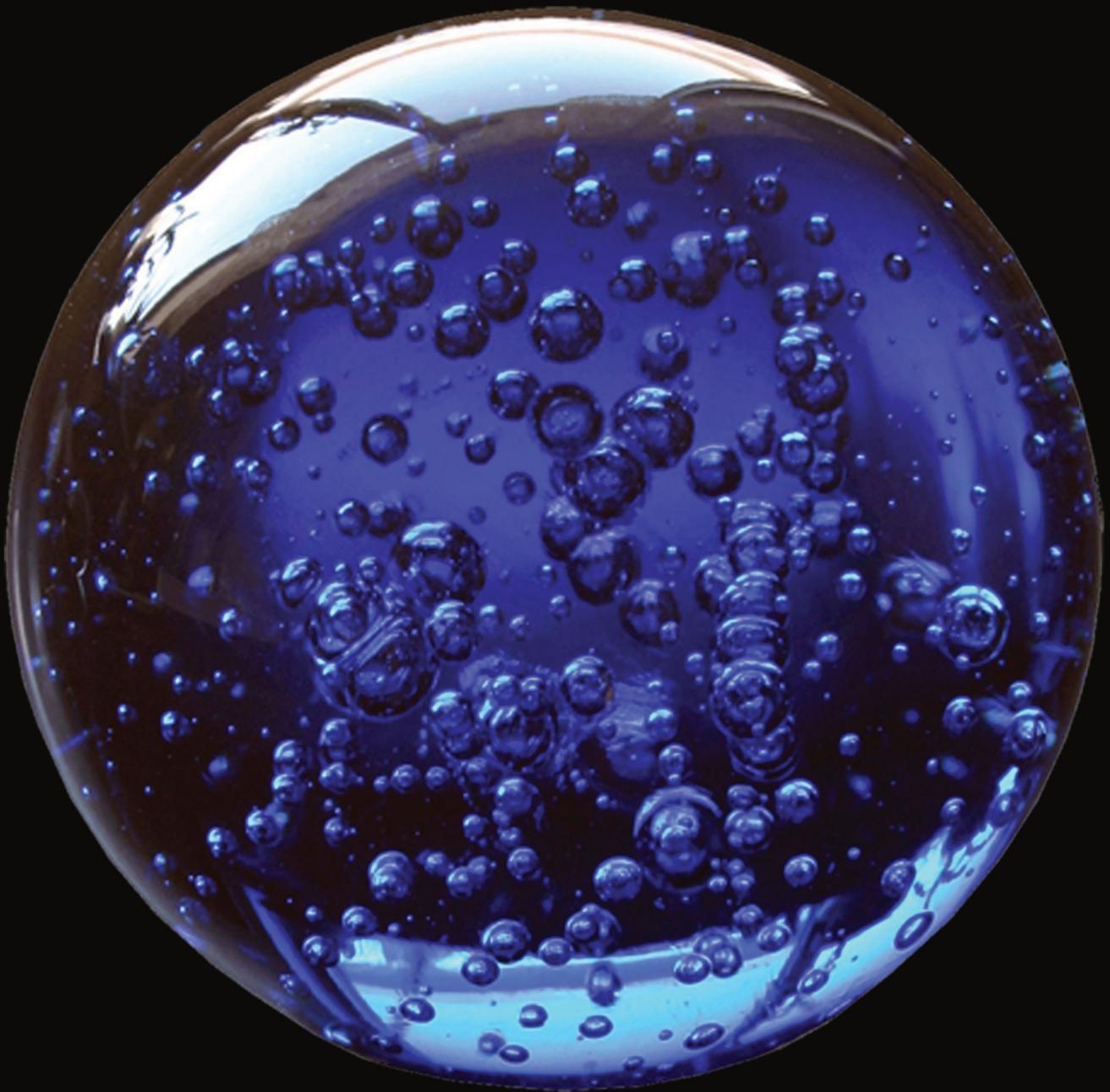


WORLD OCEAN JOURNAL

World Ocean Observatory

Volume I, No. 1, 2014



INAUGURAL ISSUE



“I promise you [the blue marble] works. Over and over again, I can see a person’s attention captured, a new idea of the ocean amplified and revalued, an innate curiosity peaked in the questions that follow. I leave the marble behind, as a gift and reminder that by its transfer my new ocean friend accepts an obligation to become a “citizen of the ocean” and to share responsibility for the ocean future. ...”

~ From World Ocean Radio 235: Blue Marble

Editor’s note

Wallace J. Nichols, sea turtle specialist and peripatetic ocean advocate, developed the blue marble as a physical symbol by which to distill and motivate empathy for and understanding of the ocean as an essential element in our lives: a blue marble—a blue glass sphere, when held between thumb and forefinger against the light, glows with an iconic power. It is what earth looks like from space in scale, color and beauty, a planet that might well have been called “Oceanus.” You can carry blue marbles too. Visit wallacejnichols.org/130/blue-marbles and click on “Play the Blue Marble Game” where you can order your supply of blue marbles...by the hundreds!



Local artisanal fishermen unloading their catch from pirogues on the shores of Senegal.
Credit: Linda Schonknecht | Marine Photobank

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RUBENS QUARTET



Through its rich knowledge of string quartet culture, the Rubens Quartet combines the old with the new, interpreting lesser known works of the past and present and placing them alongside the great standards of the quartet repertoire. The Quartet is: Sarah Kapustin, violin; Tali Goldberg, violin; Roeland Jagers, viola; and Joachim Eijlander, cello. Find them online at rubenskwartet.nl.

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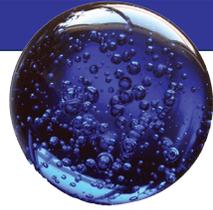
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WORLD OCEAN JOURNAL is a bi-annual publication of the World Ocean Observatory, a not-for-profit organization based in coastal Maine. The mission of the World Ocean Observatory is to communicate the full spectrum of ocean issues--climate, fresh water, food, energy, trade, transportation, public health, finance, governance, recreation and culture--as a realization of the belief that the sea connects all things.

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EDITOR'S LOG

**AN INTRODUCTION TO THE
WORLD OCEAN JOURNAL**

by Peter Neill

Welcome to *World Ocean Journal*, a new bi-annual publication from the World Ocean Observatory. As you will see in this inaugural issue, we intend to include essays, interviews, art, music, exhibits and performances in a vital profile of the impact of the ocean on our lives. We will introduce exemplary ocean advocates, describe innovative projects, and offer perspectives and ideas to help us understand the full extent of the ocean crisis and to suggest solutions and actions to mitigate destructive behaviors and to offer alternative approaches.

In this first edition, Volume 1, No. 1, 2014, we include education, design, art, music, and personal reflection: an excerpt from the introduction to Lincoln Paine's extraordinary one-volume history, *The Sea & Civilization*; a discussion about the ocean and human ecology with Dr. Darron Collins, President of the College of the Atlantic; a conversation with Wendi Goldsmith on bio-engineering and ecological design; a survey of artistic representations of Mami Wata, an African goddess of the sea, by Dr. Henry John Drewal; a performance by The Rubens Quartet, "Visions at Sea," composed by Joey Roukens,

commissioned for the 2013 re-opening of the National Maritime Museum of The Netherlands; and my own reflections on "reciprocity" as a rationale and framework for exchange of value and engagement between us and the ocean, between civil society and the natural world that sustains it.

We will distribute *World Ocean Journal* through presentation to the 1.2 million unique annual visitors to the World Ocean Observatory, through our thousands of program and newsletter subscribers, through the ever-expanding international audience for World Ocean Radio, and through our many social media channels.

We urge you to share this new publication with your colleagues, old and new friends, and other "citizens of the ocean" through your own organizational links and personal connections. Let's distribute the *World Ocean Journal* worldwide, and see what happens.

Join us, and help us evaluate the results. Please do not hesitate to contact me (editor@thew2o.net) with your reactions, comments, suggestions, and ideas for future content. Thank you for your interest and commitment.



Open Sea Exhibit, Monterey Bay Aquarium.
Credit: Gerick Bergsma, 2010 | Marine Photobank

LINCOLN PAINE

THE SEA



CIVILIZATION

A MARITIME HISTORY
OF THE WORLD

AN INTRODUCTION

by Lincoln Paine



I want to change the way you see the world.

Specifically, I want to change the way you see the world map by focusing your attention on the blues that shade 70 percent of the image before you, and letting the earth tones fade. This shift in emphasis from land to water makes many trends and patterns of world history stand out in ways they simply cannot otherwise. Before the development of the locomotive in the nineteenth century, culture, commerce, contagion, and conflict generally moved faster by sea than by land. The opening of sea routes sometimes resulted in immediate transformation, but more often it laid the groundwork for what was later mistaken for sudden change. The best example of this is the trade networks of the Indian Ocean, the oldest of which were pioneered at least four thousand years ago by navigators sailing between Mesopotamia and the mouths of the Indus River. By the start of the Common Era two thousand years ago, the Indian subcontinent was a point of departure and destination for merchants and mendicants from across the Arabian Sea and the Bay of Bengal. This is all but unnoticed in the written record, which boasts of no figure comparable to a Gilgamesh or Odysseus, and despite a growing body of archaeological evidence, these undertakings remain largely unrecognized. As a result, the later arrival in Southeast Asia of Muslim traders from the Indian subcontinent and Southwest Asia, of Chinese merchants of various faiths, and of

Portuguese Christians seem like so many historical surprises. Only the last were absolute newcomers to the Monsoon Seas that stretch from the shores of East Africa to the coasts of Korea and Japan. The others were heirs to ancient, interlinked traditions of seafaring and trade that long ago connected the shores of East Africa with those of Northeast Asia. This book shows many similar examples of maritime regions that were quietly exploited before events conspired to thrust them into the historical limelight.

Two questions merit consideration before taking on a maritime history of the world as either writer or reader: *What is maritime history?* and *What is world history?* The answers to both have as much to do with perspective as with subject matter. World history involves the synthetic investigation of complex interactions between people of distinct backgrounds and orientations. It therefore transcends historians' more traditional focus on politically, religiously, or culturally distinct communities seen primarily in their own terms at a local, national, or regional level. As a subject of interdisciplinary and interregional inquiry, maritime history is a branch of world history that covers obvious topics like shipbuilding, maritime trade, oceanic exploration, human migration, and naval history. Considered as a perspective, however, the premise of maritime history is that the study of events that take place on or in relation to the water offers unique insights into human affairs. The maritime

historian therefore draws on such disciplines as the arts, religion, language, the law, and political economy.

An alternative and perhaps simpler way to approach the question, *What is maritime history?* is to tackle its unasked twin: *What is terrestrial history?*—the view from the land being our default perspective. Imagine a world of people bound to the land. The ancient Greek diaspora would have taken a different character and been forced in different directions without ships to carry Euboeans, Milesians, and Athenians to new markets and to sustain contacts between colonies and homelands. Without maritime commerce, neither Indians nor Chinese would have exerted the substantial influence they did in Southeast Asia, and that region would have been spared the cultural sobriquets of Indo-China and Indonesia (literally, “Indian islands”)—in fact, the latter would have remained unpeopled altogether. The Vikings of medieval Scandinavia could never have spread as quickly or widely as they did and thereby altered the political landscape of medieval Europe. And without mariners, the history of the past five centuries would have to be reimagined in its entirety. The age of western European expansion was a result of maritime enterprise without which Europe might well have

remained a marginalized corner of the Eurasian landmass with its back to what Latin Europe called *Mare Tenebrosum* and Arabic speakers *Bahr al-Zulamat*, “the



Rigged model of a pinnace
Credit: National Maritime Museum,
Amsterdam, the Netherlands

sea of darkness.” The Mughals, Chinese, and Ottomans would have overshadowed the divisive and sectarian polities of Europe, which would have been unable to settle or conquer the Americas, to develop the transatlantic slave trade, or to have gained an imperial foothold in Asia.

The past century has witnessed a sea change in how we approach maritime history. Formerly a preserve of antiquarian interest whose practitioners lavished their efforts on “ancient ships and boats, ship models, images, ethnography, lexicographical and bibliographical matters and flags,” maritime history once focused chiefly on preserving and interpreting material that was readily available. This directed

historians’ attention to European, Mediterranean, and modern North American maritime and naval history. Maritime accomplishment was almost always viewed as a peculiarly European phenomenon that only attained real importance with Columbus’s epochal voyage to the Americas in 1492. In this telling, the story proceeded directly and exclusively to an explanation of how Europeans used their superior maritime and naval technology to impose themselves upon the rest of the world.

Taking Europe’s “classic age of sail” from the sixteenth to eighteenth centuries as a model for the rest of maritime history is seductive but inadvisable. While the global change wrought by mariners and the dynamics of maritime Europe are of unquestionable importance to a proper understanding of the world since 1500, maritime achievement is more broadly spread and its effects more complicated than such a narrative suggests. European supremacy was far from inevitable. More important, the concentration on Europe’s past five centuries has distorted our interpretation of the maritime record of other periods and places and our appreciation of its relevance to human progress. No parallels exist for the almost symbiotic relationship between commercial and naval policy—what we might call a “naval-commercial complex”—characteristic of Europe’s maritime expansion. There is nothing like it in classical antiquity, in Asia, or in Europe before the Renaissance, and by the twenty-first century the close ties between national naval strategy and maritime commerce so prevalent in this age had all but vanished.

The period of western Europe’s maritime dominance was critical, but it is a misleading standard against which to measure other eras.

This Eurocentric worldview was reinforced by the widespread belief among western historians that race was a sufficient explanation for “the inequality of various extant human societies.” In the nineteenth and early twentieth centuries, the clearest material manifestation of racial superiority writ large was maritime power and Europeans’ ability to extend their hegemony overseas to create and sustain colonial empires half a world away. This gave rise to the ahistorical generalization that there are maritime people like the Greeks and British and non-maritime people like the Romans and Chinese. Such assumptions mask complex realities. Put another way, the extent to which different nations rely on cars or planes depends on economics, industrialization, geography, and other considerations, and no one would think of ascribing car or plane use to racial or ethnic tendencies. In reaction to this assumption of an innate European and North American superiority at sea, a number of writers attempted to redress the balance by writing explicitly ethnocentric or nationalist maritime histories about non-Europeans. While these valuable correctives exposed previously untapped indigenous writings and other evidence of seafaring by people otherwise considered to have had little or no maritime heritage, they tended to create their own versions of maritime exceptionalism.

Even as this tendency was running its course, Fernand Braudel's magisterial *The Mediterranean and the Mediterranean World in the Age of Philip II* (1949) ushered in a new approach to maritime history. Inspired by his brilliant analysis of the interplay between geography, economics, politics, military, and cultural history, maritime historians looking past nationalist paradigms have embraced the validity of treating seas and ocean basins as coherent units of study and the past half century has seen a surfeit of works examining individual oceans and seas. This is an enlightening exercise that enables us to consider cross-cultural and transnational connections without constant reference to the mutable fiction of political borders. At the same time, we run the risk of replacing a set of arbitrary terrestrial boundaries with an equally arbitrary division of the world ocean. There is little agreement about how to parcel the waters of the world into discrete, named bodies of bays, gulfs, straits, channels, seas, and oceans, and in practice sailors rarely recognize such distinctions drafted from afar. An ancient Greek epigram acknowledges the unity of the world ocean with stark simplicity:

All sea is sea. . . .
Pray if you like for a good
voyage home,
But Aristagoras, buried
here, has found
The ocean has the manners
of an ocean.

This book is an attempt to examine how people came into contact with one another by sea and river, and so spread their crops, their manufactures, and their social systems—from language to

economics to religion—from one place to another. While I have not ignored the climactic moments of maritime history, I have attempted to put them in a broader context to show how shifting approaches to maritime systems can be read as indicators of broader change beyond the sea. I have concentrated on a few themes: how maritime enterprise enlarges trading realms that share certain kinds of knowledge—of markets and commercial practice, or navigation and shipbuilding; how the overseas spread of language, religion, and law facilitates interregional connections; and how rulers and governments exploit maritime enterprise through taxation, trade protection, and other mechanisms to consolidate and augment their power.

I have sketched this history as a narrative to show region by region the deliberate process by which maritime regions of the world were knit together. But this is not a story of saltwater alone. Maritime activity includes not only high seas and coastal voyaging, but also inland navigation.* Islanders may have obvious reasons to put to sea, but the exploitation of freshwater rivers, lakes, and canals has been critical to the growth of countries with large continental territories. The center of North America became economically productive thanks to its accessibility via the St. Lawrence and Welland Rivers and the Great Lakes, and by the Mississippi River and its tributaries. Neither corridor could have reached its potential without the development of maritime technologies—steam power in the case of the Mississippi, and locks and dams in the case of the Great Lakes.



Navigational instruments from the National Maritime Museum, Amsterdam, Netherlands.
Credit: Peter Neill

If the geography of water, wind, and land shapes the maritime world in obvious ways, maritime endeavor becomes a determining force in history only when the right combination of economic, demographic, and technological conditions is met. Few fifteenth-century observers could have imagined the prosperity that would accrue to Spain and Portugal as a result of their navigators' peregrinations in the eastern Atlantic. While they sailed in search of a route to the spices of Asia, they also came upon the Americas, a source of untold wealth in the form of silver and gold; of raw materials for European markets and new markets for European manufacturers; and territory—"virgin" in Europeans' eyes—for the cultivation of recently discovered or transplanted crops like tobacco and sugar. Papal intervention in disputes over which lands would be Portuguese and which Spanish resulted in a series of bulls and treaties that partitioned the navigation of the non-Christian Atlantic and Indian Oceans between Portugal and Spain, and helps explain why the majority of people in South and Central America are Spanish- or Portuguese-speaking Catholics.

A maritime perspective complicates our understanding of the "westward" expansion of the United States. California achieved statehood in 1851, two years after the discovery of gold at Sutter's Mill, when the territory was virtually unknown to Americans back east and the number of United States citizens on the Pacific coast numbered only a few thousand. Thanks to the extraordinary capacity of the American merchant marine of the

day, tens of thousands of people reached San Francisco by ship, a mode of transportation that was faster, cheaper, and safer than the transcontinental journey, although the distance covered was more than four times longer. The United States conquered the interior of the continent—what are today known as the fly-over states, but at the time could aptly have been called the sail-around territories—in a pincer movement from both coasts, rather than by a one-way overland movement from the east.

Yet for the most part, if ships, sailors, ports, and trades exist, the default tendency among most writers is either to celebrate them in isolation from the world ashore, or to acknowledge them only to explain particular events such as the arrival of the Black Death in northern Italy; the voyages of the Vikings to the Caspian and Black Seas (by river) and to western Europe and North America (by sea); the Mongol invasions of Japan and Java in the thirteenth century; or various other diasporas of people, flora, and fauna. But by situating our collective relationship to oceans, seas, lakes, rivers, and canals at the center of the historical narrative, we can see that much of human history has been shaped by people's access, or lack of it, to navigable water. For example, given non-Muslim westerners' ingrained impression of Islam as a religion of desert nomads, it seems remarkable that the country with the largest Muslim population is actually spread across the world's biggest archipelago. There are no camels in Indonesia, but there are Muslims, and also Hindus—especially on the island of Bali—which is especially curious when one considers Hindu prohibitions against going to sea.

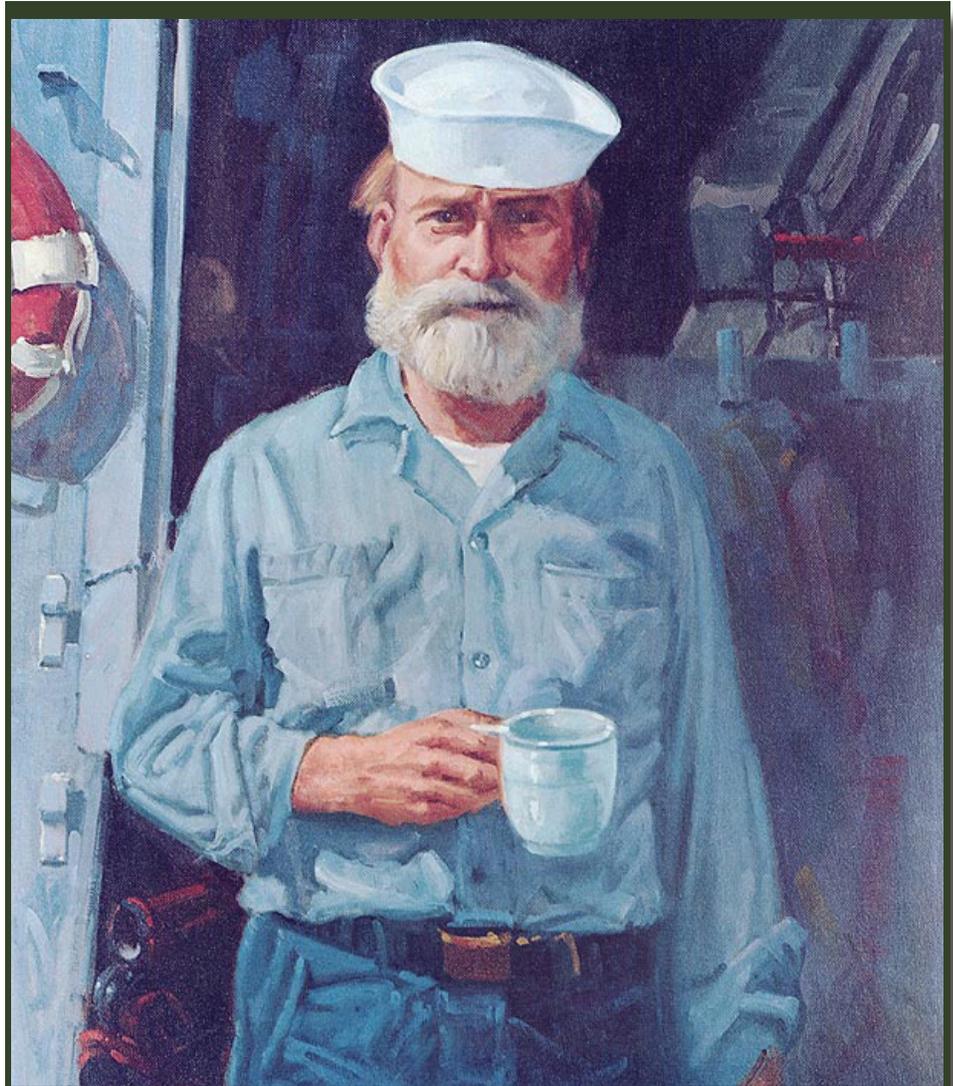
If these two religions are so tightly bound to the land, how did they manage to cross the ocean? Have the religions changed over time? Or are our impressions about the nature of these religions wrong? As is written in the Quran, "Do you not see how the ships speed upon the ocean by God's grace, so that He may reveal to you His wonders? Surely there are signs in this for every steadfast, thankful man."

These "signs" indicate that mankind's technological and social adaptation to life on the water—whether for commerce, warfare, exploration, or migration—has been a driving force in human history. Yet many mainstream histories are reluctant to embrace this. Jared Diamond's *Guns, Germs, and Steel: The Fates of Human Societies* gives barely a page to "maritime technology," by which he means watercraft and not the ability to navigate or any associated abilities. What is curious about this is that maritime traffic was central to the diffusion of many of the technologies, ideas, plants, and animals that Diamond discusses in such illuminating detail, not only between continents but also within and around them. In all but ignoring the maritime aspect of his story, he essentially overlooks both the means of transmission and, in the cases of some very important inventions, the things transmitted as well.

To take another example, J. M. Roberts's *History of the World* is, according to the author, "the story of the processes which have brought mankind from the uncertainties and perils of primitive life and pre-civilized life to the much more complex and very different uncertainties and

perils of today. . . . The criterion for the inclusion of factual data has therefore been their historical importance—that is, their effective importance to the major processes of history rather than intrinsic interest or any sort of merit.” Roberts acknowledges inland and saltwater navigation, stressing the importance of the former, for instance, in Russia’s eastward colonization of Siberia in the seventeenth century. However, he jumps to the ends without reference to the means, or the processes. He notes that from Tobolsk to the Pacific port of Okhotsk three thousand miles away there were only three portages; there is no discussion of the vessels used, the foundation of intermediate settlements, or the impact of river trade on the development of Siberia. He does not even name the rivers, which is rather like talking about the water route from Pittsburgh to New Orleans without mentioning the Ohio or Mississippi.

Had Diamond or Roberts written a century ago, their works likely would have incorporated considerably more maritime content. That they do not reflects changes in the public perception of the maritime world, for the merchant marine and naval services no longer hold the attraction for people that they once did, when ocean liners and freighters crowded the piers of Manhattan, Hamburg, Sydney, and Hong Kong. At the start of the twenty-first century, ships and shipping lines are the warp and woof of globalization. Ships carry about 90 percent of world trade and the number of oceangoing ships has grown threefold in the past half century. But the nature of



“Old Salt of the Sixth Fleet” by Frank E. Zuccarelli, 1972.
Credit: Navy Art Collection, Washington, D.C.

shipping has led to the relocation of cargo-handling facilities to places remote from traditional port cities, while a growing proportion of the world’s merchant fleets has been put under so-called flags of convenience—that is, owners in search of less regulation and lower taxes have registered their ships in countries not their own. As a result, ships no longer stand as emblems of national progress and prestige as they did in the nineteenth and early twentieth centuries.

Although airplanes have replaced ships in most long-distance passenger trades—transatlantic, between Europe and ports “east of Suez,” or transpacific—more than fourteen million people annually embark on a sea cruise. This is far more than ocean liners carried before the passenger jet rendered them obsolete in the 1950s, when the names of shipping companies were as familiar as (and far more respected than) the names of airlines today. The idea that people would go to sea for pleasure was almost unthinkable even 150 years ago. The cruise ship industry,

to say nothing of yachting and recreational boating, owe their growth to changes in economics and technology, social reform movements that ameliorated the often wretched conditions of sea travel for passengers and crew alike, and shifts in attitudes toward the natural environment of the sea. These also gave rise to the emergence of a conscious appreciation for the sea and seafaring in painting, music, and literature, and set the conditions for people's interest in the sea as an historical space interpreted through museums, film, and books.

In fact we live in an age deeply influenced by maritime enterprise, but our perceptions of its importance have shifted almost 180 degrees in only two or three generations. Today we see pleasure where our forebears saw peril, and we can savor the fruits of maritime commerce without being remotely aware of its existence, even when we live in cities that originally grew rich from sea trade. In considering the course of maritime history, we must account for this change and remember that our collective relationship with maritime enterprise has undergone a profound metamorphosis in only half a century.

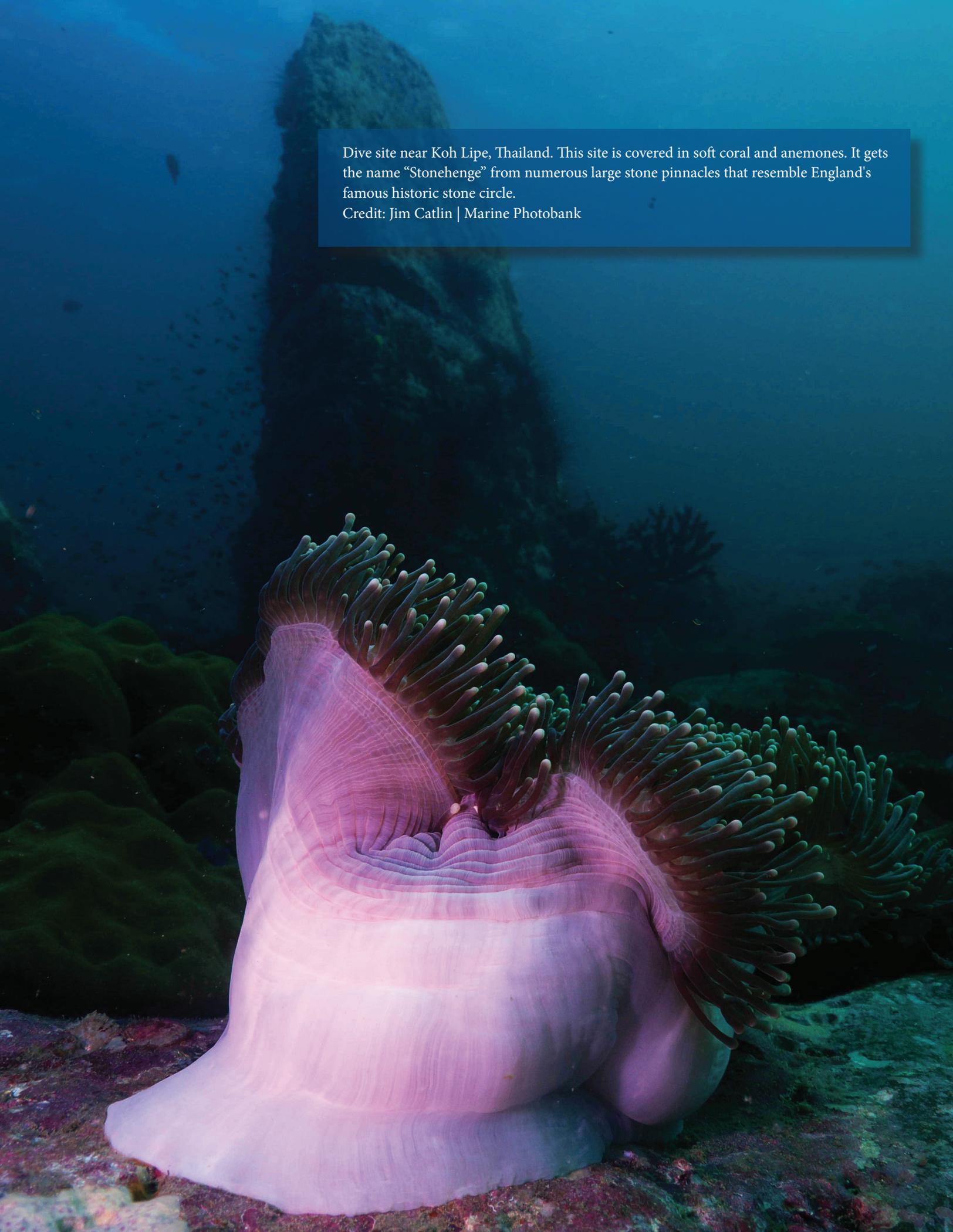


A collection of maritime instruments in the National Maritime Museum, Amsterdam.
Credit: Peter Neill



A collection of figureheads in the National Maritime Museum, Amsterdam.
Credit: Peter Neill

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Dive site near Koh Lipe, Thailand. This site is covered in soft coral and anemones. It gets the name “Stonehenge” from numerous large stone pinnacles that resemble England’s famous historic stone circle.

Credit: Jim Catlin | Marine Photobank

BIOENGINEERING: A SOFT APPROACH TO BEST PRACTICE SUSTAINABLE DEVELOPMENT

A conversation between Wendi Goldsmith of Bioengineering Group and Trisha Badger of the World Ocean Observatory

 **Though rooted in traditional methods thousands of years old, bioengineering is relatively new in the United States, is it not? Can you give us a brief overview of what bioengineering is and how it works?**

 At its basis, bioengineering involves using living plants along with other biodegradable materials such as left over brush from forestry operations and other inert materials all combined to accomplish civil engineering functions, but doing it with a green thumb. It is relatively new in the United States, but not brand new. Some of the most noteworthy bioengineering applications include river-training jetties made of bioengineering treatments with willow and soil placed at the mouth of the Mississippi River over 150 years ago. After the Dust Bowl in California, Charles Kraebel was very active using bioengineering techniques, adapting them to local, native species to stabilize mountain roads. It has become part of the national discussion for conservation and engineering practices illustrated when the National Resource Conservation Service included its first chapter on bioengineering techniques about twenty years ago. The National Academies of Science



Wendi Goldsmith, founder and CEO, Bioengineering Group, a Massachusetts-based company that works with government and private sector groups to introduce sustainability into site planning, development, transportation, stormwater management, and protection of our most vital and vulnerable ecological places.

and Engineering funded specific Transportation Research Board studies to document and share knowledge of the applicability and limitations of bioengineering techniques. The report featured those measures best suited for transportation corridors where greener solutions must meet a degree of rigor to address the high-stakes, high-risk, high-safety oriented transportation corridors around the country.

 **How do we help the concept of bioengineering to be better understood as a sophisticated, technically advanced system which**

could and should be adopted as a best practice development standard?

 Well, it seems to me the magic is in the climate change equation. Virtually every kind of engineering and construction ends up having a huge carbon footprint, whereas bioengineering techniques put in place plants that locally harvest available sun and grow carbon stored in the above ground/below ground biomass. They accumulate organic matter forever and they start by accumulating a lot of organic matter as they're getting established. So they are like little

carbon sponges in a big way. Some estimates show large amounts of carbon can be sequestered by using green infrastructure, often in conjunction with hard infrastructure so they are functioning in a complementary way. People that study this in the United States say that 10 to 15% our carbon emissions could easily be offset annually. In some places around the globe it could be even higher than that.

 **We choose to live and conduct business near the sea. Coastal development will continue despite the challenges of climate change and a warming planet. What are the major impediments to coastal communities and development today, and are they surmountable problems?**

 These are the profound questions of our day, and like any profound social need, when the challenges are faced, human ingenuity has developed solutions. In the past, human ingenuity developed our typical engineering measures without necessarily understanding the scale and the scope of change. So now coastal areas in particular, but really all areas, face vulnerabilities and threats by climate change impacts. Whatever we may have found that worked in the past isn't necessarily going to work in the future. Basing design using data from the past is no longer the right way to proceed. We need a total sea change, a true paradigm shift in how engineering is organized, so that we're basing our decisions on clear understanding of the range

of possible and probable outcomes for the future. We have used these whiz-bang computer models to show weather patterns, sea level forecasts, storm intensity and probability distribution, and we have to use the power of computer models to depict the future and use those versions of the future to make decisions about how to organize engineering to get us from now to then. Until recent times, few established what it would look like to use sophisticated computer models of the future as a basis for design, so everyone was pulling out old data and using that. Until a project sets a new standard, such as our major work down in New Orleans after Hurricane Katrina, the engineering industry had not embraced using models for engineering basis of design. Even while people with a science understanding and policy interests were saying, "The problem with the future is that it's not going to look like the past. Even if we do our best to avert carbon emissions, we are still facing a future that looks radically and dangerously different," the step where we actually proceduralize a new engineering approach has been slow to materialize. So that's our present challenge. But once we make that shift in the way we approach the problem, I do think it's solvable, in large part because we have one mega-project complete now in New Orleans to demonstrate the approach.

 **You say in your work that you are reminded to "stick to basics and to resonate with peoples' emotional connection**

to nature." In a time when we are increasingly detached from our connection to the natural world, how do we get people to care about the issues at hand?

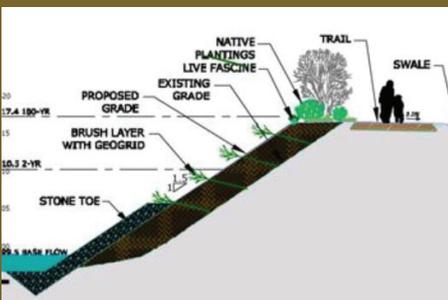
 My children remind me of this, directly and indirectly, all the time. Most people don't feel as much a part of the natural world as we once did. And most people are frightened about the prospect of climate change, especially if they spend a lot of time thinking about it, and this can be alienating. Also, the best solutions are ones where we are willing to engage in a dance with natural systems and stare down the fact that there is risk and uncertainty about the future and how we go about addressing it. So, it's important to find ways to help people get over their fear and maybe to dwell on the occasions where natural systems and natural processes have already been doing us a favor, buffering us from the impacts of storms and other kinds of threats to society as we know it. Once people start seeing a green infrastructure, whether it is a restored dune system on a barrier island or a major wetland restoration in a national park site outside of New Orleans, they get excited. They actually see how something could be built, how it could then look and feel naturalistic but still have a sense of predictability because the tame nature of it is also shining through and made evident. And it's that combination of something that appeals to the human and constructed aspect of the built environment. "Built environment" almost sounds like



Lake Whitney, Hamden, Connecticut Watershed, Stormwater & Integrated Water Management: South Central Connecticut Regional Water Authority's New Water Purification Facility.



Bayou Dupre Sector Gate Control, Structure Reach LPV 144, New Orleans, Louisiana Flood Control and Hurricane Protection Infrastructure post-Katrina.



Mill Creek at Center Hill Landfill Cincinnati, Ohio Bioengineering Group was brought in to identify a cost-effective, environmentally-sensitive bank stabilization plan to halt erosion.

an oxymoron, but it starts to reflect the combination of intentionally human-serving places that are understandable by humans, but also some of the aspects of natural systems and ecological functions. The combination allows for the major excitement, when people feel it's civilized enough, that they can understand it, can believe it, that it can have some predictability or some functionality. People often miss the notion of the whole ecosystem services idea, or that natural systems—if we leave them alone—could actually do a lot on our behalf. Many people don't get that idea, and there are some people who think that natural systems need a hands-off approach in order to function. We should know that there isn't an untouched, unaffected part of the planet, so I feel we've been hands-on in an unintentional, oblivious way. The challenge is to intervene and do the dance with natural systems in a way that meets human need while allowing for the continuation or the restoration of natural function. In every case I've looked thus far, there is ample opportunity for that to take place.

The World Ocean Observatory often speaks of the downstream—major problems and hurdles for cities & towns experiencing downstream effects (over-fertilization, industrialization, re-routing waterways, diminished reserves, erosion, urban runoff, damaged and destroyed wetland and tidal areas.) What would be your advice for communities wishing to implement some sustainability practices into their local infrastructures?



Everything you just mentioned in this downstream world is all about single purpose, one-way decision making. It's like the after-effects of Roman-style infrastructure: one piece to provide central heating, one piece to take your sewage away, another to bring fresh water via the aqueduct. We haven't evolved much since. The natural systems are all about cycles and networks where everything gets used over and over. Our current idea of the built environment has one piece of infrastructure invested to do one thing after which the resource is considered a waste product. Basically, we need to rewire the infrastructure diagram. Some examples of that are as simple as the beneficial use of dredged material, putting it back in play in the coastal environment where it can act as a buffer against rising seas. And waste water can be reused for cooling towers, irrigation and other purposes. I think that we should get rid of the concept of "waste." Any time you use the word you should ask yourself, "What are we doing wrong?" If there is waste we should be asking, "How can we not waste it?" and there is usually an answer and a solution for reuse. When you are reusing things there is no downstream.



Why do you think it is that the level of sophistication in standards and practices throughout much of Europe are so slow to catch on in the United States? Are you seeing encouraging changes which nurture this symbiosis between nature and engineering?



Yes, there are some big strides being made.

Sometimes the way this happens is through pointed technology transfer visits. For instance, after Katrina hit there was a renewed effort to have knowledge traded among the Dutch, Danish, Germans and others that have been looking at this whole sea defense question because some places were dealing with it before we started looking down the barrel of climate change. The EPA is doing a lot with water and solid waste infrastructure and looking overseas for models of how it's done. So there is much that is happening here in the U.S. by people really, truly recognizing the need while also recognizing that perhaps we don't have to be the ones to develop the technology. Places like Denmark and Germany which for decades have had strong conservation-oriented policies have been enormous investors in some pioneering technical approaches. Even China: on the one hand you can count all the ways that they are doing some very old fashioned and short-sighted things in the built environment, while on the other hand there are ways in which they are trying some radically efficient ideas which promise some breakthrough sustainability achievements. I think the bar is starting to get raised. We are finally realizing that our own national competitiveness depends on being at the cutting edge of how to operate our business, our public infrastructures, and our nation as a whole.



Your Storm Damage Risk Reduction System post-Katrina in New Orleans was officially

completed in the summer of 2011. What have you learned from this and what are some of the outstanding achievements that came from that project?



I'm so glad you are asking. Right after Katrina hit there were a lot of repairs, putting things back the way there were so that a next storm wouldn't hit an even less-prepared region. After that was done, about a year later, people took a deep breath and said, "OK. We are going to start this whole process and come up with a better plan, and we are going to make sure that this ultimately accounts for future risk." For instance, during the forensic study phase to look at what went wrong during Katrina, one of the issues that clearly had not been correctly considered was localized extreme rates of land subsidence. Some people liken Louisiana to the "canary in the coal mine" because of their tremendous land subsidence rates. We have sea level rise happening everywhere, but they have it at an extremely accelerated rate because their land is dropping. So this begged the question, "What procedures do we need in order to be able to develop an infrastructure that throughout the decades of its service life will not become obsolete as sea levels rise and/or land subsides?" We worked on developing the methodology for that; moreover we worked to shorten the time frame to get things built. We did that by introducing the idea for and smoothing out the effective adoption of design-build practices for some of the major time-critical infrastructure elements. Because

of that, the whole forward-looking system was built with future scenarios driving the design. It was built in an unprecedented four years from the concept of, "What about a system built like this?" to something that was not only engineered in four years but executed in that time. When Hurricane Isaac hit in 2012 it had a 35-foot storm surge which didn't harm New Orleans at all. So the system was generally understood to have avoided flood damage costs that far exceeded the \$14 billion it took to get the infrastructure built.



What are some of the largest environmental oversights of our day?



The big elephant in the room is the fact that we regularly pull out the FEMA-based flood elevation maps and use them as a basis for design. This is such a short-sighted move that I'd like to go on record to state my belief that it represents professional negligence for anyone in the design field or public agency review roles to be doing it. The minute the National Flood Insurance Program (NFIP) came into existence, professional societies involved in the world of engineering cautioned that any map that purports to outline something with a 1% annual risk is not telling you information that is useful for public health and safety. The NFIP's purpose for outlining the 100-year flood plain is to negotiate a one-year insurance contract rate—it should never be the thing people reach for and use when making public health and safety decisions. Furthermore, despite that



Red mangroves create a barrier between land and sea, filtering sediment from coastal runoff and protecting the coastline from storms. Benner Bay Mangrove Lagoon Marine Sanctuary, St. Thomas, USVI.

Credit: Katie Fuller, 2009 | Marine Photobank



Broad Meadows Marsh Restoration, Quincy, Massachusetts

106 acres of tidal salt marsh habitat previously utilized for dredging spoils disposal. Bioengineering Group was retained by the Army Corps of Engineers to conduct an alternative feasibility study.



Neponset River Dam Removal, Milton & Boston, Massachusetts

A feasibility study assessed options for restoring fish passage, aquatic habitat and riparian habitat upstream of the Baker and T&H Dams on the Neponset



Algiers Lock, Orleans and Plaquemine's Parish, Louisiana

Bioengineering Group performed feasibility-level designs for alternative methods of raising the existing hurricane protection to 100-year levels along the east side of the Algiers Canal.

even when flood plain maps are reasonably accurate, it is actually the case that half of the flood claims in the United States each year fall outside of the map. So those maps are not telling us the whole picture, and much is not addressed. You can say that they have a 50% accuracy rate of telling you the 1% annual risk. There is no other important decision you would make in your life where you would rely on that level of certainty. The FEMA maps are the only tool we now have to give us any sense of the risks so we reach for those maps time and again. We need to stop doing it and we need to come up with well-founded, regionally-appropriate maps of flood conditions and risk. When Hurricane Sandy struck New Jersey, the FEMA maps dated from the 1980s but the survey data that went into those maps dated from the 1950s. There was not anything near approximating current, accurate representation. They were better than nothing, for sure, but what we need is clarity on what future conditions are most likely to be based on the best available tools. And to be honest, the cost of generating those tools is not all that high. What makes the FEMA program very expensive to do their mapping is administrative and bureaucratic, including the fact that people come in and say, "Hey, we don't like your map. We think you should come up with a lower elevation than this." Sure, you can make a map say something different but it is not going to change the reality: it's not going to keep the flood out of your home.



Well, that takes us right into our next question: New York

and New Jersey have been slow to roll out any substantial or sweeping adaptive strategies post-Sandy. What are your thoughts about the scope of the adaptation efforts by those communities and their governments?



Having recently spent an hour with Daniel Zarrilli, New York's Director of Resiliency, I can tell you that they are moving pretty quickly to have developed and published a plan that is actionable and has an awful lot of near-term, practical feasibility. I think they deserve a huge amount of credit for that. I also think that the challenge is that there is no mechanism to address the known flood risk—they are lacking a clear long-term vision of exactly what the flood risks are. And, more importantly, there has not been any detailed modeling showing how those flood risks could be reduced.



What is Bioengineering Group working on now?



One project that we are very proud of that had a ribbon-cutting ceremony in October is a regional storm water management basin built in a state park that is part of the Frederick Law Olmsted Emerald Necklace greenway corridor system around Boston. The project has been dubbed the crown jewel in the Boston Harbor clean-up effort. The engineered wetland treats a large volume of storm water from a combined sewer overflow separation program; it does it in a way that restores alewife spawning habitat, performs invasive species

control, sets in place many acres of newly-established riparian wetland and forest, and does everything with a keen eye toward public recreation and education. We have worked with local teachers to outline what kinds of classes and students they would like to bring out there. The boardwalks, overlooks, boulder seating, and outdoor amphitheater were all sized and configured to meet those needs. We also supplied some places for bird watchers and a missing link of the regional bike path. All of this has been part of the project.

 **In 1999 you co-founded the Center for Urban Watershed Renewal. What are some of the projects they are currently involved with?**

 The Center for Urban Watershed Renewal (CUWR) has worked on some first-of-a-kind transactions, often involving a combination of municipal, state, and federal agencies. For instance, we worked to conserve over 60,000 acres of land in the High Sierras of California by arranging for a restoration-focused plan to provide risk reduction and clean up on a site that had been used to blow up old munitions. We worked with the local tribes, county and town officials, the state agencies of California, the Army Corps of Engineers, and the U.S. Army to make this whole arrangement happen. CUWR helped redefine how the agencies could work together. CUWR stepped in and took ownership of vast tracts of land in the meantime and helped

to serve as an intermediary to allow the lands to be transferred back to the people of California in good condition that everyone was happy with. CUWR is currently working in New York with a consortium of insurance and finance industry professionals as well as state and municipal representatives and various NGOs to create an outside-the-box visioning session to explore all the different ways that adaptation and resilience can

that is woven together with risk management strategy, including insurance as we know it today.

 **You worked closely for many years with Peter Feuerbach who died tragically in June of 2013. Could you speculate what his thoughts would be on the topics we discussed today, and what do you see of his legacy?**



Alewife Reservation Storm Water and Wetlands Restoration

This green infrastructure project prevents overflow and flooding, provides excellent retention, flood protection, and creates biodiversity on the Reservation.

be conducted--not just for New York City, but for the region as a whole--and how it can look in the near term, how it can look in the long term, and where the money can come from including from somewhere other than Federal coffers and after-the-fact disaster response. We are looking to push the envelope of how risks can be managed, not just by covering your financial bases with insurance, but by helping make infrastructure solutions, including green infrastructure, something

 Peter was trained as a geologist engaged in field research, including time spent in Antarctica. He layered this expertise with policy training from the Yale School of Forestry and later went on to earn his law degree. In conversations with him about his trajectory, I found that his drive was due to an intense passion for the outdoors and for being a proactive steward in all things. We generated the idea to form Center for Urban Watershed Renewal (CUWR) in the late 90s



RECIPROCITY: OUR OBLIGATION TO THE OCEAN

by Peter Neill

When considering how we must deal with the myriad challenges to the world ocean, the conversation comes always to questions of behavior and values. What must change in how we interact with ocean systems, with the marine environment, with exploitation of marine resources, with coastal protection and development, and with the economic and social necessities we expect the ocean to provide? Given the immensity of the challenge, and the impossibility of a single fix that will make it all better, what specific interim steps must we take to move, with all deliberate speed, in the right direction?

The ocean community has defined various short-term strategies: mitigation, for example, the direct tactical response to certain problems to negate or neutralize their effect. Adaptation is a second approach, one for which there is some logic but which nonetheless compromises response by settling for the existing circumstance as the new normal, accommodating the lesser condition, lowering the bar, giving in. Elsewhere, I have argued for a third response: invention, the pro-active, creative approach that applies present and future technology, financial incentive, and political action to new ideas, new instruments, new behaviors, new values. But this too may not be totally sufficient in that, while it presents novel strategies and applications, it may still not have the underlying power to shift people's values.

Value changes are the most ephemeral, most important aspects of the discussion. We live in a society that

has been defined by historical events and cultural traditions that are hard to deny, an evolution of behaviors based on religious assumptions, economic theories, and sometimes tumultuous governance. The world wants to be organized around a collective global desire for political order, growth as a path to well being, and capital defined first by the exploitation of natural resources and their transformation through manufacture, and second, more recently, by scientific innovation and technology. We debate the dichotomies -- guns versus butter, free market versus managed economy, consumption versus conservation -- and we conduct the arguments to a point now when we suffer from ideological adamancy, class differentiation, and political paralysis. It seems a critical moment. We can continue to suffer failed consensus and social stasis; we can experience continuing decline to collapse, chaos, even revolution; or we can regain our capacity for civilization by facing our problems, accepting the alternatives, and moving forward and away from default and defeat.

Sustainability is a new value that is advanced to this end. It accepts the finite capacity of Nature to support a burgeoning world population. It proposes new behaviors predicated on this knowledge, that we will only exploit resources to an extent that allows for their renewal and sustainability over time. We will incentivize and promote this new value system through financial tools, price structures, legislative action, regulatory enforcement, and cooperative action. We will stop taking it all, acting

unilaterally and independently for unlimited profit, and will reorganize ourselves to maintain and nurture the natural systems that have sustained us, and can continue to sustain us, even as we grow in number, over time if we will make it so.

But what can we do more to convince us at every level that sustainability is an essential core value for our future? Smarter folks than I are struggling with this problem. And clearly the struggle is necessary to counter those who will not consider or accept even the idea, much less the concomitant action, required to make sustainability succeed. What else is required to convince the body politic that such destructive indifference, by individuals, corporations, and governments, is no longer acceptable?

Let me suggest the concept of reciprocity. This is not a new idea to be sure, but perhaps it might be useful if applied in a new context. Reciprocity is a state of mutual exchange, the categorization of an action by its motivation and consequence in relationship to another. Indigenous peoples have practiced reciprocity as cultural behavior through direct barter and giving of gifts. The cultural anthropologist, Claude Levi-Straus, identified levels of such exchange, through language, kinship, and economics, a process that created bonds of social obligation present and future, an idea familiar through the popular notion of the Mafia "favor bank," a value on deposit that must be paid back in kind.



Artisinal fishermen on Inle Lake, Myanmar. Credit: Christopher Martin

What if we accepted the power of reciprocity as a standard of behavior at all levels, in all areas of exchange, with Nature? What if we acknowledged that the land and sea provide us value, not for the taking and exhausting as an entitlement, but as the giving of a gift, the making of a loan, with a consequent obligation that we pay back that value through complementary behavior, equitable patterns of consumption, and forms of exchange that sustain Nature through accepted future obligation? What if we accept such a reciprocal relationship and system of connection with Nature as our contribution -- our obligation -- to ourselves, our children, and the public good? Let me offer three illustrative statements, with examples of what I mean.

FIRST:

By not taking, we are giving back. If we choose to forego or reduce our consumption of fossil fuels or plastic bags or tuna, we are leaving that value

for others, a collective choice that taken to scale will extend or conserve that resource at a sustainable level.

SECOND:

By paying a fair price for what we need and use, we are giving back. If we pay for our consumption at a level of true cost – withdraw subsidies for fossil fuels, reinvest such underwriting in clean technology, price water as the most valuable commodity on earth, include insurance payment for disaster response and reparation from environmental destruction as part of regulatory requirement and permit fees, evaluate government investment projects based on a neutral or positive comparison of public benefit versus private profit, increase taxes and royalties to establish financial disincentives for polluting industries, allocate penalties to support of non-polluting alternatives, and many other financial calculations and market applications based on the value added by environmental

protection and sustainability outcomes.

THIRD:

By acting and applying these values, we are giving back. Modify personal, family, and community behaviors in every way possible to affirm these values through action. Become a “sustainability” citizen, A Citizen of the Ocean. Set an example. Sign petitions. Vote. Demonstrate when necessary. Communicate your commitment at every level, and hold others accountable in your daily purchases, your employment, your investments, civic organizations of which you are a member, schools that you attend or have attended, churches that you belong to, recreational activities that you enjoy, and politicians that you support. Communicate. Advocate by example. And amplify your voice by joining other exemplars into a movement of giving back.

Now, of course, I can easily anticipate the reaction to these ideas: as politically naïve, impractical and impossible, too radical, too whatever – all the predictable response by those who don't care, whose personal benefit is threatened, or who are afraid of any change. But in fact, it is their behavior that exemplifies these accusations: the simplistic political recalcitrance that sustains the status quo, the impracticality, indeed impossibility, of sustaining our way of life at present levels of consumption, the radical inflexibility and fearfulness that have brought governance to a standstill. What I am describing is a democratic process and expression of popular will based not on narrow ideology but on our understanding of the consequences for us all if we fail to act.

Reciprocity makes every one a winner, everyone a builder, everyone a giver. It is a simple framework that allows us to understand another way of being, how to support, individually and collectively, a shift from our present way that is making us all losers, all destroyers, and all takers until we have nothing left. Is that really what we want for the land, for the ocean, for our children and their future?

Reciprocity. It seems so clear. Think what the land gives us. Think what the ocean gives us. Are we not obligated to respond?

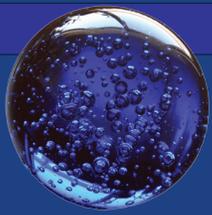
Let's start giving back.



WORLD OCEAN Observatory™

What if...

...we accept reciprocity as a standard of behavior at all levels, in all areas of exchange, with Nature? What if we accept such a reciprocal relationship and system of connection as our contribution—our obligation—to ourselves, our children, and the public good?



MAMI WATA: ARTS FOR WATER SPIRITS IN AFRICA AND ITS DIASPORAS

by Henry John Drewal

At once beautiful, protective, seductive, and dangerous, the water spirit Mami Wata (Mother Water) is celebrated throughout much of Africa and the African Atlantic. A rich array of arts surrounds her, as well as a host of other aquatic spirits--all honoring the essential, sacred nature of water. Mami Wata is often portrayed as a mermaid, a snake charmer, or a combination of both. She is widely believed to have “overseas” origins, and her depictions have been profoundly influenced by representations of ancient, indigenous African water spirits, European mermaids, Hindu gods and goddesses, and Christian and Muslim saints. She is not only sexy, jealous, and beguiling but also exists in the plural, as the mami watas and papi watas who comprise part of the vast and uncountable “school” of African water spirits.

Mami Wata’s presence is pervasive partly because she can bring good fortune in the form of money. As a “capitalist” deity par excellence, her persona developed between the fifteenth and twentieth centuries, the era of growing trade between Africa and the rest of the world. Her very name, which may be translated as “Mother Water,” is pidgin English, a language developed to facilitate trade. Countless enslaved Africans forcibly brought to the Americas as part of this “trade” carried with them their beliefs, practices, and

arts honoring water spirits such as Mami Wata. Reestablished, revisualized, and revitalized in the African Atlantic, Mami Wata emerged in new communities and under different guises, among them Lasirèn, Yemanja, Santa Marta la Dominadora, and Oxum. African-based faiths honoring these manifestations of Mami Wata continue to flourish in communities throughout the Americas, including Haiti, Brazil, and Dominican Republic. This photo exhibition explores the visual cultures and histories of

Mami Wata, examining the world of water deities and their seductive powers. It demonstrates how art reflects and actively contributes to beliefs and religious practices, globalization, and capitalism. Most of all, it reveals the potency of images and ideas to shape the lives of people, communities, and societies.

Figurehead from an unidentified vessel
Circa 1900-1925 | Wood, gilt, pigment.
The Mariners’ Museum, Newport
News, VA





Zoumana Sane (dates unknown, Senegal)
Mami Wata, circa 1987
Pigment, glass. Collection of Herbert M.
& Shelley Cole. Photo by Don Cole

WHO IS MAMI WATA?

Mami Wata is a complex symbol with so many resonances that she feeds the imagination, generating, rather than limiting, meanings and significances. She is at once a nurturing mother; sexy mama; provider of riches; healer of physical and spiritual ills; and embodiment of dangers and desires, risks and challenges, dreams and aspirations, fears and forebodings. People are attracted to the seemingly endless possibilities she represents and, at the same time, frightened by her destructive potential. She inspires a vast array of emotions, attitudes, and actions among those who worship her, fear her, study her, and create works of art about her.

Often appearing with the head and torso of a woman and the tail of a fish, Mami Wata straddles earth and water, culture and nature. She may also take the form of a snake charmer, sometimes in combination with her mermaid attributes and sometimes separate from them. She can exist in the form of indigenous African water spirits known as mami watas and papi watas or assume aspects of a Hindu deity or a Christian saint without sacrificing her identity.

Often appearing with the head and torso of a woman and the tail of a fish, Mami Wata straddles earth and water, culture and nature. She may also take the form of a snake charmer, sometimes in combination with her mermaid attributes and sometimes separate from them.



Dona Fish | Ovimbundu peoples, Angola, Circa 1950s-1960s. Wood, pigment, metal, mixed media. Fowler Museum, UCLA. Photo by Don Cole

The images included in this exhibition present a broad overview of some of the movements, images, and ideas that have played major roles in the arts for Mami Wata. These include African images celebrating ancient and indigenous water spirits, global examples that demonstrate transcultural nature, and contemporary ideological and theological controversies concerning good and evil.



Mami Wata and the innumerable mami and papi wata spirits have many faces, and their identities rarely remain constant. As conditions change, so do the attributes, personalities, and actions of these fascinating and enigmatic water spirits. When taken together, the case studies presented in this section reveal striking differences, as well as remarkable similarities, in the beliefs and expressive arts for Mami Wata and her cohorts in Africa.

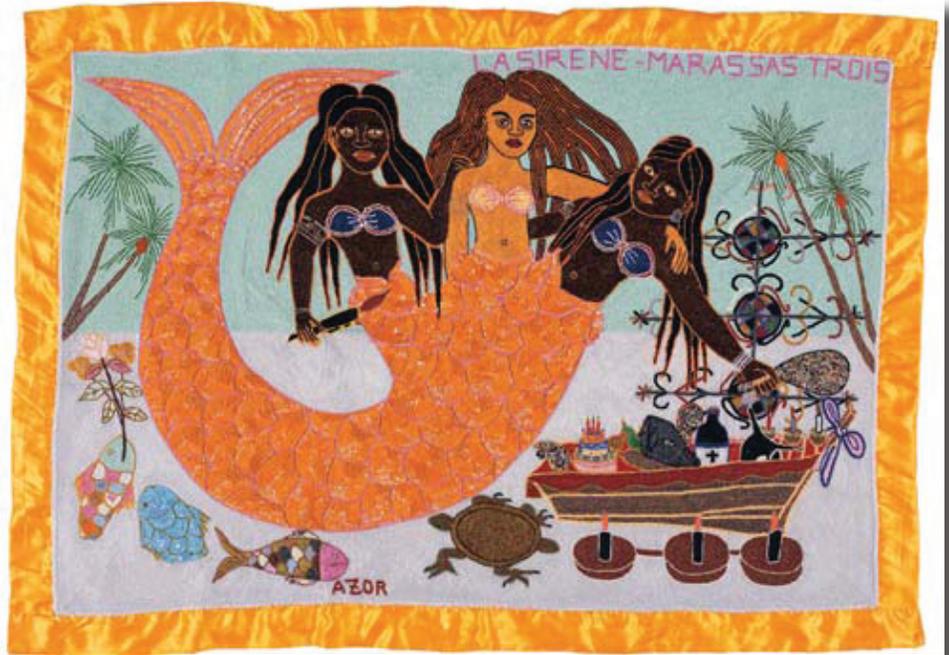
As with the arts dedicated to her, the worship of Mami Wata as a specific spiritual entity is not a unified, homogenous phenomenon. Instead, it reveals an extremely diverse and fluid set of beliefs and practices that both reflect and guide social and religious worlds. There are many expressions of Christianity, Islam, Judaism, Hinduism, Buddhism, and other faiths, and this is perhaps even more true of the worship of Mami Wata and water spirits in Africa.

Images top to bottom:

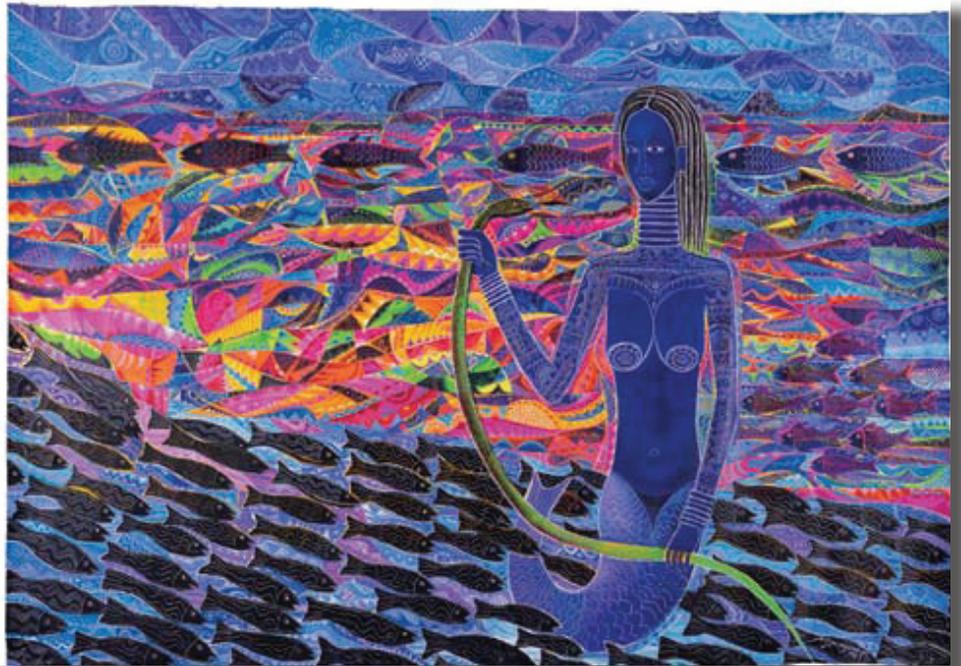
1. John Goba (b. 1944, Matru Jong, Sierra Leone) Headdress, ca.1980s. Wood, pigment, fabric, netting, beads, metal fiber. Collection of Mr. & Mrs. Jeremiah Cole.
2. Yaure peoples, Côte d'Ivoire ca 1970. Wood, paint, rubber . Fowler Museum, UCLA. Photo by Don Cole
3. Abdal 22 (active 1980s-early 1990s, Kinshasa, Democratic Republic of the Congo) Mami Wata, 1989. Acrylic on canvas. Private Collection.

MAMI WATA AS ARTISTS' MUSE

In addition to their continually transforming histories of influence in Africa and its diasporas, Mami Wata and other African and African Atlantic water spirits have gained an even wider audience, as well as new meanings and import, by capturing the imaginations of a number of contemporary artists. This section of the exhibition features the work of several artists--men and women from Africa, Europe, North America, and the Caribbean--who have found in Mami Wata and her cohorts a highly intriguing subject matter. Even though they may not worship her, Mami Wata has entered the dreams and waking hours of these artists, seducing them into creating extraordinary works that open our eyes, minds, and imaginations to wonderful possibilities. The unique understandings and involvements of contemporary artists with water spirits also allow them to employ Mami Wata and other underwater denizens to address issues of gender, race, morality, identity, economics, environment, and politics.



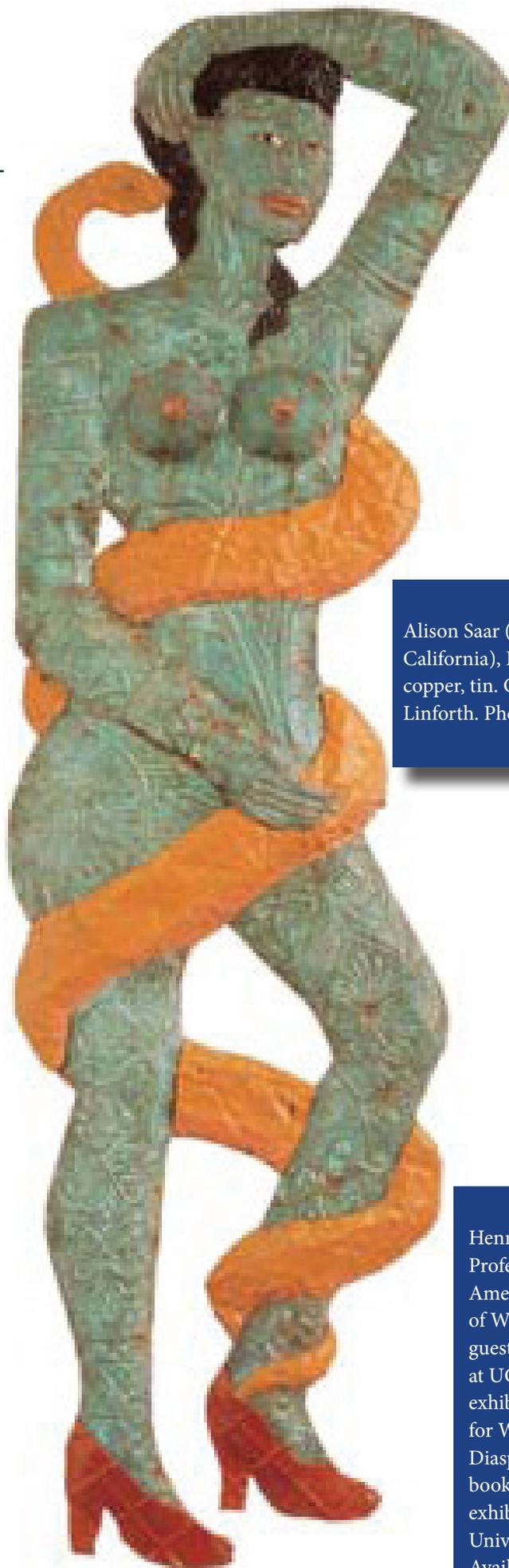
Roudy Azor (b. 1980, Port-au-Prince, Haiti)
Lasirene-marassas trois (Lasirèn-Twins [and the One Who Follows the Twins Making Three]), 2006. Satin, beads, sequins.
Private Collection. Photo by Don Cole



Moyo Ogundipe (b. 1948, Ijesha-Ishu, Nigeria; active Denver, Colorado)
Mami Wata, 1999. Acrylic on canvas. Collection of Chike Obianwu.
Photo by Don Cole

MAMI WATA'S
SISTERS IN THE
AFRICAN ATLANTIC

Sacred waters bathe the histories of African peoples--waters of life, departure, and return. Sometimes they appear as tears of deep sorrow, sometimes as soothing and cooling streams sustaining existence and hope. Water connects world with otherworld, life with afterlife. Among Africans dispersed across vast oceans, these waters are emblematic of the ultimate journey back home to Africa and all those distant yet living ancestors. In Haiti, it is the journey home to Guinee across the rippling boundary of existence, imagined as a vast expanse of water that exists between life and afterlife. This is the abode of Lasirèn, La Baleine, Agwe, Simbi, Yemanja, Watra Mama, and all the water divinities of Africa and the African Atlantic. Their names are regularly invoked to strengthen the determination needed to endure the hardships and challenges of lives scattered and torn asunder by the avarice, arrogance, and brutality of those who would enslave others for their own benefit. The arts for African Atlantic gods and goddesses evoke complex emotions, hopes, and dreams as well as fears and nightmares. They may recall a sorrowful, troubled past, yet they offer hope and inspiration for a better future and the promise of an afterlife.



Alison Saar (b. 1956, Los Angeles, California), *La Pitonisa*, 1987. Wood, copper, tin. Collection of Justine I. Linforth. Photo by Don Cole

Henry John Drewal is Evjue-Bascom Professor of Art History and Afro-American Studies at the University of Wisconsin-Madison. He was the guest curator at the Fowler Museum at UCLA for a major traveling exhibition of "Mami Wata, Arts for Water Spirits in Africa and Its Diasporas" and is the editor of the book which was developed from the exhibit and published by Indiana University Press in 2008. Available at Amazon.com.

OCEAN CLIMATE

EXTREME WEATHER, SMALL ISLAND NATIONS AND A CHANGING CLIMATE

A Statement by Ronnie Jumeau, Seychelles Ambassador to the U.N.

Carbon emissions are changing the ocean's pH, polar ice is melting in the Arctic, the ocean is absorbing solar radiation, warming seas are generating more severe and more frequent weather events. All of this is affecting the ocean resources which sustain us, and the densely populated coastal zones where two-thirds of the world's inhabitants live. Many bottom-up efforts are transforming the ways in which we adapt and live, but is it too little, too late? Are governments working hard enough and quickly enough to make the changes that are needed to alter our current course?



Children returning from school through flood water during a tidal surge in Chittagong, post-Cyclone Aila in Bangladesh, 2009.
Credit: Jashim Salam | Marine Photobank

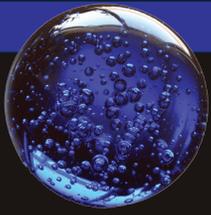
SMALL ISLAND NATIONS FACE
A CHALLENGING FUTURE

In this 3:07 video produced by World Ocean Observatory and Compass Light Productions, Ronnie (Ronald Jean) Jumeau, Seychelles Ambassador to the United Nations and the United States, discusses the shared story of small island nations and the effects of climate change. Ambassador Jumeau was interviewed by World Ocean Observatory at the Copenhagen Climate Talks in 2009.

Small Island Nations are the first and most vulnerable societies to face the challenging conditions of sea level rise, acidification, extreme weather and other dramatic manifestations of climate change and the ocean. Some island nations already face the prospect of complete submersion and loss of place and national identity. Many are now engaged in innovative strategies to respond to these challenges, and to them we may look to see the future. See more at worldoceanobservatory.org/content/ocean-climate.



His Excellency Ronnie Jumeau, Seychelles Ambassador to the U.N. and the United States, in a World Ocean Observatory exclusive interview during the 2009 Climate Talks in Copenhagen, Denmark.
Credit: World Ocean Observatory & Compass Light Productions



THE OCEAN & HUMAN ECOLOGY

An Exclusive Video Interview with Darron Collins, President,
College of the Atlantic in Bar Harbor, Maine
Produced by Molly Bedell | Edited by Trisha Badger



Batangas, Philippines: Local fisherman using a simple hook and line to catch squid, a sustainable fishing practice.
Credit: © 2007 Peri Paleracio | Marine Photobank

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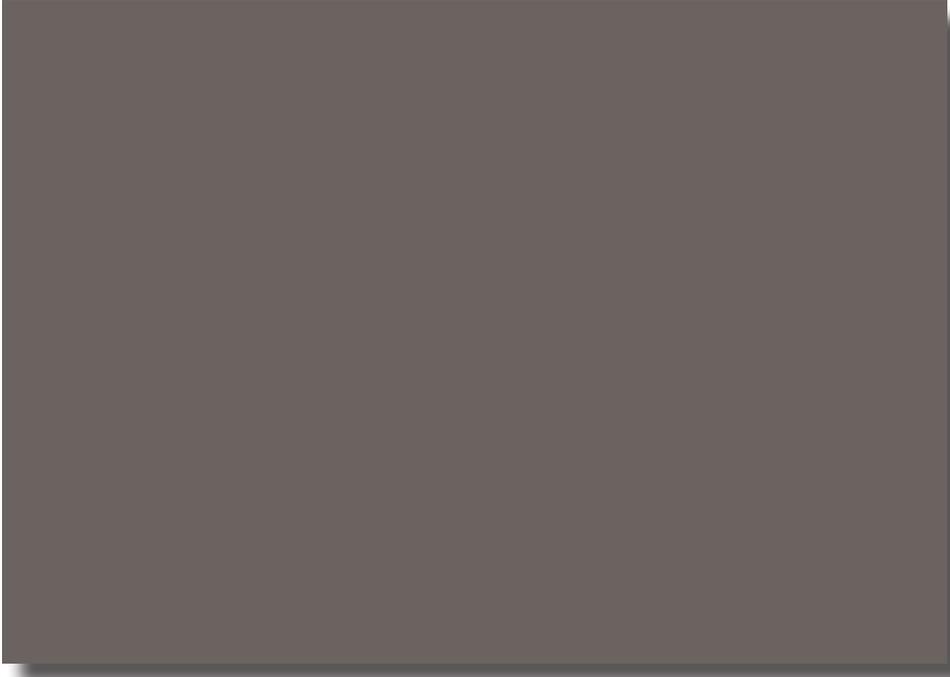
In July of 2013, Peter Neill, Director of the World Ocean Observatory, sat down with Darron Collins, President of the College of the Atlantic (COA) at the Bar Harbor, Maine campus to discuss human ecology, ocean issues, and ways in which sustainable disciplines can be implemented on a local level, scaled up, and applied to urban settlements.

Collins, a graduate of COA and Tulane University, and former Director of Creative Assets for the World Wildlife Fund, offers a unique perspective on how we as humans relate to our natural world and ways in which we are impacting our world today and the potential for a sustainable future.

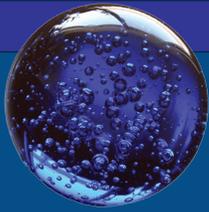
This exclusive interview between Peter Neill and Darron Collins was recorded in July of 2013 in Bar Harbor, Maine.

Produced by Molly Bedell
Edited by Trisha Badger

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July, 2013: Darron Collins speaks with Peter Neill at the College of the Atlantic campus in Bar Harbor, Maine.



VISIONS AT SEA

Composed by Joey Roukens. Performed by the Rubens Quartet

In 2011 a unique collaboration took place between composer-in-residence Joey Roukens and the Rubens Quartet. In 2011 Roukens put the finishing touches on his newest composition *Visions at Sea*, written for the Rubens Quartet and commissioned by the Scheepvaartmuseum in Amsterdam for the re-opening of the Het Scheepvaartmuseum, the National Maritime Museum of the Netherlands. The world-premiere took place on October 1, 2011 with Queen Beatrix of the Netherlands in attendance. This video was recorded in Bimhuis Amsterdam for VPRO Virje Geluiden.

In 2012 the Quartet launched a new CD featuring two new works by Roukens. Learn more at www.rubenskwartet.nl

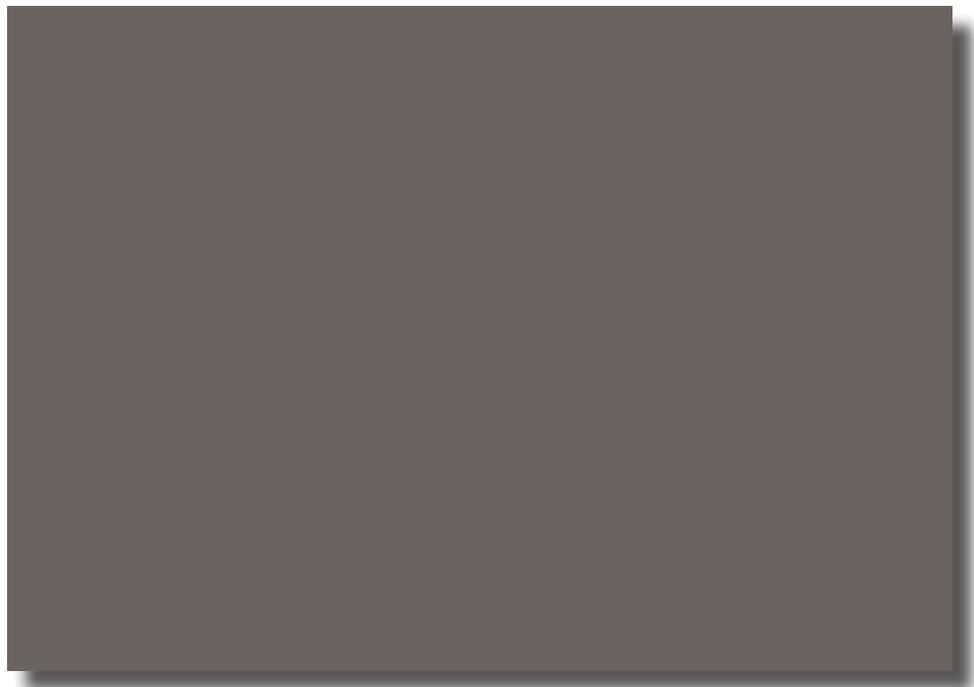
The Rubens Quartet is: Sarah Kapustin, violin; Tali Goldberg, violin; Roeland Jagers, viola; and Joachim Eijlander, cello.

Special thanks to Vrije Geluiden, VPRO television for permission to use this video.

Visions at Sea
for string quartet

Molto calmo, religioso (♩ = 48), little vibrato throughout

con sord. (ebony mute), sul tasto (legatiss.) (♩ = 4 sempre)
ppp delicatiss. softly singing
con sord. (ebony mute), sul tasto (legatiss.)
ppp delicatiss.
con sord. (ebony mute) sul tasto (legatiss.)
ppp delicatiss. realiss.





Artificial Reef Sunken Ship: Large schools of fish inhabit an artificial reef--an intentionally sunken United States Coast Guard cutter. Morehead City, North Carolina.
Credit: Brandon Puckett | Marine Photobank

I Pledge:

- To only consume seafood that has been raised or harvested sustainably;
- To refuse plastic containers when possible and to only choose those that can be reused or recycled;
- To avoid non-biodegradable packaging, Styrofoam, and plastic wrap;
- To conserve, harvest, and recycle fresh water at home, at work, and at organizations with which I am associated;
- To reduce my dependence on fossil fuels and production of CO₂ emissions and to try and reduce my annual consumption by 25% using alternative transportation and conserving energy at home;
- To adopt alternative technology, more fuel-efficient, hybrid or electric vehicles, solar and wind energy production, and other options whenever possible;
- To stop using chemical lawn fertilizers and pesticides and to advocate against industrial waste into streams, rivers, ponds, lakes and watersheds;
- To leave natural areas, waterways, and beaches cleaner than I found them;
- To oppose development within the coastal zone that compromises the environmental health of the shoreline and associated maritime resources;
- To encourage local schools and civic organizations to support environmental study, programs and values;
- To support local conservation and advocacy organizations involved in community-based activities working toward a sustainable ocean;
- To require my local, state, and national political candidates and leaders to commit to these outcomes as part of their political agenda before they are elected;
- To build the “Citizens of the Ocean” network by sharing this pledge with my family, neighbors, and friends worldwide.

SIGN THE PLEDGE

