



Barth and Trindade Island, 1957-1959*

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Abstract

Rudolf Barth took part in two scientific expeditions to Trindade Island, Brazil, in 1957 and 1959. As a backdrop to comments about his reports, the article tells the island's history and describes the national and world context in the 1950s. Barth warned about the environmental threats to Trindade, diagnosed its problems, and proposed solutions. He described endemic and invasive species. Aware that the brevity of his stay constrained his findings, he advocated further research at differing times of the year. Contemporary scientific practices corroborate a number of his analyses. Since the late 1950s, Trindade has served not only as a metaphor for global environmental challenges but also as a laboratory for conservationist measures.

Keywords: Rudolf Barth (1913-1978); Trindade Island; International Geophysical Year; conservationism; islands.

A noddy

Among the photographs that document scientist Rudolf Barth's expedition to Trindade Island, one in particular stirs our curiosity: the image of an encounter between this zoologist and a seabird, posed confidently in his hand.¹ Taken at face value, the image might convey the idea that Barth's trip was an exemplary experience in harmonious relations between man and the environment on an island paradise in the middle of the Atlantic Ocean, cut off from civilization and with no human inhabitants. But the accounts of Barth's two expeditions to Trindade soon reveal the complexity of the island's environmental history, rendering wholly inappropriate any idealized perspective of nature.

We might presume that the bird in the picture was a member of the species *Anous stolidus* (Linnaeus, 1758), commonly known as the brown noddy (*trinta-réis-escuro*), a seabird with a pantropical distribution observed by a number of scientists on Trindade Island during breeding season, between the months of September and March. Barth's first expedition took place between August and September 1957, the season these birds arrive on the island, initially only in the afternoon and then gradually increasing the time they spend there (Fonseca Neto, 2004, p.133). Surprisingly, however, Barth only mentions observations of nesting *A. minutus* (black noddy; *trinta-réis-preto*), so, in consistency with his account, this would be the bird perched in his hand.² While the two species look somewhat similar, they differ in color, size, and geographic distribution. The black noddy nests in the Northern Atlantic and, within Brazilian territory, is regularly found on Fernando de Noronha, the archipelagos of São Pedro and São Paulo, and on the Atol das Rocas reef. Still, it is plausible that Barth did indeed find specimens of *A. minutus* flying off route, outside its usual habitat. The photograph was taken aboard ship and the bird might have been lost in the ocean. The movements of this species remain unknown.

That this species is occasionally observed on Trindade or nearby – reported in different seasons – can be explained by the Brazil current, which flows southward from the equatorial region parallel to South America's eastern coast and can prompt some of these birds to migrate to higher latitudes (Barbieri et al., 2010, p.243).³

Yet if the meeting between Barth and the *A. minutus* in the southern Atlantic in 1957 seems like a relatively rare accident, what is truly remarkable is that the zoologist and others were on Trindade Island aboard the Brazilian Navy vessel Navio-Escola Almirante Saldanha. The reason for their trip was to make Brazil part of the International Geophysical Year (IGY).

At that time in history, the IGY was the largest collaborative scientific program ever undertaken. Spanning the period from July 1, 1957 through December 31, 1958, it involved governments and scientists from about sixty countries in a set of investigative actions aimed at acquiring knowledge of various geophysical aspects of our planet Earth. Research included topics like solar activity, aurora and airglow, ionospheric physics, latitude and longitude determination, oceanography, meteorology, geomagnetism, glaciology, climatology, rocketry and satellites, seismology, and gravimetry. The idea had first been put forward in 1950 by U.S. scientist Viel Lloyd Berkner (1905-1967) and eventually gained the support of the Mixed Commission on the Ionosphere (MCI), International Council

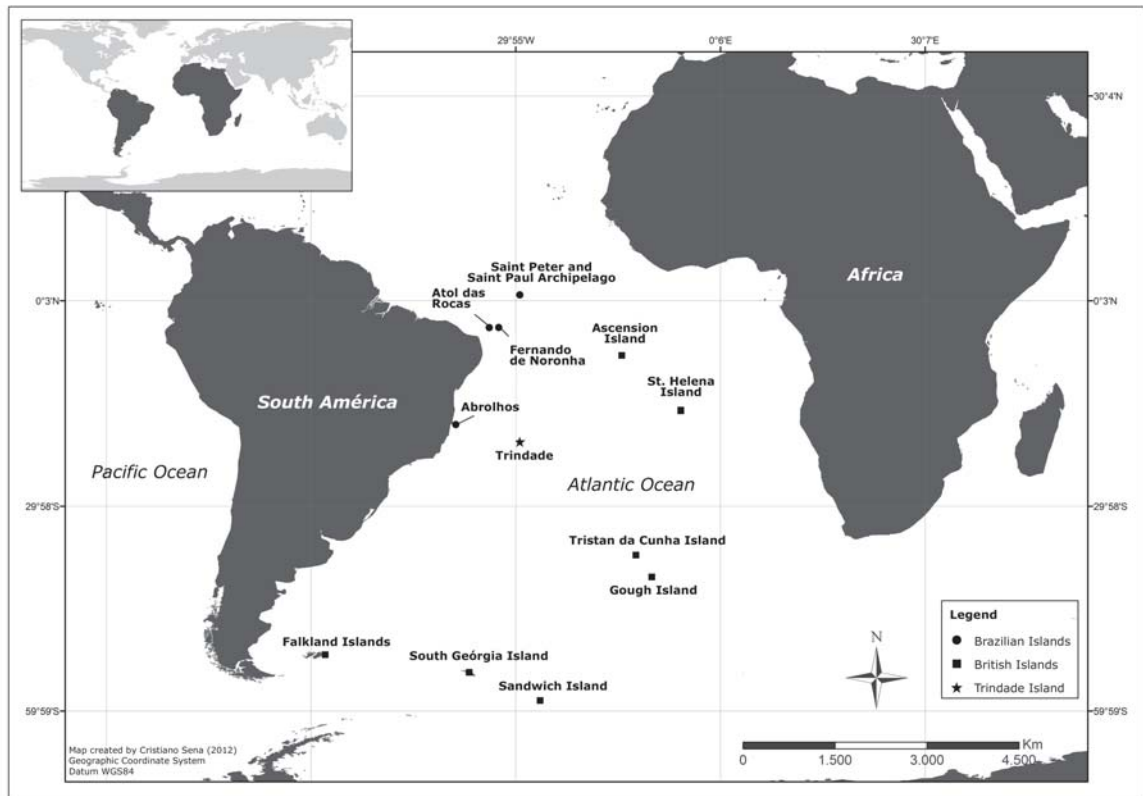
of Scientific Unions, Union Radio-Scientifique Internationale, Union Astronomique Internationale, Union Geodésique et Géophysique Internationale, and, last but not least, the United Nations Educational, Scientific and Cultural Organization (Unesco). In 1952, the latter agency guaranteed generous financing for preparation of the event and for the organizing committee. While the IGY was modeled on the two International Polar Years (1882-1883 and 1932-1933), which had studied the Arctic and Antarctica, both IGY investigations and participants were more wide-ranging, representing “an inspiring example of international understanding and co-operation”.⁴

Its ambitious goals encompassed the resolution of various impasses facing the scientific community back then, the tailoring of research to new possibilities in technology, and installing and gauging different measuring devices at distant spots under varied meteorological conditions (Buedeler, 1957). The event was undeniably a piece in the Cold War, with space projects then demanding a veritable leap in knowledge.⁵

Brazil quickly embraced the IGY with the intention of joining in international scientific progress, certainly spurred by the developmentalist optimism of these “golden years.” Then in a period of democracy, an enthusiastic Brazilian society watched the first steps in implementation of President Juscelino Kubitschek’s Goals Plan (Plano de Metas), which would transform the country’s energy, transportation, and base industries, mechanize agriculture, and establish an automotive industry as part of a concerted effort to overcome backwardness. Fifty years of progress in five: this was the slogan that fueled the hopes of Brazil’s expanding middle classes. The public enjoyed new and rising consumption standards while experiencing the excitement of the ‘radio days’, the arrival of television in Brazil, Atlântida studio’s musical comedy productions for the screen, the fever of Hollywood movies, and a profound aesthetic renewal in the arts. In March 1957, Lucio Costa’s urban design project won the bid for construction of Brasilia, the planned city that symbolized a national future of political, economic, social, and aesthetic conquests and achievements. On the international stage, there was something of a thaw after Stalin’s death in 1953. With Nikita Khrushchev in power, the Soviet Union moved beyond purely military rivalry, emphasizing economic and technological competition as well (ergo, the October 1957 launching of Sputnik, the first artificial satellite). Brazil remained firmly aligned with the United States. One of the markers of this alliance was the December 1956 agreement that allowed the U.S. Air Force to build a base on the island of Fernando de Noronha to track guided missiles launched from Cape Canaveral in Florida.

Transpiring in this context, the expedition to Trindade Island was made under the decisive leadership of the Brazilian Navy, which was also keen to score technological advances.⁶ As an integral IGY activity, the Almirante Saldanha training ship⁷ set sail for Trindade to establish a weather station there. Lying some seven hundred miles from the continent (1,140 km east of Vitória, capital of Espírito Santo), the island offered a prime location for observing ocean tides and climate (Mayer, 1957, p.40) (Map 1).

It is estimated that Trindade (20° 30’ S, 29° 20’ W) appeared about three million years ago as a result of the volcanic activity that formed the Vitória-Trindade seamount chain. The most recent volcanic activity took place roughly five thousand years ago and left an extremely rugged formation of steep slopes and deep valleys spread across the island’s area



of approximately ten square kilometers (over 3,300 sq ft), resting on the ocean bed at a depth of nearly 5,500 meters (18,000 ft).⁸ Trindade has fresh water springs and a semi-humid tropical climate tending to semi-arid, with a low average annual rainfall and two seasons (dry from January through March). Southeast trade winds prevail (Barth, 1958, p.262-264; Almeida, 2002, p.371-372; Serafini, França, Andriguetto-Filho, 2010, p.285-286; Alves, Silva, Aguirre-Muñoz, 2011, p.259). There were no native humans on the island until five hundred years ago, when sporadic occupation began.

The 1957 expedition found an island filled with mysteries for the day's scientific community. In his report, Barth shows an avid thirst for knowledge and endeavors to provide geophysical information and broad notions of flora and fauna, subjects impossible to cover during his brief stays observing and conducting research on the island.⁹ So there is considerable doubt about the noddy described by the German zoologist. Is the bird in the photograph really an *A. minutus*? What explains the fact that Barth's report contains no observation of the *A. stolidus* during that time of the year, when it nests on the island? There were so many aspects, so many things to observe. Whatever the species of noddy that posed on Barth's hand, the lyric moment caught by the photographer can be interpreted as heralding the rich potential for studies, research, and reflection on man and environment that was opened by the Navy-led expedition as part of worldwide scientific and technological efforts during the IGY.

A lead chest

On January 11, 1897, the cruiser Benjamin Constant left Rio de Janeiro for Trindade. After nine days on rough waters, its repeated attempts to reach the island's shore met with failure. On January 24, thirty-two men – including highly skilled swimmers – managed to reach land on a *jangada* (ocean raft) fixed by cable to the ship. They took with them signs to mark the territory as Brazilian: national flags and a wooden chest welded shut inside a lead one. Inside was a writ of possession, signed by the commodore and his officers, along with their business cards, newspapers from Rio, Brazilian coins, and a portrait of then President Prudente de Moraes. As the trunk was buried, the flag was raised and all cheered (Moreira de Azevedo, 1898, p.23-29).

This event marked the end of the tense dispute between Brazil and the United Kingdom over the island of Trindade. A few years earlier, in November 1893, the president of the Telegraph Construction and Maintenance Company of London wrote to the British secretary of Foreign Affairs, asking that the island be occupied because telegraph cables needed to be laid for the line extending from Ascension Island to Buenos Aires. In justifying this intention, the request cited Edmund Halley, the famous British astronomer who in April 1700, on a journey to investigate Earth's magnetism as commodore of the HMS Paramour, reached the island, claimed possession of it in name of the queen, and left his country's flag. It also mentioned British occupation of the island in 1781, when Captain Johnstone left St. Helena and landed his troops in Trindade (Marston, 1983, p.222; Brito, 1877, p.251; Lobo, 1919, p.113).

The Portuguese discovered Trindade Island at the dawn of the sixteenth century but there are no reports of human presence until the eighteenth. When Halley was there, he left behind not only the British flag but also some goats (*Capra hircus*), boars (*Sus scrofa*), and helmeted guinea fowl (*Numida meleagris*) so the next navigators, or perhaps the shipwrecked, would encounter easy means for survival. It's not unlikely that he also inadvertently left house mice (*Mus musculus*) and parasitic bugs (Alves, Silva, Aguirre-Muñoz, 2011, p.260). In 1724, news that the island was being used by British slave ships prompted Dom João V to order the governor of the captaincy of Rio de Janeiro to build a fort there. But the order was not complied with, perhaps because it was so hard to reach the location. Trindade is not a welcoming port for navigators. Its coastline is surrounded by reefs and landing is particularly hard, both because of rock outcroppings and because shifting winds make for rough waters, with no shoreline that facilitates disembarking.¹⁰ Even today, ships drop anchor short of the island, with tenders or helicopters completing the trip ashore.

In June 1756, Dom José I launched another foray to guarantee Portuguese possession; he ordered the exploration of the Trindade and Martim Vaz archipelago to check for possible ports, verify latitudes and longitudes, and study winds. Two expeditions were carried out with little success (Lobo, 1919, p.113). The British proved more efficacious. In August 1781, they established a fortress on the island. The Portuguese government lodged its protest through its representative in London, who in May 1782 firmly asked the British government to evacuate Trindade. The Portuguese government reaffirmed the legitimacy

of its claim to the land, given that the country had discovered the island centuries earlier. The impasse was quickly resolved. In August that same year, the British government ordered its troops to evacuate the island. When Portuguese ships reached it in December 1782, the British had already left, leaving behind only material signs of its occupation and a herd of sheep (*Ovis aries*). This increased the diversity of invasive animal species, alongside the wild pigs, goats, and chickens that Halley had left decades earlier (Marston, 1983, p.223; Alves, Silva, Aguirre-Muñoz, 2011, p.260; Lobo, 1919, p.114-118).

Portugal decided to effectively occupy the island in 1783, populating it with soldiers and civilians, including six couples from the Azores. In addition to establishing this embryonic settlement, the government ordered natural history material to be collected and sent to the Casa dos Pássaros, founded in 1784 in Rio de Janeiro (Alves, 1998, p.38). In October 1785, navigator Jean François Galaup, the Count of Laperouse, caught sight of the island and of the Portuguese flag flying above a few wooden houses. The dinghy he sent ashore had to employ mighty forces to plow through the powerful waves. His men encountered some soldiers who kept them from traveling about the island for scientific observations. The soldiers also refused them provisions, arguing that they had almost nothing on the island since supplies only arrived from Rio de Janeiro every six months.¹¹ That same year, Dom José Luís de Castro, Count of Resende and viceroy from 1790 to 1801, ordered the island abandoned; in complying with the order, the temporary inhabitants left behind some tame cats and other vestiges of their ten-odd-year stay (Alves, Silva, Aguirre-Muñoz, 2011, p.260). We can imagine that the cats had been brought in to keep the mice from devouring the island inhabitants' meager provisions.

Now with ruins attesting to earlier human occupation, along with goats, boars, sheep, guinea fowl, cats and mice, the island received unusual visitors in 1817. The *Jeune Sophie* had left Europe in August and a fire onboard resulted in disaster. Twenty-seven survivors of the shipwreck made it to the island, six of whom took off in a small boat in a desperate attempt to seek help. They reached Rio but when they went back for the others, they found no one, as all had been rescued by another vessel (Brito, 1877, p.261-265; Lobo, 1919, p.122).

After the news of this surprising event hit the papers, Trindade Island returned to relative oblivion, to the point that Brazil's declaration of independence made no mention of its belonging to the new Brazilian nation. Scant news of the island came from scientific expeditions, like La Coquille's (1822), and from naturalists on various vessels, like James Dalton Hooker, who reached Trindade in 1839 with the ships *Erebus* and *Terror*, and Ralph Copeland, who arrived aboard the *Venus* in 1874.¹² Some Brazilian corvettes also passed by, such as the *Itaparica* (1822), *Sete de Abril* (1846), *Dona Isabel* (1856), *Nitheroy* (1871), and *Bahiana* (1873) (Lobo, 1919, p.122-123; Moreira de Azevedo, 1898, p.15-16). Some accounts describe the difficult access to the island, which was totally barren of plantlife yet boasted water sources and the unusual presence of domesticated animals.¹³ Despite occasional visitors, Trindade remained uninhabited throughout the nineteenth century. It was deserted, with no signs of man or of ownership, when the British ship *Ruby* went aground there in 1889 (Lobo, 1919, p.123); it may have been reports from this ship that fed the telegraph cable company's greed shortly thereafter. The news that it lay

uninhabited also sparked the imagination of U.S. journalist and businessman James Harden-Hickey, of New York, who – though he'd never set foot on the island – proclaimed himself James I, prince of Trindade, and sent letters to several nations asking to be recognized (Marston, 1983, p.125; Lobo, 1919, p.123).¹⁴

In 1895, in response to the telegraph line project, the British warship H.M.S. Barracouta set sail for the uninhabited island of Trindade; on February 4, 1895, its commodore proclaimed ownership of the territory, as if it belonged to no nation. He declared “to all men that from and after the date of these presents, the full sovereignty of the Island of Trinidad and the adjacent rocks of Martim Vaz. ... vests together with their dependencies, in Her Majesty Queen Victoria, her heirs and successors, for ever” (cited in Marston, 1983, p.226).

The Brazilian government was swift to respond. Negotiations were tense. England alleged that the island was abandoned, while Brazil listed among its arguments the island's discovery by Portugal, the departure of the British in 1782, and sporadic mentions of the island in Brazilian documents throughout the nineteenth century. The situation was only settled with the intervention of Portugal, which officially declared it had bequeathed Brazil the island at the time of its independence, in 1822. Marked by heated controversies and interpretations and re-interpretations of international law, the crisis continued until England ceased occupation, pulling its troops out in August 1896 (Correia, 1896; Marston, 1983).

In addition to British avarice and the eccentric plans of the self-proclaimed James I, the island spurred the ambition of other adventurers, thanks to legends and reports about incredible treasures buried in the sand by pirates, stories that spread in the final decades of the nineteenth century. It is said that these legends drew no fewer than twelve expeditions between 1885 and 1916, all fruitless despite frenzied searching and excavation (Lobo, 1919, p.128-130; Miranda Ribeiro, 1919, p.171).

In September 1914, shortly after the outbreak of World War I, the Battle of Trindade was fought there between the German cruiser Cap Trafalgar and Britain's Carmania, ending in the sinking and defeat of the German vessel. News of this clash prompted the Brazilian government to occupy the island with military forces; a small detachment was sent aboard the cruiser Barroso with the material needed to build lodgings (Araujo, 2005, p.79-80; Mayer, 1957, p.114). On this occasion, Lieutenant Cantuária Guimarães made measurements to verify latitude, longitude, distance from the coast of Espírito Santo, and the island's area (Lobo, 1919, p.127-128; Ribeiro, 1951, p.302).

Taking advantage of the comings and goings of Brazilian Navy vessels, the National Museum in Rio de Janeiro conducted a scientific expedition to the island in 1916. Participants included physiologist Bruno Lobo, who was the institute's director, and physician and zoologist Lauro Travassos, of the Oswaldo Cruz Institute. Two members of the museum staff – a taxidermist and a petrography aide – stayed on the island for about six months, collecting specimens of fauna, flora, and minerals. This material fed the investigations of scientists Carlos Moreira (crustaceans and insects), Herman von Ihering (mollusks), Miranda Ribeiro (vertebrate fauna), Frederico Hoene (botany), and Travassos himself, as well as others. To undertake this military and scientific work, the Navy introduced

to the island some donkeys (*Equus asinus*), along with a bull and cow (*Bos taurus*), which died without leaving any young.

As soon as the war ended, occupation of the island did as well. In 1922, however, it was used as a prison by the Arthur Bernardes administration, which jailed rebel lieutenants Eduardo Gomes and Juarez Távora there, among others. After 1926, Trindade went through another period of abandonment, until a new military occupation, from 1941 to 1945.

In 1950, government authorities organized the João Alberto expedition in order to conduct “a systematic survey of geographic conditions and technical and economic problems” and to provide information for projects aimed at the “definitive economic occupation of Trindade Island.” Scientists and technical specialists from a number of fields were invited to join in the expedition, which was to involve astronomic, geodesic, and topographical surveys; an assessment of fishing potential; meteorological observations; research on energy supply; geologic, oceanographic, soil science, biological, and archeological studies; an urbanization plan; the solution of docking problems; a landing strip plan – in short, an array of information was to be surveyed to enable economic occupation of the island (Ribeiro, 1951, p.293-294). This occupation never occurred despite the valuable production of information about this fragment of Brazilian territory, systematized in reports that remain unpublished (Alves, 1998, p.40-41).

This was the extraordinary, long and winding history of Trindade Island, where Rudolf Barth headed in 1957. The entomologist had arrived in Brazil in 1950, no doubt dreaming of happiness and success for himself and his family. His curiosity about various aspects of the island’s geology, fauna, and flora show how highly motivated he was about taking part in the expedition. His notes reflect an effort to report as much as possible during his brief stay. Barth, an experienced zoologist, was surely aware of the risks involved in an endeavor of this magnitude under precarious conditions, and his reports manifest his enthusiasm about the challenge of inaugurating new paths in scientific knowledge.

Barth observed not only local degradation and the eminent depletion of invaluable fauna and botanical resources, lost to the island over centuries of exploitation by men, but also the animals that had been introduced and that destroyed plantlife and threatened the survival of autochthonous fauna. Much work would be needed, he concluded in an interview to the Rio de Janeiro newspaper *Última Hora*, to keep the island from turning into a “veritable desert in the midst of ocean waters” “in the near future” (cited in Mayer, 1957, p.125).¹⁵

Perhaps it was with Barth that a new idea about the potential value of Trindade took root. Unlike the adventurers who eagerly hunted for the alleged “treasure of Lima”¹⁶, in the second half of the twentieth century people began to consider the island itself a treasure, with its unique set of natural features as rare as they were fragile. All indications are that quite probably nothing more was ever buried there by human hands than the lead chest left by the Brazilian officers who retook the island in 1897, after the international crisis over its ownership.

An island in the South Atlantic

Down through history, islands have stirred ambiguous sentiments in the human imagination. They are the place of isolation and loneliness but also the birthplace of gods, mythical creatures, and heroes. Ulysses left the island of Ithaca to fight for the Greeks. Homer's account of his return home after the war and of the brutal adventures he had in his passage to other islands stands as a lasting reference point in Western imagination. Islands have harbored a vast edifice of dreams and have been the setting for social utopias, such as the ones described by Thomas More (*Utopia*, 1516) and Francis Bacon (*New Atlantis*, 1627). Shakespeare chose an island as the backdrop for the multifaceted plot of *The Tempest* (1616). Islands have served as a microcosmic metaphor for social criticism, as in *Gulliver's Travels* (1726), penned by Jonathan Swift. They have offered a starting point for ethical and philosophical debates on the human condition, as in Daniel Defoe's *Robinson Crusoe* (1719). Islands have also been scenes of royal punishment and ostracism, the case, for example, with the defeated Napoleon, who spent the end of his life confined to Saint Helena (Magalhães, 2001, p.5; Gil, 2001, p.12-23; Grove, 1995, p.33-42).

In the history of maritime expansion, islands constituted oases in the immensity of ocean waters, functioning as shelter, resting spots, and places where both strength and supplies could be renewed, "natural and mandatory inns and fortresses", "places for the initiation, formation, and experimentation of people and products, of techniques and customs" (Barreto, 2001, p.6).

As extremely diverse geographical complexes¹⁷, islands have come on stage in the modern world as the first warning sign that nature and the assets it affords human societies are finite. The conquistadors were well aware of the challenges of surviving on a ship, with limited reserves of water and food, under minimal conditions for maintaining life and health, and they quickly identified the same conditions in island environments. In the context of Europe's colonial expansion between the seventeenth and nineteenth centuries, many physicians and naturalists from the Netherlands, England, France, Portugal, and Spain were sent to these territories in the employ of conquering nations. On islands like Canary, Madeira, Azores, Mauritius, Saint Helena, and Barbados, Europe's colonial agents from the realm of scientific knowledge witnessed the consequences of violent deforestation. The destruction of flora and fauna, the drying up of water ways, and climate change all became visible in a relatively short time. In Western thought, islands, along with botanical gardens, became one of the most oft-cited sources of tropes about society, Earth, climate, and the economy. Easily destroyed, they display fragility but are also lush tropical paradises that nourish hopes of redemption. Harbingers of the destruction of the Earth, prime locations for experiments in conservationist practice, and meeting places for the luxuriant nature of the tropics, islands have become the locus of a new epistemology of the global environment in the modern Western world (Grove, 1995).

In the eyes of modern navigators in the South Atlantic, Trindade Island, as described here, did not offer a welcoming environment. Despite its drinking water sources, the tremendous hazards of landing made it just as risky to approach the island as to continue

the journey on to friendlier ports. Down through the centuries, the Portuguese Empire and, later, the Republic of Brazil defended this territory from British incursions, but its repeated abandonment evinces the uncertainties about its true value. In 1793, the Count of Resende described it as “a fruitless rock, with nowhere to lay anchor, nor any harbor, nor any way to approach it save for in small canoes, which are always exposed to the whim of very tall waves of a similar height, and under such circumstances serving little or no purpose” (cited in Lobo, 1919, p.121). Not long after Brazil’s victory in the diplomatic impasse of 1896 over possession of the island, descriptions of Trindade were bleak: “a granite marker in the vast ocean”, “a still-life monument”, an arid landscape devoid of trees or bushes, “sad, barren”, made of “craggy wind-swept rocks beaten by the waves” (Moreira de Azevedo, 1898, p.10-16). In 1916, Trindade was defined as “a severe, harsh, inhospitable, charred block”, horrendous at first sight, “leaving the impression that everything there would be reduced to ashes by the sharp cliffs” (Lobo, 1919, p.110-111). The terrain was so unstable that landslides were common and the soil gave way under foot, creating a “perpetual situation of insecurity” along paths made challenging by the rough terrain. Castigated either “by the wind, the rain, or the blazing sun”, visitors were also welcomed by persistent, bold, impertinent and plentiful crabs (*Gecarcinus lagostoma*) all over the island. With the trials of disembarkation behind the travelers, uncertainties about what lay ahead on their return trip still hung in the air, raising anxieties about the possibility of remaining isolated much longer than wished, since brusque and unpredictable changes in sea and winds could suddenly frustrate any departure plans (Lobo, 1919, p.133-148). Despite these gloomy descriptions of a horrifying place, the vision that had prevailed since the close of World War I was a strategic one, of the island as “a watchtower, a lookout point in the Atlantic” (Lobo, 1919, p.157).

Ever since its discovery, Trindade had been something of an enigma for the Portuguese authorities and later for the Brazilian as well. After all, exactly how much is an island worth when its access is so grueling that it is useless as a support point for Atlantic voyagers and when its environment is not propitious to any type of economic activity? Perhaps the successive British forays – Halley’s fleeting yet decisive presence in 1701, the British slave ships in the following decades, the impasses of 1781 and 1895 – led to the conclusion that the island deserved special care, even if no one knew just what it might be good for.

In the late nineteenth century, the international impasse over control of Trindade roused nationalist sentiments within the newly proclaimed Republic. News about the British invasion brought on riots and attacks to British homes and businesses in Rio de Janeiro (Moreira de Azevedo, 1898, p.17). However, we may well ask ourselves if the furious Brazilians knew just where Trindade Island was located, or if they knew anything at all about it. We imagine they did not, bearing in mind that there was some logic to the British initiative of occupying the island and expecting to hear no complaints, uninhabited as it lay for centuries. After all, as mentioned earlier, the small territory of some ten square kilometers was not explicitly listed on any documents concerning Brazil’s independence or on the territorial maps drawn up by the Empire of Brazil. If in 1895 Brazil needed arguments to prove its sovereignty over the island, available cartography provided no backing for this pressing need.

Maps are not merely compilations of geographic data. They are primarily instruments for affirming national territory (De Biagi, 2011, p.2). Throughout the nineteenth century, Brazil faced decisive moments in defining its borders with other South American countries but its Atlantic islands were never the special object of national cartography. It is clear that the *Atlas do Império do Brasil*, published in 1868, locates Trindade on the world map and includes it on the list of Brazil's noteworthy islands and lakes. But it completely disappears on more specific maps (Almeida, 1868, maps I, IIA, and IIC). *Carta do Império do Brasil*, of 1873, does not show the island, nor does *Mappa do Imperio do Brazil*, of 1878. Devoid of people, left off maps, Trindade Island was far from being a place that had been effectively affirmed as part of the nineteenth-century Brazilian nation, until the episode of British occupation.

That Trindade was omitted from the *Carta do Império do Brasil* of 1873 is significant. This map was produced by the Baron of Ponte Ribeiro (1795-1878), a key figure in the construction of Brazilian cartography within the sphere of South American border disputes. A physician, diplomat, and cartographer, he was consul for Brazil in a number of countries and negotiated Brazilian borders with Peru and Bolivia between 1836 and 1841. The island's absence offended a contemporary of his, a coronel from the army corps of engineers, archivist at the Military Archives in Rio de Janeiro, member of Brazil's Institute of History and Geography (Instituto Histórico e Geográfico Brasileiro), and founding member of the Polytechnic Institute: Pedro Torquato Xavier de Brito. He dedicated his *Memória Histórica e Geographica da Ilha da Trindade* (Historical and geographic memoir of Trindade Island) to the Baron of Ponte Ribeiro. In the text, he surveyed vast documentation and provided detailed geographic, historical, and cartographic information on Trindade (Brito, 1877). Was his writing intended to call the attention of Brazilians and, of course, the Baron of Ponte Ribeiro, to the importance of this territory? Or was it the Baron himself who asked him to draw the study up because – his omission of the island from his map notwithstanding – he sensed an urgent need to better know the island's history and geography?

Trindade Island, as we saw earlier, was the setting for James Harden-Hickey's outlandish utopia, for the ambitious dreams of adventurers in search of the "treasure of Lima", and for the Arthur Bernardes administration's repression of its opposition. Finally, in 1957, the Brazilian government turned its attention to the island, viewing the IGY as an opportunity to fully incorporate it into the national territory and construct new meanings for Trindade Island in the eyes of Brazilians and the rest of the world. Barth's account is part of this effort, and his proposals remain with us today. Trindade Island has been transformed: once a useless, frightening outcropping of rock, it is now viewed as a matchless natural paradise, proudly protected by the Brazilian Navy and the target of conservation action by researchers with ties to major science institutes in Brazil. As put so well in the title of a 2011 documentary, Trindade Island has become a "strategic paradise".¹⁸

Five streams, two streams, one...

Rudolf Barth made two expeditions to Trindade Island. The first ran from August 26 to September 13, 1957¹⁹; the second was in June 1959, when he stayed on the island only a day.

As mentioned at the beginning of this article, Barth was an experienced zoologist who knew the limitations that such short stays placed on his mission. In the report he wrote in 1957, he warned readers that the conditions under which the investigation had been carried out were precarious. The number of species of fauna found and described could not represent the island's reality, as the timing of the expedition coincided with the dry season. He emphasized insects but also focused on species from other groups in the animal kingdom. Barth took note of geographic, geologic, climatological, and botanic data as well. In the effort to encompass at least something of this myriad information, the report ended up offering "an incomplete look at the island." Barth knew that more systematic results would only be achieved through research at different times of the year, including visits to the Martim Vaz islands, lying a few kilometers from Trindade.

Perhaps because of these constraints, the report fails to explain some essential data. There is no mention either of essential methodological procedures or of the materials used; it is not clear if specimens were collected and, if they were, what methods were used to do so, how many specimens were gathered, how they were preserved, or what was done with them. Phrases like "often found" give only an imprecise notion of qualitative and quantitative aspects of the presence of the observed species. Some deductions also lack scientific proof, such as the statement that the pleasant taste of the boar meat indicated that the animals probably did not eat fish.

We must, however, take Barth's report within the context of the limited circumstances under which his research transpired. There is no doubt that the zoologist drew a valuable overall panorama, diagnosing problems and presenting suggestions whose pertinence has been corroborated by scientists devoted to studying the island in subsequent decades. In his observation of various aspects, a key question stood out for Barth and became the central thread of his impressions about Trindade: the island was in a process of rampant deterioration that had to be dealt with. In 1916, writes the zoologist, the National Museum's mission had recorded the existence of "five" permanent streams. In 1950, "two" streams were seen. Barth found only "one" of the streams that had been described earlier, although his mission's reporter saw three miniscule rivulets that did not appear in earlier accounts. The island's fresh water sources were drying up at an alarming rate and the reasons were obvious: all of them depended on the plantlife that had in turn been almost completely destroyed by grazing herds of goats, sheep, and boars, introduced centuries before and breeding since. Plantlife was also affected by the constant tramping back and forth of the animals and by the boars' voracious rooting about for food. The disappearance of ground vegetation and the steady destruction of trees, bushes, leaves, bark, and roots stripped the soil, which became dry and unstable, cut through by gulches and always about to collapse.

Besides destroying flora, the invasive animals competed with and destroyed the endemic fauna, comprising seabirds, crabs, and sea turtles. Although there were not many cats, for example, they still ate a portion of the eggs laid by birds nesting on the island, jeopardizing reproduction. Among insects, Barth found species that were likely introduced along with the garrison's supplies, or as parasites of mammals brought to the island: moths, cockroaches, flies, and fleas. The grasshopper population was on the verge of becoming a

plague, putting even more pressure on sparse plant cover. He also observed dragonflies, beetles, butterflies, and other insects.

Barth's attention was drawn especially to *Chelonia mydas* sea turtles, the island's only reptile. Upon arrival, he found signs of spawning, which occurred between April and May, on various beaches. However, he heard reports from people who had witnessed attacks on the eggs (calculated at around 1,500 per year) by boars, who rooted out and ate thousands of eggs. As this was one of the few places in the Brazilian territory with an abundance of sea turtles, Barth predicted they would disappear in a few years if nothing were done about it.²⁰

A careful observer would note signs of a different past: Barth found dead trunks up to thirty centimeters (nearly one foot) in diameter all over, evidence of the earlier existence of woods and of the sharp retreat of the island's plantlife.²¹ The island was in countdown mode and, given this diagnosis, it could only be saved with imperative measures. All animals that had been introduced to the island would have to be eliminated and the soil restored through the systematic planting of resistant trees. In terms of reforestation, the vital consideration would be to reestablish the original flora to avoid the risk of invasive species once again bringing imbalance to "the primitive sociological composition, adapted to the climate of the island" (Barth, 1958, p.273).

Barth's account reveals a protectionist sensitivity rare in post-World War II Brazil, when the push for development and the praise of progress overrode the first half of the century's not negligible tradition of defending the environment (Franco; Drummond, 2009; Duarte, 2011). The firm and urgent measures that Barth called for in hopes of solving the small island's grave environmental problems found echo in the successful actions of other scientists and of the Navy in the following decades. Today Trindade Island displays another panorama and a different outlook for the future. It has not, as Barth feared, become a tiny desert in the midst of the Atlantic Ocean.

A frigatebird

During the 1916 expedition, two technicians from the National Museum who collected and preserved specimens stayed on Trindade for six months, "cut off from the world". They gathered material for study and recorded observations "in this rough territory of Brazil" that would be useful to science (Lobo, 1919, p.107). One morning as baby sea turtles were being born and heading to the sea, Pedro Peixoto Velho decided to protect them from the island's natural, native predators: crabs and frigatebirds. The birds tried to rip the turtles from Pedro's hands, fearlessly attacking him. Unsuccessful in his attempts to defend himself with a stick, he picked up a shotgun and brought down several of them, including one that had just gobbled up a baby turtle. He took a knife, opened the predator up, and pulled out three tiny living turtles, which, "once put in the water, quickly disappeared" (Lobo, 1919, p.149).

Trindade Island has two endemic sub-species of frigatebirds: *Fregata mino nicolli*, or great frigatebird (*tesourão-grande*) and *Fregata ariel trinitatis*, the lesser frigatebird (*tesourão-pequeno*). A very small number of individual specimens of both are alive today. They are

classified as critically endangered (CR) in Brazil. There have been no records of their nesting on the island since 1975 (Olmos, 2005, p.22; Alves, Silva, Aguirre-Muñoz, 2011, p.262). They feed off fish, and *F. minor* also hunts newborn sea turtles.

The 'protective' action taken by Pedro – the museum collector who was moved by the baby turtles' fight for survival – fell far short of addressing the main problem faced by this species on Trindade. As Barth ascertained years later, the boars that had been there since the eighteenth century and that had been re-introduced several times, represented the real threat to the turtles, as they quickly devoured thousands of eggs. Crabs and frigatebirds were responsible "for a natural measure of elimination", without representing any true danger for *Chelonia mydas*, "living documents of a paleontological epoch," whose total disappearance loomed imminently (Barth, 1958).

Because it is so small and its distance from the continent leaves it isolated, Trindade Island has a substantial proportion of endemic species. As occurs in island environments, the high percentage of endemic species implies greater vulnerability, given factors like a restricted geographic space, the specificity of interactions between the specific biotic and abiotic environments, and lesser genetic variability. In the case of Trindade, its significant distance from the continent, the fact that it was never part of the main, and its small surface area rendered this balance even more fragile (Serafini, França, Andriquetto-Filho, 2010, p.282-283). Discovery and human action had drastic consequences. If the relationships between turtles, frigatebirds, and crabs had once been balanced, the introduction of invasive species, the destruction of the island's plantlife, soil erosion, and the exhaustion of water sources created a critical situation. These unsustainable impacts bred "competitive exclusion, the shifting of niches, hybridization, predation, and extinction" (Serafini, França, Andriquetto-Filho, 2010, p.283).²²

Like Barth, many other scientists came to the island in subsequent decades, and the Navy played an important role in its restoration. As stated earlier, the suggestions made by the zoologist in 1957 found echo in later actions. When he returned in 1959, Barth wrote a second report, in which he described the significant decrease in wild pigs and goats. Ground vegetation had started returning to the beaches, and sea turtle eggs were safer from hungry boars. In 1965, the Brazilian Navy eradicated boars, sheep, and donkeys. Guinea fowl were eliminated in the late 1980s, along with cats. The island was definitively cleared of goats in 2005. Scientists began to see positive results from these initiatives, especially the recovery of endemic plantlife (Silva; Alves, 2011, p.259-263). The biosafety measures taken by the Navy, including the elimination of invasive species by marksmen, show that effective protection measures are sometimes incompatible with romantic notions about the environment, given that it was these pressing, radical actions that prevented the total destruction of biodiversity.

Trindade Island now receives regular visits from researchers from various states of Brazil, representing different fields of knowledge. Their studies guide management policies that have yielded ever more positive results. Since 1982, the Tamar green sea turtle project has been at work on the island, which is one of the creature's most important spawning sites (Almeida et al., 2011, p.193-201). Botanists from the Universidade Federal do Rio de Janeiro's National Museum conduct research and management projects to restore flora (Silva; Alves,

2011). Inaugurated in April 1997, the Pro-Trindade Program has been working to foster scientific investigations on Trindade and Martim Vaz and in adjacent areas.²³

Trindade Island offers an important analogy for our current environmental problems. Its history serves as a perfect emblem when reflecting about the imminent exhaustion of our planet's natural resources, the drying up of water sources, the exhaustion of soils, the effects of domesticated species all over the globe and their invasive action in savanna and woodland areas, the extinction of native species, and the pressure of human societies on the environment, with their unsustainable, profligate practices of production and consumption. Like so many islands from the past and present, Trindade is a challenging metaphor for our environmental problems and for historical relations between human societies and the natural environment.²⁴ Yet it also represents hope, as an example of the gradual but real recovery of a previously degraded environment. Further, Trindade demonstrates how knowledge from a variety of fields – like geography, geology, botany, zoology, and history – can be conjoined towards the solution of environmental challenges.

Today, sea turtles spawn on Trindade under much different circumstances than in 1957, when Barth was left awestruck. There are no more wild pigs to devour thousands of eggs. Baby sea turtles of course have their predators – above all crabs – but this is part of nature's inevitable game of life and death. Frigatebirds do not threaten the turtles' journey, as the birds are rare and still endangered in this territory (Olmos, 2005, p.22; De Luca, Develey, Olmos, 2006, p.6-7; Alves, Silva, Aguirre-Muñoz, 2011, p.262). Will the major recovery efforts on Trindade Island bring them back? In this hoped-for future, the scene of a frigatebird eating a baby sea turtle will certainly take on new meaning in an onlooker's eyes.

NOTES

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¹ See the image cited in Rudolf Barth's text in this issue (<http://scielo.br/hcsm>).

² Although Barth was an experienced zoologist, he was not an expert in ornithology but in entomology. Since the island is a nesting spot for *Anous stolidus*, it is fitting to ask whether he did not confuse the two birds. It is hard to come to any firm conclusion, as the black-and-white photograph makes it hard to distinguish the bird's colors. Another possible criterion would be size, as *A. stolidus* is larger (about 45cm long) than *A. minutus* (about 30cm long), but there are nevertheless differences between individual members of the species. According to Fonseca Neto, there is no proof that black noddies are regular nesters on the island at any time of the year. Its presence was not observed during any of the five expeditions between 1994 and 2000 (Fonseca Neto, 2004, p.133-135). The Cantuária (1914) and National Museum (1916) expeditions only observed *A. stolidus* (among other birds) but not *A. minutus* (Miranda Ribeiro, 1919, p.179).

³ On birds of Trindade, see also Miranda Ribeiro, 1919, p.179-192; Fonseca Neto, 2004; Olmos, 2005, p.22; Alves, Silva, Aguirre-Muñoz, 2011, p.261-262.

⁴ Werner Buedeler, *The International Geophysical Year*, Paris, Unesco, 1957, p.6.

⁵ On Berkner's key role in relations between science and politics in the United States and on the IGY in the international context of the Cold War, see Needell, 2000, p.297-344.

⁶ In late 1956, Kubitschek bought an aircraft carrier from the British Navy and re-christened it the *Minas Gerais*. The vessel joined the Brazilian Navy in 1960. This event sparked rivalry between the Navy and Air Force, allayed under the Castelo Branco administration, which gave the Air Force authority over aircraft aboard vessels.

⁷ The Almirante Saldanha joined the Brazilian Navy in 1934 as a training ship, with a crew of 460. In

February 1957, under the control of the Navy's Directorship of Hydrography and Navigation (Diretoria de Hidrografia e Navegação), it was redeployed as an oceanographic vessel and outfitted with an oceanographic laboratory and a 5,000-meter sonar rig. These changes were made with the financial support of Unesco, in consonance with IGY activities. It was the main Brazilian vessel in this scientific event and was definitively reclassified as an oceanographic ship in 1959, when it was equipped with laboratories, winches for ocean research, sonar, and echo sounders. It was fully active until 1990, the year it was retired. See <http://naviosbrasil.com.br/ngb/A/A044/A044.htm> (accessed May 25, 2012).

⁸ Different authors give different estimates for the size of the island: 9.28 km² (Alves, 1998, p.13; 2011, p.717; Serafini, França, Andriuguetto-Filho, 2010, p.285); 13.5 km² (Almeida, 2002, p.371); and 8.2 km² (Fonseca Neto, 2004, p.119-146).

⁹ Barth himself warns his readers about the limitations of some of his observations, which dealt only with land fauna; further, the number of observed species referred solely to the dry season, while he estimated that the number would be much higher in the rainy (Barth, 1958, p.264). For a comparison of research conditions, see a contemporary study of island birds, where a team undertook five expeditions between 1994 and 2000, accumulating a total of 280 work days (Fonseca Neto, 2004, p.119-121).

¹⁰ For descriptions of the hardships encountered in landing there in the eighteenth and nineteenth centuries, see Brito, 1877, p.256-258 (especially the excerpts of the report on Laperouse's expedition – which passed by the island in 1785 – describing conditions for making land); Moreira de Azevedo, 1898, p.23; Lobo, 1919, p.131-132.

¹¹ For a Portuguese translation of this excerpt from Laperouse's *Voyage de Laperouse autour de monde*, see Brito, 1877, p.256-259.

¹² Journeys of scientific exploration marked the final decades of the eighteenth and nineteenth centuries. Sponsored by large European nations, the main goal was to undertake cartographic work, study fauna and flora, conduct astronomic and meteorological observations, and calculate longitudes. Mello Leitão, 1934; Duperrey, 1830; Petit-Thouars, 1855.

¹³ For a detailed, well-documented list of scientific expeditions to Trindade Island in the nineteenth and twentieth centuries, see Alves, 1998, p.37-43.

¹⁴ Harden-Hicken committed suicide soon after, in 1898, following a series of psychological breakdowns and deep depression.

¹⁵ In this and other citations of texts from Portuguese, a free translation has been provided.

¹⁶ According to legend, the Spanish had taken gold and silver objects from the cathedral in Lima after Peru's independence. On their way to Europe, however, they were set upon by pirates who in turn buried the treasure on Trindade. The same pirates were supposedly arrested and beheaded in Havana, except for one Russian, who, before dying in Bombay, shared the secret with a ship captain (Lobo, 1919, p.129).

¹⁷ On this concept, see Monbeig, 1991.

¹⁸ The program "Ilha da Trindade: paraíso estratégico" (Trindade Island: strategic paradise) was broadcast on TV Brasil (Ilha da Trindade, 17 fev. 2011). For other current television programs that present the island to viewers as a "paradise," see: "Ilha de Trindade," Globo Repórter, 1992, and GloboMar, June 2011, all available on YouTube.

¹⁹ Barth's report is not clear about whether these nineteen days include the ship's voyage or not.

²⁰ Barth devoted a special article to the subject. See Barth, 1962.

²¹ The botanist Ruy Alves, researcher at the National Museum and author of major works on Trindade Island, shows that these trunks evince the existence of forests with a predominance of *Colubrina glandulosa* var. *retizii*. For Alves, "the true cause of the total extinction of the *Colubrina glandulosa* forest must be attributed to herds of domesticated animals" and also to wood consumption by the island's occasional inhabitants over the centuries. In recent decades, management has been practiced on the island, gradually bringing back plantlife; it is also aimed at conserving remaining soils, restoring sources of drinking water, and protecting endemic species of fauna and flora (Alves, 1998, p.33, 113; see also Silva; Alves, 2011).

²² On the botanic aspects of Trindade's biogeography, see Alves, 1998, p.81-86.

²³ On the Pro-Trindade Program, see www.mar.mil.br/secirm/trindade.htm.

²⁴ With the development of environmental history, historians have focused on studies of these relationships. Some important journals are specialized in the area, like *Environmental History* (www.environmentalhistory.net/), *Environmental and History* (www.ericademon.co.uk/EH.html), and *Historia Ambiental Latinoamericana y Caribeña* (www.fafich.ufmg.br/halac).

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