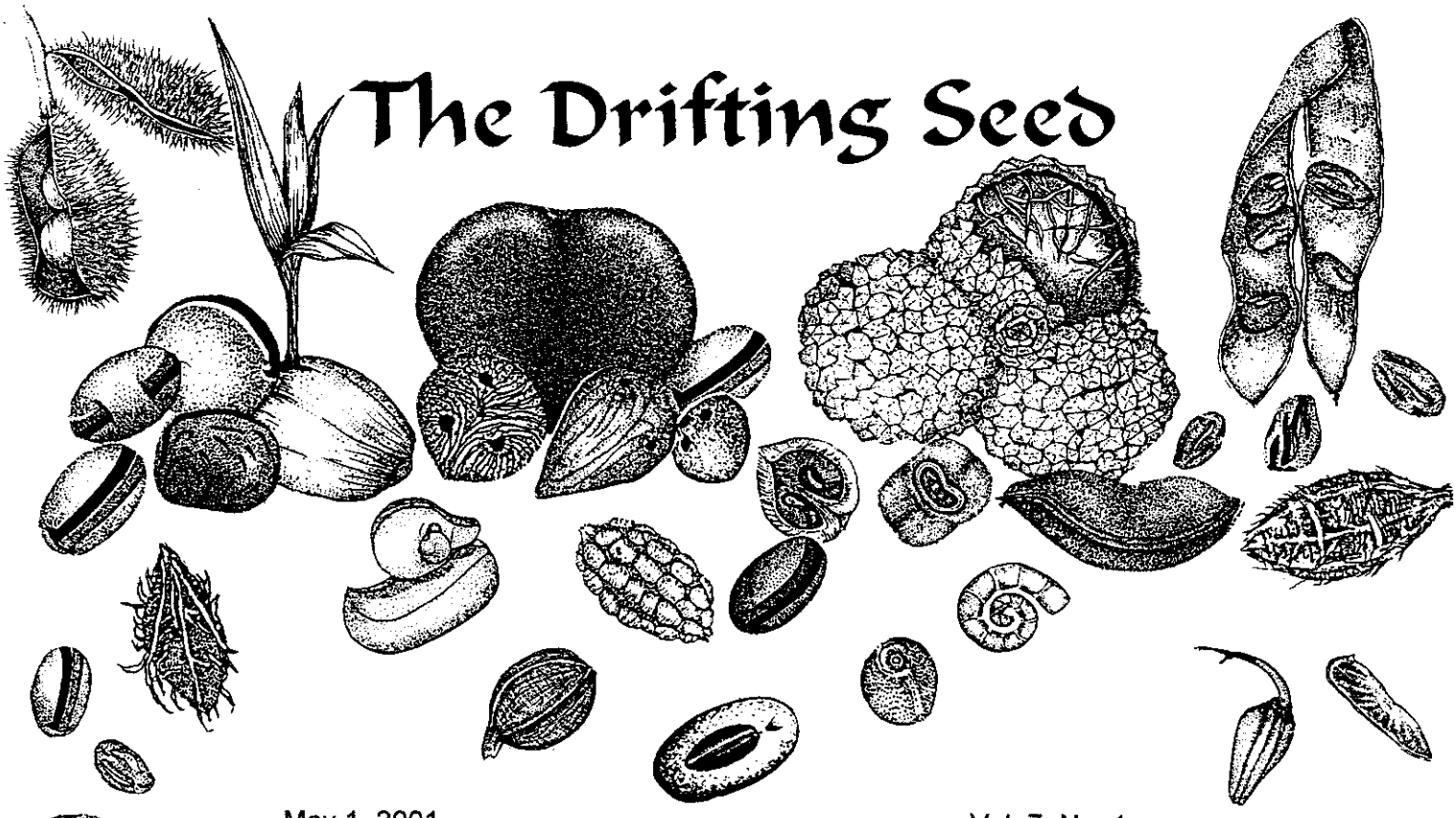
The Drifting Seed



May 1, 2001 Vol. 7, No. 1

THE DRIFTING SEED

A triannual *Newsletter* covering seeds and fruits dispersed by tropical currents and the people who collect and study them.

Distributed to more than 20 countries.

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Exhibits and displays by The Sea-Beaners will be part of
The Conchologists of America Convention, July 7-11, 2001
Hosted by The Astronaut Trail Shell Club

2001 Shell Odyssey

at the Radisson Resort at Port Canaveral, Florida
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FROM CATHIE

Thank you all for your generous donations to this newsletter. The response from so many of you confirmed the need for sea-beaners around the world to exchange information about our beloved drift seeds.

Since our symposium in October, we've had one of our least productive winters — hardly any fresh seaweed, and what little there was, didn't bring with it our normal bounty of drift seeds in Florida. Many of you said it was in keeping with the bad luck so many of us have had this past year, but I think it was to make us more appreciative of the abundant years we had in the past — especially here in Florida — and the ones we'll have in the future. I realize how much we take for granted here when I receive a letter from someone in North Carolina who is excited about finding three tropical almonds. Most of us used to pass by almonds, golfball beans, coconuts ... without a second glance. How jaded we had become! This year re-awakened our love of *all* things found on the beach.

One of my favorite shore treasures is the one I had the most difficult time researching. Here on the Space Coast we call them "stoned crabs," but they are actually fossilized ghost crabs that look like clumps of sand. About 8 years ago, my friend Pat Brett pointed out to me that these "rocks" were really petrified crabs. I didn't believe him until he filed through the side of one to clearly expose a crab claw. I was hooked from then on, but couldn't get any concrete information until last year's symposium when I spoke with John Beerensson from Merritt Island, Florida. The following page is extracted from a letter I received from him shortly after the symposium. This is one of the most exciting letters I received all year, so, with his permission, I'm including it on the following page.

I'm also printing a wonderful response to *The Drifting Seed*'s (Dec 2000) request to answer "Why do drift seeds drift?" from Dr. Blair Witherington. His reply is so enlightening that it had to be included in this newsletter (page 4).

Now, a note about the style rules of this newsletter: they reflect the nature of us beachcombers — we mull over each item and can't always agree on what it is or where it came from...and we're notably irregular. Does the term *sea bean* have a hyphen or is it all one word? Spelling, capitalization, punctuation, and other grammar rules vary between continents, sometimes within offices. So, to keep peace among us, I choose to maintain the style of each author, even at the risk of inconsistency within this newsletter. (I can hear the collective gasp right now!) But remember, we're an odd bunch of lay readers and professionals and I can't please you all, so I might as well make it easy on myself.

Once again, I want to thank all of you Drifters who kept me informed about beach activities during my hospital stays this winter. With the love and luck of sea-beaners surrounding me, I pulled through another round of cancer surgeries, coming out of them energetic and hopeful, although with a few missing organs and bones. I now "waddle" to the beach with the help of my friends. Park Ranger and dear friend Ed Perry took over my presentations while I was away and I understand from the attendees that he captivated his audience with the charm and enthusiasm that only a truly dedicated naturalist can provide. And my other dear friend Sue Bradley kept the business of beans running smoothly as well as making sure that I was well taken care of. Thanks to both of you for keeping me and The Drifters afloat!

FROM BOB

I hugged our substitute mail lady at 1:30 PM on April 2. To say the least she and I were astonished. I was working on the pond part of our pond-waterfall combination when she drove up to our house. Well actually I was talking to our 11 goldfish, 2 salamanders, and some odd newts. I walked up to her, and she said that she had a letter that was not to be folded and was too large for our mailbox. When I saw the mailing label, I hugged her, and hastily told her that it had come from our very dear friend Cathie who was having problems, and that we had not heard from her for quite a while. We were very worried and I was relieved to see her mailing label again. After washing up, I opened the envelope to find a group picture from the 2000 symposium. What a treat! It brought back a flood of fond memories. In a letter Cathie told us she was better, and that it was time for me to prepare an item for the May Newsletter. Cathie, we are happily relieved.

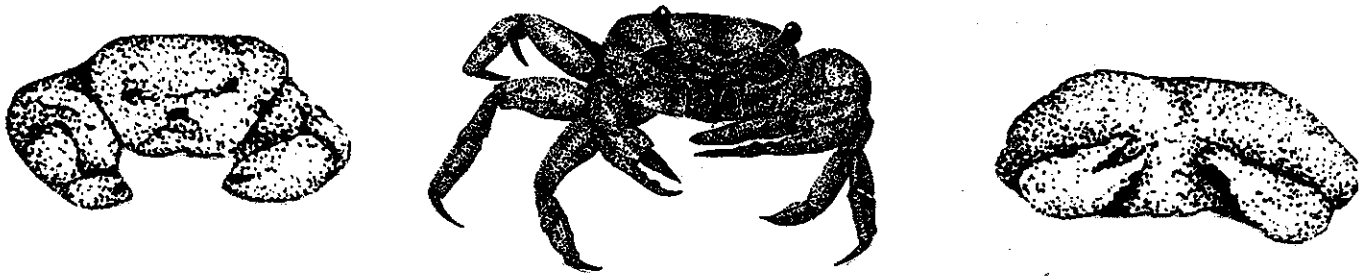
Betty has asked to add a note to Ed Perry. Ed, the nickernut that you gave her is taking over the bathroom and is tending to grasp us as we pass. My advice to Betty was to not consider growing a nickernut, but it is her "baby" now. I just hope that I can get it out of the house in May. At least there has been no mention of a greenhouse for it.

My initial database of seed and fruit morphological characters of families was well received at the UDSA. APHIS (Animal and Plant Health Inspection Service) was so interested that they are in the process of hiring a technician to electronically photograph the illustrations that will accompany the text. It will be made available electronically to users, especially agricultural inspectors at the port-of-entry to the United States. I am polishing and honing the database which currently contains 414 spermatophyte families and 331 seed or fruit characters.

FOSSIL GHOST CRABS

from a letter from John L. Beerensson
Merritt Island, Florida

Please allow me to follow up on our conversation about the fossil crabs. As you know, *Ocypode quadrata* (Fabricius 1767) represent the vast majority of the crabs that are found on Brevard's beaches. On rare occasions the genus *Menippe* can be found.



The crabs are found primarily in a relaxed position — claws beneath the carapace, legs extended. Unfortunately, wave and tidal action cause the legs to break off; thus few crabs are found with attached legs. Most crabs that wash ashore are heavily rolled. However, there are the scarce finds when preservation is near perfect. There are also rare finds where the crab has its claws extended.

Other "coquina" fossils that can be found aside from small shells include large *Busycon* and Pen Shells. Additionally, sand dollars can be found; most are *Mellita quinquiesperforata*. At next year's sea-bean symposium I promise to give you a very nice example of *Mellitidae*.

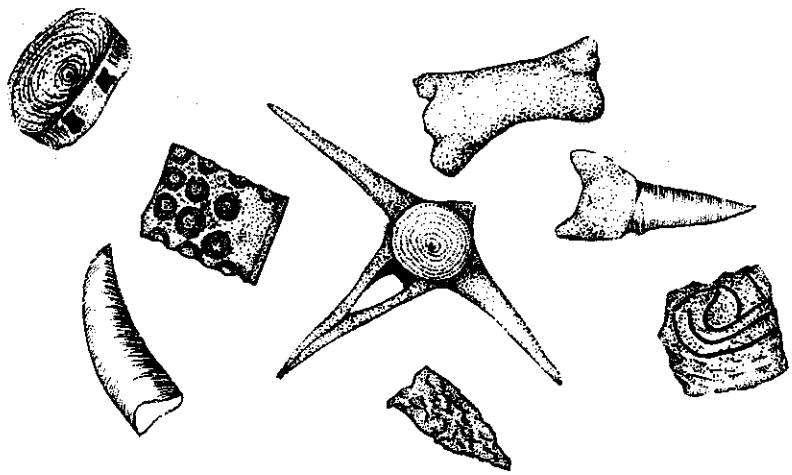
Brevard is blessed with these finds. The only other beach where this phenomena occurs is on Anastasia Island near St. Augustine, Florida. However, the fossils are quite scarce.

The fossils are late Pleistocene and wash out of the Anastasia Formation laid down more than 100,000 years ago. Many crabs tested are of this age, although some can be of a younger age.

What initiated the fossilization process is currently being studied by the Florida Museum of Natural History. Roger Portell, Curator, Invertebrate Paleontology, is heading up the research. Roger's work will be published in the near future. Roger has been to Brevard on a number of occasions, and he has had graduate students in Brevard assisting with the studies.

We are very fortunate to have someone of Roger's experience, knowledge, and credentials interested in our "coquina" fossils. To top it off, Roger Portell is one of the finest gentlemen I have ever had the pleasure of meeting. Nobody more than I is awaiting Roger's publication.

Of interest, aside from these fossils, vertebrate material occasionally can be found on Brevard's beaches. Along with fossil shark teeth (some as large as 2 inches from the Great White), material from whales, tapirs, horses, giant armadillos, etc., can wash ashore.



I've been a beachwalker here in Brevard for over 30 years, and from fossils to sea-beans to Spanish artifacts, there are no better beachcombing beaches in the world.

Work is much more fun than fun.
Noël Coward

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Why do drifting seeds beguile us with their prodigious journeys? What's in it for the bean itself... besides the notoriety?

Your notion on the effects of environmental "influence" on sea-bean evolution is identical to a hypothesis set forth by a great biological thinker, Jean Baptiste Lamarck (1774-1829). He was a principal in some of the first thinking on how organisms evolve. Lamarck proposed that plants and animals adapt to their environment in their lifetime and then pass these acquired traits on to their offspring. Thus, giraffes that strain to reach high leaves get little giraffes with longer necks, professional weight-lifters get more muscular kids, and (reaching a bit now) plants that strive to depart their homeland get hard, waterproof seed coats that allow them to drift.

Especially since Charles Darwin's *Origin of Species*, people have looked long and hard for Lamarckian effects on evolution, but to no avail. Mice and fruit flies that are exercised and tested by environmental rigors seem to show that evolutionary adaptation has nothing to do with the toil of one's ancestors. The current theory that best fits all of the observations we have of the natural world is that any changes in the genes passed on to offspring are random, undirected changes, but are changes that may be snuffed out, or persist, based on how those changes affect survival and breeding, that is, "natural selection" (Darwin's notion).

But in your wonderment of bean survival at sea, you bring about an equally deep question: what good is it for a seed to circle an ocean and land on a beach where it has no prospects? Confusion over the answer to such a question might lie in our focus on a very small part of a sea bean's life history. A similar confusion comes when we try to explain the beauty of an abalone's mother-of-pearl. All the abalone's life, it's iridescent, shimmering colors are hidden away where no one and no thing, not even the abalone itself, can appreciate them. Only in death is this splendor revealed to the world.

The riddle of the abalone's hidden splendor and the sea bean's futile travels comes from a limited look at their lives. Back home in the Pacific kelp beds, abalones avoid being eaten by keeping a thick hard shell around them. Holding onto that shell with such a tender, soft body requires some creative use of physics. To appreciate the utility of the pearly smooth layers inside an abalone, try picking up a dime from a wet pane of glass and from wet concrete sidewalk. Through the eons, abalones and their kin may have tried this experiment, of sorts, and the ones that remain continue to lay down smooth layers of nacre that cling their shells to their bodies and that so beautifully refract light upon their deaths.

Back home in the riverine rainforest, *Mucuna* vines grow, and the most successful of these produce seeds that survive predators and that float away to likely habitats downstream. There, buoyancy and a rock-hard seed coat are essential survival traits. But where we are at the fringe of a sea bean's world, it's difficult to think of these traits as anything else but a long-distance delivery system that puts a lovely object of nature at our feet.

Then again, maybe there is a purpose to all this beauty. Perhaps it is a lesson for us... that all the things we do in life persist beyond us. Now I'll admit the looseness of the metaphor that relates the glimmer of a lost sea bean to, say, the nation-changing legacies of Gandhi and Lincoln. Yet, it's something to think about. We each may have little chance to be a great person of history, but all of us have opportunities to leave the joy as brought about by a shiny bean.

In life's wilderness, survival rates are higher if an organism gifts its offspring with the genetic version of a bulky Swiss army knife.
Diane Ackerman in *A Natural History of Love*

Notes On The Ocean Dispersal of Coral Beans

Wayne P. Armstrong
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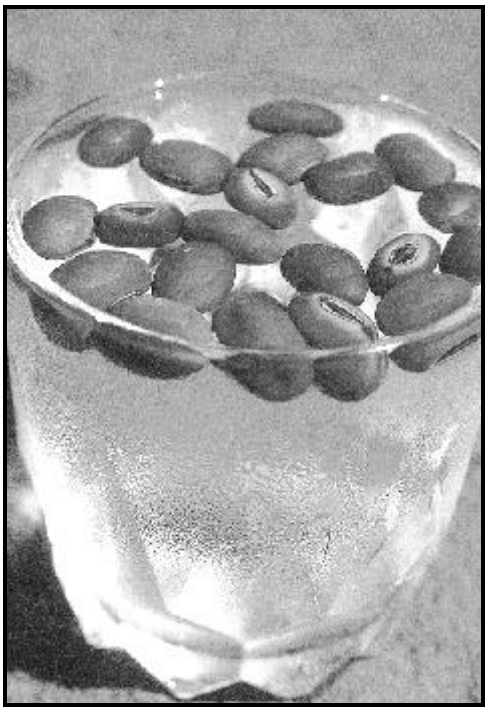
Wayne's Word web site: http://daphne.palomar.edu/wayne/wayne.htm

Erythrina is such an extraordinary genus of flowering plants that four international botanical symposia were devoted to it during the 1970s and 1980s. Some of the world's leading botanists discussed a wide range of topics, from the taxonomy and pollination of these trees, to their remarkable geography and dispersal. A number of articles from the symposia were published in several scholarly journals, including *Lloydia* Volumes 37 & 40 (1977), *Annals of the Missouri Botanical Garden* Vol. 66 (1979) and *Allertonia* Vol. 3 (1982).

Erythrina flowers are pollinated by perching birds (passerines) or hummingbirds, depending on the species. Flowers pollinated by perching birds typically have gaping corollas in which the upper banner is widely separated from the wing and keel petals, while hummingbird flowers typically have slender, tubular corollas.

The exact mechanism for dispersal of *Erythrina* species throughout all the major continents of the world is an enigma. Over 100 species are distributed in the following regions: Mexico (27), Central America (25), South America (21), West Indies (9), Tropical Africa (26), South Africa (5), Continental Asia (6), Melanesia and South Pacific (6), and Australia (2). One additional species (*E. fusca*) occurs on all the continents except Africa, and three additional species are native to the continental United States and the Hawaiian Islands. Since a few species occur in more than one major continental group, the grand total is 116.

But why are populations of coral trees so widespread throughout the world? Although the distribution of some ancient plant groups, such as the cycads, correlates rather nicely with continental drift, the time frame when all the continents were joined together is much too early for *Erythrina*. More plausible theories for the intercontinental dispersal of coral trees include seed dispersal by ocean currents, rafting, and perhaps migratory birds. Although most species have seeds that sink in water, there are some with buoyant seeds that may have drifted or rafted to some of the Polynesian Islands.

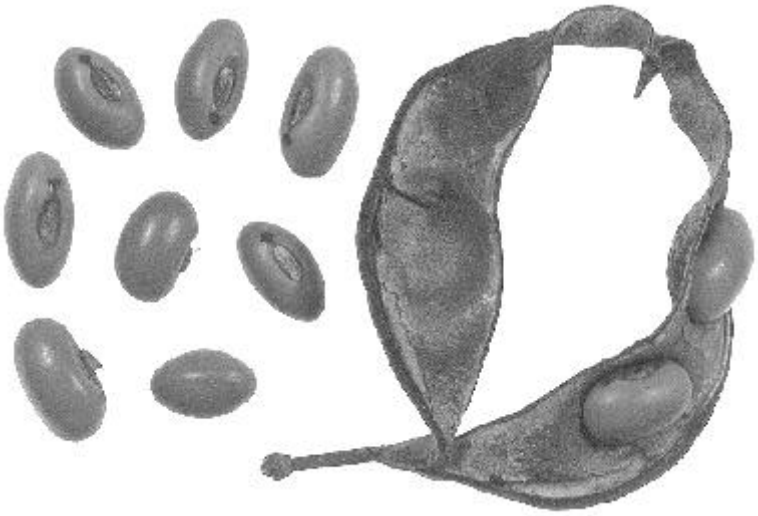


Seeds of the Asian coral tree *(Erythrina variegata*) are buoyant in seawater and may have drifted to distant shores of the tropical Pacific. In fact, this species (or its progenitor) may have given rise to several species of endemic coral trees in the tropical Pacific region.

According to Bob Gun and John Dennis (*World Guide to Tropical Drift Seeds and Fruits*, 1976), the buoyancy of *Erythrina* seeds is due to lightweight cotyledonary tissue. E. Charles Nelson (*Sea Beans and Nickar Nuts*, 2000) states that coral beans are true long-distance drift seeds which can remain buoyant in saltwater for at least one year. He documents several coral bean collections from beaches of the British Isles. It is not surprising that the most widely distributed of all coral trees (*E. fusca*) has buoyant seeds.

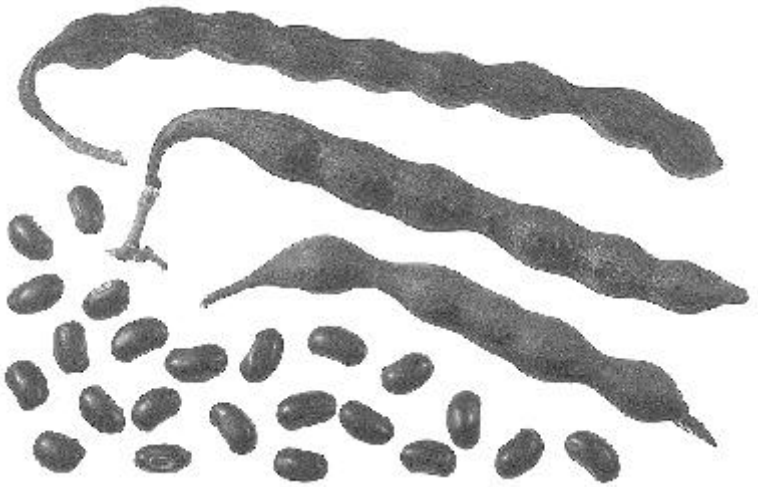
Another species with buoyant seeds (*E. variegata*) occurs in Asia, Polynesia and Australia. One remarkable observation by the naturalist H.B. Guppy (*Plant Dispersal*, 1906) describes abundant seeds of an unknown *Erythrina* floating off the coast of Ecuador. Because of their small size they must have been a colorful, red-seeded species present in large numbers. It is interesting to note that *E. velutina* occurs on the Galapagos Islands 600 miles off the coast of Ecuador, where it is pollinated by finches.

More than half of the known species have bright red seeds that may have also been dispersed by birds or mammals. In fact, the shiny red seeds are collected by people and used for necklaces, earrings, good-luck charms, and rosaries in Africa and Caribbean Islands. With thick, impervious seed coats, *Erythrina* seeds could pass through the digestive tract of large mammals and birds. The fact that wild populations of coral trees are represented on practically all major continents and many islands is truly remarkable.



Above: Pods and seeds of the endemic Hawaiian coral tree called wiliwili (*Erythrina sandwicensis*). Although the ancestor of this species probably reached these islands by drifting or rafting, the bright red seeds of wiliwili do not float in water.

An interesting coral tree endemic to dry, leeward slopes of all the main Hawaiian islands is called wiliwili *(Erythrina sandwicensis*). Although the flowers are usually red, some of the populations have color variations of red to orange and white. This Hawaiian endemic belongs to a group of closely related passerine species in the section *Erythraster*, including *E. tahitensis*, endemic to Tahiti; *E. variegata*, a widespread species in tropical Asia and the South Pacific; and *E. velutina*, another widespread species in northern South America, the West Indies and the Galapagos Islands. Although the seeds of wiliwili sink in water, it may have originated from an ancestral species with buoyant seeds that reached these islands many thousands of years ago. In fact, a related tropical Asian species (*E. variegata*), which is commonly planted as a street tree in Hawaii, has seeds that float in water. The seeds of this species sometimes show up along Hawaiian beaches and tidal waters; however, they are usually of local origin. Trees of *E. variegata* are fairly easy to identify because the pods are longer than most cultivated coral trees, often up to 12 inches or more in length (shown below).



According to Sherwin Carlquist (*Hawaii: A Natural History*, 1980), the seeds of wiliwili (*E. sandwicensis*) have gradually lost their ability to float in seawater. Although the reasons are not identical, Carlquist compares this with the loss of flight in certain insects and birds. "If a plant shifts its ecological preference, it will tend to lose contact with the agent responsible for its dispersal." Carlquist's hypothesis does not apply to the three species of sea beans on the Hawaiian Islands, including *Mucuna gigantea*, *M. sloanei* and *Dioclea wilsonii* (*D. violacea*), which appear to have arrived on these islands naturally and have retained their buoyancy and ecological preference. According to the second edition of *Manual of the Flowering Plants of Hawaii* by W. L. Wagner, D.R. Herbst and S. H. Sohmer (1999), all three lianas appear to be indigenous, and one variety of *M. sloanei* (var. *persericea*) is endemic to Maui. Unlike populations of *Erythrina* on these islands, the sea bean species appear to have maintained their ecological preference for wet, lowland forests where they sprawl over rocks, shrubs and trees along streams and near the ocean.

Although natural populations of wiliwili typically occur on the drier, leeward slopes of the islands, Carlquist postulates that they probably arrived by drifting (either buoyant seeds or floating limbs bearing seed pods) because of their proximity to the ocean. Perhaps *E. velutina* arrived on the Galapagos Islands by a similar mechanism. In fact, mainland iguanas probably rafted to the Galapagos Islands and gave rise to the present-day populations of marine iguanas. Based on the speed of the currents and local winds, it has been estimated that a raft from Ecuador could reach these islands in about two weeks. It is interesting to note that the Hawaiian wiliwili has a soft, light wood that was (and still is) highly prized for the outriggers of traditional canoes. It was also used for fishnet floats and surfboards.

In my view, we will learn most about our nature by looking at our cells as living entities with a mind of their own ... Every day of our lives is imbued with the resonances of how a single cell behaves. We are part of the web of life, and our genetic nature links us to every single living thing scattered across this wonderful and captivating planet.

Brian J. Ford in *Genes: The Fight for Life*

SEA-BEAN HUNTING IN THE AMAZON

by Pete Zies

We all have wondered to ourselves, as we hold the tiny tropical treasures we just beachcombed, where they came from and what their surroundings looked like. Visions of lush, steamy jungles with vegetation in riot fill our mind's eye. Well, imagine opening your eyes and being there! With a lot of traveling and a bit of luck in June of 2000 I found myself in the heart of the deepest, darkest Amazonia.

I spent two weeks in the jungles of Peru, and I saw poison dart frogs, Morpho butterflies, pink dolphins, dozens of exotic birds, and plants of every description. I searched the jungle floor, the canopy from suspended walkways, in riverside markets, and native villages for the tropical seeds we love to find on our beaches, but aside from a few on necklaces I had no luck in locating them.

The Amazon River is very wide in most places, and two weeks of scouring it by motorboat bore no fruit. Just as Dr. Gunn could never seem to catch sea-beans actually floating in the ocean, I was unable to locate any riding the currents of the Amazon and its tributaries. I only discovered the secret to Amazon sea-bean hunting by accident, and at the last minute!

I was only 200 miles from the mountainous source of the Amazon in the Andes, and I was more than 2400 miles upstream from the great river's mouth. Not even appearing on maps, we were near the Pueblo de Ucuruchi on the Rio Ucayali in Peru. We were due to leave the jungle the next morning, and with sunset approaching I could find no sign of the seeds I'd come in search of.

Then, it happened. Our riverboat, La Malaquita, had tied up on the bank and I accidentally dropped a gaff overboard. As I lay flat on the deck to recover it, a tiny bobbing piece of flotsam caught my eye. I was shocked when I recognized it as a "Black Sea Biscuit" (*Poupartia amazonica*), identical to seeds I had beachcombed back in Indialantic! I quickly scanned the other riverbank drift material within arm's reach and discovered several other drift seeds, including a Hamburger Bean (*Mucuna* sp.)! Realizing that this was my one shot, I quickly put on water shoes and jumped over the railing into the mucky wash around our boat. I tried to stay on the bank initially (for fear of piranhas, anacondas, caimans, and who knew what else), but missed my footing and ended up in the soup. I was, at the same time, elated that I was finding so many seeds so quickly, and furious that I had let all this slip past me for almost the entire trip! Now that I had found the elusive seeds, it became a race against time to collect what I could before I lost the light.

In that last half hour before sunset I stuffed my pockets full of seeds. I even recruited a local who was hawking necklaces from his dugout. I offered him a U.S. dollar if he'd help me for a minute to gather seeds. He gathered two big handfuls from his canoe, going where I couldn't reach, and I gladly gave him the buck. Soon the light faded away and I had to give up searching. I'd gathered a total of 145 seeds in 30 minutes of frantic collecting. These were from 32 visually distinct species, although only 16 could be properly named. Of the 16 identified species, all but one had been collected on our Florida beaches as well!

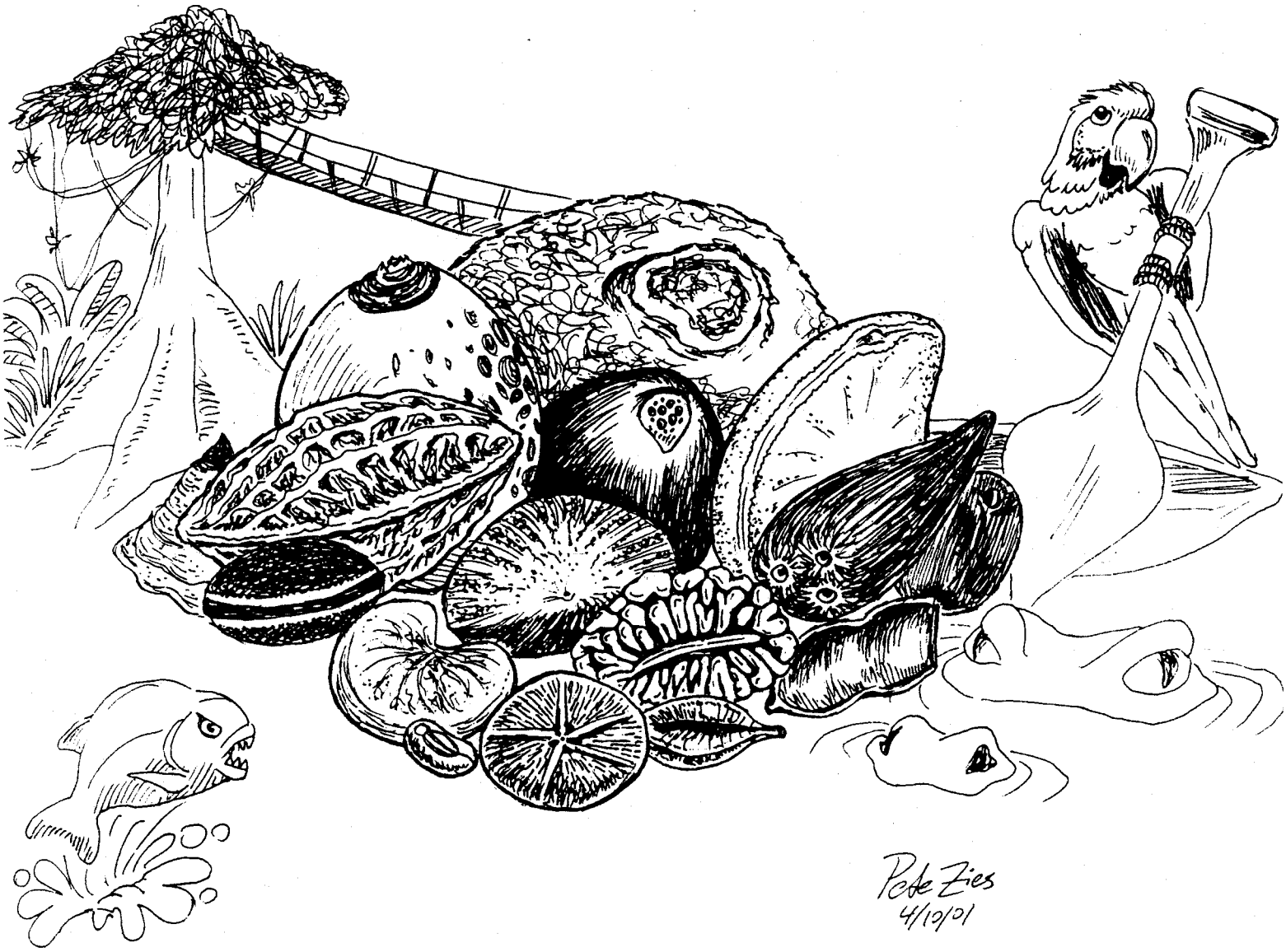
Many of the unidentified species seem familiar and similar to unknowns from our beaches too. Palm Nuts, including Starnut Palm, comprised just over a third of the total (54). The Black Sea Biscuits were more than 10% of the haul (16). Several Antidote Vine and *Machaerum lunatus* (8 each) were also found. Hamburger Beans were scarce (5), and I found just 2 Coral Beans. Single specimens were found of Jamaican Naval Spurge, Para Rubber Tree, Calabash, *Calatola costaricensis*, *Caryocar glabrum*, *Combretum* sp., *Inga* sp., Cannonball Tree, Ivory Nut Palm, and a Kapok Tree thorn. These added up to 2/3rds of the seeds collected. The remaining third could not be identified.

In my dreams I had imagined sea-beans lying everywhere in the rainforest, much as explorers had believed the streets were paved with gold in the fabled city of El Dorado. The reality was that I needed to develop a new set of "Bean eyes" for the river. Back home, I needed to carefully search the seaweed wrack line to find sea-beans on the beach, and on the Amazon River I learned that I needed to search the flotsam along the shoreline of the riverbank to find seeds. This made sense because Amazon Riverbanks are a favorite spot for sea-bean vines to grow. The unimpeded access to sunlight allows quick growth, and seeds can drop directly into the river, which is a preferred dispersal mechanism for many of these plants.

SEA-BEAN HUNTING IN THE AMAZON by Pete Zies (continued)

As the jungle settled on our riverboat I was happily counting sea-beans in my cabin. Later that night, with my newfound treasures safely stored away, I stepped back out on the deck and looked out onto the broad expanse of the Amazon River. The moon cast a silver glimmer on the water's surface. I reached into my pocket and brought out the Hamburger Bean I'd brought from home as a good luck charm. I'd collected it on my favorite beach, and I figured it had done its job (since I felt very lucky right then) so I tossed it into the Amazon and wondered if I might find it again someday back on my beach. With that, I went back to my cabin and had wonderful dreams of sea-beaning on the Amazon!

In the illustration below by Pete Zies, he shows the following:
The dark one in the middle is an Ivory Nut Palm; underneath that is a Jamaican Naval Spurge and below that to the right is *Caryocar glabrum*. Then, starting clockwise with the biggest one at the top: Cannonball Tree seed; Antidote Vine; Starnut Palm, Para Rubber Tree seed, *Inga* sp.; *Combretum* sp.; Black Sea Biscuit (*Poupartia amazonica*); Coral bean (*Erythrina* sp.); *Machaerum lunatus*; *Mucuna urens*; Kapok Thorn; *Calatola costaricensis*; and Calabash.



The Amazon forest contains a third of the planet's trees and supplies half its oxygen.
Getting rid of what is in essence the planet's lungs has an impact way beyond Brazil's borders.
Kenneth C. Davis in *Don't Know Much About Geography*

Heritiera littoralis, New for the Netherlands and Europe

by Gerhard C. Cadée and Herman Nijhuis
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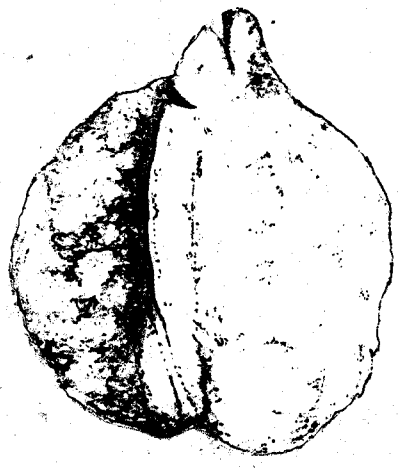
Nelson's (2000) *Handbook Sea beans and Nickar Nuts* gives an excellent and up to date overview of tropical drift seeds and fruits found on European coasts. The increased interest in tropical drift seeds in the last years, stimulated i.a. by "The Drifting Seed" newsletter, will certainly add new species to the 55 described by Nelson.

Here we mention number 56 found by the second author in the summer of 2000 on the 'Maasvlakte' a recent extension of the Netherlands in the North Sea near our main harbour Rotterdam, for expansion of its harbour facilities.

The West coast of the Maasvlakte is well suited to collect drift material as well as fossil bones from the sand dredged from the North Sea to build the Maasvlakte. *Heritiera littoralis* fruits are very easily recognisable due to the presence of a wing-like keel (figure shown to the right). Gunn & Dennis (1976) give a good description with illustrations. They mention the tree to be native of southeastern Asia, where it inhabits tidal swamps. It ranges from Madagascar to the Fiji Islands and from India to Australia.



drawing by Hans Cadée-Coenen

Smith (1999) illustrates and describes the drift fruit from Australia. Schimper (1891) pictures it from beach drift of Tjilatjap (southern coast of Java), where he found it dominant among drift fruits and seeds and accompanied by abundant pumice from the Krakatau eruption in 1883.The first author used some specimens collected under a *Heritiera* tree on the Seychelles to conduct an experiment on their buoyancy, because this was not tested according to Gunn & Dennis (1976: p. 204). Two of the three fruits are still drifting (in December 2000) since the start of the experiment 15 February 1993, one sank after only 3.5 months.

Although the fruits can thus drift for years, the contained seed is apparently always dead in far-drifted fruits, as suggested by Smith (1999). This makes it understandable that the distribution of *Heritiera littoralis* remained confined to the coasts of the Indian and part of the Pacific Oceans.

Guppy (1907) also did some drift experiments with *Heritiera* during his two-year sojourn on the Fiji Islands. Apparently he had to terminate the experiments when he left, so he only states (Guppy, 1907: p 529) that *Heritiera* fruits drift "for months," which agrees with results of Cadée mentioned above. The question is how did this drift fruit reach the Dutch coast? There is probably very little drift from the Indian Ocean that reaches the Atlantic.

Frick & Kent (1984) studied pumice in drift on beaches, the chemical composition gives clues to its provenance. They observed pumice from the famous Krakatau eruption in 1883 between Java and Sumatra still abundant on beaches, but only along the Indian Ocean, not on Atlantic Ocean beaches.

The Indian Ocean Agulhas current, the south flowing part of a big gyre in the Indian Ocean, is traditionally indicated on maps to turn sharply to the East near the southern tip of Africa (the Agulhas retroflection). Recent hydrographic research has, however, indicated that irregularly rings of Agulhas Current water with a maximum diameter of some 500km enter the Atlantic Ocean. The frequency is about six rings per year. Some of these rings could be traced to cross the South Atlantic (De Ruijter et al., 1999). With these rings, also floating material of the Indian Ocean might reach the Atlantic. However, to reach Europe there is still a long way to go including twice crossing the Atlantic. Drift has to travel via the Benguela, South Equatorial and Guiana Current to the Caribbean Sea, and from there via the Caribbean and Florida Current, the Gulf Stream and its northern extension, the North Atlantic Drift, to Europe.

Muir (1937), however, found only two Heritiera fruits in his years of collecting on the Riversdale beaches of South Africa (Indian Ocean side, 21-22° East). This indicates already its rarity in the Agulhas Current. It seems therefore highly unlikely that our Heritiera travelled all the way to Europe by sea. Moreover, if our *Heritiera* fruit had travelled the long way from the Indian Ocean by sea, one might speculate more specimens to have reached the coasts of Ireland and the UK, much better supplied with peregrine tropical drift seeds and fruits than the Dutch coast (Nelson, 2000; Cadée, 2000). Our conclusion, therefore, must be that this Dutch specimen is not a true 'peregrine' drift-seed, but belongs to the category 'refuse' of Nelson (2000), discarded by humans.

Cadée (1997) mentioned earlier this 'human factor' in drift seeds and fruits on the Dutch coast. Some tropical seeds are imported for use in floral arrangements (particularly popular in The Netherlands during Christmas time), but we had not yet seen this species in shops. Quite recently we discovered *Heritiera* fruits in a flower shop on Texel, they will now be present also in other shops in the Netherlands.

Our *Heritiera* might also have been collected on one of the beaches along the Indian Ocean by a sailor or tourist and thrown overboard in The English Channel before entering a European harbour such as Rotterdam. For the same reason other typical Indian Ocean drift seeds found on the Dutch coast, such as *Pangium edule*, *Cerbera odollam* and *Nypa fruticans*, were recognised as 'occasional seeds' not 'peregrine' drift seeds sensu Nelson (1990, 2000) by Cadée (1986, 1996).

In conclusion, this new addition to the list of tropical drift seeds and fruits found on European coasts belongs to the 'occasional seeds' mentioned in Nelson's (2000) book, mainly 'refuse'. Unfortunately these were not illustrated. Therefore, Hans Cadée prepared a drawing of our specimen (shown on previous page).

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THE LUCKY BEAN

by John V. Dennis, Sr.
11719 Beechwood Street
Princess Anne, MD 21853

John V. Dennis, Sr (left) with Amos L. Wood

In my opinion, the outstanding beachcomber of the 20th century was the late Amos L. Wood of Seattle. For the 19th century, I would nominate Dr. H. B. Guppy of England. He is best known for his two books, *Observations of a Naturalist in the Pacific Between 1896 and 1899* and *Plants, Seeds and Currents in the West Indies and Azores*. Although Guppy did the pioneering work in tropical drift seeds and fruits, his books are almost without illustrations and are poorly written.

On the other hand, the two books by Amos Wood are highly readable and well illustrated, but with next to nothing about the tropical drift seeds. I have his two books, both of them autographed, and had the pleasure of meeting him in October, 1988.

I was visiting Seattle to meet a couple of bird watchers with whom I had been corresponding. I was getting information for a book I was doing on attracting birds. Mrs. Thero North, one of the persons I talked with, happened to mention that Amos Wood was a neighbor of hers. She asked if I would like to meet him. I nearly fell over! I was interested in the glass fishing floats and knew that Amos was the world authority on the subject.

It was a short walk from where Mrs. North lived to the home of Amos Wood, on the beautiful shores of Lake Washington. Amos, a widower, gave us a warm greeting. His house – inside and outside – was decorated with a fabulous display of glass floats. They were different shapes and sizes. Collector's items, they were worth hundreds of dollars. They had been carried onto our shores by ocean currents that circled the Pacific, and had been lost from huge nets that the Japanese fishermen used to catch tuna.

Sadly, Amos died of cancer a few months after I met him. Although aware that he had terminal cancer, he had been a cheerful and most gracious host.

His book, *Beachcombing for Japanese Glass Floats*, was published in 1967. It has numerous black and white photos, maps, and accounts of beachcombing for the floats. The coasts of British Columbia, Washington, and Oregon were good places to find them. Amos even went to Japan to see how they were manufactured.

Even though the Japanese have stopped making glass floats, Amos stated that, because of the thousands still afloat and circling the Pacific, some would still come ashore almost indefinitely.

Amos had a little something on drift seeds. On page 150 of his glass float book, he has a photograph of a coconut with goose neck barnacles attached to it. In his *Beachcombing the Pacific* published in 1987, on page 57, he has photos of the tropical almonds showing some with the outer coats intact and others in various stages of erosion. Writing about this seed, he says, "Native to Hawaii, this seed has been found in Oregon, an 11,100 mile, seven-year journey by the Kuroshio Current. Other tropical seeds may be awaiting identification while lodged in the driftwood on North American ocean shores."

Since the tropical almond has a maximum floatation of only two years, it couldn't have made the long ocean journey suggested by Amos. However, he was correct in stating that other tropical seeds may be awaiting identification.

Dr. Curt C. Ebbesmeyer of Seattle, taking up where Amos left off, has complied records of about half a dozen different kinds of tropical and temperate drift seeds on West Coast beaches. Curt, as many of us know, publishes his own beachcombing journal. It is called "Beachcombers' Alert!" He compiles records of products lost from container ships and whatever else of interest comes ashore on Pacific coast beaches.

Amos did his beachcombing before the day of container ships. But he did not overlook junk of all kinds that came ashore and also items of value. Among the things he treated in his *Beachcombing the Pacific* were agates, pumice, petrified oyster shells, present-day shells, driftwood, Indian dugout canoes, and message bottles.

Amos had been an engineer working for Boeing in Seattle. Beachcombing was a hobby that became a passion when he retired. It is interesting that two beachcombers with much the same interests were, in one case, from Seattle, and the other, now lives in Seattle. An equivalent on the East Coast is Melbourne Beach in Florida!

NEWS FROM BERMUDA

Bob Patterson of **Hamilton, Bermuda**, who is one of our active Drifters with his wife **Helle** and daughter **Maia** (Sea Grant's Extension Agent in **St. Augustine, Florida**), wrote to us about his ambergris discovery written about in the *Museum News* of the **Bermuda Zoological Society** to which he donated his ambergris:"Ambergris is produced by chronically constipated sperm whales (*Physeter catodon*). While healthy whales apparently excrete the waxy, indigestible left-overs from their main diet, which is deepsea squid, diseased whales accumulate them in the bladder and intestine, from where they occasionally expel chunks of it in bursts of flatulence. This highly valuable chunk of ambergris is the size and shape of a stubby little knockwurst, 8 cm long and 4 cm wide. As it turned out, Bob Patterson's find put us way ahead of even the Smithsonian Institution."

Bob gives popular beachcombing presentations in Bermuda that include sprouted seeds as shown to the right. Bob also sent a list of beachcombing treasures from March 3 and 4 of this year. Here is a summary of his take for two days: paper nautilus (his third one!); 9 sea hearts; 9 golfball beans; 4 sea purses; 2 hamburger beans; 5 starnut palms; 2 nickars; 2 sea pearls; 1 laurelwood; 1 walnut; some unidentified seeds; and 2 spirula; 5 *Janthina*. Bob also found a bottle tossed out to sea by **Ms Carey Fitzgerald** of **Tom's River, New Jersey**. Carey wrote to us as follows: "Here's what happened: I was aboard my husband's and my motorsailer, *Ms. Fitz*, en route from the Abacos in the northern Bahamas to Fort Pierce, Florida, in April 1998, when I tossed two messages-in-bottles into the Gulf Stream (lat: 26.56.34N/lon: 079.12.34W). I promptly forgot them, probably because I doubted that they would ever be found. Then in March 1999, I received a letter from Bob telling me that one had washed up on a small beach at Bailey's Bay, Bermuda, on a morning in February of the same year. He added that in 40 years of beachcombing this was the only message-in-a-bottle he had ever found. As far as I know now, my other bottle still hasn't been found. But since one *was* found, that gives me a 50% success rate, an interesting statistic in itself."

ED'S BEACH BYTES

Beans of a Different Color: Coralbeans on North Atlantic Shores

By Ed Perry

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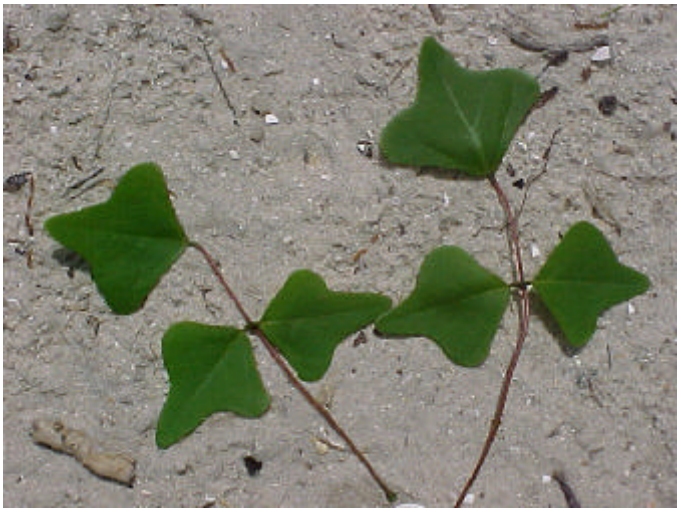
Paralleling the beauty of their flowers are the seeds of the coralbean genera, *Erythrina*. Seeds from these shrub/trees can be found along all North Atlantic coast beaches. In Florida and other North American states from North Carolina around to Texas, it is only *Erythrina herbacea* that is native. However, it is nearly impossible to pin down seeds that are found on beaches to a species level. Seeds found in wracklines come in hues of lustrous red, scarlet, orange, brown, yellow, and even purple.

Seeds of different species of plants may appear identical to one another while seeds coming from the same plant can at times be different in color from one another! Adding to their elusive identities, not all coralbean species even have seeds that are capable of floating, while not each individual seed from a known species that has buoyant seeds may float!



There are slightly over 100 species of *Erythrina* worldwide. Flowers of these plants are borne on stalks in the spring, before leaves later appear on the prickly branches. In *E. herbacea*, spikes of narrow, scarlet red flowers are followed by alternate compound leaves of 3. Each leaflet is somewhat 3-lobed in appearance as shown to the left. Every season the dunelines of Florida's coastal strand come alive from March-June with the scarlet red inflorescences of the native coralbean plants. Seed pods ripen in the summer and are usually 7-10 cm long with heavy constriction between seeds. The pods closely resemble those of *Sophora tomentosa*, or necklace pod. Both pods can at times be found still intact on beaches. The pods eventually split open to reveal as many as a dozen shiny, crimson 1-cm long poisonous seeds.

Seed color is a poor way of identifying seeds to a species level. If you are fortunate enough to find one near its parent plant then you can probably make the identification and skip the need to grow the seed to a flowering, mature plant, which is necessary for proof positive identification. Comparative seed samples are almost non-existent, but should be forthcoming with the renewed interest that now exists in sea-beans of all kinds on a worldwide level.

Coralbean seeds that strand on beaches may go unnoticed by the majority of beachcombers. Rather small and kidney bean shaped, anywhere from 1-3 cm long, they share a centrally located, somewhat sunken hilum that is about half the length of the seed. The hilum is divided bilaterally by a linear dash. The non-hilum, dorsal side of the seed always bears a seam or ridge wrapping around its length that divides the seed in two halves. Stranded seeds have excellent viability and germinate well upon slight scarification.

Though considered uncommon at best, records of coralbean strandings exist for the Yucatan, Gulf of Mexico states, Florida, North Carolina, and western Europe. With a little searching, and some luck, most beachcombers should be able to come across a handful in their lifetime.

In Florida, no variety or color of coralbean is considered common and all are treasured finds, but astute beachcombers more often find the brown, to brownish red, or brownish purple ones, that are often barrel shaped, more than any other kind. These seeds more than likely originate south of the state where *E. variegata* has been introduced into the New World tropics by humans. Seeds resembling *E. variegata* but with black spotting and flecking are also found and resemble those described by Jeremy Smith (1999) as *E. crista-galli*, as well as those described by Cathy Yow of Texas. She had a *crista-galli* plant growing in her neighborhood as an ornamental tree which she sometimes collected seeds from to use in jewelry. I found one of this description while visiting Padre Island, Texas in March, 1999. Several have also been found on Florida beaches.

Coralbean seeds of a color other than brown are exceptionally rare finds on beaches, even here in Florida. Scarlet red or vermilion seeds could have originated from native *E. herbacea* plants, or from similar species to the south, like *E. velutina*. Without growing out the seed there is no sure way to know. The paucity of red colored seeds found on Florida beaches is highlighted by the only one ever found by Pete Zies of Maitland which bears the teethmarks of perhaps a dune rodent. Another is 1 of only 2 red seeds found by Cathie Katz of Melbourne Beach that was later lost in her backyard citrus grove only to be found 3 months later by me during a visit!

Even more exceptional Florida finds include a largish, canary yellow specimen found by John Dennis while searching through debris on the east shore of Key Largo on January 13, 1972. This is the only bright yellow strand record that I know of, and unfortunately it too became lost (but never re-found!). A slide photograph was taken before it went missing and this color plate will be featured in the forthcoming *Sea-Beans from the Tropics*.

Another exceptional find is a fat, bright purple coralbean I came across in Melbourne Beach in December of 2000. This is by far the largest coralbean in my collection, and one of the most beautiful. It matches purchased seeds that were labeled "Indian Coral Tree, *E. indica*." It is a known exotic species planted in South Florida and the New World tropics. Scott Boykin of Gulfport, Florida obtained nearly a hundred of these same seeds from the shores and forests of Madagascar during a vacation trip there in the summer of 2000.

Contrary to the *World Guide*, coralbean seeds are known from the shores of the eastern North Atlantic and are quite capable of making trans-Atlantic voyages. With a tested flotation capacity of around 15 months (possibly longer), stranding on the shores of Ireland, Britain, and the Dutch coast are well within their capacity. Shorelines in the US that are covered with fruiting *E. herbacea* along the barrier islands from Georgia to North Carolina, as those discovered by Scott Boykin during a visit to St. Helena Island in June of 2000, could be origins for the (red) coralbean records reported by Nelson and others on European coasts. These states represent a frequent strike zone for Atlantic hurricanes, which could be responsible for releasing these coralbean seeds and setting them adrift across the North Atlantic.

Coralbeans take on a nice polish and lend well to the making of jewelry and artifacts, besides being beautiful and some of the most interesting of the smaller driftseeds available to beachcombers. So the next time you find yourself on a beach with your gaze staring downward, instead of ahead, look a little closer and good luck in finding a coralbean seed. Perhaps it will be a brilliantly colored gem!

NEWS AND NOTES

Be sure to look at **Mark Bartlett's** beautiful and creative (and useful) sea-bean ID page:

http://homepage.mac.com/seabean/PhotoAlbum.html

Gerhard Cadée from **The Netherlands** sent a summary of an article about nickar nuts (knikkernoot in Dutch) in the *Texelse Courant* of 5 December: This spring, **Kees Camphuijsen**, during one of his regular beach surveys for dead (mainly oiled) seabirds, collected a strange, grey coloured and very hard sphere of almost 2 cm diameter. When Gerhard Cadée, during a lecture on tropical drift seeds, showed amongst others some Nickar nuts he had received from Ed Perry from Florida, Kees immediately told Gerhard that he had found exactly the same, but up until then he had had no idea what it could be. This appeared indeed to be a Nickar nut, the first specimen ever found on a Dutch beach! Kees generously donated the Nickar nut to Gerhard, who wrote an article in the local newspaper. Thanks to this and earlier articles in the *Texelse Courant*, more (real) tropical drift seeds are known from Texel than from any other place along the Dutch coast.

Nick and Jane Darke from **Cornwall**, **England** wrote in December: "We've had a good start to the season, so far picked up, since October: 8 sea hearts; 11 horse eyes; 1 sea purse; 4 grey nickarnuts; 1 bay bean; 26 *Ipomoea*; 10 *Calystegia*. This is very good for us, bearing in mind that by this time last year we hadn't picked up a single sea-bean! We've also had a bumper season for lobster tags."

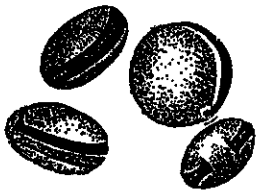
From **Larry Groshart AKA "Johnny Coconutseed"** in **Ft. Lauderdale, Florida**: "I find a lot of sea coconuts (*Manicaria saccifera*) here in Ft. Lauderdale, and my macaw loves to tear them open and eat them!" (Larry added, "When I thought he was a girl bird, I named him *Maria Conchita Guadelupe Alonso de Chipichipi*. Now that we know he is a boy bird, we just call him 'Lupe.'")

Recent emails from **Bill and Bess Pope** from **Arkansas**, give us a good idea of the treasures to be found on the coast of Louisiana. "Bess and I just returned to Arkansas from 3 great weeks at our place on the beach in Louisiana. We did a lot of walking and looking, and to my surprise we found quite a few beans and things of interest, including two 'lucky stones' found in the bleached out skull of a large redfish. When I shook the skull, it rattled and inside I could see the two large ivory-like stones. (Four lucky stones can be seen in the lower left of this photograph.) Another interesting discovery was a spent 50-caliber machine gun bullet that was undoubtedly fired from an airplane on submarine watch duty during WW2. Also, sting ray stingers, catfish fins, lemon squeeze, huge artificial fishing lure, shark jaws and vertebra.

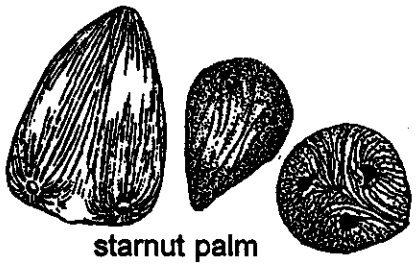
"Bess calls our beach place our museum for we keep most of our unusual stuff that we have found during our many trips up and down the beach. There are bottles, all sorts of net or long line fishing floats some big red plastic ones, a couple aluminum floats from Spain (I think) and shoes. I am constantly amazed by the number of shoes that we see. I found a dolphin skull complete with teeth, and I have two stainless steel tags that I removed from dead Ridley turtles. (I did notify the address in Miami that I found them and I sent all the information I could about where I found them. I have found three bottles with notes in them. Two were from cruise ships out in the Caribbean and one from an oil exploration ship out in the Eastern Gulf. One day we found some sort of a floating oil exploration device that had a big notice that if the finder returns it to the address on the device there was a $250.00 reward We did return it and they sent us a check for that amount. That was one of our best finds.

Simple Guide to Common Drift Seeds

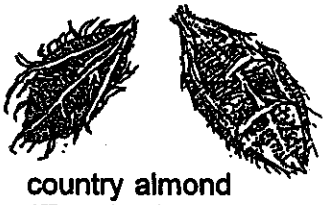
(Illustrations by Cathie Katz and Pamela J. Paradine)



hamburger bean
(*Mucuna* spp.)

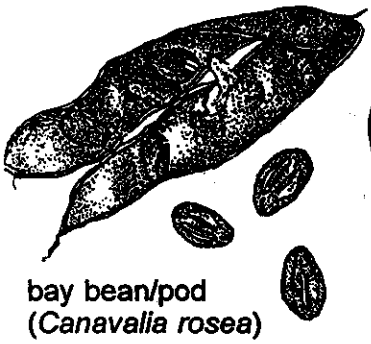


starnut palm
(*Astrocaryum* spp.)

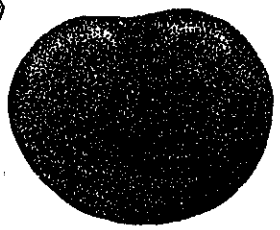


country almond
(*Terminalia catappa*)

sea pearl/pod
(*Caesalpinia bonduc*)

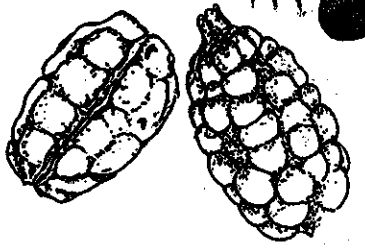


bay bean/pod
(*Canavalia rosea*)

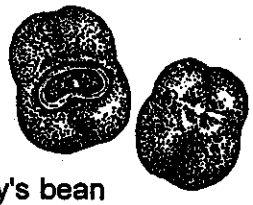


sea heart
(*Entada gigas*)

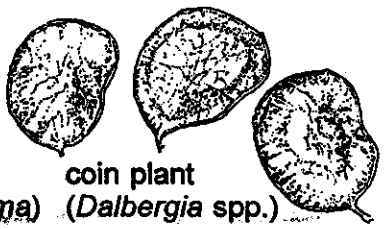
golfball/pod
(*Manicaria saccifera*)



hand grenade
(*Sacoglottis amazonica*)

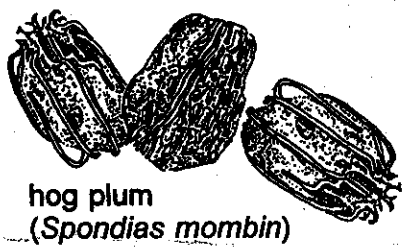


Mary's bean
(*Merremia discoidesperma*)

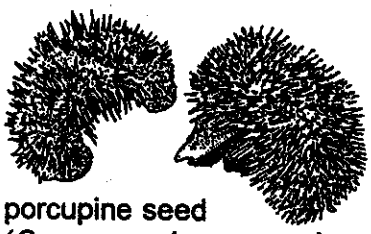


coin plant
(*Dalbergia* spp.)

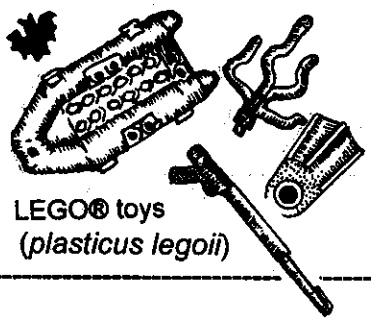
sea purse
(*Dioclea reflexa*)



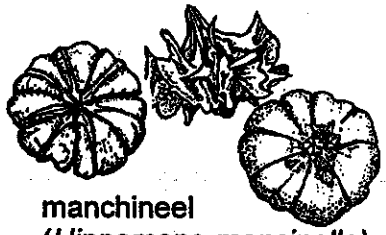
hog plum
(*Spondias mombin*)



porcupine seed
(*Caryocar microcarpum*)

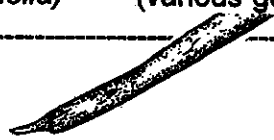


LEGO® toys
(*plasticus legoii*)



manchineel
(*Hippomane mancinella*)

white/black/red mangrove
(various genera)



The Drifting Seed

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