

# THE PROLETARIAT

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Buried in the sediment along the ocean floor is a species of microscopic beings, encysted algae, hibernating, lying in wait for stimulation. A school of unsuspecting striped bass stir the water overhead, trailing a mystery excretion powerful enough to signal the creatures below that it is time to awake. Swarming from the depths, these seemingly insignificant protists metamorphose within minutes into amoeboid attackers, spreading an invisible neurotoxin throughout their surroundings. Mercilessly diffusing the oxygen-laden water with poison, it sends the bass jolting and twitching into paralysis and quickly death. One bass floats helplessly toward the surface; before its frozen gold-flecked eyes have seen their last, segments of its body are already being digested.

Fish have ruled the seas for millions of years warranting fossil study, biological surveys, and conservation efforts. Meanwhile, the world toiled away without any knowledge of the existence of a microscopic creature called the dinoflagellate until 1753, unknowing, uncaring about their habitats, food requirements, or even general wellbeing. Biding its time, the species slowly willed itself to change, evolve, to create cleverer, more effective ways to thrive.

Late 1980s fish kills along the North Carolina coast brought national attention to these mysterious algae, causing scientists to ask questions about scenarios they had never thought possible before. Underestimation is the key to *Pfisteria piscimorte*'s success. It operates in unique patterns, careful to operate under the biological radar, finding camouflage amongst members of the other 2,294 species of dinoflagellates. This whirling, whipping, scourge has evolved to hide in plain sight, earning names such as phantom and ghost of the sea. Within hours of an attack, it has withdrawn into its cysts, floated lazily back to its bed, leaving no sign of an uprising.

Headlines from a 1993 issue of *Discover Magazine* cry, "A horrific, predatory little plant (*sic*) is beating up on fish around the world," but who is really the victim here? These lowly creatures greatly outnumber the measly one percent swimming leisurely above them in this fish-eat-

fish world, but the rest of the ocean churns below, awaiting opportunity. Oppression can only be tolerated for so long before the time comes to rise from the depths and overturn the hierarchy. The food chain places photosynthetic plants low, stationed to fuel those on higher links, but *P. piscimorte* is clawing its way up, rattling the standing social structure as it goes.

Making its way through life on the bottom, it crept steadily into new and different habitats. From estuaries, to oceans and even rivers. Its ability to move easily between fresh and salt water and to tolerate temperatures from near freezing to a balmy 82 degrees creates a threat that no one can anticipate. Other species of dinoflagellate watch apathetically not understanding this surge to the top, the discontent with the ebb and flow of marine life. But no habitat is safe from these highly adaptable creatures: fin fish, crustaceans, shellfish, marine mammals, birds and even humans beware. Local precautions become global as *P. piscimorte* gains strength.

Red tides sweep the summer coasts as the algae bloom in violent crimson, spewing its offensive toxins throughout beachside communities, catching on the wind and news waves inspiring fear in some and curiosity in others. Coastal cities shut down and citizens with respiratory issues are put on high alert, since the neurotoxins such as Saxitoxin, causing death by respiratory failure. The King James Bible may have even described one of the earliest recorded appearances when God punishes Pharaoh by turning the river Nile red with blood, "And the fish that was in the river died; and the river stank, and the Egyptians could not drink of the water of the river;" (Exodus 7:21).

Anthropogenic providence, divine right, enables a sense of confidence that can lead to downfall. Humans ride the top of the Great Chain of Being, their innovation and cleverness keeping progress and ego intact. It is unfathomable that bottom dwellers could threaten the natural order. While its awesomeness infiltrates every breath of space, it seems easily forgotten that nature works in mysterious ways, refusing to be contained by human ideals.

When these lowly dinoflagellates began making waves in the late 1980s, fishing communities were hit with multimillion dollar losses, rocking the industry's comfortable standing, therefore the algae became foe. The algae bloom threatened the economy and even the health of the human population. A 1987 outbreak of in Guatemala infesting bivalves was considered the largest outbreak of shellfish

poisoning among humans in recent times. The inability to suppress the occupation of these tiny creatures shows the unstoppable potential of strength in numbers.

Since 1859, Charles Darwin's theory of natural selection has been applied to every species in biology and has even filtered through to define all hierarchy; those at the top remain at the top due to superior genetics and adaptability. At first the mass fish kills were localized to the East Coast of the United States, but quickly became a global concern. Each group of predatory dinoflagellates inspired by the last, taking on bigger challenges to the system. The desire for justice after years of being limited to a photosynthetic lifestyle is enough to incite a global rebellion.

Swirling across oceans, through tides and under eddies, *P. piscimorte* made its way to a South Sea of Korea, settling incognito, ready to make waves. Under a new name, *Cochlodinium polykrikoides*, predatory algae rattle communities by organizing time and time again, sending scientists scrambling for solutions. These tiny creatures, of which masses can perch, huddled on the head of a pin, demand to be heard and make clear that there will be no stopping until demands are met.

Ecologists sit stunned in the wake of these disturbances, puzzling as to how and why this one particular cousin of the dinoflagellates species has become so outspoken. Nature has a way of shifting natural balances over time to maintain order, could this perhaps be the natural time within a cyclical realm for these creatures to be on top? Or is the changing climate enabling a power shift where there was no opportunity before? Greenhouse gas emissions have raised the carbon levels higher than they have ever been in recorded history, each one of the 400 parts per million threaten a tipping point from which there is no return. Climates are shifting and ocean temperatures are rising. Ocean acidification watches monarchies of coral reefs bleach, become brittle and die, abandoned by their zooxanthellae staff, the photosynthetic algae on which their survival is dependent and close cousin to *P. piscimorte*. Perhaps the warming of the globe is priming the seas for a new world order, the proletariat have found their climate ripe for change.

Massive fish kills spark concern over the rapid shifting of power to the assumed minority. They struggle to bring their destructive rampage to a halt, searching for a way to reinstate the natural order:

fish above phytoplankton. To counteract the spread of incendiary outbreaks, scientists are working to predict, mitigate, and control the toxic algae, but identifying the perpetrators is much more complicated than it seems. The rabble rousing algae are almost imperceptible from average dinoflagellates, only detectable on a genetic level or if they can be caught in the act. To quash the rebellion, scientists work to combine efforts internationally to create a gene probe, a tool to identify *P. piscimorte's* unique DNA sequence, to hunt out the specific offenders and kill them.

The health of an ecosystem can mirror the health of a political system. Unrest, even at the lowest levels, can upset the balance of the whole enterprise. Predatory algae threatens the accepted aquatic paradigm, setting the scientific community into a panic, striving to maintain normalcy. Biologists attempt to pin down genetic markers for threats to desired social strata in order to eliminate the nonconformists. Following mass fish kills in the battle for the seas, huge economic losses are rendered and the damage is spread far beyond the initial conflict. Humans eat dinoflagellate laced shellfish and die horrible paralytic deaths. During the upset to the status quo, chaos reigns; swarming, churning, roiling chaos. Through the darkness unknown threats charge, wreaking havoc for those in power.

Blinded by righteous indignity, these algae press on, regardless of the outcome. They have no forethought for consequences, having no knowledge that not all rebellions are successful. Some leave the oppressed in conditions far worse than before. Sometimes the ruling class is too powerful, or too well armed with technology inaccessible to lesser beings. Humans will protect their anthropocentric right to their way of life in any and all ways possible, even if that means calculated removal of each and every microscopic threat. If the battle is lost, a petri dish in a cold, fluorescent laboratory awaits the remaining revolutionaries with guards in white lab coats rationing out dead fish.