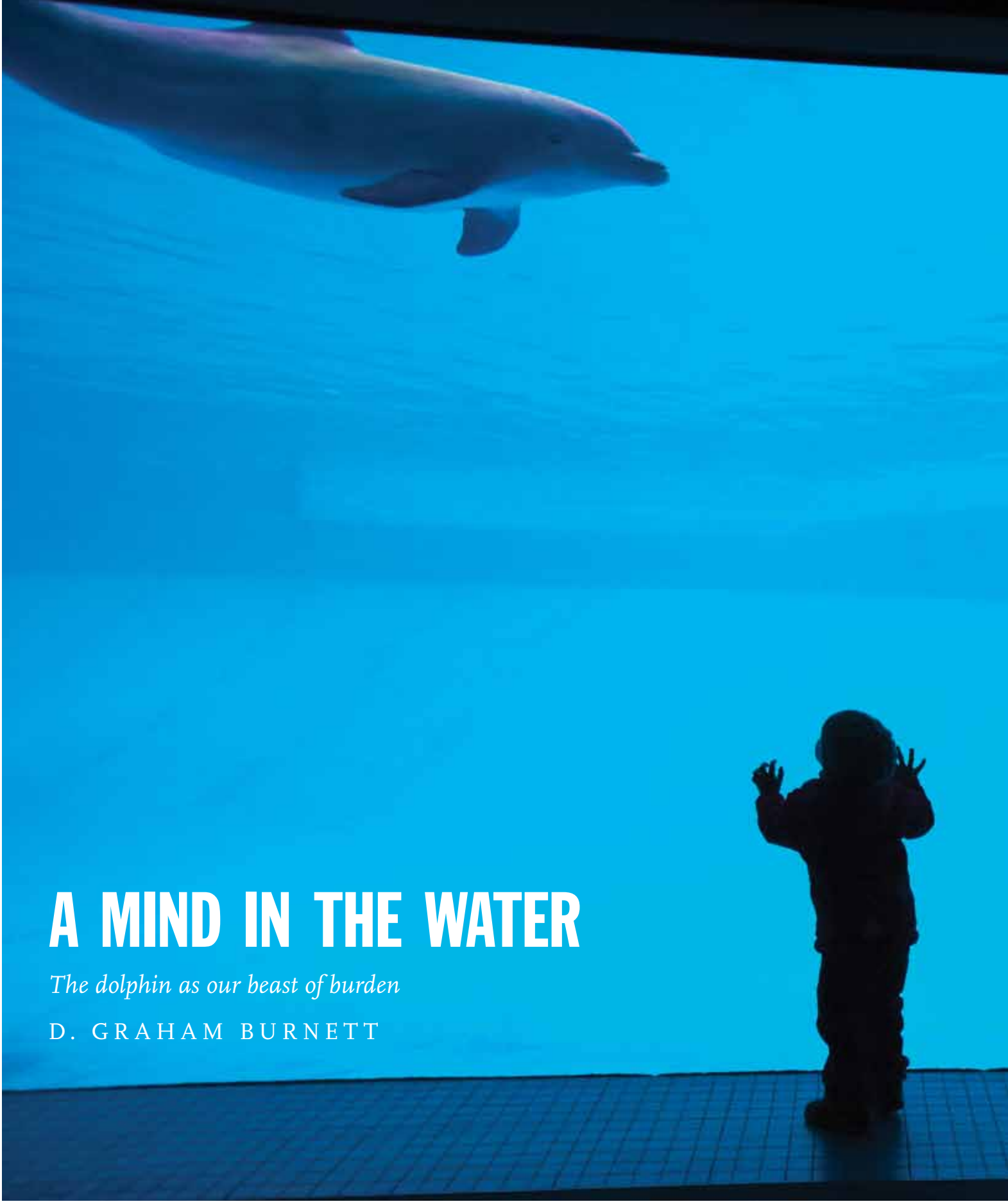
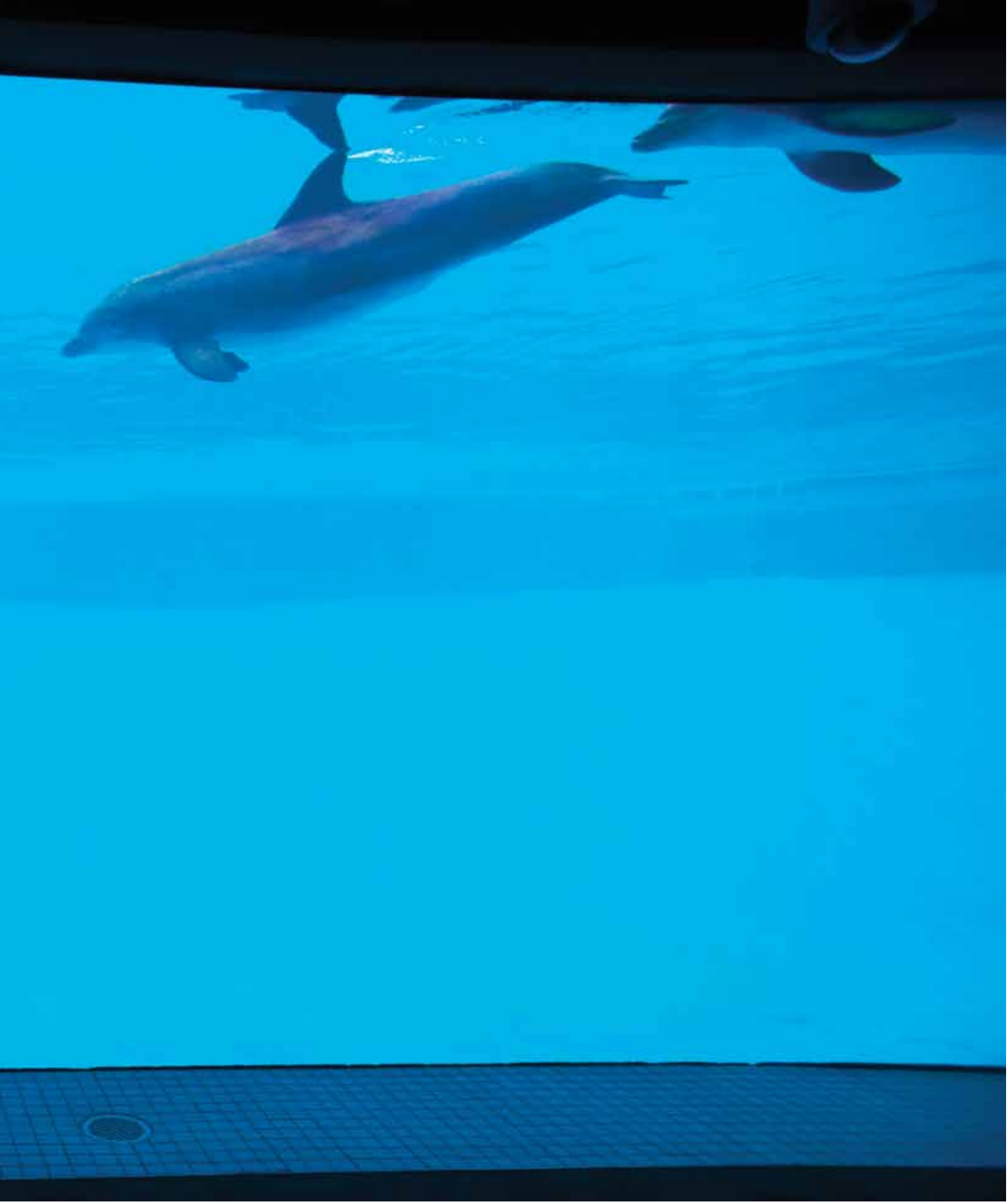


A MIND IN THE WATER

The dolphin as our beast of burden

D. GRAHAM BURNETT



ON THE 3RD OF JULY 1814, a gang of scrappy Devonshire fishermen and crabbers working the Duncannon Pool of the Dart River in southwestern England fell upon a huge and disoriented sea creature that had made its way too far up the tidal reach and too close to the village of Stoke Gabriel. After four hours of bludgeoning it with boathooks in the muddy shallows (aided by a pair of furious terriers), they heard the twelve-foot fish emit a plaintive, expiring wail, "like the bellowing of a bull." And that was that.

Or that would have been that, except word of the catch reached the ears of Colonel George Montagu, who lived in patrician seclusion on his estate some ten miles down the road. Montagu, veteran of the American Revolution (and at the time the world's leading expert on the taxonomy of British sponges), was a corresponding member of several societies for natural history, and he set out to recover what was left of the carcass, which had been briefly exhibited at the county fair before being boiled down for oil—the bones unceremoniously dumped back in the river. A little diligent muckraking revealed the skeleton of what Montagu eventually decided was a little whale not previously seen on the English coast, so he wrote up a detailed anatomy and preserved its toothy skull.

Though Montagu stepped on a rusty nail a few months later and promptly died of tetanus, his final dissection outlived him: published posthumously, his account represents the first recognized scientific description of the bottlenose dolphin, a creature Americans generally think of as "Flipper," but which those in the know call *Tursiops truncatus*. The skull of the Dart River Beast remains to this day in a drawer in London's Natural History Museum—the eternal type specimen for the species as a whole. If, therefore, you wish to grasp the essential nature of the bottlenose, you should, technically speaking, start here, pulling item number GERM.353a, and looking down that bony beak into a pair of empty orbits. *Alas, poor Yorick!*

Actually, though, knowing the bottlenose is a good deal harder than that. Neither Colonel Montagu nor those rough-handed boatmen could have had any idea that the creature they dispatched to scientific apotheosis in 1814 would go on to lead such a queer and dramatic life in the collective imagination of modernity. *Tursiops truncatus*—a slate-gray, slick-skinned net thief, which coastal fishermen of the late nineteenth-century Atlantic sometimes called the "herring hog" in disgust—would, by the 1970s, leap in the vanguard of the Age of Aquarius, enjoying an improbable secular canonization as the superintelligent, ultrapeaceful, erotically uninhibited totem of the counterculture. And to this day, for many, the bottlenose—mainstay of aquatic ecotourism, beloved water-park performer, smiling incarnation of soulful holism—represents a cetacean version of our better selves. If, as Thoreau wrote a few years after the slaying of the Dart River dolphin, "animals . . . are all beasts of burden, in a sense, made to carry a portion of our thoughts," then there are few creatures that have done more hauling for *Homo sapiens* in the twentieth century than *Tursiops truncatus*.

How? Why? Answering these questions demands a turn through the strange history of postwar American science and culture, and the unbraiding of a set of unlikely historical threads: Cold War brain science, military bioacoustics, Hollywood mythopoesis, and early LSD experimentation. Recovering our strange and changing preoccupations with the bottlenose dolphin across the twentieth century is, in the end, an adult swim.

BUT LET'S START WITH the children. San Diego is as good a place as any to watch *Tursiops* grin and splash their way through our feel-good fantasy life. With this in mind, I pull into the oceanic parking lot of SeaWorld on a bright Saturday morning in August and make my way through the sprawling gates. By trade, I'm a left-leaning intellectual historian, so I know I am supposed to dislike this sort of establishment—rife with callow consumerism, sentimental vulgarity, and bad food. But the truth is, SeaWorld is pretty nice: sculpted paths edged by well-tended plantings of sea lavender and greasewood; shady groves hedged in blooming rosemary. And though the park is filled with weekending families, it doesn't feel crowded; people (of all shapes, colors, sizes) are courteous, maneuvering their strollers into designated areas and waiting here and there in unrancorous concession lines.

I steer toward the "Rocky Point Preserve" to have a "Dolphin Encounter." Admittedly, the Rocky Point Preserve is none of these things. For starters, there aren't any real rocks, but rather an ersatz topography of sculpted cement surrounding a swimming-pool-blue in-ground enclosure. And the notion of a "preserve" must be extended considerably beyond customary usage to be applicable here, where a dozen nonendangered *Tursiops* line up to be fondled in exchange for vanishingly small smelt. One does fret for a moment about a culture that accepts such a perfect inversion of meanings in the name of infotainment: dolphin preserve? They probably sell jars of it in the gift shop.

But surely only a wild-eyed animal libertarian could grouse about the cerulean interspecies *paideia* unfolding before me. The tank looks clean enough, and the tykes are comely and unblemished. Moreover, as a cheerful woman on a headset microphone explains to the crowd, the dolphins have the option to wait out the "encounter period" in a small inaccessible side pool—a sort of cetacean greenroom. This fact draws a misty aura of mutuality over the moment (though, like much mutuality, there are the inevitable hidden constraints: this is how these creatures get

PHOTOGRAPH PREVIOUS SPREAD | CHRISTOPHER BOYER

their rations, so understandably few opt for inordinate displays of privacy when smelt, however diminutive, are on offer). I take my paper tray of little fish and join the line.

Opportunities to interact with *Tursiops truncatus* drive a healthy minor industry in the U.S. and abroad. Touch-and-feed attractions like this one are ubiquitous at water-themed amusement parks around the world, and programs in Mexico, the British Virgin Islands, and elsewhere cater to tourists seeking fully immersed contact with these animals. The most elaborate of such enterprises feature "dolphin assisted therapy," which offers patient-customers the opportunity for extended aquatic intimacies that promoters insist can work wonders with autistic children, the withdrawn, those suffering from chronic pain—a whole roster of ailments like those that once drove pilgrims to the baths at Lourdes.

SeaWorld itself offers occasions for such miracles. One of the park's employees tells me the story of an old man in a local nursing home who had been mute and vegetative before a community service agency brought him into the park's Dolphin Interaction program, whereupon, after several sessions, he reportedly regained his vitality, his will to live, and finally even his speech. Anecdotes like this concerning the salvific powers of *Tursiops* abound in the subculture of committed dolphin lovers, many of whom believe that the animals use their sonar (bottlenose dolphins possess powerful abilities to echolocate underwater, scanning their environment by means of sound) to reach inside the human body for diagnostic or palliative purposes—and perhaps also, at times, to reach inside the human mind. As one dolphin handler put it to me, looking up from a pen of captive *Tursiops*, "Plenty of folks out there think these creatures are closer to God."

Though it is by no means obvious, upon reflection, why one would accord *Tursiops* this privilege. Despite the widespread sense of the benevolence of these beasts, there are reported instances of wild and captive *Tursiops* injuring and even killing swimmers. Males are, episodically, libidinous in the extreme, and in some of these cases it has been alleged that the aggressive animals had mating in mind. As for their vaunted intelligence, it's an iffy thing: for instance, they have not proven especially savvy about escaping from fishing nets at sea; and though they can

PHOTOGRAPH | JOEL SARTORE

jump almost twenty feet in the air, they very rarely sort out how easy it would be to roll over the top of an encircling trap. When I explained to the chief veterinarian at SeaWorld that I had come to spend some time with the *Tursiops*, he tried to be encouraging, but it was clear they were not his favorite animals; the "bad boys of the cetacean fraternity" he called them, and mentioned that the aquarium staff at Epcot had tried to put *Tursiops* in their large sea tank but found that the males were so aggressive in their efforts to "breed" the sharks (family-park euphemism there) that it was a matter of life and death — for the sharks, which ultimately had to be quarantined. Inclined now and again to rake, butt, and sodomize each other, these powerful sea mammals with fixed grins have presented challenges to their keepers from the earliest days of captivity: one male in a Florida facility in the late 1940s used to spend a good deal of time hanging poolside, its lengthy member inserted into the filtration hose, through which ran a firm current of fresh seawater.

WHEN I EXPLAINED TO THE CHIEF VETERINARIAN AT SEAWORLD THAT I HAD COME TO SPEND SOME TIME WITH THE *TURSIOPS*, HE TRIED TO BE ENCOURAGING, BUT IT WAS CLEAR THEY WERE NOT HIS FAVORITE ANIMALS; THE "BAD BOYS OF THE CETACEAN FRATERNITY" HE CALLED THEM.

"What do they feel like?" asks the blond woman in a purple and black wet suit who wears the Madonna mike. "A hot dog!" chirps a small girl in a pink dress. And it's true, I think, brushing the top of a gaping snout as I dangle my limp fry over the deep, pink throat guarded by a snapping jaw of needle-teeth — they do feel very much like a hot dog.

FOR A BRACINGLY CONTRASTIVE glimpse of the bottlenose, one need only take a short drive south from the pink and green-blue towers of SeaWorld, climbing over the ridge of Point Loma on Nimitz Boulevard. A quick right turn, and Rosecrans Street peters out into a warren of armed gatehouses and federal installations. Welcome to the Bayside Campus of the Space and Naval Warfare Systems Center (SPAWAR), home to about seventy-five *Tursiops truncatus*, the majority of which are so-called "fleet animals" trained to perform military functions. Some of them deploy with the Navy's Explosive Ordnance Disposal Mobile Units (primarily in swimmer interdiction programs — i.e., the dolphins serve as underwater watchdogs), and others work with Navy Special Clearance Team One (primarily in mine detection operations — i.e., the dolphins assist in identifying and locating underwater explosives, using their natural capacities for echolocation).

Cleared through the checkpoint and clipped with a small red security tag, I make my way down to the water's edge in the company of a minder from the Navy's Public Affairs Office. Now and again the billowing thunder from a fighter jet — already long gone over the Pacific — momentarily forestalls communication and redlines the input indicator on my Dictaphone.

With the permission of my host, I step out onto the floating piers, where a dozen or so civilian employees pad around in flip-flops, wearing sun visors and carrying large, cylindrical, fish-filled Igloo coolers emblazoned in garish magic marker with names: Niño, Mu, Old Ben, Shasta, Belle. Here and there out of the honeycomb of docks a large bottlenose suddenly squirts from the water in a suspended vault, before splashing back into its pen, having seized a mackerel from a dockside handler. A few divers emerge from a shed, carrying their tanks and flippers; and three small center-console runabouts, battleship gray, nose in and out around the lattice of nested holding pens, license-plate-sized American flags flapping from long radio antennae.

My guide rehearses the official history and nonclassified operational specifics of the Navy's Marine Mammal Program: Dating back to the early 1960s and emerging out of research into hydrodynamics (it was briefly thought that the study of dolphin swimming might lead to improvements in torpedo design), the Navy's work with captive *Tursiops* eventually gave rise to a then-secret plan to deploy trained dolphins in Vietnam, as part of an effort to capture and/or kill Viet Cong sappers raiding the ammunition depots of Cam Ranh Bay. Though the deployment did not last for very long, Navy records accounted the program a success, and military divers continued to expand the scope of their tactical work with free-swimming trained bottlenose.

Some of the animals before me now are ready to go, should the call come. Bayside personnel pride themselves on their ability to get their *Tursiops* (which leap up out of the water into carrying slings on command) aboard the cargo planes — accompanied by their retinue of veterinary technicians and trainers, mobile tanks and filtration systems — in a matter of hours. Deployment specifics are classified, but mine-sweeping dolphins (often outfitted, cyborglike, with undersea cameras and other equipment) were used at the start of the most recent Iraq war, and there is every reason to think that some of the animals having their lunch right here have done a tour in the Persian Gulf. Indeed, with life spans

of over forty years, it is quite possible that some of them have smelled the Mekong Delta—rumor has it that Toad, one of the beloved animals from the Cam Ranh Bay mission, is still alive, but no one will tell me where she is.

My guide, who has fielded queries from many Vietnam-obsessed conspiracy theorists over the years (*Did the dolphins ever actually kill anybody? No no, they were only trained to "mark" intruders . . .*), would rather talk about the future. The latest plan is to use Navy *Tursiops* to ratchet up port security in the war on terror: trained bottlenose already assist in perimeter monitoring in the open water around moored military vessels at a base in King's Bay, Georgia, and a similar arrangement is slated for deployment later this year at a Navy shipyard in Washington State, not far from Seattle. Not surprisingly, a number of animal protection groups oppose these projects, and dolphin-loving radicals from such organizations have attacked Navy marine mammal facilities on several occasions over the years, in efforts to liberate animals or damage equipment.

I descend the gangplank to the pools, and stand just a few feet from one of the animals, which rolls to its side to eye me, showing the lightest pink edging of a white belly. The gaze is steady, attentive; the body motionless. This is Belle, a military dolphin.

Wouldn't the little girl in the pink dress on the other side of Point Loma be surprised to meet Belle? After all, she just might be a trained killer.

CONCEPTUALLY SPEAKING, San Diego's geographically adjacent dolphin-worlds would seem to be a million miles apart. What is truly strange, then, is to discover that they are, genealogically speaking, kissing cousins.

The roots of this family tree lie buried in a set of forty-one boxes in the basement of the Stanford University Archives. These weathered files, acquired at a considerable price (rumored to touch the hem of seven figures), represent the personal and laboratory papers of the most important dolphin scientist of the twentieth century, the controversial neurophysiologist John Cunningham Lilly—the man who was, in effect, the spiritual grandfather of both the new age dolphin and its military alter ego. Lilly died in 2001, and though he is now widely reviled by those who study *Tursiops truncatus* professionally (working scientists have for some time tended to dismiss him as a lunatic or a charlatan), there is, in fact, no one who played a larger role in shaping modern ideas about dolphins. To the extent that *Tursiops* has been a hard-working Thoreauvian "beast of burden" for much of the last half century, it was John C. Lilly who put the smiling creature in harness.

So who was Lilly? His early biography offers little hint of what would be his enduring obsession with the bottlenose. Taking a degree in physics from Caltech in 1938, Lilly headed off to study medicine at the University of Pennsylvania, joining the war effort as a researcher in avionics. An early photo shows him as a rakish young scientist, smoking a corncob pipe while tinkering with a device designed to monitor the blood pressure of American flyboys—a number of whom, in those days, were actually using surfacing cetaceans for strafing practice.

After the war, motivated in large part by contact with the pioneering brain surgeon Wilder Penfield, Lilly turned his hand to neuroscience, applying the era's expanding array of solid-state electronic devices to the monitoring and mapping of the central nervous system. Eventually appointed to a research position at the National Institutes of Mental Health (NIMH), Lilly spent the better part of a decade conducting invasive cortical vivisection on a variety of animals, particularly macaques. In the spy-versus-spy world of the high Cold War, this kind of work had undeniably creepy dimensions. *Manchurian Candidate* anxieties about "forced indoctrination" and pharmacological manipulation of political loyalties peaked in the 1950s, and security establishment spooks (as well as a few actual thugs) hung around the edges of the laboratories where scientists were hammering electrodes into primate brains. Lilly later claimed not to care for that sort of thing, but in his prime as a government employee he had high-level security clearance—J. Edgar Hoover knew him by name—and was actively involved in research into brainwashing (or "reprogramming" as it was then called among the cognoscenti), sleep deprivation, and "operant control" of animals with wires implanted in the "pain centers" of their gray matter. Lilly's papers from this period include a black-and-white photograph of two brain-wired monkeys at coitus, ostensibly being driven by remote electrical stimulation. It may have been some sort of inside joke around the lab, but maybe not.

It was about this time that Lilly learned from a European colleague, an oceanographer with military contracts to study the physiology of deep-diving, that the small toothed whales had surprisingly large brains—proportionately speaking nearly as large as those of human beings; and in absolute terms, bigger. Intrigued, Lilly got wind of an outfit in Florida—Marine Studios, which was at this time a cross between a public aquarium and an underwater sound stage for shooting swamp-thing-oriented B-movies—that had figured out how to keep bottlenose in captivity. By 1955 Lilly had found his way down to St. Augustine, in the company of a number of other researchers, to hammer some electrodes into *Tursiops* brains and see what happened.

This may sound flippant, but that was in fact the basic modus operandi in the early days of neurophysiology: stick electrode into brain; apply charge; observe animal; move electrode; repeat. The correlation of spasms, jerks, and eye-rolling with the position of

the electrode eventually amounted to a cortical map. It was an ugly business, but the youthful Lilly was not a sentimental character. He wanted to get inside heads, and, if possible, get his hands on the steering wheel of consciousness—as can be surmised from the title of a shocking unpublished paper he prepared in these years, "Special Considerations of Modified Human Agents as Reconnaissance and Intelligence Devices," where he noted proudly that "a technique for covert and relatively safe implantation of electrodes into the human brain has been devised"—a little hardware that would ultimately provide "push-button control of the totality of motivation and of consciousness."

The dolphins, which (unlike people) do not continue breathing when anaesthetized, had the good fortune, for the most part, to die with merciful dispatch. One of them, however, before succumbing, made a set of wheezing phonations that Lilly interpreted as an effort to mimic the voices of the laboratory personnel. It was his eureka moment, and he would later equate it with the Copernican Revolution. For Lilly, and those who became his champions, that fateful day at Marine Studios would forever stand as the epiphany of a fundamental discovery: human beings were not at the center of the animal universe. After knocking firmly on countless mammalian brains, the energetic brain doctor finally got a reply—John C. Lilly had *heard a voice*.

To appreciate the rings of significance that widened from this laboratory scene, it is critical to understand that in the 1950s no one thought of whales and dolphins as "musical" or "intelligent" or—of all things—"spiritually enlightened." At that time, the large whales were generally regarded as huge kegs of fat (useful for making soap), meat (good to feed to chickens), and fertilizer (best thing to do with what was left after you took the fat and meat), and the smaller dolphins and porpoises were mostly just a nuisance to fishermen—though bottlenose were sometimes actually hunted, since the fine oil in their jaw ducts was considered a superior lubricant for precision timepieces.

This context helps explain the furor that attended Lilly's presentation, in May of 1958 (at the annual meeting of the American Psychiatric Association in San Francisco), of a paper that made a set of dramatic claims for the intelligence and linguistic abilities of *Tursiops truncatus*. Despite his small and entirely anecdotal evidence, newspapers on both coasts picked up the fascinating story (*Talking fish! What will they think of next?*), and by the autumn of that year Lilly was writing grants for a major initiative to study cetacean communication and cognition. In a matter of months he had quit his job at NIMH, separated from his wife of two decades, and moved to the Caribbean. Initially using some of his own funds, but soon outfitted with a string of prestigious federal research awards (National Science Foundation, Office of Naval Research, Department of Defense, even NASA), Lilly founded his own nonprofit scientific establishment—the Communications Research Institute, or CRI—and built a dedicated dolphin laboratory, complete with holding tanks and state-of-the-art bioacoustical equipment, on Nazareth Bay at the eastern end of St. Thomas, in the U.S. Virgin Islands. He also married a woman from the Islands, a divorced fashion model named Elisabeth Bjerg.

ARCHIVE WORK IS, when you get right down to it, a pain in the ass. The chairs are hard, the room generally silent, the papers often boring. What's worse, Palo Alto produces one perfect day after another. Time for a break. Time to do a little bodysurfing in the glorious, roiling waters of the Pacific.

An hour or so later I am tucked into my wetsuit (critical equipment for research trips) and making my way down to a small arc of sand nested at the bottom of a precipitous and eroding dune. The water is less cold than I feared, and I paddle out,

PHOTOGRAPH | U.S. NAVY

feeling my neoprene skin fill with brine. A handful of hardboard surfers cork in a line about a hundred yards offshore, waiting for the combers that mount smoothly on the outside reef. By contrast, the shore break is sloppy, more up and down than straight ahead; but it still feels good to move freely in the active surf. When a fair-sized wave rises behind me, I give a kick, throwing my legs up into the curl. One stroke and I am in the churn, body stiff, chin tucked, hands out, splitting the liquid like a prow and feeling the hard sand as I am driven ashore.

Why was Lilly so amazingly successful at promoting his unlikely program of research on the bottlenose? After all, he managed to cash in upward of half a million dollars a year in grants at his peak—big money in those days. And for what? *Dolphin communication?* Rolling over in the spent foam of a receding wave and looking out across the heaving blue, it occurs to me that part of the answer lies right here: in the ocean and its changing meanings.

There is nothing quite like the feeling of being propelled through a slipstream in a sea surge, the rush of water seeming to lengthen the body into a fusiform streak. So natural does this watery pleasure feel, so native to the body and the mind, that one easily forgets the novelty and historical specificity of this way of experiencing the briny deeps. Granted, there have long been surfers and surf-swimmers among the traditional peoples of the Pacific islands, but it took a very long time for Anglo-Europeans to approach the sea with anything but anxiety and disgust. The beach as a locus of health and pleasure is a firmly nineteenth-century invention (before that it was a convenient place to throw garbage). And our crystalline vision of refreshing, turquoise waters teeming with beautiful fish would have had little currency before the mid-twentieth century—right about when Lilly turned to the bottlenose. Only then did the widening availability of inexpensive swim goggles and modestly safe diving equipment open leisured access to underwater vistas. Previously, the sea floor fell away in the imagination as murky and abysmal—unaccommodating, hostile, black.

The 1950s and 1960s, then, saw the emergence of a new and widespread cultural preoccupation with the undersea world, a burst of interest on which Lilly drew and capitalized, and to which he ultimately contributed. It was in a file that he had labeled, somewhat ominously, "Solitude," that I found Lilly's dog-eared paperback copy of *The Silent World*, the popular oceanic *vade-mecum* authored by the psychopomp of SCUBA, Jacques Cousteau, and popularized in the U.S. in the late '50s in connection with a successful motion picture of the same name. Significantly, Lilly had marked with care a number of passages, all of which dealt with the kinetic and tactile experience of being submerged, weightless, isolated, and sensitized by a descent into the aquatic realm.

Lilly was no diver, however. His deep fascination with these feelings hails from a very different arena: his long-standing research into that menacing corner of the human sciences known as sensory deprivation. While still working for the government at NIMH, Lilly and several collaborators developed a new technique for testing the psychological stability of human beings under sustained isolation and reduced sensory input: the flotation tank. Warm water, circulating silently through a perfectly dark chamber, buoyed a naked experimental subject over whose whole head had been fitted a latex mask attached to life-support and monitoring devices. Money for this sort of research hailed, of course, from the military, which was mostly curious how pilots and submariners (and potentially astronauts) would fare during long spells of lonely tedium. When it turned out that many subjects rapidly came unhinged in this disorienting environment, unforeseen possibilities emerged: the technology could be used in personality assessment, and perhaps also in personality adjustment. Lilly himself—fearless about self-experimentation, and already beginning to conceive of himself as a cosmonaut of consciousness—spent many hours encased in his own tanks, exploring what happened when a mind in the water was left to its own devices. The results were trippy (this was, after all, the Lilly that would later inspire the sci-fi thriller *Altered States*), but he was convinced that the mentally sophisticated and strong—those with what he would eventually call "wet courage"— could thrive under these conditions. One had to transcend the terror, because a kind of enlightenment lay on the other side.

Suspended in warm water, in perfect darkness, Lilly became, you might say, a brain in a vat. And he liked it. Liked it enough that he took a flotation tank with him to his new St. Thomas dolphin laboratory, where it soon became an important tool in his increasingly eccentric pursuit of cetacean intelligence. His own lengthening spells in weightless submersion led him to ponder with mounting awe the sort of mammalian brain that would evolve to dwell in the deep sea. It would be, he decided, a mind like his own, only more so: fearless, deep, and self-sufficient—an expansive intelligence in contemplation of itself. Moving to the Caribbean, Lilly mostly left the electrodes behind, and embarked on a new way of getting inside the heads of his experimental animals: rather than cracking them open like nuts and rewiring them like doorbells, he would *cogitate* his way in, commensurating his intelligence to theirs, becoming, through strenuous exercises of sympathetic convergence, his own instrument—more and more he wanted to "think like a dolphin." Thus a nasty piece of Cold War psy-ops technology was launched on a new career path: as the head-trip hot-tub of psychedelia. Before long, Lilly, floating in the dark, was piping the feed from the hydrophones in the dolphin

tanks to his own stereo headphones and trying to imagine what it would be like to "see" with sound. And that was pretty far out.

ON THE GRANT APPLICATIONS, however, the central research project of Lilly's Caribbean dolphin institute was more straightforward: "communication." At the most basic level this meant studying the phonations of *Tursiops truncatus* in an effort to understand if they could communicate with each other, and, by extension, if we could communicate with them. Like any savvy fund-raiser, Lilly sold his idea of intelligent and communicative dolphins to different people in different ways, and he started with those he knew best: his earliest and most important backers were in the military.

One of Lilly's old classmates from Caltech, William B. McLean, had gone on to glory as a wizard of warcraft, developing the Sidewinder (the first functional air-to-air missile), and rising to serve as the technical director of the U.S. Naval Ordnance Test Station (NOTS) in China Lake, California. McLean was struck by Lilly's visionary ideas, and had him out to NOTS for a briefing—where he clearly stimulated some out-of-the-box thinking. Sifting Lilly's correspondence from these heady and secretive years, I discovered a magnificently cryptic letter from an excited Navy researcher at NOTS following up on the visit:

> *I have wondered whether it might not be feasible to attempt to develop some mechanical equipment that a dolphin might use . . . [and] wondered whether it might be at all feasible (and I realize that this idea may sound a little fantastic) to arm dolphins with some sort of weapon that would enable them more easily to attack shark . . .*

And why not something more elaborate, like,

> *. . . the possibility of developing some dolphin toys, large complex mechanical devices that might be of some interest to dolphins in the open seas, that would involve some kinds of buttons to push that would generate running water, perhaps with one trained dolphin teaching others.*

It is surpassingly unlikely that the Navy was contemplating mid-ocean dolphin playgrounds at the height of the Cold War. The veils of euphemism barely conceal that something considerably more germane to national defense was on the drawing boards at China Lake. Lilly himself, writing a few years later, was more explicit:

> *They could be very useful as antipersonnel self-directing weapons. They could do nocturnal harbor work, capture spies let out of submarines or dropped from airplanes, attacking silently and efficiently and bringing back information from such contacts. They could deliver atomic nuclear warheads and attach them to submarines or surface vessels and to torpedoes and missiles.*

By 1961, the Navy had developed its own research program on dolphin communications and intelligence, and two years later a formal Navy facility for marine mammal study and training had been opened at the Naval Missile Center at Point Mugu, a little north of Los Angeles. Lilly, however, who was spending more and more time in his floatation tank trying to commune with his experimental animals, would soon be *persona non grata* at this facility, despite his having had a hand in its creation. The buzz-headed types had noticed that Lilly was getting a little, well, weird.

But the Navy was never Lilly's only paymaster. Persuaded that he had glimpsed a genuine dolphin "intelligence" in the late 1950s, Lilly also succeeded in selling the nation's nascent space administration on the idea that his dolphin laboratory could provide a model system for "breaking through" to a nonhuman mind. In the era of Sputnik this meant actual extraterrestrials, which may sound crazy now, but these issues lay on the cutting edge of national concern in those days: if we met the little green men (or, more likely, started receiving radio signals from deep space that looked to carry nonstochastic levels of information), what would we do? Lilly promised that dolphins offered a chance to rehearse, and he positioned CRI as a visionary organization conducting fundamental work in exobiology. In fact, by 1962, Lilly even presided as the "Grand Dolphin" over a kind of semiserious secret society of prominent astrophysicists, radio astronomers, atmospheric chemists, and computer engineers who called themselves "The Order of the Dolphin," wore small, engraved *Tursiops* insignia (a little like a tie clip), and exchanged messages in binary code to test each others' readiness for extraterrestrial contact.

One of these visionary "Dolphins" was a brilliant young Harvard astrophysicist named Carl Sagan, who made his way down to St. Thomas several times in these years to meet Lilly's dolphins and muse about alternate forms of life in the cosmos.

By 1964, "Want to come and see my dolphins?" had become an irresistible invitation.

THAT WAS BECAUSE by the early 1960s Lilly and his dolphins had become a national, indeed an *international*, phenomenon. In the wake of the initial flurry of interest in his 1958 claims about the linguistic abilities of *Tursiops truncatus*, Lilly seized a trade-book contract and gave free rein to his exuberant imagination. The resulting volume—*Man and Dolphin*, published by

Doubleday in 1961—offered an intrepid-scientific-explorer narrative of the building of the Nazareth Bay lab, together with some headline-ready suggestions about the future of human-dolphin interactions. Passages of startling weirdness (if dolphins prove as intelligent as the initial studies suggest, then "for a long time presumably they will be in the position of the Negro races in Africa who are attempting to become Westernized") were buttressed by pseudo-technical appendices on neuroanatomy and illegible sonographs of *Tursiops* phonation. The book, with its tincture of *Planet of the Apes* fantasy and just-the-facts authority, thrust Lilly onto the national stage in earnest as the iconoclastic boffin of porpoise intelligence: an appearance on the *Jack Paar Show* followed, together with a photo-spread in *Life* magazine, talking dolphins in *New Yorker* cartoons, and glowing reviews throughout the national press. The initial print run of *Man and Dolphin* sailed off the shelves, and Lilly's Rolodex swelled to include White House contacts, Hollywood film celebrities, and a host of enthusiasts, fans, and well-to-do hangers-on.

Inspired by Lilly's depiction of CRI as a kind of Swiss Family Robinson outpost (*Man and Dolphin* played up the fact that Lilly and his beautiful new wife and their respective children all lived at the lab and participated in the research), the Florida-based Hungarian émigré film director Ivan Tors undertook to produce a film about a Lassie-like dolphin and the family it loves. The 1963 blockbuster *Flipper* not only gave Lilly a credit line (and research support out of the proceeds); it also gave the world its first "domestic" marine mammal—a lovable, faithful, gentle, and chuckling companion.

Another Hungarian, the physicist Leo Szilard, also boosted Lilly's cachet in this period, citing him by name in a biting and popular satire on the nuclear arms race, *The Voice of the Dolphins*. This futurist tale, which emerged out of Szilard's conversations with Lilly in the late 1950s in Washington, depicts a Soviet-American scientific research institute that departs from Lilly's work and seemingly succeeds in communicating with dolphins; they prove to be brilliant strategic thinkers, and help steer humans away from thermonuclear devastation. (They are the *Delphic* oracles—get it?)

The general hubbub attracted a steady stream of high-profile visitors to St. Thomas in the early 1960s, perhaps none more important to the emerging vision of the bottlenose than the quirky and brilliant British anthropologist Gregory Bateson, already well known as an avant-garde social theorist with an appetite for cybernetics. After reading *Man and Dolphin*, Bateson wrote Lilly an admiring letter, pressing him to think still harder about the ways that *Tursiops truncatus* could serve its human interlocutors. Indulging his appetite for ethnographic speculation concerning the minds of others (together with an immoderate enthusiasm for semiotics and psychology), Bateson laid out a sweeping theory of cross-species language development: human beings, in his view, possessed a language disproportionately preoccupied with *stuff*. This was our joy and our pain, since the evolution of such thing-centered linguistic abilities had gone hand in hand with the extraordinary material culture of *Homo sapiens*, from moldboard plows to supersonic cruise missiles. Yet in Bateson's view this same evolution had left us with a grotesquely impoverished intelligence in the domain of social relations: those intersubjective complexities, he averred, "are very poorly represented in language and consciousness." *Homo faber* was, in this sense, "stunted," and the consequences, for Bateson, were clear: war, social conflict, pervasive psychological maladjustment.

Enter the bottlenose. Permit a human-sized intelligence to develop over millions of years in a highly social animal, which—on account of its aquatic evolution—possessed no *hands*, and thus no real capacity to manipulate a material culture, and it was reasonable to hypothesize that the cognition of such a creature would be radically, fundamentally, pervasively *social*. Theirs would be a language not of things but of *beings*. As Bateson put it to Lilly, "If I am right, and they are mainly sophisticated about the intricacies of interpersonal relationships, then of course (after training analysis) they will be ideal psychotherapists for us."

IF THE PROJECT WAS COMMUNICATION—IF THE INHIBITIONS AND BLIND SPOTS OF THE EXPERIMENTER WERE NO LESS A HINDRANCE THAN THE RESISTANCE OF THE SUBJECT—THEN PERHAPS BOTH SCIENTIST AND DOLPHIN COULD TAKE THE LSD TOGETHER, AND THEN, FOR THE FIRST TIME, REALLY, THEY MIGHT COME TO AN UNDERSTANDING.

The Navy definitely had no need for dolphin psychoanalysts, and neither did NASA. But around the end of 1964, Lilly—whose second marriage was in free fall, and whose much-hyped research was generating nugatory publishable results—needed all the help he could get. More than ever he needed to listen to the dolphins; and he needed to hear them.

SO HOW DO YOU "break through"? Well, this had always been Lilly's basic preoccupation as a scientist of the mind. And indeed, over the course of his decade of intensive dolphin research,

Lilly can be understood to have more or less sequenced through the whole battery of Cold War techniques for dealing with a tight-lipped foreign asset held in captivity. Initially committed, in the late 1950s, to that spookish tool kit of techno-maniacal assaults on the cranium (picture a Frankenstein-like cap with electrodes penetrating the skull), Lilly gradually moved, at CRI, to less invasive approaches with his animals. But he nevertheless continued to draw on the playbook of those psy-ops intelligence services that shaped his early training in neurophysiology. For instance, by the early 1960s he was testing code-breaking techniques, having been granted access to one of the very earliest programmable electronic computers, which he used to try to sieve recordings of dolphin vocalizations for patterns, deploying the same statistical methods as Cold War cryptographers. A little later he began experimenting with "chronic contact" scenarios, which involved "isolating" a dolphin in constricted quarters with a human agent, on the assumption that a conversion of loyalties would result. To this end, Lilly even redesigned the St. Thomas laboratory with floodable living quarters, and initiated a set of long-term cohabitation experiments in which a male dolphin and a human female in a leotard and lipstick (to help the dolphin see her mouth move, of course) spent weeks interacting in a confined space. Lilly had her read *Planet of the Apes* to prepare for the work.

This sort of deracinating, intensive environment—colored with erotic potential—belonged, of course, to the world of counterespionage debriefings. Lilly did not explicitly advertise these dimensions of his project, preferring to talk of the need to treat the dolphin like a child, positioned to learn human language from the continuous attentions and baby talk of a new "mother." But he was by no means unhappy when an Oedipal scene unfolded underwater: with all the inevitability of a classical drama, this newest effort at interspecies communication eventually climaxed in what is probably the very oldest form of human-animal intimacy—sexual contact.

Pressed by an increasingly desperate Lilly to recognize that she needed to open herself to the dolphin's solicitations (and warned by him against succumbing to the blinders of her own cultural preoccupations and psychological blockages), the young experimenter eventually decided that the randy and terrifying buckings of her imprisoned subject animal were themselves nothing less than his effort to *communicate*. In the protocols of her experimental notebooks she recorded coming to feel that her

PHOTOGRAPH | FLIP NICKLIN / NATIONAL GEOGRAPHIC

sharp-toothed roommate was doing the best he could to solicit her in a more and more gentle manner; it fell to her to meet him halfway, stroking him to a shuddering calm.

Lilly chalked it up as a victory for interspecies contact. But Swiss Family Robinson it was not. Neither was Lilly's final effort to hear what the dolphins were saying, which involved the use of lysergic acid diethylamide, otherwise known as LSD.

This now seems to us, perhaps, paradigmatic of the mid-'60s moment, and in this sense, inevitably, a little comic. But such a reaction trades considerably on hindsight. After all, Lilly's use of pharmaceutical-grade LSD-25 on his experimental subjects was entirely consistent with the trajectory of his borrowings from the Cold War sciences of mind and behavior. Indeed, the drug was widely tested at Veterans Hospitals in the United States as an aid to psychotherapy, in that it was understood to break down inhibition and open pathways to hidden parts of consciousness. It was precisely these putative features of LSD that drew it to the attention of the CIA, which used this powerful psychotropic agent both with and without the awareness of human subjects in these years. As a federal researcher Lilly secured the product (which was a controlled substance) from Sandoz Pharmaceuticals under an NIMH contract, and was explicit about his intentions to give it to the dolphins. I am quite certain that no one evaluating the application would have batted an eyelash, since there were plenty of neuroscientists giving LSD-25 to captive animals in those days — including fish, dogs, and primates. It made perfect sense to try it on the animal that seemed to offer the greatest promise of cognitive sophistication.

In fact, if the project was communication — if the inhibitions and blind spots of the experimenter were no less a hindrance than the resistance of the subject, if the aim, in the end, was nothing less than the commensuration of minds — then perhaps it was the scientist who needed the LSD even more than the dolphin? Or better yet, both scientist and dolphin could take it together, and then, for the first time, really, they might come to an understanding — floating in the blue water, listening to the strange sounds echoing through their heads.

Together they were drifting over a cultural watershed. Lilly and his dolphins had tuned in and turned on.

AND, SOON ENOUGH, they had dropped out. Or, more like, been kicked out. By the end of 1965, still short of peer-reviewed publications, and with rumors of his increasingly idiosyncratic experimental practices swirling among his professional colleagues (including several who had been folded into the Navy's rapidly expanding marine mammal project), Lilly faced devastating evaluations from a visiting board of grant examiners — an assessment of his work that effectively torpedoed his research program and shuttered the Nazareth Bay laboratory. Incensed, Lilly fell back to Miami, writing furious letters to old allies and accusing the Navy scientists of staging a military coup in *Tursiops* research.

Perhaps they had, but the damage was done. In the thick of a second divorce, all his grants revoked or terminated, his fancy computer repossessed by the feds, a defiant and unrepentant Lilly very publicly released his research animals back into the open water whence they had come. Claiming flamboyantly that these brilliant and otherworldly animals had finally succeeded in "reprogramming" *him*, John Lilly — the star neurophysiologist now turned pied piper of delphinid spiritual awakening — set out for the West Coast, became a regular at Esalen, took to wearing futuristic jumpsuits, and increasingly promoted Zen Buddhism and the mind-expanding virtues of a variety of psychopharmaceuticals. Meanwhile, a number of Lilly's erstwhile dolphin-researcher colleagues were doing their part to help the Navy win Southeast Asia.

This strange rupture effectively established the curious double legacy of the modern bottlenose: the flower children all learned that *Tursiops truncatus* was an erotically liberated, spiritually profound pacifist, intent on saving humans from their materialistic, violent, and repressive lives; meanwhile, over on the other side of Point Loma, a coterie of (equally) Lilly-inspired marine mammal biologists busily worked to teach these creatures how to recognize and neutralize enemy combatants.

A caricatured view of the 1960s depicts doves and hawks facing off on opposite sides of the barricades: daisies on this side, gun barrels on that. It is easy to think of the dolphin story as similarly drawn up in ranks: the Navy's weaponized dolphins belonged to the hawks; the stained-glass dolphin decals on VW microbuses swam with the freaks and the hippies. But what Lilly's several lives show, what the bottlenose story shows — indeed, what a host of deeper researches into the history of Cold War military technology, computing, sexual identity, music, and the drug culture all show — is that the two sides that would later come to blows, the Cold War and the counterculture, were initially quite intimate, were born, in fact, as Siamese twins.

And they continued to play footsie even as they were pried apart. For instance, the Navy's failure to win the life-support contracts for the American space race (the Air Force prevailed) left the blue-water forces in the military on the sideline of the era's flashiest techno-scientific research initiative. Fighting back, the Navy spent much of the 1960s touting the sea as Earth's forgotten "deep space," perversely overlooked in the country's preoccupation with the remote and irrelevant heavens. Thus SEALAB and the Man in the Sea programs were conceived to parallel space-station work and manned interplanetary travel. With the oceans intensively reimagined in these years as our as-yet-unexplored

"inner space," Navy propaganda and research could not but reinforce the notion that dolphins were a kind of neighboring extraterrestrial, awaiting contact. In fact, one of the first undertakings of the new Navy Marine Mammal Program was to train dolphins to work in the open sea as messengers to underwater SEALAB stations. They even made a thirty-minute propaganda film—narrated by Glenn Ford, titled *The Dolphins that Joined the Navy*—that depicted Navy researchers testing a perfectly fantastic "Human-Dolphin Translator," an audio-frequency converter capable of shifting the acoustic profile of human commands up into the sweet-spot of delphinid hearing. And (I could not make this up) the Navy scientists ultimately decided to try speaking to them in Hawaiian, on the grounds that this language seemed likely to be closest to their own. The big blue, it turned out, really did have its own little green men—but they were big and gray and always smiling.

I leave Southern California on a Sunday morning, the flight banking slowly up over the Pacific. And as the Earth tips below, I can clearly see from one side of Point Loma to the other.

JOHN CUNNINGHAM LILLY set out to "break through" to a dolphin. In the end, suspended in his warm tank, addled out of ordinary experiences of human cognition, he did indeed find a "mind in the water"—his own. And the Age of Aquarius found its avatar.

All in all, it would not be wrong to say that the whole thing began in a small cinder-block structure on the southeastern tip of St. Thomas. Curious if the building remains, I spend several hours on Google Earth one afternoon, trying to match up a 1960 aerial photograph of the excavation of the dolphin pond with the modern coastal topography of Nazareth Bay. It is hard to say: hurricane damage along this stretch of beach has been extensive, as has been the commercial buildup in the last half-century.

My wife is from Puerto Rico, which pulls us close enough to St. Thomas that I can't resist an off-season investigative day trip across the short channel separating the two islands. So I stuff the maps in a small backpack, together with a swimsuit and a towel, and I take the twenty-five minute flight in a chattery ATR-42, whose scimitar propellers sweep menacingly at the narrow cabin. Below, the pleasure boats cut their white arcs against the deep blue water.

Following the southern coast road in my rental car, I thread my way up to a ridge overlooking Nazareth Bay, where I pull over to consult the satellite images. If it exists, then the laboratory must lie down one of these descending spurs, unpaved paths that disappear into the brush. I park and grab a bottle of water for the hike. Slipping cautiously around a fresh-looking chainlink gate emblazoned with stern yellow signs reading KEEP OUT – PRIVATE PROPERTY, I drop down the steep track through the heavy cover. Bromeliads cup rainwater in the shade, and

PHOTOGRAPH | DAVID DOUBILET / NATIONAL GEOGRAPHIC

a hermit crab clacks into hiding in the scree. A single flying needle, a blue dragonfly, stays above me for a moment, seeming to point the way.

And then, the path opens onto the water and there it is: the shattered remains of the Communications Research Institute. It's an oblique angle of a building, set on a stony promontory, and over the ruins hangs a twisted, overgrown sea grape tree. Stacks of marine plywood and piles of studs litter the courtyard, and an abandoned yellow cement mixer has begun to sink into the soft ground on one side. I walk around to the windward face of the structure, where crumbling steps lead precariously down to the water's edge. For some reason, I am frightened as I feel my way down: it's midday, and bright, but I am absolutely alone, and the hulking structure—roofless, stripped, bleached like bone, spiny rebar bristling from broken walls—looks cruel and dangerous. Small lizards slip along the dry grass beside the steps, and as I come to the edge of the dolphin pond a pair of rock crabs, hanging upside down like bats, scurry along the outer lip of the wave ramp, where the light surf splashes through a narrow inlet to fill and flush the pool.

I sit for a while here, looking up at the empty, floorless rooms, which are without graffiti—without, in fact, the least trace of all that went on here. A scaffoldlike wing of the building juts out over the rocky basin: once it held the dolphin "elevator," in which the animals rose to enter the flooded rooms of the lab. In the incandescent endgame, Lilly imagined such a device configured so as to be operated by the animals, permitting them to come and go as they wished. The skeleton of this superstructure gives the dolphin pool the shadowy solemnity of a hidden grotto. A loose doorjamb swings pendular in the breeze before the encroaching vegetation. A storm-crumpled beach chair is embedded in the straggling limbs of a bougainvillea, itself nearly swallowed by the strangling vines.

Like the cavernous halls of the Natural History Museum, this too is a good place to contemplate the essential nature of the bottlenose. Or, perhaps better, this is a good place to dismiss the very idea of such an essence. Ruins have always been helpful this way, since they are so candid about the passage of time, so articulate about the inevitability of change. There are, in the end, no fixed definitions, only histories; no essences, only genealogies. Over time, and through the workings of an improbable series of personalities, technologies, and cultural preoccupations, the Dart River Beast became, as the anthropologists like to say, "good to think"—an animal through which we came to see ourselves in new and disorienting ways.

As Thoreauvian beasts of burden, the dolphins have certainly done their share of heavy lifting. What they've been thinking along the way, though, remains very hard to say.

I DECIDE TO go look for some surf, and make my way back up to my car. And it's only as I start to drive back down the ridge that I notice a white paper sign wrapped in plastic and nailed to a tree. It announces a recent zoning hearing about this property, which is slated, it turns out, for a major commercial installation: "64 villas, 36 condos, 4 bungalows, swimming pool, tennis court, waste-water treatment plant, reverse osmosis plant," and a host of other structures, all shoehorned into Lilly's Edenic eleven-acre plot. Apparently the whole thing has gotten bogged down in an environmental controversy, owing to the discovery of a few endangered Caribbean tree boas on the property. *Et in Arcadia ego.*

The development—if it happens—will be called "Dolphin Cove."

Visit orionmagazine.org to discuss this article and read more on dolphins and whales by D. Graham Burnett.

The Fixt and Random Universe Is Seen to Move

In the suckhole near the ditch,
snails squirm their way up
stalks of snake reed.

Get down on your knees
in the mud. You'll see

how their pearl shells
bear up your bent face
and the whole bright sky.

—Joe Wilkins