

Avatar Update

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November 2015

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*A subscription newsletter
to bring you bits and pieces
that clarify understanding
as I come to learn more
in my own Rabbit Hole
discoveries*

Deep Sea Sound

We've been hearing of the dying whales stranding on beaches lately, and articles across the Internet point an accusing finger at radiation from Fukushima spilling into the ocean and poisoning marine life. Kelp is said to be radioactive as well, and oceangoers like me are continually told not to swim. But Fukushima happened in 2011 and unusual whale strandings actually began long before that. My own questions (I had a few) are now being answered by a book I got last year, which I finally began to read! Titled *War of the Whales*, it is wonderfully written, in that style they call "creative nonfiction," placing you right in the middle of everything that's going on – as if it were a real-time documentary film.

What happens when *cetaceans*, as the category of dolphins and whales is called, become stranded? As fully aquatic marine mammals they cannot survive on land, and when beached, their body weight compresses their lungs and/or breaks their ribs. Smaller species die of heatstroke, thanks to their thick coating of fat (thermal insulation). Still, beaching is preferable to being torn apart by sharks, so that's what they do when the going gets tough.

It was in year 2000 that whale specialist Ken Balcomb found himself in the midst of a mass whale stranding in the Bahama islands: multiple species on multiple islands in just a couple of days. These were beaked whales – small animals that might look to us like dolphins, but they are actually deep-sea divers, hunting squid at depths of a mile or more. The little we know about whale species is from their strandings: skeletons, the contents of their stomachs and wombs (fetal specimens), and examination of decapitated heads. Toothed whales use *echolocation* to find food, meaning they rely on sound to locate and hunt prey. Baleen whales filter feed: they simply open their mouths and take in the krill that washes in.

It was a huge surprise to me that the group most interested in whales and dolphins has been the United States Navy, and for what except their study of sonar – navigation and detection by sound. Cetaceans are famous for their clicks, whistles, moans, snaps and popping sounds that are now known to be transported in a deep layer of water—a “whispering chamber” as *War of the Whales* calls it—where pressure and cold trap and focus low-frequency sound waves. Known as the Deep Sound Channel (DCS), this is what natural species have relied on and adapted to with bones and tissues evolving to harvest information crucial to their existence.

The Navy's goals are similar: ferreting out enemy submarines across entire oceans, wiretapping coastlines by way of underwater hydrophones connected to listening stations on shore. Of course this all makes sense, and the first data collection was nothing less than brutal, if you are an animal lover. Questions #1 and #2: *What are natural and what are man-made sounds?* The way to find out the exact source of animal sounds was to first detect them and then get a boat over to the creature and capture and kill it. Skeletons would go to Harvard's zoology museum where they would be entered and matched to their sounds in a recording log. Biological sound, or *biosonar*, comes from all kinds of fish and crustaceans who rub skeletal sections together like crickets and drum and pop air with bladders and claws. Conversations are refracted from the shallow ocean down to its depths and sent back up again through differing densities and temperatures of water, which affect the speed of the sound waves. And all this can be used to develop tactics in war. So, is it any wonder that military experts delved into the mysteries of the oceans and busily researched biological life? From *War of the Whales*:

The traditional way to locate a submarine with sound was *active sonar*. First invented in 1912 in response to the *Titanic* disaster the “echo-ranger” that enabled ships to locate submerged icebergs was soon repurposed to track the

deadly U-boats unleashed by Germany in the first months of World War I. Active sonar locates submarines the same way bats and toothed whales use echolocation to hunt their prey—by sending out a sound signal and calculating the time and trajectory of the echo to fix the location of the target.

But WWII-era active sonar had a serious limitation: it could only detect submerged submarines at short ranges of a mile or less. During the Cold War, America needed to track a vast Soviet fleet of submarines across wide ocean basins. ... By the end of the [1950s] both navies had equipped their nuclear-armed subs with nuclear-powered turbines that enabled them to stay submerged for months. Unlike land and air-based ballistic missile systems, submarines were invisible and ever-moving missile silos that could hide and launch anywhere in the world's oceans – even under the Arctic ice cap. ... Faced with the threat of intercontinental ballistic missiles launched from thousands of miles away, the question driving US antisubmarine strategy became: How can we detect and track Soviet submarines *across whole ocean basins*?

Just Listening Quietly

It should not be a surprise, then, that our finest marine mammal experts emanate from the Navy, or that Woods Hole and Scripps Oceanography institutions do as well, and let's not forget Sea World and other aquatic parks! To continue from that great book, *War of the Whales*:

When the Navy began studying cetacean biosonar in the late 1940s, the only people who cared about saving the whales were whalers. By the end of World War II, it had become clear to everyone in the whaling industry that 50 years of unbridled slaughter had decimated populations around the world.

...

Things got progressively worse for whales in the 20th century. Demand for whale oil to manufacture glycerin bombs spiked during WWI, and after the war, the process of hydrogenating whale oil created a boom market for its use in margarine. ... Throughout the 1930s, tens of thousands of great whales were harvested each year. In 1939 alone, whalers

killed almost 40,000 blue whales.

Whaling was suspended during WWII, as shipping lanes shut down and many whaling ships were drafted into service as military cargo vessels. Still, the war took a deadly toll on whales caught in the cross fire of major sea battles in the Atlantic and Pacific. Millions of tons of explosives were detonated in the oceans, including hundreds of thousands of antisubmarine depth charges. Air forces and navies on both sides of the conflict made a practice of using passing [whale] pods for target practice. [After] the war, industrious whalers adapted military sonar to locate, drive to the surface, and herd their prey—but there were indisputably far fewer whales left to hunt.

By 1946, 15 whaling nations established the International Whaling Commission with the stated goal “to provide for proper conservation of whale stocks and thus make possible the orderly development of the whaling industry.” The idea of preserving whale populations for purposes other than killing and processing them into margarine and motor oil was still 20 years in the future. And it would be fully 40 years before the IWC called a halt to commercial whaling worldwide in 1986.

During those intervening four decades, whales would undergo a radical cultural transformation from commercial commodity to entertainment superstars and revered icons of the New Age, environmental, and animal rights movements. Where once their value was measured in the price per barrel of their oil, whales and dolphins would suddenly become box-office sensations, drawing millions of admiring customers to movie theaters, aquariums, and theme parks, and in time to open-sea whale-watching venues around the world.

Cetaceans taught our militaries how to echolocate their enemies, first by the scavenging of their own remains from beaches, and then by performing in captivity. The U.S. Navy's SOSUS innovation in 1944 – *passive sonar* – was the best-kept secret of the Cold War and gave it a tactical edge over the Soviets for a quarter of a century. SOSUS simply listened for sounds of submarines moving through the water, using the Deep Sound Channel as its

transmitter. Sound carried in the DSC could travel horizontally for thousands of miles without diffusion, as though in a sound pipeline. The technical word for this is a *waveguide*. So imagine high-decibel bombs going off in the depths of the ocean and traveling straight across it with no distortion! Back to 1944:

To test this theory [Woods Hole geophysicist Maurice] Ewing directed ... the destroyer USS *Buckley* to drop four-pound bombs timed to detonate 3000 feet below the surface—explosives being the high-decibel, low-frequency sound source of choice for Ewing and his generation of acoustic experimenters. ... After each detonation, the *Buckley* moved 10 miles farther into the Atlantic and detonated another bomb. When the *Buckley* ran out of bombs, 900 miles out to sea, Ewing could still hear the explosions clearly from [the hydrophone suspended 3000 feet deep from the bow of] the *Saluda* with almost no signal loss! He happily set sail for Woods Hole to announce that his hypothesis of a deep sound channel was now fact.

Harvested Heads

It is now the year 2000, and we are in the Harvard University radiology lab of Dr. Darlene Ketten,

... the US Navy's top-gun whale pathologist, the go-to forensics expert for any "unusual mortality event" (UME) that [the National Marine Fisheries Service] or the Navy needed to investigate. She had joint appointments at Harvard Medical School and Woods Hole Oceanographic Institution, though she spent much of her time flying around the world to investigate unexplained strandings.

Dr. Ketten is using a CT scanner to do a digital dissection of the ears of one of the beaked whales found stranded in the Bahamas a few days prior. It was kept on ice, transported by air, accompanied by human escorts, and a chain-of-custody form rigorously filled out at all junctures. A little more about the beaked whale:

During their first 10 million years in the Great Bahama Canyon, beaked whales developed primitive biosonar. By bouncing sound clicks off their prey's hard shell, day or night, beaked

whales easily outcompeted the other predators in the canyon who could only hunt by daylight. Their ability to hunt squid at increasing depth drove the beaked whales' ascent to the top of the canyon's food chain.

When the hard-shelled nautiloids evolved to abandon their shells to avoid biosonar detection, beaked whales refined their biosonar to echolocate the *internal* structures of the soft-bodied squid – which then developed survival countermeasures including camouflage, shape-shifting, and ink-cloud diversions. Millennium by millennium, the beaked whales improved their sonar to defeat these escape mechanisms and chase the squid deeper into the canyon. This evolutionary pursuit-and-escape minuet between squid and beaked whales continued for thousands of generations, until the whales could hunt squid at depths of a mile or more – deeper than any other predator.

To hunt at such extreme depths, beaked whales made several physical and metabolic adaptations, allowing them to dive quickly with a minimum of drag, to tolerate the cold temperatures and crushing hydrostatic pressure at depth, and most importantly, to regulate their breathing to enable deep foraging dives that could last an hour or longer. Other deep-diving cetaceans, such as sperm whales in pursuit of giant squid, have made similar adaptations. But none dive as deep, and surface as briefly, as the beaked whales of the Great Bahama Canyon.

Beaked whales routinely dive deeper than 5000 feet and remain underwater for more than an hour; the deepest dive ever recorded by an air-breathing mammal was a Cuvier's beaked whale that descended 9816 feet in a dive that lasted 137 minutes. ... By comparison, a WWII German U-boat reached its crush depth at 860 to 920 feet. Even the deepest-diving of modern military submarines can't dive as deep as a beaked whale.

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A beaked whale's head tells the entire tale of its remarkable evolution. Its cranium is almost twice as thick as a dolphin's, the better to withstand extreme water pressure at depth. Its dense, beaked rostrum is both a powerful

weapon against mate-competing males and a potent defense against sharks. The beaked whale's sound-emitting powers originate in its nasal cavities, which transmit both communication sounds and sonar clicks. Its concave forehead cradles an acoustic lens, or melon, that focuses sound into different beam forms. Its long jawbone conducts return echoes and incoming communications from other whales to the three small ear bones common to all mammals, which are nestled well back in its head. Elaborately convoluted, with an enormous auditory cortex, the beaked whale's brain is a masterpiece of signal processing. It can conduct multiple conversations simultaneously, as well as translate biosonar echoes into exquisitely detailed, three-dimensional maps.

In Darlene Ketten's lab, the two ears of the Bahamian Cuvier's beaked whale (*Ziphius cavirostris*, but also referred to by the name of the French naturalist, Georges Cuvier, who first noted the species) are placed on the CT scanner bed.

Ketten pointed at red lines in both ears. "Look what we have here: the pattern of hemorrhaged blood is almost identical bilaterally. If we saw the blood only in one ear, that would suggest a postmortem trauma, or simply evidence of the whale lying on one side postmortem. But this bilateral hemorrhage is a clear sign that the ears were traumatized *before* the whale hit the beach.

They replaced the [Cuvier's] ears with the Blainville's head [another stranded beaked whale species], which took a full hour to image. "Look," she said, when the details were filled in and colorized. "The same hemorrhagic bleed pattern in these ears." After the Blainville's, they scanned the Cuvier's head and found blood pooling around the brain.

...
 "The pattern of the hemorrhages therefore suggests strongly that a cerebrospinal fluid 'squeeze' from an intense pressure event was the source of inner ear blood in these animals ... The inner ear pathologies demonstrated on the scans are consistent with observed pathology in ears exposed to exceptionally intense impulsive sources ..."

The Deep Sound Channel Party Line

The first phonograph recording of cetacean voices was released in 1962 by two Navy submarine acoustics specialists, biologist William Schevill and linguist Bill Watkins. *Whales and Porpoise Voices*, featuring underwater sounds made by 18 marine mammal species, was collected over three decades of crossing the world's oceans. The paths of whales were undoubtedly similar, as long as 1000 miles—using the Deep Sound Channel to navigate, eat and communicate. Eons before the USS *Buckley* detonated its first war-games sonar-testing explosives and the oil and gas industries were blasting away underwater, cetaceans had their own global bandwidth. It was this very bandwidth that Maurice Ewing relied on to hear the *Buckley's* bombs going off nearly a thousand miles from where they were set off.

And so it was discovered that in the vicinity of Great Bahama Canyon in March 2000—in fact, on the very same days the multiple strandings occurred—the warship USS *Caron* was videotaped off the islands. The *Caron's* equipment included Mark 29 missile batteries, ASROC antisubmarine rocket launcher, Tomahawk cruise missiles, Aegis air and surface radar, and a state-of-the-art hull-mounted AN/SQS-53 sonar transmitter.

You might very well want to read Joshua Horwitz's *War of the Whales*, which might have been titled *War ON the Whales*, for that is what it is really about. From whale oil lamps to whalebone corsets to margarine (which I didn't know about) and motor oil, dog food, and now theme parks, our hustling cetaceans is more than horrifying. And of course, by the year 2000 when the dead beaked whales were discovered in the Bahamas, the Navy had to keep its culpability more than quiet, as the public was now an enthusiastic defender of whales.

I had never heard of the Deep Sound Channel or even known about beaked whales themselves. I have seen plenty of dolphins, also of the cetacean order, who cruise our waters here in merry pods; they can surf a wave six at a time in a completely even line-up, with no trainer present! They ringed me by the dozen while I swam one summer day and kept me surrounded without my even knowing it (people on shore told me of this in wide-eyed disbelief), and another time one dove at me in a head-on charge which I thought was surely going to be my last moment, but it was only a joke!—for he (I am sure it was a male) headed off laughing, the distinct vibe I got as he left me gasping in the ocean water.

All those conversations contained in the DSC party line ... it's more than amazing. Dolphins are known to make sounds like a creaking door, which are actually composed of thousands of separate clicks (just try it yourself!). Every dolphin has its own distinctive click chain, and they can send out a couple thousand clicks per second. Each click bounces off what is around them, and they do not send out more clicks before analyzing what is returned. So thousands of clicks per second means thousands of returns per second that are interpreted. Now to behavior: Birthing mothers have a midwife in attendance (a dolphin midwife, of course), and the midwife remains with the mother for several weeks after the dolphin calf is born.

You can imagine the study opportunities afforded at marine parks. Animal-inspired technology is known as *biomimetics*, which the Navy turned into *bionics* – a combo of *biology* and *electronics*. Though the Navy has been a devoted patron of modern cetology, it has foraged systematically and recklessly in many other physiology arenas, including the human brain. Meet banking family heir John Lilly, graduate of Dartmouth Medical School, brain specialist and inventor. Lilly was also an electronics wizard, as well as a trained psychoanalyst. At Marineland in Palos Verdes, CA (later bought and closed by SeaWorld San Diego), Lilly put an electrode deep in a dolphin's brain and loaded it with voltage. From our *Whales* book:

As he gradually increased the electrical current to the probe, the animal began vocalizing in what Lilly called a “dolphinsese fashion.” Deeper penetrations and increased voltage evoked “a more exuberant vocalizing than ever I'd heard before. Whistles, buzzings, raspings, barks and Bronx-cheerlike noises were emitted ... One time he mimicked my speaking voice so well that my wife laughed out loud and he copied her laughter.”

Lilly constructed a lever that the dolphin could push with its rostrum [beak] to activate the electrical charge itself. After pushing the lever faster and faster, the dolphin went into an epileptic seizure and died.

...

[What] Lilly uncovered in the course of his experiments was that dolphins ... when properly stimulated ... [were able] to mimic human speech. Lilly left Marineland convinced that he had tapped into the whispering chamber of interspecies communication. Listening to the

whistles, laughs, and barks of the electrically neurostimulated dolphin, he heard a voice calling to him across what he termed the “air-water boundary” separating humans from their cetacean cousins. Lilly had come to Marineland in search of a big brain of humanlike complexity. What he discovered was “a mind in the waters.” ... [He chose] the 1958 annual meeting of the American Psychiatric Association in San Francisco ... as the first audience for his proclamation that dolphins offered us a gateway to what he termed “cosmic consciousness.”

Technocratic Takeover

It was a correspondent from Brazil who recently offered me the term *Technocracy*, referring to a scientific/political agenda begun many decades ago that has not died out in the least and remains extremely active today, operating over and above the *corporatocracy* that so many of us believe to be ruling the world. In the interest of complete control, it is no wonder that technology has so carefully studied natural processes, first in order to imitate them and ultimately override them. Hey, no surprise at all that our militaries have turned increasingly technological and robotic, and branches of them (like the Navy) have engaged the best scientific minds to delve into and pry apart the secrets of biological life, not only in the ocean but on land as well. I once thought the Woods Hole and Scripps Oceanography Institutions were about the *love* of marine life and the desire to study it scientifically, but they appear not to have altruistic interests at all (more like the opposite) and were formed no doubt by the same entities that have brought us chemical and radiation “medicine.”

A new post on my blog (sofiasmallstorm.com) reveals that the controllers of allopathic medicine deliberately and systematically abuse medical students and doctors – all day long and all through their careers. If you work for a hospital or in a medical group, you must “process” cases (patients) at lightning speed, as everything depends on maximizing revenue. The book *Doctored* by Sandeep Jauhar describes this ruthless model of medicine-as-business; doctors today are all too aware of this, but without a second to take a breather, they plunge through the hours to make the paycheck and pay off their loans. What many of them don't know, it appears, is that their “model” of health care (patented chemical compounds and radiation) only sickens patients further, which fits with the interests of those who want revenue. I learned from Ty

Bollinger's new cancer series (see Episode 1 now on my blog) that oncologists will prescribe a \$10,000 chemotherapy drug rather than a much cheaper one, as the kickback to them from the \$10,000 drug is far greater, and they desperately *need the money*. Money too is technocracy: games, loans and booby traps designed to fleece us and trick us into participating in and supporting a false reality that will ultimately do us in and then claim us so we become, like the skulls and tomography images of the stranded whales, the property of technocracy.

Fukushima's nuclear disaster serves as a great cover story for the destruction of marine life as the U.S. Navy establishes more of its "warfare training range complexes" off our shores. These have massively increased post- 9/11, in the name of national defense and homeland security. Visit www.AgricultureDefenseCoalition.org (See the U.S. Navy tab) to learn more about the Navy's continued undisguised plans to "take" (their term for harming and/or killing) thousands of marine mammals and millions of other ocean creatures with their openly expressed war games that include use of explosives, chemical warfare, radar/sonar, electromagnetic weapons, lasers, missiles and submarine warfare. I have written about this before and I will write about it again, for here is *a real, admitted source* of animal destruction (to say nothing of harming humans living near and on the shores), compared to the endless speculation contained in Internet articles about what is drifting to us all the way from Fukushima. Does it occur to you that someone *wants* us to worry about the effects of Fukushima while our own military drastically messes around in our own immediate waters? *No one talks about the U.S. Navy* – its silencer is clearly effective.

And another big surprise (not!): After Dr. John Lilly announced the cosmic connection offered by dolphins and his desire to establish the world's first laboratory to study their intellectual abilities, who signed up right away as his research sponsor? From *War of the Whales*:

By 1963, Lilly had raised the money to launch his Communications Research Institute in the Virgin Islands. Lilly's first funder was the Office of Naval Research, which sent a Navy demolition team to Saint Thomas to blast a dolphin cove out of a rock and coral promontory ... His other funding came from the Department of Defense, the National Science Foundation, and ... NASA.

Of course, boys and girls! The military is *very* interested

in how we're put together – animals and plants too. No wonder the Manhattan Project skulks around us today in the form of institutions and labs and research universities. Still trying to learn all there is to learn about how life reacts to natural and man-made phenomena, for someday, when these are no longer mysteries, artifice will stand in for life itself, and none of us will be the wiser.

Recreational Living

In spite of *War of the Whales* being a New York Times bestseller, no one (not even its author, Joshua Horwitz) has jumped up and said, "Wow! That might be why all those dolphins are dying, fish bleeding from their gills, whales washing up deaf and exhausted on beaches—the Navy war games, not Fukushima!" I posted on my blog a detailed and fascinating YouTube about *auditory transduction*, or "hearing" – that thing our ears do as life unfolds around us. Watch this video by a medical illustrator and you may think again before you go to any more rock concerts or have leaves blown around your yard. Car horns, jackhammers, motorcycles and trucks all make noise that overstimulates the ear's hair cells, causing them to produce high levels of glutamate, which is toxic and causes cells to die. Then there's recreational noise: even the World Health Organization is concerned that millions of young adults are damaging their hearing at night clubs and bars and from volume set too high on personal audio devices. But the WHO appears not to know about military exercises blowing out the Deep Sound Channel and hemorrhaging the brains and ears of millions of ocean creatures who have no personal audio devices.

Thanks to Dr. Lilly and the new craze of dolphin fondness, MGM made the smash hit *Flipper* (1963), leading to what eventually became New Age dolphin worship as well as the international Save the Whales movement. Orca love followed, with Sea World's playful Shamu killer whales enthralling audiences and raking in the bucks. In 1966, 120,000 people came to see Namu perform in his Seattle aquarium: he lasted for 334 days of twice-a-day shows, finally dying from an old infected bullet wound. The death of Namu spawned Namu, Inc. (of course!), a partnership to capture young orcas for Sea World's many parks and Shamu Shows. The monetizing and merchandising of cetaceans will continue as long as people who will pay and there is money to be made. But what if it *were* disclosed that these creatures were being destroyed by Homeland Security exercises? Would the bases be shut and the wars end? It's all about the power of the message and the idol: Will it be Shamu today or Private Ryan?