



PAPER CLIP

FLAGGING INTERESTING RESEARCH

BIOLUMINESCENCE

SEEING THE LIGHT

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AUTHORS: Séverine Martini & Steven HD Haddock

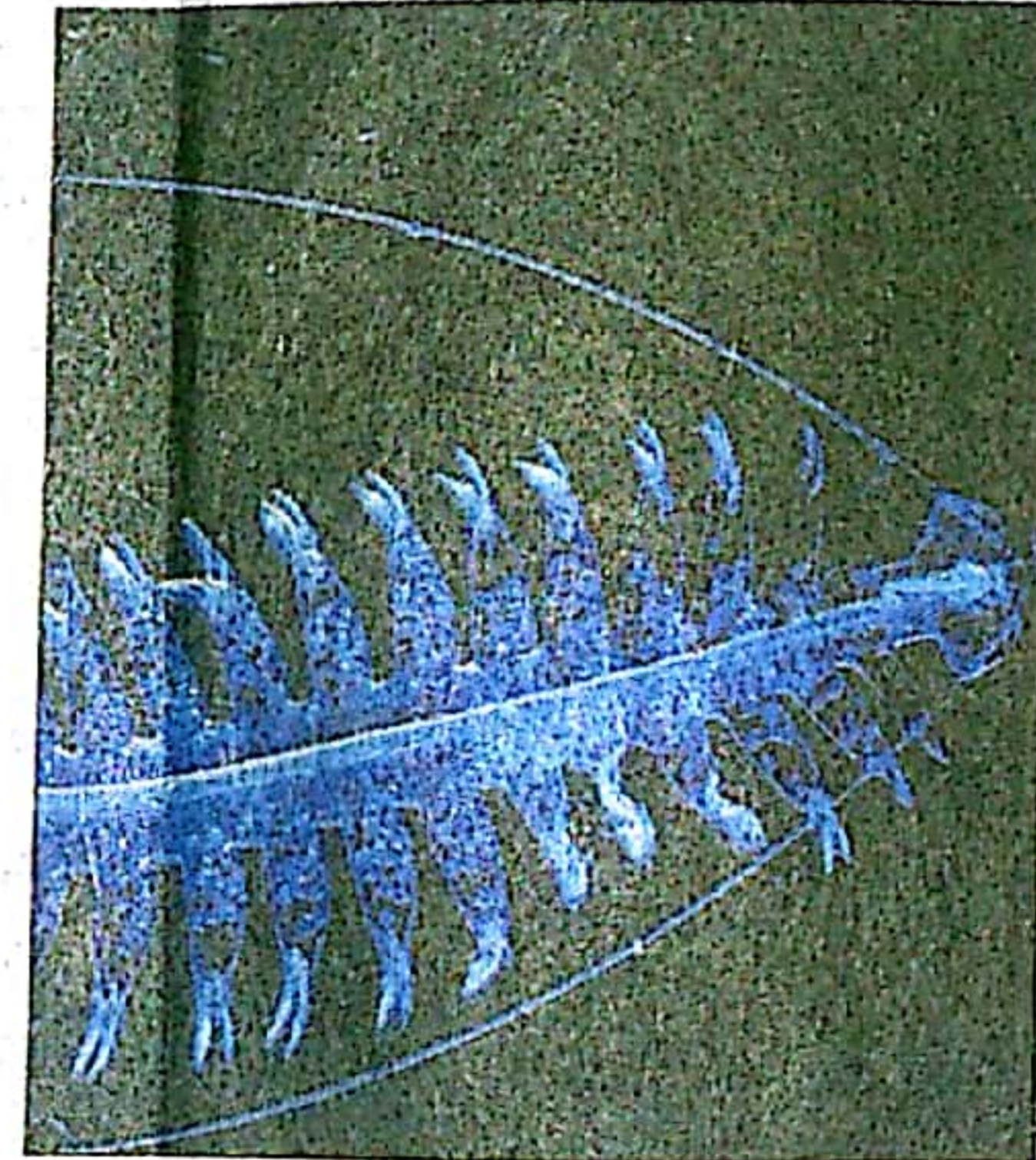
3 out of 4 deep-sea creatures make their own light

IN 1932, William Beebe became the first scientist to descend into the sea's inky darkness. A tiny window in his submersible let him gaze out. He described an unfamiliar world of dancing lights, pale glows and beguiling shimmers.

"It seemed to explode," he said of one luminous creature. Nothing, he added in his book, *Half Mile Down*, had prepared him for the spectacular displays. The colours included pale greens, blues, reds and especially, blue-greens, which by nature can travel far in seawater.

Over the decades, biologists learned that the creatures of the deep sea use light much as animals on land use sound — to lure, intimidate, stun, mislead and find mates. The living lights emanated from tiny fish with needlelike fangs, and gelatinous brutes with thousands of feeding tentacles. The sheer variety suggested that bioluminescence was fairly common, but no scientist came up with a measurement of the phenomenon.

Now, 85 years after Beebe's pioneering



(Left) *Beroe forskalii*, a comb jelly that can produce waves of light in the deep sea; *Tomopteris*, a genus of sea worms that emits blue light, but one species of which can produce yellow. Handout/Steve Haddock via *The New York Times*

dive, scientists have succeeded in gauging the actual extent of bioluminescence in the deep ocean.

During 240 research dives in the Pacific, they have recorded every occurrence and kind of glowing sea creature — more than 500 types living down as deep as 2 miles. Their headline finding: a stunning 76% of sea creatures made their own light, vastly outnumbering the ranks of the unlit, such as dolphins.

Over the decades, scientists have traced the evolutionary roots of the living oceanic lights to primal seas hundreds of millions of years ago, long before the age of dinosaurs.

By contrast, terrestrial bioluminescence is relatively new. And the land creatures that light up, unlike their undersea kin, constitute a tiny minority. The ranks include fireflies, some beetles, millipedes and earthworms.

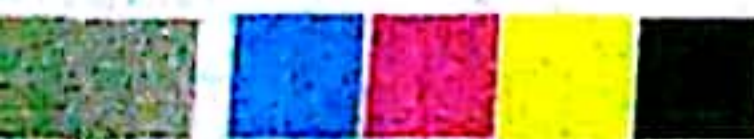
The 240 dives used to perform this survey were all research trips conducted since 1999. The cruises ranged up to 180 miles off Moss Landing, California, and covered an

area roughly the size of Ireland. Cameras mounted on robots made more than 350,000 sightings of deep-sea life.

The finds included anglerfish, which lure prey by dangling lines tipped with glowing lures in front of large mouths full of dagger-like teeth; the *Vampyroteuthis infernalis*, Latin for "vampire squid from hell", with blue eyes, a dark red body and cloaklike webbing over its arms, the tips of which glow; and siphonophores, gelatinous creatures with long bodies ringed by pulsing bells and up to thousands of elastic tentacles for catching and drawing in prey, which light up brightly.

In the conclusion to their study, the scientists have acknowledged that their expeditions have produced no more than a rough estimate of the true dimensions of deep-sea bioluminescence. "The full extent of bioluminescence capability is yet to be established, especially in the deep sea where continued discoveries await," says the report.

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