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Historical Perspectives

Giuseppe Notarbartolo di Sciara

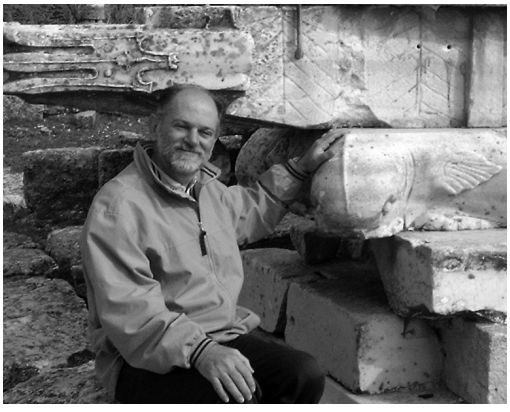
(born 1948)

Born in the Italian lagoon city of Venice, fascinated by nature since I started walking and swimming, I have been looking for all sorts of critters in the world that to me matters most, where water and land meet. Becoming a marine ecologist was therefore my recipe for happiness.

Once into my professional life, I narrowed the range of my interests—it had to be marine and it had to be big—which brought me, among other things, to spy on Bryde's whales in the Caribbean, humpback whales in Hawaii, fin whales in Iceland, mobulid rays in Baja California, and spinner dolphins in the Red Sea. Working toward my Ph.D. in the Sea of Cortez, surviving the shipwreck of my vessel, I described *Mobula munkiana*, a manta ray until then unknown to science.

During my lifetime, as the world transited between two geological epochs, from Holocene to Anthropocene, the depressing deterioration of the marine environment has mutated science in my mind from an end into a means. This caused the age of curiosity to yield to commitment to conserve, and happiness to be tainted with concern. Back in Italy, from 1985 to this day, I am engaged full time in supporting the conservation of Mediterranean marine fauna through various institutions, including the Tethys Research Institute (which I founded in 1986 and chair today); ICRAM (the Italian government's Central Institute for Applied Marine Research, which I chaired from 1996 to 2003); the Scientific Committee of ACCOBAMS (which I chaired from 2002 to 2010); the Cetacean Specialist Group of IUCN's Species Survival Commission (of which I have been deputy chair since 1997); and the University of Milan "Statale," where I have been teaching a course on the conservation of marine biodiversity since 2006.

I was certainly neither the only nor the first person to engage in Mediterranean marine mammal conservation, an effort that has involved many talents from several walks of life during the past three decades. I simply was, and still am, a cog in the wider machinery, and therefore the story that follows should be considered as one of the many possible accounts of the subject, strained through the filter of my personal experience.



Giuseppe Notarbartolo di Sciara stroking a marble bow-riding dolphin in the archaeological site of Cyrene, Libya (Photo courtesy of Paolo Casale)

Taking stock of the results of all these efforts, I must admit that so far most battles to conserve Mediterranean marine mammals have been lost against overbearing economic interests, protected and nurtured by a still oblivious public opinion, and insensitive and inept, when not corrupt, politics and bureaucracies. But the conviction remains in my mind that in the long run the war will be won. Whales, dolphins, and even the critically endangered monk seals are hanging on in the Mediterranean by tooth and nail. The moment we manage to give them a break, things can only improve. Wouldn't it be great if people started to really care, and governments were to decide that the time has come to implement the conservation commitments they have so many times solemnly undersigned but never bothered to honor? (See www.disciara.net for a more complete biography.)

Ancient Waves, Recent Concerns: The Budding of Marine Mammal Conservation Science in Italy

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Western culture originated in the Mediterranean Sea, and science, including natural science, is an integral part of that culture. Aristotle, born along an Aegean shore 2,400 years ago and considered one of the world's earliest natural scientists, had a clear notion of the mammalian nature of dolphins in spite of their exterior similarity to fishes. And yet, during the millennia separating Aristotle from the 1980s, the few zoologists who took an occasional interest in marine mammals in the Mediterranean limited themselves to dealing with taxonomic or anatomical descriptions. The diffused disregard for the lives of the region's marine mammals, which lasted until recently, is a puzzling epistemological question because it was certainly not due to lack of scientific tradition. Only during the last three decades have things radically changed. I happened to be caught in the middle of this gnostic maelstrom, which permeated my life deeply, both professionally and personally. Being Italian, in describing my perspective of the development of marine mammal conservation science in the Mediterranean, I will base my views and discussion mostly on what happened in my country; however, we should not forget that similar developments have taken place simultaneously in other Mediterranean nations, particularly in those countries with an Illuminist past such as France and Spain.

The older works on marine mammals in Italy, largely ignored by the international scientific community because they were published in Italian and mostly in now extinct, hard-to-obtain journals (Notarbartolo di Sciara & Bearzi, 2005), included accounts found in the writings of natural scientists across a wide temporal span, from the partly fantastic stories by Pliny the Elder in the 1st century to the colorful portrayals of whales, dolphins, and seals by Ulisse Aldrovandi (Aldrovandi, 1638). These were followed by increasingly accurate contributions from the mid-19th to the late 20th centuries by a number of zoologists, including Emilio Cornalia (1872), Sebastiano Richiardi (1874), Giovanni Capellini (1877), Leone De Sanctis (1879), Enrico Giglioli (1880), Corrado Parona (1897), Antonio Carruccio (1919), Giuseppe Tamino (1957), and Luigi Cagnolaro (1977). However, although some of these studies were extremely detailed and truly beautiful, such as the account of a rare right whale (*Eubalaena glacialis*) caught in Taranto in 1877 (Capellini, 1877), and that of a sperm whale (*Physeter macrocephalus*) stranded in the Adriatic in 1874 (De Sanctis, 1879), the body of knowledge these contributions accrued was mostly limited to lists of species occurring along Italy's shores and to anatomical investigations of the occasional stranded or captured animal.

Strikingly, however, there was an acute lack of ecological curiosity and rigor, even by otherwise experienced and well-known marine zoologists. Rorquals and sperm whales stranded along Italian coasts were thought by most to be occasional strays from Atlantic populations, having entered through Gibraltar by mistake and succumbed to starvation in the oligotrophic Mediterranean (Vinciguerra, 1926). Even the few cetacean species regularly found in the region were often misidentified as demonstrated by the recurrent confusion between short-beaked common dolphins (*Delphinus delphis*) and striped dolphins (*Stenella coeruleoalba*) (e.g., Tortonese, 1965), in spite of the glaring distinctiveness of their coloration patterns. Obviously, marine mammals did not seem to deserve the attention that the zoologists of the time normally dedicated to other marine taxa such as fishes and invertebrates.

Absence of interest generated poor ecological knowledge, which, in turn, created, in a perverse spiral, lack of conservation concern—with few notable exceptions. Arturo Bolognari (1951), from the University of Messina, was one of these exceptions. Fascinated by the large herds of sperm whales he frequently saw cruising in full view from shore along the narrows separating Sicily from the Italian mainland, Bolognari embarked on a complicated set of hypotheses describing the migratory patterns of the *capodoglio* (literally, "oil-head"), which were largely speculative due to the crippling lack of regionwide observations at sea. To the best of my knowledge, Bolognari (1957) was also the first Mediterranean scientist to voice concern for the whales' welfare and conservation status, in view of the pointless massacres routinely performed on the hapless herds by local fishermen. This prompted him to wish

> that the Sperm Whale, instead of enduring the fate of disappearing due to the relentless war that mankind has been conducting against it for centuries, may continue to plough the world's oceans as its instinct dictates; thereby testifying, with its immense size in which force, agility and beauty coexist, a highly significant work of Nature. And perhaps we would render to the Sperm Whale justice by no longer considering it a sea monster, but rather a living being fully entitled to exist undisturbed on Earth. (Translated from Italian in Notarbartolo di Sciara & Bearzi, 2005)

Marine mammals in the Mediterranean are currently represented by one pinniped, the Mediterranean monk seal (*Monachus monachus*), and nine regularly occurring species of cetaceans (Notarbartolo di Sciara & Demma, 1994; Notarbartolo di Sciara & Birkun, 2010). The dire conservation status of monk seals, assessed as Endangered in the *IUCN Red List* in 1986 and uplisted to Critically Endangered since 1996 (Aguilar & Lowry, 2011), was already evident in the mid-1970s. The monk seal condition was eloquently stated by the many experts attending the First International Conference on the Mediterranean Monk Seal, convened in Rhodes, Greece in May 1978 (Ronald & Duguy, 1979). By contrast, widespread concern for cetacean conservation first dawned in the Mediterranean—and in Italy—not earlier than the mid-1980s, coinciding with the beginning of the first dedicated investigations of free-ranging animals (Cagnolaro & Notarbartolo di Sciara, 1990).

The impulse to investigate the conservation status of Mediterranean cetaceans was facilitated by a number of factors. First, awareness of the fast degradation of the Mediterranean marine environment was growing. So too was the concern for the future of many of its inhabitants, apex predators in particular (United Nations Environment Programme/Mediterranean Action Plan [UNEP/MAP], 1988). Unfortunately, scientific information on Mediterranean marine mammal ecology, status, and threats was too sparse to afford solid conservation guidance. Status reviews were occasionally performed within the framework of CIESM (the International Commission for the Scientific Exploration of the Mediterranean) (e.g., Duguy et al., 1983), although the scant and uncertain data on which these reviews were based, such as that provided by Italian seafarers and amateurs through a program launched by World Wildlife Fund (WWF) Italy, made such contributions limited in terms of conservation effectiveness.

Second, a legal framework was developing to address the growing concern for the status of the Mediterranean marine environment and its biodiversity. In 1976, the Mediterranean countries adopted the "Convention for the Protection of the Mediterranean Sea Against Pollution," also known as the Barcelona Convention, and amended it in 1995 as the "Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean" to incorporate provisions deriving from recent developments in marine conservation policy (e.g., the UN Convention on the Law of the Sea and the UN Conference on Environment and Development). Action plans to address monk seal and cetacean conservation issues were developed within the framework of the Barcelona Convention, although the lack of sufficient information on these mammals' ecology and status forced such initiatives to be too vague to be of real conservation use.

Meanwhile, new methods were developed, notably overseas, to investigate the ecology of free-ranging marine mammals (e.g., Le Boeuf & Würsig, 1985), and this was the essential third factor that really turned the tables in favor of the progress of ecological knowledge of Mediterranean cetaceans. These techniques happened to be accessible to small research groups without the support of major institutional funding, and included, among many, the application of simple analytical methods to derive relative or absolute population sizes and distribution in a given area, based on both visual sightings and acoustic detections, often from platforms of opportunity (Gordon, 1994); the use of photo-identification techniques to reveal details on social ecology and to measure population size (Hammond, 1986); the application of genetic analyses of remotely collected skin biopsies to studies of population structure (Whitehead et al., 1990); and the use of remote sensing to record vertical and horizontal movements of animals tagged with electronic devices (Watkins et al., 1984), which were becoming increasingly effective and affordable.

This is where my story comes into play. In 1976, after having obtained my "laurea" degree in Italy, I was fortunate enough to be invited to California by Walter and Judy Munk, who welcomed me into their family and introduced me to key players in marine science. I ended up spending almost a decade in that part of the world, engaged in various research activities under the guidance of a wealth of mentors, who contributed significantly to the building of my professional training. Carl Hubbs introduced me to William Evans and Stephen Leatherwood from the Hubbs-Sea World Research Institute in San Diego, who involved me in a yearlong survey (1977-1978) of the marine fauna in

the Venezuelan Caribbean (Notarbartolo di Sciara, 1983; Notarbartolo di Sciara & Hillyer, 1989). My project in Venezuela was concluded by a Bryde's whale (*Balaenoptera edeni*) radio-tracking experiment under the leadership of William Watkins from the Wood Hole Oceanographic Institution (Watkins et al., 1979). In 1977, I was involved in a study of humpback whale (*Megaptera novaeangliae*) social ecology in the waters of Molokai and Maui as an assistant to Louis Herman at the University of Hawaii. The climax of excitement for my first decade in the marine sciences, however, was reached in 1980 when I was accepted as a Ph.D. student at the Scripps Institution of Oceanography in La Jolla, California, where I was encouraged to leave marine mammals on the side and explore the mysterious world of pelagic elasmobranchs. I was thus engaged in studies of the ecology and taxonomy of the Gulf of California's manta rays (Notarbartolo di Sciara, 1987a, 1987b, 1988; Schweitzer & Notarbartolo di Sciara, 1986) under the guidance of Richard Rosenblatt.

In 1985, nine years after leaving Italy, the urge to return to the Mediterranean was growing stronger, and although my stay in the Americas had been thoroughly enriching and enjoyable, as soon as I concluded my schoolwork, I packed my stuff and headed back to my native shores. Once back in Italy, I threw myself headfirst into scientific conservation activities, eager to apply methods developed overseas to studies in the Mediterranean. In doing so, I was by no means the only one, nor was I the first, to apply these techniques. Marine mammal conservation in the Mediterranean has involved scores of enthusiastic scientists and advocates belonging to two generations; as I mentioned earlier, I simply was—and still am—one of the many pawns of such a process.

Soon it was quite clear to me that the lack of science based on robust ecological data was a crippling handicap to the implementation of even the simplest conservation measures. In the early 1980s, Italy did not even possess a functional, nationwide marine mammal stranding network—the most basic of tools to make the first inroads into a systematic understanding of the cetaceans of any given area. To everyone's surprise, myself included, setting up the first stranding network was accomplished in a rather simple way, and with only a few weeks of preparation. As a non-paid affiliate to the Natural History Museum of Milano, together with my friend Luigi Cagnolaro, at the time curator of vertebrates in that institution, his assistant Michela Podestà, and a host of young volunteers, during a meeting in 1985, we created an organization tasked with the recording of cetacean strandings on a national scale (Notarbartolo di Sciara et al., 1986). Under my coordination, the

Figure 1. Measuring the skull of a Bryde's whale in Cayo Herradura, Venezuela, 1978 (Photo by Laura de Santillana)

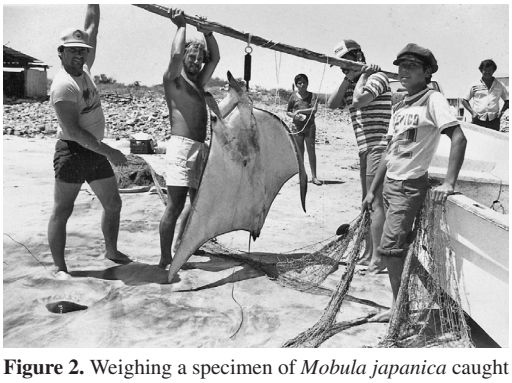

Figure 2. Weighing a specimen of *Mobula japanica* caught by the local fishermen, Punta Arena de la Ventana (Baja California Sur, Mexico), for my Ph.D. work at the Scripps Institution of Oceanography, 1983 (Photo by Fay Wolfson)

Centro Studi Cetacei (CSC), as this organization was called, partitioned the 8,000 km of Italian coastlines into a dozen subdivisions, each tended by a local volunteer intervention group. Citizens finding a stranded cetacean anywhere were invited through a media campaign to alert the Milan-based CSC using a toll-free number. This number was provided at no cost by the insurance company Europ Assistance. The CSC would then contact

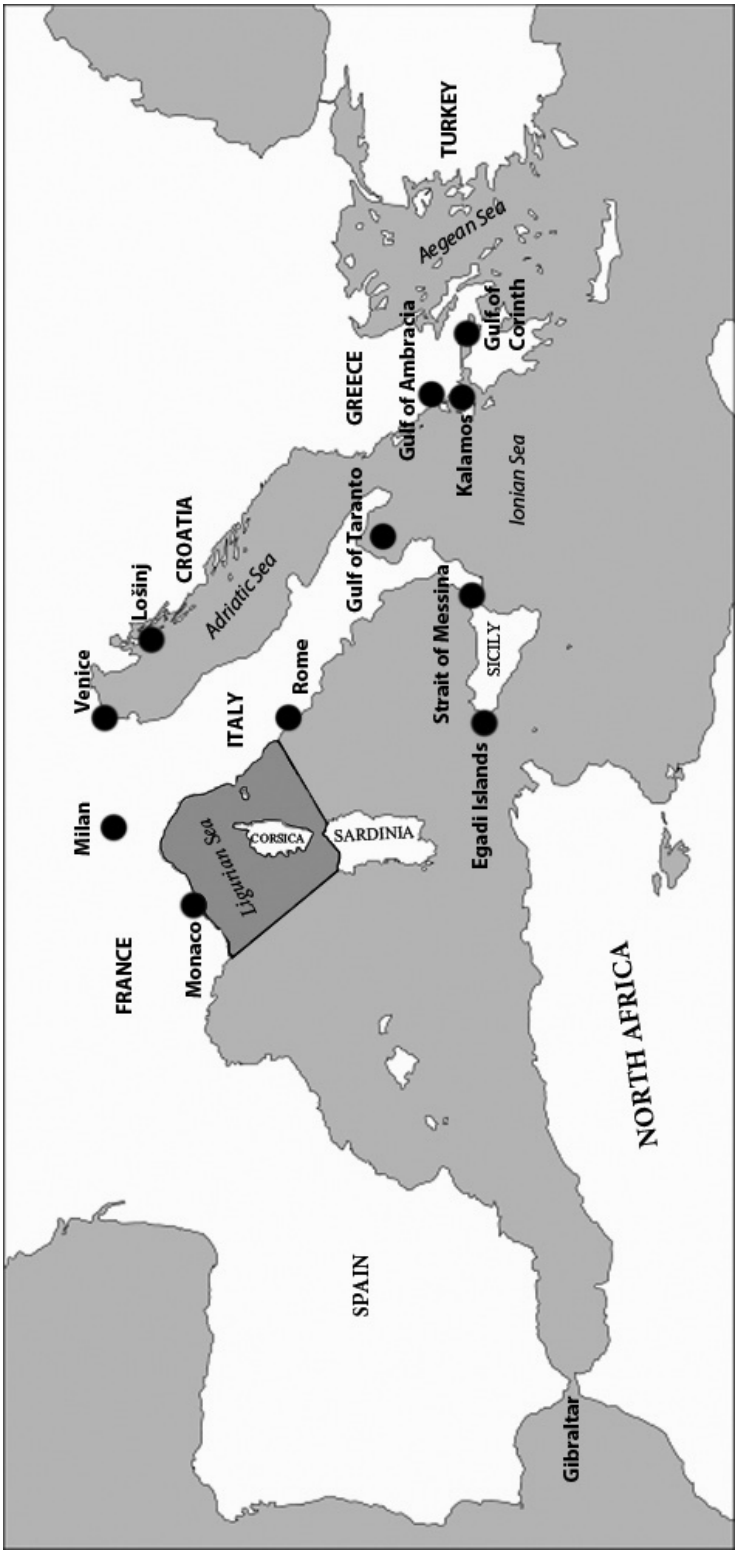

Figure 3. Map of the Mediterranean locations mentioned; the shaded portion in the Ligurian Sea surrounding Corsica is the Pelagos Sanctuary.

the relevant intervention group—no mean feat in a time during which mobile phones hadn't yet been invented and long-distance calls were still rather expensive—and, when possible, and on a purely volunteer basis (the government never financially supported the program), a reconnaissance to the site of the stranding was made. During 21 years of operation (1986 to 2006), thanks to the enthusiastic participation of a large number of volunteers from the most diverse walks of life, the program allowed a huge amount of stranding data to be collected; the CSC recorded the stranding of 3,456 cetaceans belonging to 13 species (165/year on average), with updates published yearly in the proceedings of the Italian Society of Natural Sciences. The wealth of biological material made available by this program stimulated the production of the first nationwide comprehensive investigations of cetacean biology and threats, including, most relevantly, causes of mortality and pollutant loads. For the first time in Italy, we were able to glean, albeit in a semi-quantitative way, details related to pressures exerted on cetaceans by human activities, such as from pelagic driftnets that were the rage of the time, with over 700 vessels and tens of thousands of km of nets deployed in prime cetacean habitat (Cagnolaro & Notarbartolo di Sciara, 1992).

A national cetacean stranding network, however, could not be expected to continue forever on a volunteer basis. In fact, it was our initial idea that, having demonstrated that the program was feasible and useful, the stranding baton would be passed as soon as possible to the national institutions in charge. After all, cetaceans are protected species, and laws existed giving a precise mandate to governments to monitor their status. Alas, the persistent, multi-decadal lack of governmental interest and support for the CSC's efforts eventually managed to erode civil society's goodwill; the development of squabbling among the various groups could not be avoided, ultimately resulting in the break-up of the former nationwide scheme into a number of uncooperative local entities. By the time the government finally decided, in 2008, to formally organize a nationwide cetacean stranding network, envisaging the cooperation among the Ministries of the environment, health, coast guard, etc. (which however hasn't started to operate yet as I am writing), a widening temporal gap had developed between the last time the network could be considered functional and the present, and this state of affairs had crippled a unique time series. The story of the demise of the national stranding network in Italy recapitulates on a small scale one of Italy's greatest tragedies, whereby the value of individual efforts and accomplishments is constantly hampered by the ineptitude and lack of interest of the major institutions (both scientific and political). As will become more clear later, this was only the first of several occasions in which I had to realize this sad truth.

While the work of the CSC was helping to make inroads into the main causes of cetacean mortality, the next challenge we had to face involved moving the scientists' sights from the beaches to the open sea—that is, from where cetaceans die to where they live. We already knew, with some approximation, which cetacean species inhabited the waters around Italy, but we still were in the thickest of fogs concerning the status of various populations, the whereabouts of their critical habitats, and the nature and distribution of their main threats. To learn these details, there was only one option: take to the seas and go find cetaceans where they have their happy hours.

Taking to the seas was easier said than done, especially for someone in my condition—that is, an individual devoid of any institutional affiliation. Having abandoned the national scientific establishment about a decade earlier, I had discovered with dismay that the bridges behind me had burned. When I returned from America, all the doors to Italian academia were tightly shut. Since there was no institutional shelter that could be relied upon, my only alternative to giving up was to invent an institution. This adventure turned out to be less impossible than it sounds, although it came with a high price: a steep road to the conquest of scientific legitimacy and a very tight belt.

Soon after returning to Italy, while waiting for a proper research opportunity to present itself, I joined the publishing enterprise of my friend Egidio Gavazzi as the science editor of *AQUA*, a beautiful magazine he created that was dedicated to the description and popularization of the watery world. Egidio's idea was to enrich the magazine's contents with a suite of connected initiatives; one of these consisted of the creation of a small scientific structure dedicated to the conservation of the Mediterranean marine environment. This was, of course, music to my ears. Gathered in a notary's office on a cold and drizzly Milanese afternoon in January 1986, Egidio and I signed the act, which formalized the birth of the Tethys Research Institute, named in honor of the Greek goddess of the sea, spouse of Oceanus (www.tethys.org). Regrettably, my professional association with my friend didn't last long. Months after creating Tethys, Egidio moved his sights to other adventures and closed his publishing house. Before doing so, however, he generously placed the keys of Tethys in my hands and wished me good luck. I lost a great supporter, with an infant organization still balancing in a rather perilous predicament,

but I had a research institute with which to try my fortune and virtues. Yippee!

Tethys's piggy bank was empty, but ideas and willingness to place science at the service of conservation were not in short supply. In fact, it was soon evident that Tethys was a very wealthy organization: not in terms of money, of course, but of human capital. Given the dearth of opportunities offered in Italy to researchers eager to engage in marine conservation, even in its constitutional precariousness, Tethys soon presented itself as a beacon of hope and became a condensed nucleus of young talents, willing to withstand significant personal sacrifices in exchange for the opportunity of fulfilling their professional aspirations. Funding was always a problem, with public support out of the question and corporate sponsorships proving little short of being pacts with the devil. What carried Tethys forward through decades of hardship was the financial support of ecotourists willing to contribute to a research project in exchange for participating in field activities they viewed as engaging and glamorous. Such support was not lavish for sure, but it was enough to keep us afloat. Tethys was now ready to head for the open seas.

The first effort of the newborn organization was to scout around the seas surrounding Italy, from the borders with France to those with Yugoslavia, to acquire knowledge of distribution of populations and derive abundance indices that would provide a comparative understanding of the different seas' relative importance to cetaceans (Notarbartolo di Sciara et al., 1993). Cruises conducted between 1986 and 1989, surprisingly, revealed the overwhelming importance for whales and dolphins of the Ligurian Sea, where all the species regularly seen in the Mediterranean were encountered with rates significantly higher than anywhere else in our study areas. In fact, oceanographic studies had recently revealed that the whole pelagic area that was comprised of the southern coast of France, northwestern Italy, and the island of Corsica was one of the most productive in the whole Mediterranean due in large part to upwellings generated by the presence of a permanent oceanographic front (Jacques, 1989). High pelagic productivity sustains a large biomass of zooplankton—predominantly northern krill (*Meganyctiphanes norvegica*)—which in turn attracts a rich variety of secondary consumers.

Surprises continued when we began our first investigations into the relationships between Mediterranean cetaceans and their Atlantic conspecifics. We started by investigating fin whales (*Balaenoptera physalus*), which after striped dolphins were the most frequent cetaceans encountered in the Ligurian offshore. The question—quite relevant as far as conservation goes—was whether the fin whales we observed in the Mediterranean were separate from their North Atlantic conspecifics. A heated, but largely speculative and data-poor debate had developed on the topic in the previous years (e.g., Viale, 1985). With advice from friends and colleagues Scott Baker and Mason Weinrich, I assembled my own crossbow bolts fitted with small biopsy tips and collected from the whales' skin samples that were analyzed by Martine Bérubé at the University of Copenhagen (Bérubé et al., 1998). Lo and behold, Ligurian Sea fin whales turned out to be genetically distinct from their Atlantic conspecifics; a result which, to our greatest surprise, made it to the front pages of the national media and which allowed significant progress in elucidating the ecology of this Mediterranean population of large cetaceans (Notarbartolo di Sciara et al., 2003; Castellote et al., 2012). Separation between Mediterranean and Atlantic cetacean populations eventually turned out to be the norm rather than the exception as a number of other species in the region, such as sperm whales, Cuvier's beaked whales (*Ziphius cavirostris*), as well as common bottlenose (*Tursiops truncatus*), Risso's (*Grampus griseus*), short-beaked common, and striped dolphins, were subjected to genetic investigation (e.g., Garcia-Martinez et al., 1999; Dalebout et al., 2005; Natoli et al., 2005, 2008; Gaspari et al., 2007). Small openings in the window on the lives of Mediterranean cetaceans were finally starting to appear.

Figure 4. Margherita Zanardelli (left) and Michela Podestà figuring out where to look for cetaceans in the Southern Tyrrhenian, 1987 (Photo by G. Notarbartolo di Sciara/ Tethys Research Institute)

Meanwhile, CSC data, and in particular the work by Michela Podestà and Luca Magnaghi, were revealing that the Ligurian Sea was the theatre of a cetacean massacre of unprecedented magnitude due to the perverse practice of fishing with driftnets (Podestà & Magnaghi, 1989; Notarbartolo di Sciara, 1990). Hundreds of vessels from southern Italy had developed the habit of

Figure 5. A large fin whale surfaces in the Pelagos Sanctuary. Tethys's former research vessel, *Gemini Lab*, keeps close watch in the background (1999). (Photo by S. Airoldi/Tethys Research Institute)

invading the richer northern fishing grounds during summer in pursuit of swordfish, and were placing tens of thousands of km of deadly nets in the water every night—fully encouraged by the FAO. The nets impeded navigation and caused the death of scores of non-target, protected species such as cetaceans and devil rays (*Mobula mobular*). It was ironic that no sooner had evidence of the existence of an extraordinary assemblage of marine fauna in the area been provided that we had good reason for being concerned for its rapid disappearance. Something had to be done immediately.

Thus, the crazy idea materialized of creating an international marine protected area in the Ligurian Sea to preserve the entire pelagic ecosystem, where not only driftnets but also other human activities known to present threats to cetacean survival could be kept in check. This was a bolder move than the simple prohibition by the Italian government of fishing with driftnets in a shallow triangle adjacent to the Ligurian coast, which did not even include the core of the cetaceans' critical habitat. At the time, mainstream legal thinking dismissed as laughable the idea that international waters—such as those that contained most of the cetaceans' critical habitat in the Ligurian Sea, beyond 12 nmi from the baseline—could be subject to any sort of protection, and if human activities existed there causing ecological damage, that was just too bad. With sponsorship of the Rotary Club, which was instrumental in raising the attention of Prince Rainier III of Monaco, and together with Fabio Ausenda from Europe Conservation (an NGO), I drafted a document called "Project Pelagos," which proposed the creation of a large cetacean sanctuary in the area. In March 1991, the proposal was presented in Monaco to Prince Rainier, who immediately endorsed it and helped propel it from the world of dreams to that of reality. From that moment and during the ensuing eight years, the Sanctuary concept made slow progress along the bumpy terrain of politics and bureaucracies, surviving partly thanks to the support of organizations such as the WWF and Greenpeace, until an agreement for the establishment of the "Pelagos Sanctuary for Mediterranean Marine Mammals" among France, Italy, and Monaco was formally signed in Rome in 1999 (Notarbartolo di Sciara et al., 2008). The creation of the Sanctuary, subsequently listed among the Barcelona Convention's Specially Protected Areas of Mediterranean Importance, resulted in the world's first High Seas Marine Protected Area (MPA), and was thus met with much acclaim in the marine conservation community. Unfortunately, in the 13 years since its creation, Pelagos has failed to fulfill its goal of significantly improving the conservation status of the area's cetacean populations, mostly because of the lack of political will to establish a proper management body (Notarbartolo di Sciara, 2009). Nevertheless, even though the whales and dolphins of the area may still be unaware of its existence, the notion of Pelagos is alive in the minds of the local people, who believe that the area is protected even if in fact it is not in practice. A growing number of French and Italian coastal towns have proudly formalized their partnership with the Sanctuary, while scientists from both countries continue to work hard to build robust ecological knowledge of its mammalian fauna (e.g., Azzellino et al., 2012, and references therein).

While the Pelagos Sanctuary and its cetaceans have absorbed, and still do, a large part of Tethys's attention with research and awareness activities continuing there under the guidance of Sabina Airoldi, Arianna Azzellino, Simone Panigada, Margherita Zanardelli, and Maude Jahoda, the other half of Tethys was (and still is) hard at work with odontocetes on the opposite side of Italy, in the Adriatic and Ionian Seas. In 1987, Giovanni Bearzi began investigating a group of common bottlenose dolphins in the waters surrounding the island of Lošinj in what was then Yugoslavia for his thesis work at the University of Padua. After graduating and formally becoming affiliated with Tethys, Giovanni rapidly established his permanent camp in Lošinj and launched the Adriatic Dolphin Project (ADP), which he managed for 14 years, with Yugoslavia breaking up in flames as a backdrop. In 2001, Tethys passed the baton of the ADP to Blue World, a Croatian NGO, which is ensuring continuity and still monitors many of the same individual dolphins first observed in 1987. Through the passionate work of Giovanni and other talented enthusiasts, including Elena Politi, Caterina Fortuna, Drasko Holćer, and Peter Mackelworth, the ADP has become today

the longest-running study of bottlenose dolphins in the Mediterranean, has resulted in significant progress in our knowledge of the species in the region (e.g., Bearzi et al., 1997, 1999, 2009), and has proposed the creation—albeit, still unsuccessfully—of a specially protected area to support dolphin conservation in Lošinj.

Meanwhile, towards the turn of the millennium, Giovanni and his group—in particular Elena Politi and Joan Gonzalvo—moved their sights to the south, to Ionian Greece. In the area's many sheltered waters, a number of quite intriguing situations were discovered involving populations of small odontocetes; all awaited investigation. In the Inner Ionian Sea, centered around the small island of Kalamos, a vestigial population of endangered short-beaked common dolphins, formerly widely distributed throughout the Mediterranean, was discovered in 1995, and monitored throughout its almost complete disappearance from the area, caused by overfishing of sardines, the dolphins' main prey (Piroddi et al., 2011). The semi-enclosed Gulf of Ambracia presented a fascinating study area because it is a simplified marine ecosystem hosting a community of about 150 bottlenose dolphins (Bearzi et al., 2008), almost certainly isolated (genetic studies are ongoing). The Gulf of Corinth, another semi-enclosed body of relatively deep waters, narrowly sandwiched between the Peloponnese and the Greek mainland, was surprisingly found to host a resident population of about 800 striped dolphins, normally considered a pelagic species (Bearzi et al., 2011).

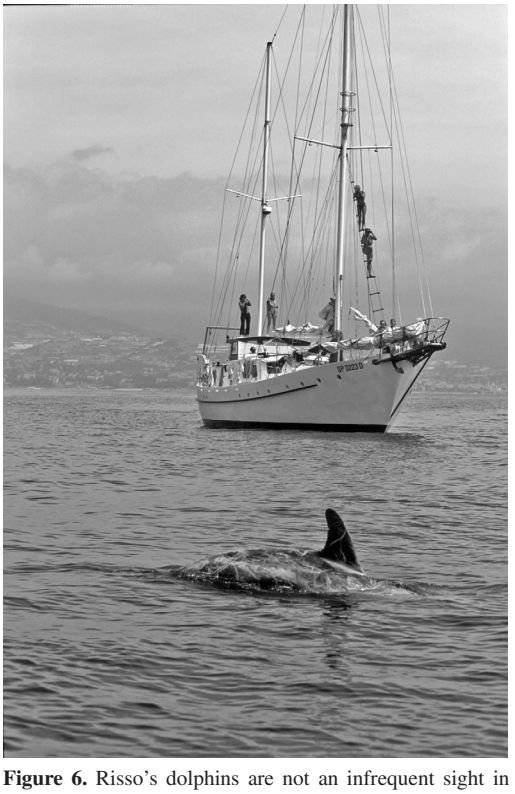

Figure 6. Risso's dolphins are not an infrequent sight in the Pelagos Sanctuary, close to the continental coast where the slope is steepest (2002). (Photo by S. Airoldi/Tethys Research Institute)

In 1996, Tethys was 10 years old when by presidential decree I was nominated president of the Central Institute for Applied Marine Research (ICRAM), the governmental research agency responsible for supporting national marine conservation policies. A lot of progress was made during that first decade of Tethys's life, with the institute becoming increasingly known and accepted both nationally and internationally, and more was to come later, with over 300 scientific papers published and about 60 university theses produced. So, it was with great regret that, because of my new position in the public administration, I felt compelled to formally detach myself from Tethys for reasons of transparency and institutional fair play. My new role, dictated by the requirement of advising and supporting government policies on the full range of issues connected with marine conservation—from the disposal of toxic muds dredged from harbors to the nearly impossible challenges of sustainable aquaculture—was highly inspirational and formative, but it dragged me by the hair from keeping my head buried in the charismatic species-based approach I had been toying with since the beginning of my professional life. Dealing on a daily basis with the crucially relevant but often absurd mechanisms of Italian political decisionmaking was a tough but instructive learning process, although I fear it has forever destroyed my confidence in any government's availability to seriously undertake environmental conservation actions. At the same time, my experience at ICRAM forced me to widen my views by appreciating that large marine vertebrates, although fascinating and ecologically important as they certainly are, are not the only relevant component of the world they live in, and that marine conservation is mostly effective if contemplated within a more articulate, ecosystemic approach.

This experience opened for me the doors to the world of MPAs, which I had previously been dunked into only when dealing with the Pelagos Sanctuary. Here, I was fortunate enough to find in friend and colleague Tundi Agardy a wonderful mentor, who valiantly assisted me in my initial steps in this new discipline (Agardy, 1997, 2010). ICRAM provided the platform and funding mechanism for engaging in an unprecedented nationwide effort, "Sistema Afrodite," dedicated to the standardized monitoring of biodiversity

Figure 7. Joan Gonzalvo and an assistant follow a small herd of common bottlenose dolphins in the glassy surface of the Gulf of Ambracia, western Greece, 2006 (Photo by G. Bearzi/Tethys Research Institute)

and threats within the core zones of all the Italian MPAs of the time (Greco et al., 2004). It was an exciting program that saw the cooperation of about 60 researchers belonging to more than 20 research groups, and which allowed, among other things, the comparison among different Italian MPAs in terms of actual enforcement effectiveness (Guidetti et al., 2008). Unfortunately, in 2003, the right-wing government of the moment, whose environment-unfriendliness was above average, decided to avail itself of the spoils system to throw me out of office, and ICRAM was eventually merged into a greater, mostly terrestrial-oriented environmental protection and research agency. Needless to say, marine conservation issues had become a lower priority in the new organization, and "Sistema Afrodite" was killed in its cradle.

Having served for over seven years to contribute to the marine conservation policies of my country, irrespective of the political connotation of the various governments alternating during my two mandates, I felt bitter about having been caught in the spoils system like a politician, which I never wanted to be and never was. However, this setback coincided with my increasing engagement in conservation at the regional and international levels; in the end, it provided a powerful stimulus for personal growth and renewal. In those years, the CMS "Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area" (ACCOBAMS; www.accobams.org) was warming its engines in Monaco before coming into force in 2002; I had cooperated intensely with the agreement's Executive Secretary, Marie-Christine Grillo, to help lay the foundations of a regional cetacean conservation strategy. At the first meeting of the agreement's parties, I was nominated chair of the ACCOBAMS Scientific Committee, a post which I held until I decided to step down in 2010. I must admit that my decadal involvement with ACCOBAMS and the opportunity of playing a role in cetacean conservation science at the Mediterranean level, something I threw myself into with body and soul, contributed to a terribly exciting period of my life. It was a unique occasion for stimulating conservation science; inventorying cetacean populations, their habitats, and their threats; and supporting conservation capacity building across the steep gradients of nationalities, cultures, and environmental commitments and sensibilities that make up the unique Mediterranean soul (Notarbartolo di Sciara & Birkun, 2010). I am certain that during its first 10 years of existence, ACCOBAMS stimulated a huge progress in the understanding and awareness of cetacean conservation needs in the region, through the work of its Secretariat and its Scientific Committee, now valiantly chaired by Alexei Birkun from the Ukraine. Significantly, a link had been created between ACCOBAMS and IUCN's Species Survival Commission, and most relevantly the Cetacean Specialist Group (of which I have been deputy chair since 1997), whereby a number of cetacean Mediterranean subpopulations were assessed and included in the *Red List*: short-beaked common dolphins (Bearzi, 2003) and sperm whales (Notarbartolo di Sciara et al., 2012) as Endangered; and fin whales (Panigada & Notarbartolo di Sciara, 2012), common bottlenose dolphins (Bearzi et al., 2012), and striped dolphins (Aguilar & Gaspari, 2012) as Vulnerable. On the other hand, I must admit that my involvement with ACCOBAMS was also a growing source of frustration caused by the dismal availability of the parties to respond to the concerns raised by the Scientific Committee with clear, effective conservation and management actions. Although our knowledge of Mediterranean marine mammal ecology is still incomplete, huge progress was made in the past three decades. And, I can state with conviction that scientific uncertainty cannot be used any longer as an excuse for management inaction. Once again, I found myself banging my head against the brick wall of political and bureaucratic ineptitude, indifference, and shameless disregard for undertaken commitments. Among the many examples I can provide, I will only mention here a common dolphin conservation plan never implemented, a much-needed region-wide cetacean population survey never funded, a driftnet ban insufficiently enforced, and the turning of a blind eye—or perhaps more appropriately, a deaf ear—to a growing intensity of noise-generating activities by the oil industry and the military in the region, including in well-known critical habitats of particularly sensitive cetacean species and in protected areas such as the Pelagos Sanctuary.

Decades after having been immersed into Mediterranean cetacean conservation science,

monk seals suddenly appeared on my radar screen in 2008, when the Hellenic Society for the Study and Protection of the Monk Seal—also known as MOm—charged me with the drafting of the Greek national strategy for the conservation of this highly charismatic, yet critically endangered pinniped (Notarbartolo di Sciara et al., 2010). *Monachus monachus*, once widely distributed across the Mediterranean, the Black Sea, and part of the northeastern Atlantic (including Madeira, the Canaries, the Cape Verde islands, and the northwestern coast of Africa from Morocco to Mauritania), now resists in isolated pockets of its former range, with no more than a few hundred individuals in total. During the past three decades, the species was practically extirpated from the western Mediterranean basin, where from time to time only a few isolated individuals make their fleeting appearance in the most unusual of places (e.g., Mo, 2011). In the eastern Mediterranean, by contrast, monk seals are still present with small breeding nuclei scattered around the Greek and Turkish coastlines (Aguilar & Lowry, 2011). Thereby, I am convinced, lies the key to monk seal recovery because if we manage to secure them where they still reproduce, the monk seals will have the chance of eventually becoming more widespread and recolonizing their former habitat elsewhere in the region. Even though Mediterranean monk seals are among the world's most endangered marine mammals, I believe that there is hope of reversing their declining trend because we know pretty well what factors are causing their decline—deliberate killings by fishermen and encroachment of the monk seals' habitat by highly disruptive human presence—and doing what needs to be done to address such threats does not involve rocket science (Notarbartolo di Sciara, 2010). During the last decade, we keep hearing of individual monk seals being sighted in locations from which they had disappeared for a long time, such as the northern Adriatic Sea, the Egadi islands in Sicily, and Sardinia, and hoping that the species will eventually be able to make a recovery does not sound as crazy to me today as it did a decade ago.

Figure 8. Maude Jahoda introducing ecovolunteers to a pod of long-finned pilot whales dozing in the waters of the Pelagos Sanctuary, 2009 (Photo by M. Zanardelli/Tethys Research Institute)

My story ends here, although the story of Mediterranean marine mammal conservation is obviously continuing. Hopefully, better results than what we could obtain up until now will be seen in the future, as I wished in my preface to this historical overview. The experience of the past three decades has been exciting at times, but very often frustrating through the realization of how little traction all these efforts have had so far on the reality of things, and in particular on the lives of the individual animals and populations.

Are Mediterranean marine mammals better off today than they were 30 years ago? I think not. Even if governments were to effectively address the negative effects of the many human pressures, such as fishing and pollution (which they aren't), the specter of climate change is looming, with its many possibly dire consequences that for the moment remain largely conjectural. Conditions are not likely to get any better in the near future. However, one could speculate that many of the Mediterranean marine mammal species would be much worse off now than three decades ago if nothing had been done. All the species that were present in the region then are still present today, in spite of the incontrovertible deterioration of the general environmental conditions of the Mediterranean; even the critically endangered monk seal still harbors hopes of regaining lost ground. In conclusion, the war on behalf of Mediterranean marine mammals is far from being lost, and therefore, it would be foolish to give up; the fight must go on. I am not sure whether the conservation community should just continue with the actions we have been implementing for decades—that is, lobbying decisionmakers for a more incisive and effective application of conservation policies; promoting awareness throughout all sectors of civil society; and providing robust, science-based elements necessary for systematic conservation planning—hoping that the dearth of concrete results until now is simply due to the long timescale needed to reach the desired change; or if there is a need for a bold paradigm shift in conservation strategy, the direction of which unfortunately remains totally obscure at this time.

As far as I am concerned, even though I am approaching my mid-60s, retirement is not in my plans. Fortunately, compared to when I began my career, I have clear evidence from Tethys and through my teaching position at the University of Milan that many young brilliant researchers now

exist, eager to swell the ranks of those who support marine conservation in the region.

During the course of my professional life, I have come across many take-home lessons. Here are a few which seems particularly important to me.

Relationship Between Science and Politics

Tons of ink have been used on this subject, so I am going to be very short here. Conservation is ultimately a political action because it involves shaping the behavior of people; science's role is merely a supporting one, as crucial as it may be. The main problem I have encountered with political action in the region I've been concerned by is lack of follow-up to undertaken commitments. Even though an MPA is declared by law, it doesn't mean the area is protected yet. Once the ACCOBAMS parties adopt a resolution on anthropogenic noise, the problem is not addressed until the provisions of the resolution are implemented. Unfortunately, this rarely happens, and therefore politicians need prompting by watchdogs from civil society, with the support of scientists. Surely, politicians and bureaucrats are not necessarily all bad (although many of them indeed are); very often it is the system they work in that forces them to malfunction. In this respect, I can testify that being outspoken with politicians is a must, but it can carry a price. Our only armor is the solidity of our arguments because, in the end, it will be these that win. Our values will survive us and prevail in the end, if they have merit.

Relationship Between Science and the Public at Large

We badly need to bring the wider public to the side of the environment because, in the end, the public will influence political action. Although huge progress was made in this domain in the past 30 years, it is far from enough. The majority of the people out there are still too unaware and, ultimately, too unconcerned to make a difference. I have been trying to convey to the Italian public my fascination of and concern for the sea through all the available media for half of my life, and the results continue to appear dismal. I think that convincing the wider public of the urgent need to conserve the sea is the toughest nut to crack in the process of improving the conditions of the marine environment.

Data Sharing

Scientists collect data so that natural phenomena can be understood. Some of these data are used to publish scientific papers, but a large part of the total often remains unused and is left to wilt, forever inaccessible, inside the researchers' closets (Pullin & Salafsky, 2010). This is a tragedy that must be addressed because the availability of data is one of the main bottlenecks impairing scientific progress, and the notion of data that could be available but are inaccessible is one of terrible waste. Based on such a tenet, Tethys has deposited all of its sightings data with OBIS SEAMAP, an online database aggregating marine mammal, seabird, and sea turtle observations from across the globe (http://seamap.env.duke.edu/dataset/774; http://seamap.env.duke.edu/dataset/776).

Supporting the Growth of Conservation Science

What I mean by this is helping younger people to meet the challenges posed by starting off a career in a rather unfriendly and uncertain setting. My own experience has taught me an invaluable lesson because I know that I would never have been able to accomplish even a small fraction of what I did without the fundamental and unselfish support of the many wonderful people who decided to lend a hand in the early stages of my professional life. Faced with the question of how to pay back for such extraordinary service, I realized that the only option is to behave similarly with the younger generation. If one is willing to stretch the concept a bit, such behavior makes even evolutionary sense (W. D. Hamilton permitting). Assuming that the conservation community is "kin," it seems sensible that older members of the community should take on the small cost of supporting the younger with advice and help, which would give huge benefits to the latter and ultimately enhance the community as a whole. Based on this, I have always tried to go out of my way to be helpful to young people coming to ask for advice.

Why Bother?

Indeed, why bother to spend one's life to help preserve a natural heritage that 99% of the people one comes across don't seem to care for? The question "Why am I doing all this?" used to surface frequently in my mind. To be honest, in nursing my concern for the future of marine mammals, or of any component of the natural world for that matter, my role model was neither Don Quixote nor Mother Theresa of Calcutta. As I mentioned in my preface, the real reason why I am doing what I am doing is that it makes me happy. It must be my karma. If anyone finds ethical merit in this type of activity, I guess it doesn't hurt. But it is not because of that that I have been doing it.

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