gill opening on each side, we go from section 3 to section 5. As our fish does not have a tubular snout section 5 refers us to section 6, and this in turn to section 7, since neither the upper jaw nor the lower is greatly

prolonged. Since the body is not square-cut close behind the dorsal and anal fins, but has a definite tail part, we proceed from section 7 to section 8, and from section 8 to section 11, for our fish has no sucking plate or disc, either on top of the head, or on the chest. Section 11 refers us in turn to section 12 because the tail fin is nearly symmetrical in outline. The anal fin being clearly and definitely separated from the caudal fin, we go from section 12 to section 13; and from section 13 to section 14, for our fish does not have any evident light-producing ("luminescent") spots either on its sides or on its head. Our fish does not have a fleshy fin or flap either in front of the ordinary dorsal fins or behind them, but all of its dorsal fins are supported by rays that are visible if held against the light. Consequently, we proceed from section 14 to section 18, and this refers us to section 22, there being no flaps or tags of skin on the sides of the head.<sup>11</sup> Our fish obviously does not lie flat on one side, i. e., it is not one of the flat fishes, which brings us to section 23, and

<sup>11</sup> There is a barbel on its chin, but this is very different in appearance from the skin flaps around the jaws that are characteristic of the few species that fall under the first alternative of section 18.

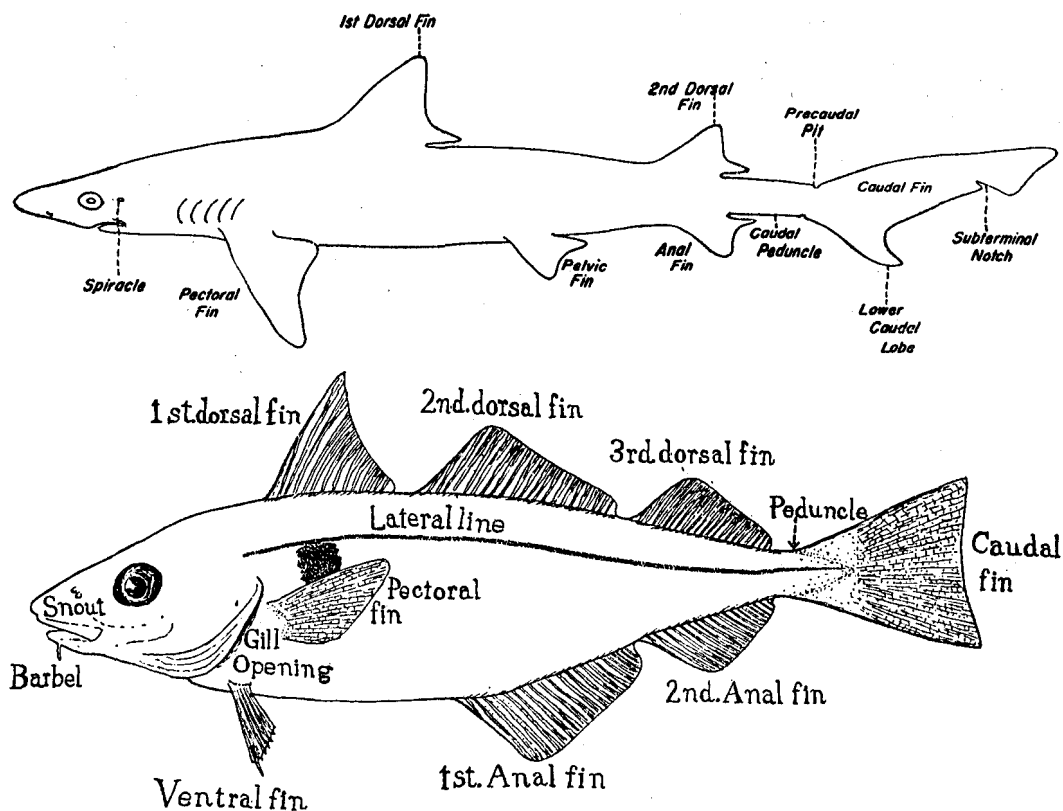


FIGURE 1.—Diagrams of a haddock (below) and of a typical shark (above) with terms used in the keys and descriptions.

this in turn carries us to Key E (p. 7) because it has three separate, well developed dorsal fins.

Since there are 3 dorsal fins and 2 anal fins, section 1 of Key E sends us to the key to the cod and silver hake families (p. 173). Turning to the first section of the latter we find that our fish fits the first alternative (3 dorsal fins and 2 anals),

which refers it to section 2. And here the black lateral line and the dark blotch on each shoulder name it a haddock.

Any other Gulf of Maine species is to be named in the same way, starting with Key A, section 1, and following through the appropriate alternatives as they refer it from section to section.

## KEY TO GULF OF MAINE FISHES

### Key A

1. Mouth soft, with no firm jaws; no pectoral fins; form eel-like..... 2  
Mouth has firm jaws; pectoral fins are present even if the form is eel-like..... 3
2. Two separate fins on the back; no barbels on the snout..... Lamprey, p. 12  
Only one fin on the back; with barbels on the snout..... Hag, p. 10
3. Five gill openings on each side..... 4  
Only one gill opening on each side..... 5
4. General form cylindrical in all Gulf of Maine species; the forward edges of the pectoral fins are not attached to the sides of the head forward, past the gill openings; the gill openings are not confined to the lower surface; the upper margin of each orbit is free from the eyeball, as a free eyelid..... Sharks, key, p. 16  
General form very flat, dislike; the forward edges of the pectoral fins are attached to the sides of the head forward past all of the gill openings; the gill openings are confined to the lower surface; the upper margin of each orbit is not free from the eyeball (no free eyelid)..... Skates and Rays, key, p. 57
5. The bones of the head are fused in a tubular snout, with the mouth at its lip..... refer to Key B, p. 6  
No tubular snout..... 6
6. One or both jaws are prolonged as a bony sword or bill..... refer to Key C, p. 6  
Neither jaw is greatly prolonged..... 7
7. Body abruptly square-cut, close behind the very high dorsal and anal fins..... refer to Sunfishes, key, p. 529  
Body with distinct tail part..... 8
8. There is a sucking plate or disc, either on the top of the head or on the chest..... 9  
There is no sucking disc or plate..... 11
9. The sucking plate is on the top of the head..... refer to Remora family, key, p. 485  
The sucking disc is on the chest..... 10
10. General form is like a tadpole; the anal fin originates about as far back as the tips of the pectorals, refer to Sea snail family, key, p. 464  
General form is not like a tadpole, but is high arched, with longitudinal ridges; the anal fin originates far behind the tips of the pectorals..... refer to Lumpfish family, key, p. 459
11. Tail like a shark, i. e., with the upper lobe much longer than the lower..... Sturgeons, key, p. 81  
Tail with the upper and lower lobes of equal lengths, or nearly so..... 12
12. No clear separation between the anal and the caudal fins, which together form one continuous fin (the anal portion may be either long or short)..... refer to Key D, p. 6  
Anal and caudal fins are separated by a deep notch, or by a space..... 13
13. Sides of body and head, or both, with luminescent spots or patches, easily seen if not damaged, refer to Luminescent fishes, key, p. 141  
No luminescent organs..... 14
14. There is a fleshy ("adipose") fin, with neither rays nor spines, either in front of the rayed dorsal fin, or behind it..... 15  
There is no fleshy ("adipose") fin, but both the dorsals (if there are two) are supported by rays or by spines that can be felt, if not seen..... 18
15. The adipose fin is on the nape of the neck, in front of the dorsal fin..... Tilefish, p. 426  
The adipose fin is behind the dorsal fin..... 16
16. The dorsal fin extends nearly the entire length of the body..... Lancetfish, p. 161  
The dorsal fin is short, standing about midway of the body..... 17
17. Tail deeply forked..... refer to Smelts and Argentine Key, p. 133  
Tail nearly square or only slightly forked..... refer to Salmon key, p. 120
18. The head is fringed with fleshy tags or flaps..... 19  
The head is not fringed with fleshy tags or flaps..... 22
19. The pectorals are armlike..... 20  
The pectorals are not armlike..... 21