



The Drifting Seed

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THE DRIFTING SEED

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

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**The 12th Annual International Sea Bean Symposium will be held at the
Cocoa Beach Public Library, October 19th-20th, 2007.**

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Drift Fruits Transported by Pipeline to Texel's Beach

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To his great surprise Henk Brugge, walking his dog on the beach of the island of Texel (The Netherlands), observed 12 fruits of *Nypa fruticans*. He saw them with the incoming tide coming out of a pipeline on that beach. This floating pipeline (see figure) was just recently brought there, to be used the next day for beach nourishment with sand from deeper water.

Nypa fruticans is a trunkless palm, growing in mangrove areas of the Indo-Malaysian region (Gunn & Dennis, 1976). The characteristic fruits are up to 15 cm long and grow in a spherical aggregate fruit of about 30 cm in diameter. The individual fruits float and they are well known from drift in the Indo-Malaysian area (i.e. from Java, Schimper, 1891), and also collected from the Australian coast (Smith, 1999). However, they are rarely found on European coasts, only three specimens are reported. It is hardly conceivable that drift from the Indo-Malaysian area arrives in Europe by sea currents. Therefore, the specimen found in Denmark in 1973 (Nelson, 2000) and the two reported from the Dutch coast (Cadée, 1995; Brochard & Cadée, 2005) were supposedly introduced by man.

The pipeline was reported to be cleaned before use on Texel. However, Cadée & Brugge (2006) suggested, that a spherical aggregate fruit of *Nypa* may still have been left behind in the pipeline after use in the tropics. Before it was used on Texel for sand transport, the individual fruits left the pipe with upcoming flood. This is a never before reported transport mechanism for drift seeds. Although one has often speculated on the 'human factor' in drift seed and fruit transport (Cadée, 1997; Nelson, 2000; Brochard & Cadée, 2005), not often will one be able to witness man's help in bringing tropical drift fruits to our coasts!

We are very grateful to photographer Heleen Vink (Oudeschild, Texel, www.heleenvink-texel.nl) for the use of the picture she made of this phenomenon on the beach.



The floating pipeline on Texel's beach with six *Nypa fruticans* fruits that just have left it. Picture taken by Heleen Vink, Texel.

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Short-term Floatation Experiments on Vegetation and Flight Feathers in Cold English Seawater

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Introduction

Using the experimental seawater conditions described recently (Hewitt 2006) and the four remaining floating coconuts C to F (Hewitt 2005), one can attempt to measure the flux rates of mass (usually added water, rather than lost endosperm) through the total externally measured areas of their eyes during relatively uniform winter pressure and temperatures in 2005/6 (Table 1). It was noted that coconuts A and B had relatively large eyes and it was decayed inside the largest of the trio of them. This probably caused them to sink quicker than the four remaining coconuts. Much of this decay and mass gain took place in the summer. It then resulted in sudden sinking when the residual mass of gas inside the coconuts encountered lower temperatures and higher barometric pressures in December. The total eye area of 2.4 cm² in coconut A implied a mass flux of 117 mg/ cm²/day over the winter to next winter period (day 500 to 816) and in coconut B the corresponding statistics were 1.46 cm² and 155 mg/ cm²/day (day 200 to 500 prior to actual rupture of the largest eye of 0.63 cm² area). Table 1 suggests that coconut E with unusually small eyes is still not admitting more water than mass lost by internal decay.

Table 1. Comparison of mass flux rates (mg per day) through the total 'eye' area in cm² of coconuts C to F in winter (day 800 of coconut C floatation being November 28, 2005)

°C	KPa	C day	C g	D-F day	D g	E g	F g
5.3	99.8	800	468	774	-	-	523
5.0	101.1	802	-	776	496	496	-
8.9	102.5	826	473	800	498	498	527
5.0	103.3	857	478	831	499	497	528
5.2	100.5	900	472	874	497	491	525
5.7	99.2	916	475	893	498	490	526
Gain g		-	+7	-	+2	-6	+3
Eyes cm ²		-	1.32	-	1.44	0.89	1.46
mg/ cm ² /day		-	+46	-	+12	-59	+18

Sturnus vulgaris L.

Identification books for bird feathers include Brown *et al.* (2003) and Elbroch (2001). A female Sparrowhawk *Accipiter nisus* (L.) helpfully plucked two sets of Starling (*Sturnus vulgaris* L.) wing feathers without puncturing them. The 12 of 67 to 103 mm length (Av. 80 mm) were floated in the disturbed tank. The initial tank temperature of 77°F (25.0°C) was within a few hours of death on the



warmest ever recorded day in S.E. England (August 10 2003). A second set of ten, of 85 to 100 mm length (avg. 92.5 mm) were more promptly floated in unusually cold but dry weather as soon as the hawk left on March 11 2004, 35 minutes after capture. The initial tank water temperature was 40.5 F (4.7 °C) but any cooling of the air inside the feathers had the effect of increasing the number of molecules of gas removed later on at slower diffusion, effusion and decay rates. Moreover, the residual mass of the trapped air expanded as the water warmed during the spring and contracted after the August heatwave, producing a further difference in floatation times.

Only the August sinkings were in a sequence predicted by their length and calamus diameter. The cold-water set did not; perhaps because three developed transverse cracks of the rachis and other decay evidence during their longer floatation time. The August set started to sink on day 4.16 (70 mm length) and had a maximum time of 19.22 days (103 mm, sinking at 16.5°C); averaging 9.75 days. The winter set averaged 42.71 days (range 35.91 to 53.09, the last at 12.8°C but experiencing 14.4°C on day 45). A set of six feathers of the same size (length 80 to 103 mm) and species were plucked by hand from a wing stranded and kept wet on Westcliff beach in March 18 2004. They floated for another 37.6 days (range 24.4 – 43.25). The same spot (beside Chalkwell Station) yielded a Pheasant wing and hollow buoyant Horse Chestnut seed in January 2006, and a coconut with one 'eye' open (through the 15-mm thick endosperm) on April 2 2006.

The hawk-predated cluster of similar and smaller Starling feathers (54 tested) discovered on dry Hawthorne leaf litter on December 21, 2005, were floated contemporaneously with the coconut data reviewed on Table 1. The seawater was aerated once a day and exchanged with the sea once a week. The record intact time of 70.2 days came from a primary feather of 75 mm length, 15 mm width and 1.68 mm maximum calamus diameter. It corresponded to an average water temperature of 6.3 °C (3.3 to 8.9 range) which illuminates the test conditions on Table 1. The temperature experienced by the coconuts remained below 49°F (9.4°C) from early on November 14 until the evening of March 25. Five primary wing feathers of 75 to 93 mm length (avg. 84) sank intact in 31.7 to 70.2 days (avg. 51.3); compared to 16.1 to 33.7 days (avg. 26.1) for the 8 similarly tested secondary wing feathers of 68 to 74 mm length (avg. 71 mm). A subset of these feathers was tilted in a tall jug for 2.0 hours per day at the same temperature to simulate waves. They showed slightly reduced floatation times (i.e. two large tail feathers sank in 17.5 and 21.1 days, compared to 19.2 to 42.5 days (avg. 25.8) in 8 similar tail feathers).

Other bird species

A variety of recently predated and then stranded feathers were collected from the sea or latest strandline at Westcliff in January 2006 and they included some which sank in a similar or better state of preservation than the famous 69 mm long *Archaeopteryx* flight feather (Meyer, 1861). The 15 large feathers (>78 mm long) from a bitten-off wing of the Pheasant *Phasianus colchicus* L. included primary feather 10 (175 mm long and 12 wide) which sank in only 45 days on March 5. A tail feather of a set of Oyster Catcher feathers sank after only 35 days on February 14 (i.e. *Haematopus ostralegus* (L.) of 112 mm length). Gull and other marine feathers appear to float until they disintegrate, perhaps because they are adapted to resist seawater when swimming.

The usual difficulty with bird feathers is that they decay before and during floatation into a brittle form

of their keratin and so disintegrate before they sink. Small fossil feathers clearly did sink (Kellner 2002). A tail feather of the Maypie *Pica pica* L. (220 mm) sank 26.1 days after floatation on August 2 2002 at > 20°C. A 128 mm wing feather of the Collared Dove sank for 57.75 days after November 3 2003. It was plucked by the hawk on wet weather, perhaps a day or so earlier. The smaller flight feathers of this *Streptopelia decaocto* (Frisvaldsky) included ten in the 55 to 102 mm length range, which averaged 24.64 days (5) when showing no decay (range 15.68-32.73). The dove floatation involved an initial temperature of 11.1°C and a final one of 8.6°C. The hawk also plucked some promptly floated, primary and secondary wing feathers, of the Sparrow *Passer domesticus* (L.). The initial temperature was 8°C on October 27 2003. Ten of 25±1 mm length floated for 1.31 to 10.15 days (avg. 4.41) and 16 (56 to 69 mm) for 10.07 to 17.46 days (avg. 12.85). These variable times are similar to intact leaves floated in similar temperature and storage conditions (Table 2).

Wet vegetation similarly tested

Experiments on fresh vegetation were mainly conducted following an unusually wet and stormy leaf-fall. Samples were collected inland at Leigh-on-Sea and Braintree, Essex in December 2000-January 2001 and floated in seawater at temperatures of 13° declining to 4°C. The mean of 9.0°C in December and 6.7°C in January is the same as the monthly averaged surface temperatures in the adjacent North Sea. Most samples were blown down by the wind, or cut for comparison, with a typical length of 75 mm (twigs or foliage stems) or 8-20 mm (fruit). The first letter of the “code” on Table 2 indicates the color of the specimen or associated leaves when collected (B = brown, G = green, R = red, W = white berry). The second letter indicates the possible secondary hydration prior to floatation up to one hour after collection (L = litter or recently blown down, P = picked from plant). The third letter of the code separates clusters of leaves (C) floated on 10 mm twigs (*Cedrus*), 80-mm long twigs (*Pinus*) or their green stem (*Taxus*, *Acacia*); from 7-to 25-mm diameter twigs (W) and separate leaves (L) ranging in length (inclusive of petiole) from 40 mm in *Crataegus* to 280 mm in the largest *Rhododendron*. The remaining samples are female cones or berries (F).

The difference in the short floatation times of green picked and brown leaf litter of the hawthorn *Crataegus monogyna* Jacquin in winter (Table 2) is less significant than the greater dispersal potential of the seeds. But holly leaves and berries (*Ilex aquifolium* L.) show their similar floatation times reduced in brown leaf litter (Table 2). All the leaves except for *Aloe*, ivy and large fronds from cypress sank quicker than they lost chlorophyll. Seven leaf-covered tips of *Araucaria araucana* (Molina), fallen with lengths of 65-to 200-mm, averaged 21.2 days. The male catkin with a length of 50 mm and a density of 0.5 g/ml floated for 75.7 days. The 126-mm long, freshly pruned leaf of *Aloe variegata* L. floated for 47 days and the small cluster of leaves picked from *Halimione portulacoides* (L.) floated for 48.2 days. This intertidal plant (sea purslane) grows and is stranded at Westcliff in winter. Reeds and oak leaves come from elsewhere to strand there. The reeds typically arrive in March and had a maximum floatation time in a few tests of 110 days (i.e. *Phragmites communis* Trinius).

Table 2. Floatation times of Winter Essex vegetation and also summer poplar twig cuttings (compare Spicer 1981)

Taxon	Code	N	Av. days	Range days
<i>Pinus sylvestris</i> L.	GLC	5	5.300	0.60-10.9
<i>Pinus sylvestris</i> L. 35-to 45-mm long	BLF	5	9.410	6.07-11.5
<i>Cedrus libani</i> Richard	GPC	5	0.790	0.40-1.02
<i>Cedrus libani</i> Richard	GLC	5	5.130	1.05-9.70
<i>Cedrus atlantica</i> Manetti	GPC	7	1.970	1.22-2.77
<i>Cedrus atlantica</i> Manetti	GLC	10	2.240	0.93-6.08

<i>Cedrus atlantica</i> Manetti	GLW	6	26.839	14.9-34.0
<i>Larix decidua</i> Miller	BPF	6	9.739	7.6-11.20
<i>Larix decidua</i> Miller	BPF	6	4.163	0.24-12.9
<i>Larix decidua</i> Miller	BPW	5	46.456	16.3-70.9
<i>Taxus baccata</i> L.	GPC	11	4.930	2.78-7.95
<i>Taxus baccata</i> L.	GLC	5	18.650	9.6-25.72
<i>Taxus baccata</i> L.	BLC	2	4.270	3.78-4.77
<i>Taxus baccata</i> L.	BLW	2	8.970	8.18-9.75
<i>Chamacyparis lawsoniana</i> (Murray)	BLF	6	12.293	6.87-28.9
<i>Chamacyparis lawsoniana</i> (Murray)	GLC	7	7.910	4.05-12.5
<i>Chamacyparis lawsoniana</i> (Murray)	BLC	10	8.310	2.75-19.9
<i>Chamacyparis lawsoniana</i> (Murray)	BLF	12	6.493	1.70-19.9
<i>Acacia dealbata</i> Link	GLC	5	0.300	0.20-0.63
<i>Rhododendron arboreum</i> Smith	GPL	6	13.010	3.98-20.0
<i>Rhododendron arboreum</i> Smith	BLL	6	1.550	0.27-3.75
<i>Eucalyptus gunnii</i> Hooker	GPL	6	0.800	0.15-2.39
<i>Eucalyptus gunnii</i> Hooker	BLL	10	1.070	0.72-1.68
<i>Ilex aquifolium</i> L.	GPC	2	27.814	22.8-32.9
<i>Ilex aquifolium</i> L.	GPL	5	14.274	2.75-20.5
<i>Ilex aquifolium</i> L.	GLL	6	16.430	3.30-24.4
<i>Ilex aquifolium</i> L.	BLL	10	2.090	1.40-3.45
<i>Ilex aquifolium</i> L.	RLF	6	9.750	0.99-30.8
<i>Hedera helix</i> L.	GPL	6	35.755	15.0-48.7
<i>Crataegus monogyna</i> Jacquin	GPL	20	0.710	0.02-1.40
<i>Crataegus monogyna</i> Jacquin	BLL	20	0.790	0.10-2.40
<i>Crataegus monogyna</i> Jacquin fall & winter	RLF	16	7.707	2.01-24.7
<i>Rosa canina</i> L.	RLF	29	5.168	0.00-24.7
<i>Symphoricarpos rivularis</i> Suksdorf fall & winter	WLF	16	15.520	5.65-31.2
<i>Alnus glutinosa</i> (L.)	GPL	6	1.350	0.60-2.59
<i>Alnus glutinosa</i> (L.)	BPL	6	0.330	0.17-0.79
<i>Castanea sativa</i> Miller	BPL	10	2.800	2.11-4.69
<i>Fagus sylvatica</i> L.	BPL	14	2.566	1.5-3.842
<i>Quercus petraea</i> (Mattuschka) Jan. 2001	BLL	6	5.147	2.09-8.34
<i>Q. petraea</i> October 22, 2003	BLL	11	7.920	0.8-15.27
<i>Platanus</i> x <i>hispanica</i> Miller ex Münchenhausen	BPL	8	2.004	0.75-3.27
<i>Platanus</i> x <i>hispanica</i> Miller ex Münchenhausen	BPF	2	3.835	3.60-4.07
<i>Populus nigra</i> L. 'Italica'	BLW	5	94.933	39.73-101
<i>Populus nigra</i> L. 'Italica' summer & winter	GPW	10	188.029	149.3-226
<i>Salix alba</i> L. 'Pendula'	BLL	12	0.398	0.01-1.17
<i>Salix alba</i> L. 'Pendula'	GPW	4	20.203	16.8-23.7
<i>Alnus glutinosa</i> (L.) June 8 2001	GPL	9	1.208	0.85-1.54
<i>Ginkgo biloba</i> L. May 24 2002	GPL	6	2.891	1.45-7.73
<i>Ginkgo biloba</i> L. Dec. 21 2001	BPL	10	3.161	1.69-5.59
<i>Ginkgo biloba</i> L. Nov. 3 2002	BLL	7	2.289	1.70-3.12

<i>Ginko biloba</i> L. Nov. 15 2003	BLL	12	1.660	0.71-2.71
<i>Ginko biloba</i> L. Nov. 19 2002	BLL	10	1.896	0.76-4.19
<i>Ginko biloba</i> L. Dec. 7 2001	BLL	12	2.801	1.53-4.58
<i>Ginko biloba</i> L. Dec. 12 2001	BLL	20	1.895	0.03-3.71
<i>Pteridium aquilinum</i> (L.) Sept. 4 2001	GPL	10	3.619	2.94-4.20
<i>Pteridium aquilinum</i> (L.) Dec. 18 2001	BPL	11	2.574	1.65-4.29
<i>Pteridium aquilinum</i> (L.) Oct. 24 2003	GPL	48	2.767	1.88-5.04
<i>Pteridium aquilinum</i> (L.) Oct. 22 2003	BPL	11	5.593	2.20-11.1
<i>Macrolepiota procera</i> (Scopoli)	BPF	1	8.76	(146 mm dia.)
<i>Equisetum telmateia</i> Ehrhart	GPW	9	46.143	(23.8-85.1)
<i>Fraxinus excelsior</i> L.	GPW	13	73.328	(26.5-247)

Ten freshly picked and wilted *Quercus robur* L. leaves floated for an average of 2.22 days (range 0.72 – 3.62 days) in June 2001 at about 15° C. Samples of six green to slightly green leaves were picked from this particular branch on December 11 2000 and sank after 1.49 to 3.64 days (avg. 2.68); compared to 4.77 to 8.61 days (avg. 6.54) for associated insitu yellow leaves, and 1.05 to 2.68 days (avg. 1.97) for brown leaves picked from the same branch on December 18. A sample of eight shed, wet yellow to brown leaves, sank after 0.21 to 7.5 days (avg. 2.99). Times of 0.98 to 1.55 days were recorded for green leaves blown-down on short twigs. In mid-January 2001 there were only two brown leaves left on the oak branch and they floated for 3.94 and 4.81 days. The experiment was repeated on another tree after a period of calm anticyclonic weather on December 17, 2001. The floatation time of nine green-yellow leaves averaged 4.62 days (range 2.4 – 7.92) compared to 8.56 days (range 4.30 – 14.25) for an equal number of brown-yellow leaves picked from the same branches. A decayed branch floated for 5.57 days and 10.98 days when cut into two equal lengths of 150 mm. A similar sample floated for 8.68 days in June. Smaller decayed twigs, collected in a similarly wet state floated for 19.0, 28.3, 35.5 and 58.9 days (diameter 5-to 10-mm, length 100-to 160-mm). Oak leaves are exceptional in floating longer when washed out to sea by winter storms, than in a freshly grown summer condition. However, the greater floatation times of ash twigs in winter, produced by the removal of sap, is a general rule for deciduous trees. Attachment of leaves to twigs blown down in summer, or to non-deciduous trees such as *Araucaria*, reduces twig floatation time. A sample of 655 leaves or leaf-bearing twigs, and 386 bare twigs (including 150 driftwoods in 28-to 250-mm length range) showed the following numbers still floating at known times: 484 ‘leaves’ and 374 ‘twigs’ after 1.0 day, 115 and 338 by 6.0 days, 34 and 292 by 13.0 days, 20 and 227 by 20.0 days, 4 ‘leaves’ and 140 ‘twigs’ by 40.0 days, and just 72 ‘twigs’ inclusive of 45 driftwood after 80 days, and 7 after 500 days and 4 after 1141 days.

Discussion

In theory, short term experiments can be done on periodically weighed drift seeds during one season of the year contemporaneous with total floatation times of terrestrial bird feathers, leaves and non-drift seeds from England. However, care has to be done to take the weighing when the barometric pressure and experimental water temperature are similar, or the air inside the seeds will have a different density and hence give an erroneous result in terms of the net flux of nitrogen mass out of the seeds. One can therefore record annual flux rates from measurements taken at the same time of year and similar barometric pressure; but these results will mainly reflect rates of decay, effusion and

diffusion in the summer season, and not the winter studied on Table 1. Winter results are of interest because terrestrial material is most likely to be washed far out to sea in the late fall and then become fixed carbon, phosphorus etc. due to slower rates of submarine bacterial decay in colder water. The resulting very poor record of fossil feathers and the good record of leaves is partly due to feathers floating for long enough to be destroyed at the surface of the sea. Another point, which can be made from Table 2, as well as from homologous feathers tested together, is that the range in the floatation time is large and symmetrical around the mean in each test. Probably this also applies to drift seeds, which are more difficult to study on longer time-scale.

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My blog <http://everyday-scientist.blogspot.com/> reviews strandings on the local beaches during March-April 2006.

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The Eyeless Nut
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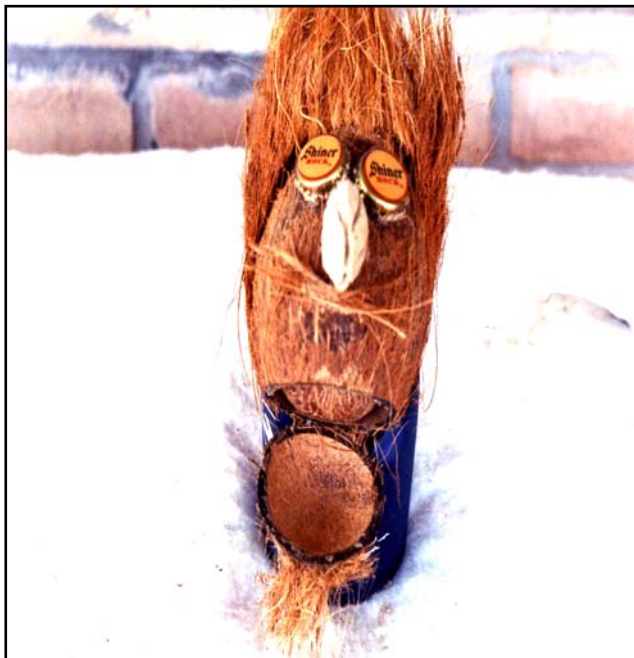
Most have fantasized the winning or finding of a vast fortune at one time or another. As a child, perhaps a free gumball or jawbreaker from a candy machine; dreaming of a cascade of quarters from a soda water machine; experiencing the inability to pass a pay telephone or newspaper stand without an inconspicuous glance or a quick insertion of a treasure-seeking finger; hitting the jackpot with a one-armed bandit or lucking out with a mega-bucks lottery; discovering a gold doubloon on the beach; or discovering a perfect pearl in your oyster. Have you ever considered a pearl in your seabeam? I have.

One day while transporting my pet coconut to another household display site, something went clunk! I mean clunk! I quickly rotated it 180 degrees and another resounding clunk. Repeated rotations were followed by clunks. Could it beIt had to be! I had the “mother of all coconut pearls”! There was no other explanation.

Quickly I reviewed my coconut pearl knowledge. I was aware of George Eberhard Rumphins’ six volume *Herbarium Amboinense* in which he described and illustrated coconut pearls, often mounted in gold, silver and jeweled settings. Unfortunately these eighteenth century books were never available to me. Supposedly, the Maharajah Coconut Pearl is on display at the Fairchild Tropical Garden Museum in Coral Gables, Florida. An internet search failed to furnish proof of the existence of this botanical gemstone, but it may well be there. Mister Hgoi, a Malaysian has advertised a coconut pearl for sale on the internet with an accompanying color photo. In spite of these, there persists the notion that coconut pearls are no more than a hoax.

My pet coconut, aka, the Professor, is quite important to me. I found him wedged in a sand dune just off the beach on Mustang Island, Texas. His appearance was unique in that he appeared to have recently visited a 1950’s barber. He was clean shaven, crew cut (flat-top), with attending sideburns and an outstanding goatee. The next day, I extracted two Shiner Bock beer caps and a large country almond from the wrack, which I attached to the appropriate sites. Now there was but one thing missing, a moustache. I plucked several fibers from the back of his head and affixed them under his rather large, newly acquired nose. Initially the Professor resided on our condo balcony bench. The first amazing thing I discovered in talking to him was that I could actually complete a vocalized sentence without my wife’s assistance. Her condition had worsened to the point that I didn’t have a clue as to how she might conclude my sentences.

In this instance I spoke not to the Professor, but rushed him to the maintenance shop ER. Once there, I place him between the rusty jaws of the bench vise and applied pressure ever – so – slowly. I would never forgive myself if I were to crack or crush him. One slight extra rotation of the vise handle and the nut would be destroyed like Humpty Dumpty. Now that the Professor was secure in the vise, the delicate surgical procedure could begin. A highly corroded hacksaw was selected.



Please note, when one lives by the seashore, everything is in some advanced stage of deterioration. The incision was made just above his goatee and around the nut’s circumference in order to extricate the enclosed developed pearl.

Wow! What a disappointment. Where was my giant pearl? In its place was an extremely large, ovoid, brown-colored object whose fibrous outer surface was etched in a web-like design. Its immense size prevented removal without further surgery. Apparently what had transpired in the Professor was as dehydration of the coconut milk occurred, the thin seed coat began to shrink along with the endosperm (coconut meat), until it was completely dislodged from the hard endocarp (shell) of the nut.

Even though I was terribly disillusioned, I did not forget my friend and surgically repaired the incision with copious amounts of Elmer’s glue.

Perhaps, as this dehydration continues, this interior object may shrink to the size and compactness of

a marble, resulting in the world's only brown-colored pearl. Why not? There are black pearls you know.

Seriously, a coconut pearl is believed to occur because of an abnormality of the nut in which no "eye" (pore) is formed. Because the developing cotyledon (first leaf of a seedling) cannot emerge, a peculiar chemical deposition of calcium carbonates is believed to occur, resulting in the birth of a coconut pearl. Needless to say, I will continue my beach search for the "Blind Nut;" in fact, my search now includes the coconut bins at all vegetable and fruit markets.

October Beanza: A Bonanza of Sea Beans

by Stephanie Bernstein, Phoenix, AZ

QueenSeaBean@aol.com

A few days after attending the festive 11th Annual Sea Bean Symposium in Cocoa Beach, Florida my husband Steven and I headed to Palm Beach late in the afternoon to search for beans along a secluded beach. A recent storm had ravaged the strand as the dunes were eroded with three lines of wrack to comb through. Immediately I was pleasantly surprised to find two handsome red hamburger beans and a plump little sea heart covered in bryozoans and gooseneck barnacles!

We knew we were in for some great sea bean discoveries but had no idea how great it would prove to be! Step after glorious step we found beautiful beans some of which we had never found before: Ivory Nut Palm, Porcupine Seed, Rangoon Creeper, Two Lobed Mora and our first and ever so coveted Mary's Bean - which should *really* be called the "Merry Bean" as it brings such happiness to all that find one!

Far away from Florida's beaches we find ourselves back in Phoenix, Arizona. We share our rare finds with the desert dwellers who can only imagine the spoiled fun we Floridians have beachcombing for rare and intriguing drift seed treasure.



editor's note: On this day Stephanie and Steve beachcombed 149 specimens that represented 30 different species of seeds.

The Nirvana Bean

by John Beerensson

Merritt Island, Florida



Many years ago, when I had to travel to Seattle for business, I brought along an anchovy pear (*Grias cauliflora*) to show a friend who was a fellow beachcomber. He was impressed with it, acknowledging that this was one weird, gothic-looking sea-bean. Knowing that I not only was into sea-beans, but music too, he suggested that when I finish up with my business obligations that afternoon I try to catch Kurt Cobain and *Nirvana*. They were playing at a place not far from my hotel.

Let me digress for a moment. Seattle has always been on

popular music's leading-edge. Seattle is the home of Paul Allen's (think Microsoft co-founder) Music Museum. The building that houses the museum is shaped like one of Jimi Hendrix's smashed guitars. The museum itself is a tribute to rock n' roll, blues, funk, and grunge. Seattle is the birthplace of grunge; with Kurt Cobain and *Nirvana* being the kings of grunge. Seattle is also the birthplace of the rock anthem *Louie Louie*. Last, but not least, Seattle has *Red Hook* brand beer, maybe the best regional beer in the country. Right Dr. Curt??

Following my friend's outstanding advice, I showed up at what most people would consider a dive. I still had on my business suit. Needless to say, the doorman/admitter said, "... no way suit-dude." So I went back to the hotel. I'm a grubby t-shirt and shorts kind of person, and that's what I wear after business hours. I had the clothes to wear to get admitted, but I needed a little something else for touch. I looked at the anchovy pear, and the light went on . . . bingo!! With a shoelace poked through it, I had the perfect bling.

The doorman/admitter was impressed. "I remember you, and what's that thing around your neck?" My response was something like ". . . if you like it I'll give it to you, but I want admittance and three *Red Hooks*." He took it.

The *Red Hooks*, Kurt Cobain and *Nirvana* were great. Soooooo . . . if you like free beers and great dive joint music, don't forget to pack your anchovy pears and shoelaces the next time you travel to Seattle.



Driftseeds and Seabirds
by Jeremy Smith
selwynsw@bigpond.net.au



As always, the arrival this week of a new issue of *The Drifting Seed* (volume 12.2) was an excitement and pleasure. Of particular interest to me this time was separate mention by two correspondents of driftseeds being transported by seabirds.

After detailing the plastics-swallowing habits of albatrosses, Murray Gregory noted the finding of two *Sophora microphylla* seeds beside Royal Albatross nests on Chatham Island, New Zealand and concluded that they had been picked up by a bird foraging at sea and later regurgitated, possibly while feeding a chick. Charles Nelson noted a *Caesalpinia bonduc* seed found in 1883 in the nest of a Fulmar Petrel on St Kilda Island in the North Atlantic. Another record of this kind is from subantarctic Macquarie Island, south of New Zealand, where a seed of *Ipomoea* (possibly *I. pes-caprae*) was collected on the shore of a lake frequented by Giant Petrels, which nest nearby and use the lake for bathing¹.

Recently Billi Wagner² added several more records of bird-dispersed driftseeds, collected in 2001 from near the nests of Laysan and Black-footed Albatrosses at Midway Atoll northwest of Hawaii. She found more seeds inland (including from within albatross chick carcasses), carried there by the birds, than she collected on the shore. Commonest were *Aleurites moluccana*, *Juglans* sp., *Dioclea* sp. and *Entada* sp., with *Caesalpinia bonduc*, *Mucuna* sp., *Terminalia catappa* and *Calophyllum inophyllum* represented by single specimens.

Many seabirds in the order Procellariiformes ('tube-nosed' seabirds including albatrosses, petrels and shearwaters) may be involved in such seed transport. Scavenging of floating material provides much of the food of several of these birds, including drowned insects and human garbage as well as dead fish and squid. Presumably other floating materials including plastics and driftseeds are swallowed by the birds in mistake for such food objects. In south temperate ocean waters it is common for various albatrosses and petrels to follow ships for hours, quickly flying down to the surface to peck at and presumably swallow any floating items dropped from the ship or churned up in its wake.

The occurrence of some typical 'driftseed plants' flourishing in habitats far from the sea (sometimes far from any water) indicates that these plants have seed dispersal mechanisms in addition to ocean drift. Indeed, quite how seeds get carried even from beaches into the fringing littoral vegetation where they might establish the next plant generation can itself be puzzling. Transport of drifting seeds by seabirds from the sea to their nesting areas provides a possible explanation for some of these cases. It would be interesting to collect further records of this kind.



Unfortunately, seabird numbers are now much reduced in many parts of the globe through a wide range of human activities, so any such seed dispersal probably occurs now on a far more restricted scale than formerly. Beachcombers like Stephanie 'Queen Sea Bean' Bernstein, who plant in the dunes seeds that were found on the nearby beach, help to rectify matters!

PS. The Dutch driftseed figured in the last issue of *The Drifting Seed*, vol. 12(2):15, is the Australian macadamia nut (*Macadamia tetraphylla*), not a good drifter and no doubt owing its arrival in Holland to commercial activity.

1. Taylor, B.W. 1955. The Flora, Vegetation and Soils of Macquarie Island. *Australian Antarctic Research Expeditions Reports B2. Botany*. Antarctic Division, Melbourne, Australia.
2. Wagner, Billi F. 2002. Driftseeds of Midway Atoll National Wildlife Reserve. *The Drifting Seed* 8 (1), 7-8.

Riddle of Dutch Mystery Drift Seed Solved: *Macadamia tetraphylla*

by Gerhard C. Cadée, cadee@nioz.nl



Jeremy Smith (Armidale, NSW, Australia) was the first to identify the nut pictured in *The Drifting Seed* of September 2006 (p.15). It appears to be a nut of *Macadamia tetraphylla*, which Jeremy Smith (1999) has described in his book on Australian Drift seeds. It is probably the first record of this nut from an Atlantic coast, as it is not mentioned in Nelson (2000), Perry & Dennis (2003) and Brochard & Cadée (2005).

It is very easy to find information on *Macadamia* on the Internet (i.e. [Wikipedia](#); www.macnut.co.nz; www.hort.purdue.edu), as well as in Menninger (1977). It is a tree typical for Australia and wasn't discovered until 1875. Cultivation of the trees for their nuts started in 1890, first in New South Wales. The nuts are eaten raw, or after cooking and its oil is used in cosmetics, especially for skincare.

Already in 1892 cultivation of *Macadamia* started outside Australia on Hawaii, and it is now grown in many areas world wide including New Zealand, Sri Lanka, South Africa, Rhodesia, Paraguay, Jamaica, Costa Rica and even France is mentioned. Smith (1999) mentions the nuts found on Australian beaches as refuse, not real drift seeds that need water transport for their dispersal. That they are found on Australian beaches indicates that they can float for a certain still unknown period. As it is now cultivated worldwide and transported we may expect macadamia nuts also on beaches outside Australia as this first Dutch (and European) record indicates.

I am very glad Ed Perry suggested publishing the pictures in *The Drifting Seed* and happy with the rapid answer I got from Jeremy Smith! This proves how important this newsletter is in bringing drift seed enthusiast all over the world in contact.

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Wracky Potpourri II

by John Williams & Gerald Sullivan
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Warning! Warning!



Of the seven species of sea turtles, six reside in U.S. waters: green, hawksbill, Kemp's ridley, leatherback, loggerhead and the olive ridley. All are protected under the Endangered Species Act of 1973. Under this law, it is illegal to possess any part of the aforementioned turtles without a proper federal permit. Persons finding turtle bones on the beach may not collect or possess them. "Unintentional" violation of this law results in the confiscation of the item and a maximum penalty of \$1,000. Intentional possession may cost you \$25,000 plus a prison term. Rewards of up to \$2,500 are paid for information leading to a conviction. A word to the wise – select your friends carefully. What's a *Drifter* to do!? If you happen to encounter turtle bones on the beach, do one or more of the

following:

- (1) Strike up the song "Dem bones, dem bones, dem dry bones ----by softly whistling, humming, or singing.
- (2) Totally disregard dem bones, don't touch nor look at them. "I see nothing!"

(3) Wish for an immediate, mild tsunami to wash dem bones back into the hintersea.

(4) Anonymously, alert the authorities.

Please examine the photo which shows two turtle rib plates and possibly the edge of a shell with a rib socket. A wintering Texan from Michigan informed us that when this photo was taken, the radiating heat from the flash disintegrated the fragments into a pile of dust.

Seafaring Hitchhikers via Drift Seeds

Most accomplished sea-beaners are well aware of an assortment of seafaring organisms which secure themselves to drifting seeds. The following is a brief sketch of the most prevalent-

Colonies of bryozoans: the phylum Bryozoa is composed of hundreds of different bryozoans which are, "believe-it-or-not", animals which attach to pilings, rocks, shells and drift seeds. A number of drift seeds may serve as a host to these monolayered colonies composed of millions of individual animals in ridged, oval, angular or tubular shapes. The marine organism resides inside the "pore" and secretes calcium carbonate (limestone) as its building material. See photo.

Coiled tube worms: This tube-dwelling marine animal also secretes copious amounts of limestone and may become several centimeters in length. Our coiled *Spirorbis spirillum* is merely a few millimeters and attached to a porcupine drift seed. (Please check the blue spinning top with large coiled tube worm on Page 13 of the Dec. 2005 *The Drifting Seed*.)



Goose barnacles: *Lepas* species secrete a two-part shell and attach to virtually any surface afloat, including a host of drift seeds. These stalked barnacles

range from a millimeter or two to several centimeters and are white or white with purple splotches.



Acorn barnacles: We have encountered acorn barnacles only on a few seahearts and black walnuts. These were quite small, ranging from 1-4 mm. in height and width.

Lucifer's Light

One of the more frequently encountered drift items on Mustang Island beaches is the "longliner" or "lightstick". Actually, for several years, I thought that these translucent plastic tubes containing a yellow-colored liquid were solutions intended for intravenous drip systems. Their presence was erroneously attributed to hospital waste dumpings into the Gulf of Mexico. I refrained from physically handling them until I was informed by John Williams that they were harmless "longliners" which commercial fishermen attach at specific intervals to long lengths of fishline as a fish light attractant.

Each glowstick contains two inactive solutions separated from one another by an impermeable plastic septum. Disruption of the septum allows the solutions to mix freely, resulting in the chemical production of a luminescent light by combining luciferin with an energy source (ATP) which reacts with oxygen to produce oxyluciferin plus a luminescent light. Basically this is the same reaction which

occurs with terrestrial fireflies and marine organisms such as tiny crustations, seed shrimp, sea fireflies, jellyfish-like organisms, etc.

Just for fun, all the lightsticks encountered in the wrack were collected for a distance of 0.2 miles, resulting in a collection greater than one dozen. Do the math. This was considered normal distribution. Litterally, thousands wash ashore on a monthly basis.

More recently, over a two-month period, six PML (Personal Marker Light) washed ashore. This is a more elaborate lightstick which is U.S. Coast Guard approved and can be used in emergencies on both land and sea. The septum is disrupted by squeezing the handle.

Note-Extensive bryozoan encrustation on PML, indicative of long duration in the Gulf, possibly years. This is not a flare.



editor's note: This 4-part article was split in half and the remaining half will be reported in a forthcoming edition of this newsletter.

Coin in a Coconut by Curtis C. Ebbesmeyer

— *You'll never look at coconuts the same way again*

On Wednesday, October 26, 2005, Mike O'Reilly beachcombed a ragged, oddly-shaped coconut in Apponagansett Bay off Buzzards Bay, Massachusetts, USA. Mike, Environmental Affairs Coordinator for the city of Dartmouth, found the coconut while flagging coastlands along Gulf Road.

Embedded in the nut's brown husk, he discovered an aluminum, squarish 5-paise coin minted in 1974 in India (paise is pronounced *pay-sa*). By *Googling* the words "*five paise coconut*," I found that the coin and the nut are prominent in the Sikh religion. Sikhism began in sixteenth-century Northern India with the teachings of ten gurus. The lineage of living Gurus continued until the tenth told his followers that a book of holy scriptures known as the Guru Granth Sahib was to be their future guide. Guru Gobind



Singh opened the Granth Sahib, placed a five paise coin and a coconut before it and solemnly bowed to it as his successor. Today, a 5-paise coin has the approximate monetary value of a penny, but 400 years ago it was a lot of money.

Sikhism is the only religion in which scripture is revered as a Guru. In these teachings, the word Guru is composed of two words meaning light (RU) which dispels darkness (GU). Bowing before the Guru Granth Sahib is not bowing before a book but is bowing before Divine Light. On September 1, 2004, Sikhs the world over celebrated the 400th anniversary of the first reading of the Granth. Many Sikh dignitaries gathered to celebrate at the White House. To this day, coconuts are often used as offerings throughout India. It is likely that 5-paise and coconuts were presented to mark the 400th anniversary. Perhaps some were set adrift.



If correct, this reasoning implies the coconut floated almost 40 months (420 days). Given that the long-term average drift speed in the North Atlantic Ocean is seven miles per day, the currents could have transported the coconut nearly 3,000 nautical miles thus ruling out India as a possible origin. Objects from India can reach the Americas along a drift route of more than 15,000 miles: south along east Africa, right around South Africa, right turn into the Atlantic to Florida and Massachusetts. The fact that there is little barnacle growth suggests an origin in the North Atlantic Ocean as far away as Europe.

The condition of the coconut might hold clues as to drift longevity. A coconut freshly dropped from its mother tree has a smooth green skin. As it drifts, the husk disintegrates till all that is left is the husk-less hard inner core. Assuming the coin was inserted into a fresh coconut, stripped to its inner husk suggests substantial drift.

"It is quite possible that the coconut did wash in from open sea," wrote Mike. "Apponagansett Bay — where I found it — is open to Buzzards Bay. And Buzzards Bay is wide open to the Atlantic. It is not at all uncommon to have debris wash on shore. It is mostly derelict fishing gear but all kinds of overboard debris can be found. You find some unusual things that are kind of curious but never a coconut."

The search for an origin might be narrowed based on the shape of the coconut. Oddly shaped specimens often drop from wild trees, whereas the more spherical ones often found in grocery stores are farm grown. The 400th anniversary might have been conducted by someone with access to wild coconuts.

Mike's discovery has given me a new appreciation for stranded coconuts. Beachcombers, please inspect marooned coconuts for 5-paise coins!

Thanks: Patrice Coholan, *Horizon Marine*, Inc. for referring the story to the *Beachcombers' Alert!*; Beth Perdue for photos and the clipping from her article in *The Dartmouth Chronicle* (November 2, 2005).

Eleventh Annual International Sea-Bean Symposium

October 13-14, 2006, Cocoa Beach, Florida

by Margie Mitchell

The good news—no hurricanes came to Florida this fall. The bad news—no sea-beans either. As the symposium dates approached, Eastern Florida's beaches stayed positively summerlike, nice gentle surf, no east wind. However, Mother Nature had an eye on the calendar and sent a full moon high tide containing a bounty of beans less than a week before the symposium. Whew! Eager beaners raced immediately to the beaches to vacuum up everything they could find, but they somehow missed a few and left enough out there for a good Bean-a-thon when we all converged in Cocoa Beach on October 13th and 14th.

Our keynote speaker Alan Rammer took us far away from Cocoa Beach for a look at Pacific Northwest beaches with his talk, "Beachcombing the West Coast from A to Z." Alan is a long-time Drifter with a beachcomber's dream job. As a Community Outreach and Environmental Education Specialist for the Washington State Department of Fish and Wildlife, he gets to spend a lot of time on Washington's beaches, observing and collecting, then sharing his knowledge with others.

Alan regaled us with tales of competitive beachcombing for glass fishing floats, and showed us the great variety of size, shape, color, and age of these most sought-after gifts from the sea on the Pacific Coast. He described for us the variety of marine creatures and other natural wonders a West Coast beachcomber can expect to encounter -- sea lions, gray whales, fossils, shells, and knee-deep piles of by-the-wind-sailors when conditions are right. He also explained the predictable progression of the arrival of sea drift on Washington beaches when the west wind begins to blow. An experienced beachcomber knows exactly what to expect when. First come the lightest items -- by-the-wind sailors, water bottles, Styrofoam cups, and light bulbs. The big glass balls follow, then medium glass balls. Finally, the smaller rolling pin floats used in octopus fishing arrive, signaling the end of the event. After sharing with us so many fascinating stories and photographs of all that West Coast beachcombing has to offer, Alan should not be surprised to see some familiar faces at one of his educational programs someday soon.



Other presentations this year included Ed Perry's always-enjoyable "Beginning Beachwalking" and Dr. Curtis Ebbesmeyer's "trash talk" on Friday. Curt's talk this year was subtitled, "Things You'll See Floating in the Ocean But You Can't Tell Anyone About Because They Won't Believe You." Examples included a stranded mermaid [statue], a utility pole (one of 300 still missing in action), the tail of an F-14 Tomcat, labeled, "The Grim Reaper," and a 10-foot plastic Yogi Bear. Curt also gave us our annual traveling plastic duck update. Did you know that there are 1,969 individual toy duck species, but only one is the true vagabond duck? After his presentation, Curt showed the fascinating beachcombing film, *"The Wrecking Season,"* about the life of Drifter Nick Darke and the tradition of beachcombing in Cornwall.



On Saturday, we were treated to "Polishing Your Sea-Beans," a new presentation by Drifter and expert polisher Bill Blazek. Bill has been amazing us at the symposium every year recently with beautiful hand-polished specimens of sea-bean species no one had dreamed of trying to polish before. He finally agreed to let us in on his secret. And not only did he reveal the secret, but he demonstrated exactly how he does it, including modeling proper polishing attire. The secret, by the way, seems to be ever-finer sandpaper and a lot of patience.

Saturday afternoon wrapped up with Paul Mikkelsen's beautiful multi-media

presentation of Cathie Katz talking about the magic of the ocean on BBC radio.

Kim Mohlenhoff won the Bean-a-thon this year with 30 different species. Other winners were:

- Young Bean: Torrey Cranston (13 species)
- Cool Bean: Joanne Powell (Nypa Palm)
- Non-Bean: Tom Brzuszek (toy dinosaur)
- Grand Slam: Elizabeth Eubanks

Odd Bean contest winners were:

- Largest Hamburger: Mike Burnett
- Smallest Starnut: Bill Blazek
- Best Crossed Mary's Bean: Ike and Elaine Alvo



The variety of exhibits was as interesting as ever. First time exhibitors Terri Kirby Hathaway of the North Carolina Sea Grant and Joanne Powell of the North Carolina Maritime Museum brought with them a display of their educational project, "Caught in the Drift: Sea-Beans and Ocean Currents," a program which trains teachers to teach oceanography using sea-beans and ocean currents.

Other exhibitors were Nan Rhodes, just returned from beanning in Australia, with an amazing display of seed jewelry and mangroves; Bill Blazek's hand-polished sea coconuts, sea hearts, coconuts, nickarnuts, prickly palms, hamburgers, starnuts, sea purses, laurelwoods, and Jamaican naval spurge; Michelle Kelly's huge and varied sea-bean collection, Mike Stewart's beans, bones, and other eclectic beach treasures; Jim Angy's beautiful wildlife photography and "Still Nature" CD series; Krieger Publishing's nature book collection; Curt Ebbesmeyer's trash 'n treasure assortment; and Paul Mikkelsen and Mary Canada's seeds, plants, pods, books, and jewelry. The Bean-o-Matic made what we hope to have been its

final appearance. A new and improved model may be in the works for next year.

Cathie Katz's display boards and famous sand box were with us, as always, and as popular as ever. Cathie's presence remains with us year after year in so many ways.

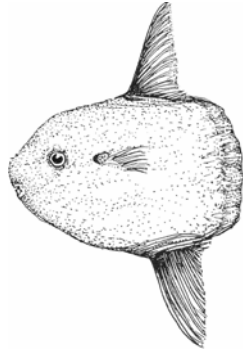


Thanks to everyone who donated the wonderful collection of raffle prizes. Tickets sold well to help support publication of *The Drifting Seed* for another year, and all the winners were thrilled. Thanks also to everyone who helped with set-up and clean-up, worked the hospitality table, and pitched in with all the other minute-to-minute details of running a successful symposium. It's a group effort and we appreciate everyone's contribution. Special thanks to Nan Rhodes, who designed this year's "The Bean Team" t-shirt.

Next year's symposium is set for October 19 - 20, once again at the Cocoa Beach Library. Mark your calendars!



News and Notes



Look what Wim Kruiswijk found in Zandvoort last December. Shortly after finding the first *Mola mola*, or ocean sunfish, he found a second. This is a very small ocean sunfish as they grow 10 feet long and 11 feet high and reach weights of 4,400 lbs., making them one of the largest of the bony fishes.

Addenda to Floating Islands: A Global Bibliography

By Chet Van Duzer

47 pages including sixteen photographs (eleven in color)

E-Book in Adobe Acrobat PDF

ISBN-10: 0-9755424-1-9

ISBN-13: 978-0-9755424-1-5

The *Addenda* to Chet Van Duzer's *Floating Islands: A Global Bibliography* contain almost 200 new citations on the all aspects of the subject; they include material on floating islands that formed since the publication of *Floating Islands*, unique historical descriptions of several floating islands that no longer exist, and important new references on floating islands seen at sea and on the dispersal of species on floating islands.

The entries are annotated and cross-referenced, and are followed by a geographical and thematic index. The book also includes an account of the author's visit to the rare intermittent floating island in Derwentwater, Cumbria, England, as well as sixteen photographs of floating islands around the world. The photographs of the floating island in Derwentwater in the *Addenda* are among the first color images ever published of that island.

If you already own *Floating Islands*, you will certainly want the *Addenda*; if you have not yet seen the book, the *Addenda* will give you a good idea why reviewers have called *Floating Islands* "masterful," "definitive," "exhilarating," and "amazing," and have insisted that "every environmental-related institute should acquire a copy."

For a limited time the publisher has made the 1.8 MB PDF file available as a free download at this address: <http://cantorpress.com/floatingislandsaddenda/>

Reported in the News and Notes of the last issue of this newsletter was an individual selling seaheart (*Entada*) pods. At least one Drifter has sent his money without receiving the product; at best this can be called an extremely slow response, at worst a scam.



Soapberry on the halfshell—compliments of Gerald Sullivan!

From Drifter **Ruth Smith's** daughter, Carolyn:

Last Saturday (September) in Dover, home of Delaware State University, Ruth was honored at the dedication of the Ruth Smith Botanical Bead Collection at the University's herbarium. She and Dad and I drove up in the morning and spent time in the herbarium before the crowds came. Some of her jewelry is displayed in table-top cases and on poster stands, but most of it is out of sight. There are 411 pieces of botanical jewelry in the collection (way too many to display), and the curator staff has done a wonderful job of cataloguing and archiving them in a way that preserves them from bugs, sunlight and other things that could compromise their longevity but still allow them to be accessible to students and researchers.

Mom had found her first botanical necklace while living in Bangkok in 1971. Gradually she collected more seed beads and grew more fascinated with the ingenious ways humans took parts of plants and made them into adornments. Mom got up and told about the most challenging part of the process, which was taking a little piece of dried seed, root or stem and trying to identify the plant, flower or tree it had come from. In those pre-Internet days she called and wrote botanists and universities as far afield as the UK and Australia, hoping someone somewhere could make an identification for her.

The herbarium at Delaware State got a new building in 2000 and has been trying to expand its collections since then. Mom's donation is a significant addition to its collections and also a unique one—the herbarium now houses one of only three collections of botanical beads in the world (one of the others is at Kew Gardens in England, which was the recipient of the other half of Mom's collection).

Many of you missed the request for newsletter donations in the May 2006 issue. If you would still like to make a donation for 2006 or for 2007 (\$10 please), cut this coupon from your newsletter and send in to: **The Drifting Seed, P.O. Box 510366 Melbourne Beach, FL, 32951, USA**. This will also serve as the only request for 2007. Newsletter printing and postage keeps the cost near \$2000/year (no money is made from the publishing/production of this newsletter, and the editor works for free!). Of course, all issues are available for free and printable off www.seabean.com. Donations of \$25 or more will receive a "What's a Sea-Bean Anyway?—*Mucuna, Entada, It's a Sea-Beaner's Philosophy!*" canvas tote bag, while supplies last. Thanks for your support! Please print clearly:



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What is a Sea-Bean, Anyway?



Sea-Beans are actually seeds from common trees and vines that grow in the tropics. Washed out of rainforests, these seeds are carried by streams and rivers like the Amazon. Eventually some reach the ocean where mighty currents transport them thousands of miles, finally bringing them to rest on foreign shores.

Sea-Beans are symbols of good luck and longevity to beachcombers fortunate enough to find these rainforest gems washed ashore on a coastal beach.

PS—If you would still like to receive the newsletter and cannot afford a donation, that's okay, but please send this back to us stating just that—so we know you are still out there and interested!