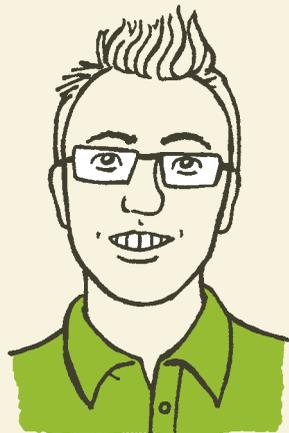


Do you have a thirst for adventure and dodging danger?

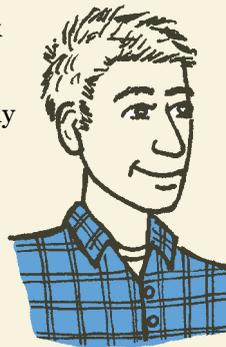
If so, you are part of a very elite and specialized group of explorers who, by the end of this book, will have the firsthand skills and know-how to defy even the most dangerous situations on Earth.

Complete with hands-on experiments, *A Young Scientist's Guide to Defying Disasters* is your guide to surviving anything planet Earth can throw at you! Ever conquered a limnic eruption or a lahar? No? Well, kit up, engage your brain and prepare yourself for the ride of a lifetime.



JAMES DOYLE was born in inner-city Belfast at the height of the notorious “Troubles” period. From an early age he dodged the bullets and bombs of the city by immersing himself in books about far-flung, exotic places. He is a full-time teacher of geography at Our Lady & St. Patrick’s College in Belfast.

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A Young Scientist's Guide *To defying* DISASTERS



A Young Scientist's Guide to defying DISASTERS

includes
20
EXPERIMENTS
for the sink,
bathtub and
backyard



with skill & daring
JAMES DOYLE
Illustrated by **ANDREW BROZYNA**

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Milky seas

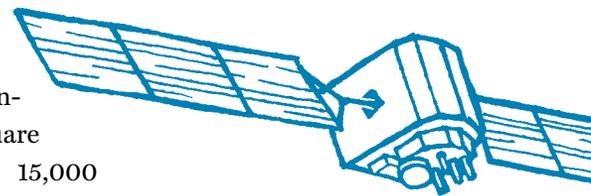
Milky seas are not really life-threatening, but they are really cool and very rare natural phenomena that any intrepid explorer would be bursting to experience. Milky seas have long been recorded and described in maritime or oceangoing folklore. Back in the 18th century, this weird phenomenon was written about in the Jules Verne classic novel, *20,000 Leagues Under the Sea*, but until recently there was no real scientific proof to back up the crazy claims of seafarers.

Many sailors would describe what they were experiencing as though they were “sailing upon a field of snow” or “gliding over a giant sea of milk,” all of which happened in absolute darkness with not so much as the light of the moon.

The glowing waters appear to extend right out to the horizon in all directions, and can last from several hours to several days.

More recently, it has been possible to gather clearer scientific evidence about milky seas. On the night of January 25, 1995, a British merchant vessel, the S.S. *Lima*, was sailing through the northwestern Indian Ocean off the coast of the African nation of Somalia, when it sailed into a milky sea. The ship’s captain wanted the event recorded and so contacted the Naval Research Laboratory (or NRL for short). They were able to track the milky sea from space using a special satellite that can detect extremely low levels of visible light.

The satellite detected images of an enormous area of glowing water spanning more than 6,000 square miles, or approximately 15,000 square kilometers (that’s the same surface area as the entire State of Connecticut in the United States). The glowing continued for three whole nights. The cause of these strange nighttime events is still being discussed, but scientists believe they are linked to strong bioluminescence (which is science-speak for natural biological light). The light is thought to be produced by huge colonies of bacteria in surface waters. In other words, this is the ocean’s own version of billions upon billions of tiny fireflies grouping and glowing together. Those guys are a real bunch of bright sparks!



IF YOU ARE PLANNING AN EXPEDITION TO DISCOVER A MILKY SEA, YOU WILL NEED THE FOLLOWING:

1. A seaworthy oceangoing vessel, aka, a boat.
2. A reliable and experienced crew (easily recruited with a palm of silver).

3. Sufficient food and fuel for a long expedition.
4. An awful lot of luck! (Remember, these events are extremely rare and only the most daring and fortunate explorers have encountered them.)

YOUNG SCIENTIST ACTIVITY

How to Make Water Glow

This experiment will allow you to make glowing water.

EQUIPMENT NEEDED

- A bottle of tonic water
- A florescent highlighter
- A very dark room
- An ultraviolet black light (which can be picked up cheaply at most stores)



INSTRUCTIONS

1. Take a florescent highlighter pen. Carefully break it open and remove the felt tip inside. Now soak the felt in a glass of tonic water for several minutes.
2. Take the glass of water and UV black light into a very dark room.
3. Turn on the UV black light near your water and get ready, set, glow!

Science Factoid

The florescent highlighter and the tonic water both contain phosphors, which are special substances that give out light and have the ability to make ultraviolet light, which is usually invisible to the human eye, visible. The UV black light and the phosphors combine to make the water glow. Tonic water also works because the UV light reacts with phosphors in a chemical within the tonic water called quinine.