Some Oak Island Limericks

A Limey, while scanning some dirt,
Found some metal that caused him to blurt:
"Once more this 'ere 'obby
Has dazzled me bobby!"
And pockets some rust in his shirt.

The secrets the Money Pit hides
Are protected on all of its sides
By tunnels that flood
As you dig through the mud
And the floods ebb and flow with the tides.

When the story is finally told
Of the quest to find Oak Island gold
The spring, summer, and fall
Will be all we recall
'Cause the winters were too freaking cold

The Laginas all jump at the chance
When a clue or an odd circumstance
Justifies an off-site
Tax deductible flight
To Italy, England, or France

Mr. Legge is a blacksmith by trade
Who is never the least bit afraid
To look at a kettle
And judge by the metal
The month and the year it was made

The boulders that make Nolan's Cross
Weigh too much to easily toss
So who placed them there
With precision to spare?
A Templar whose nickname was "Hoss!"

We can reconstruct scenes by the rocks
Of the road that led down to the docks
That some treasure was hauled
But was suddenly stalled
By a partially shod limping ox

They say FDR trod this ground
For a treasure he looked all around
There's a picture of him
With his pipe and his grin
And a part of his boot has been found

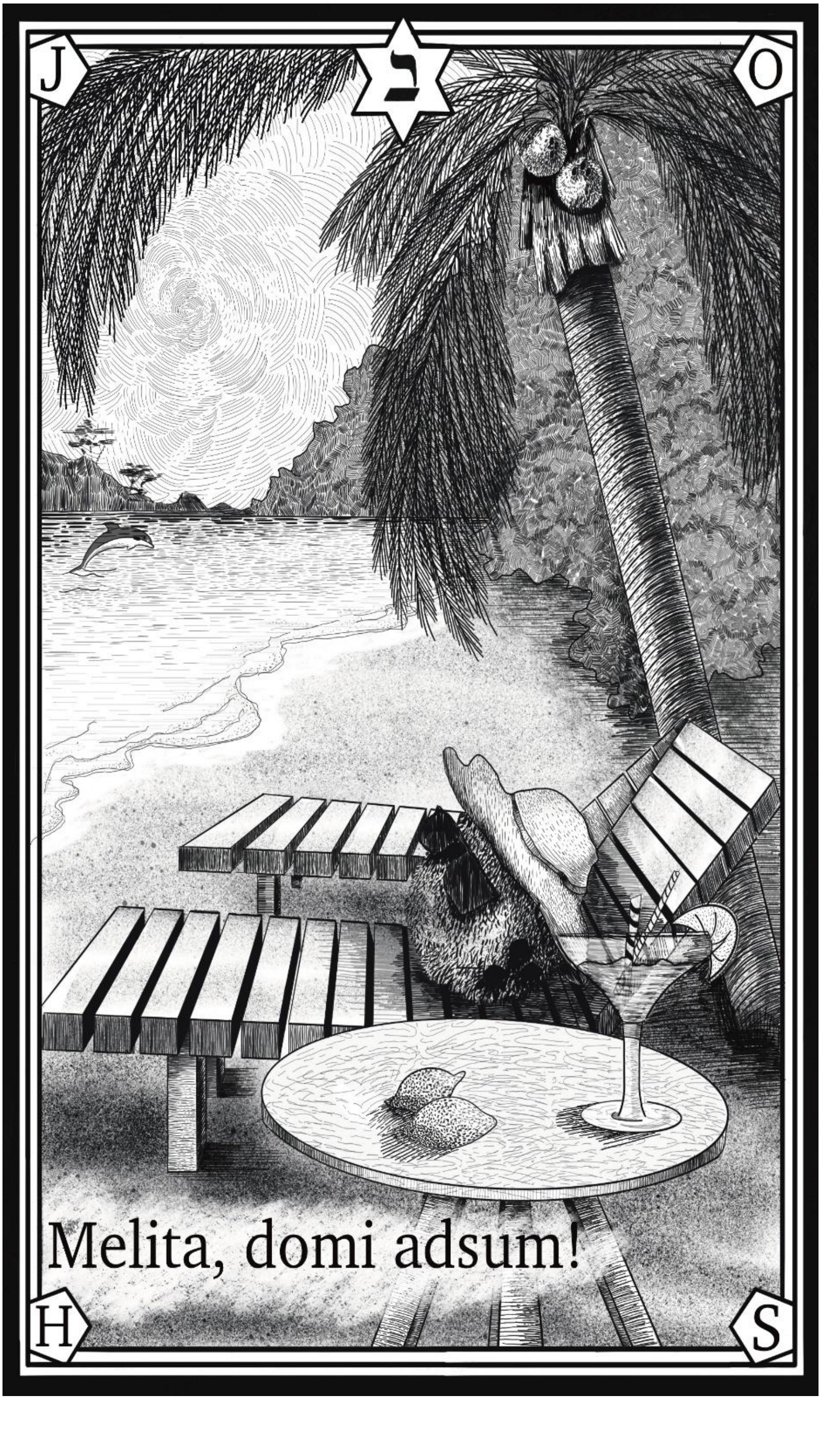
The Laginas, a persistent kind
Relentless in body and mind
Will locate the prize
With their boots and their eyes
Unless it is too hard to find

When some searcher locates a tool
Or a shoe from an ox or a mule
Starting right from today
Throw that item away
'Cause Rick says the War Room is full

When searchers for treasure get low
And start to doubt all that we know
Some guys named Lagina
A lady named Zena
And Prometheus tell us it's so

When Carmen Legge gives his decision
And dates an old nail with precision
And can feel with his thumb
Where the old nail came from
Old son, that is good television!

Joe Urbanski


J
ב
O
Melita, domi adsum!
H
S

Chapter Two

COIR'S COMFORT ZONE

Evolutionary biology has provided todays coconut palm, *Cocos nucifera*, of the Arecaceae family. It has been part of man's history between 40-100 centuries as well as being the most helpful plant to humans.[1] Every part of the Coconut Palm Tree is used in some sort of economic use.[2] It is the most widespread plant in coastal and lowland tropics and subtropics and can be found on more than 30000 islands of the Pacific, Indian, and Atlantic Ocean basins.[3]

> "*The botanical evolution and anthropogenic migration patterns of the Coconut Palm Tree have been well researched and with little exception, acknowledged throughout the scientific community. Though the origins of the species is still not declarative, the taxonomic characteristics and historical record of its use is well documented. Researchers have developed DNA testing of Cocos nucifera, making it possible to better pinpoint from where a palm – or its seeds (coconuts) came from*."[4]

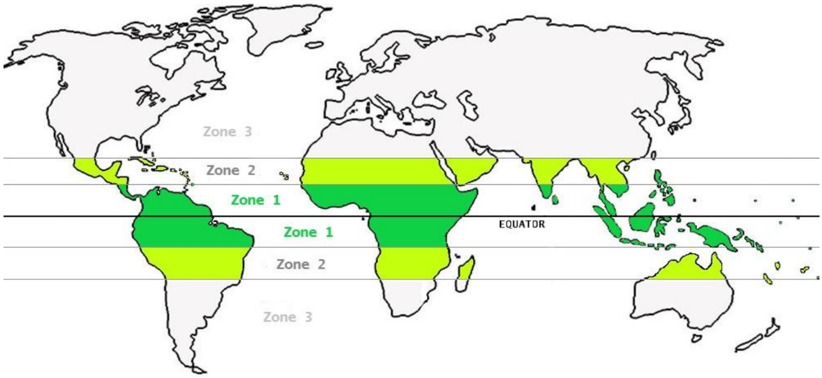
Unfortunately, the Oak Island specimens previously collected and dated could no longer provide sufficient DNA material and other microcellular determinations to successfully locate origin or conclusively identify the palm fiber to genus or species.[5] Exhaustive botanical research and historical review performed in our previous Volumes determined parameters which isolated and located the source of the Oak Island fiber.[6] This chapter shuffles in new forensic data from archaeobotanical and historical records bolstering those existing parameters. Here, the stage is set to determine if and how 1.54 metric tons of acquired Coconut Coir Fiber (CCF) found its way from Kerala, India, to Oak Island, Nova Scotia, and into the Money Pit and Filtration System.[7] This updated analysis clearly eliminates all possibilities other than man's intentional placement of CCF into the island. But was it coconut coir fiber indeed? These next chapters further prove how improbable that scenario is likely to have been the case. Getting to know CCF helps you see why the fiber is not CCF!

The coconut coir fiber is not put in anyone's hand, placing it in the island, but forensic examination eliminates all but one explanation how so much "fiber" ended up on Oak Island by the late 1700s. Below is the summarized review of those updated scientific parameters isolating the source of CCF acquisition. This evidence eliminates most of the popular misperceptions of how retted coconut husk ended up in Oak Island.

The Germination Range of Cocos nucifera

Of 2600 palm species, this particular palm flourishes best close to the sea on low-lying areas a few feet above high water, and where circulating groundwater is available with ample rainfall or high humidity (70-80%).[8] Understanding its historical record, the Coconut Palm growing region was on littoral areas found between **20º N & 20º S** Latitudes on both sides of the equator. Though it could grow beyond this range in selected biomes as far as **27º N & 27º S** Latitudes, cultivation and nut germination in those further areas were problematic; as the palm does not fruit in cooler climates or when subjected to any frost. Hybridization and variant strains of the *Cocos nucifera* after the 1850s have changed their growing range considerably and are not part of this analysis. The illustration below identifies latitudinal zones for growth of The Coconut Palm Tree of the past: **Zone #1**, supporting high productivity potential; **Zone #2**, with medium levels of climatic benefit and germination; and Zone #3, offering little or no potential for tree growth and fruit production.

Figure #1. **Growing Range of *Cocos nucifera*** [9]



Courtesy: Mike Foale, 2003.

Even in consideration of climatic and environmental changes, which have been significant over time, the studies of plant phylogeny and biogeography have well-defined the spread and cultivation of the *Cocos nucifera.* This palm requires abundant sunlight with minimum temperatures below 69.8°F, maximum heat of 99°F, and annual rainfall of 60-100 inches.[10] There are many regions within these zones which were not conducive for the coconut palm to grow on its own without man's constant agronomic management.

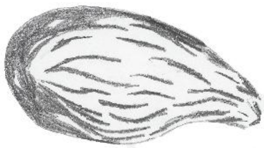
The Type of Coconuts Used

When those "*ancient voyagers*" sought coconut fiber, there were two subgroups (types) of *Cocos nucifera* for them to consider. This was previously discussed in great detail in Volume Two, Appendix I, "*Cuckoo for Coconuts*." One coconut palm subgroup was named ***nui kafa***, which is often thought of as the 'tall coconut tree,' and considered by botanists as the wild, nonhybridized subgroup.[11, 12] Conversely, the ***nui vai*** subgroup represented the smaller, dwarf tree variety which man had come to domesticate for food and water.[13, 14]

The ***nui kafa*** subgroup was spread westward into the Indian Ocean Basin, while the ***nui vai*** moved throughout the Pacific Ocean Basin.[15, 16] The ***nui kafa*** grew the 'football' shaped coconut which had a more fibrous husk, while the ***nui vai*** had the 'basketball' shape and its exocarp was thinner and its husk volume was less.[17, 18] Though not determinative by itself, the ***nui kafa*** subgroup demonstrably represents the almost exclusive coconut variety historically used for coir production prior to AD 1900.[19, 20] Whereas the ***nui vai*** dwarf variety was passed throughout ocean island communities for its larger provision of ample water, milk, and meat (copra).[21, 22]

Genetic studies of *Cocos nucifera* tree DNA from hundreds of genotyped samples using specific genetic markers prove the migration and type of palm spread through these areas. These datasets were uploaded into microsatellite regions and linked to form definitive migration patterns of the Coconut Palm.[23] The following illustrations depict the two subgroups generalized descriptions as they were found around the world.

Fig.'s #2 & #3. Courtesy: Miles and Shane Ballew

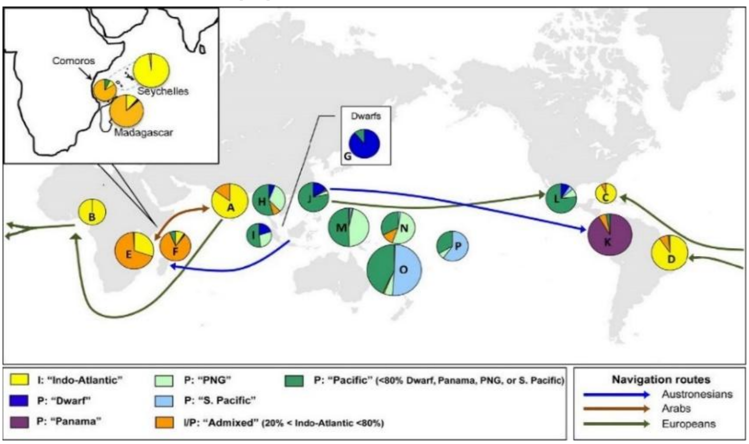


niu kafa
15–25% water, 27-36% shell
46–52% meat (copra)[24]

niu vai
>35% water, >24% shell
<42% meat (copra)[25]

To be clear, the *Cocos nucifera* subgroup – specifically ***nui kafa*** (the wild one), were dispersed by man into the areas of Sri Lanka, the Maldives & Laccadive archipelagos, and southwest India.[26] The Coconut Palm tree hereditary dispersion can be seen in the graphic below.

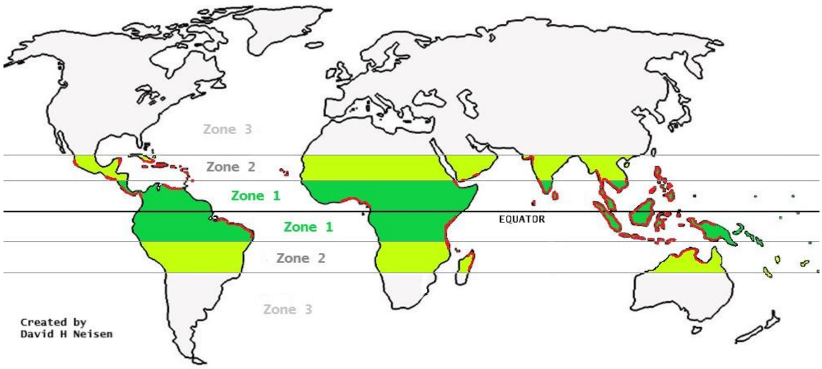
Figure #4. **Geographical distributions of Indo-Atlantic and Pacific coconut subpopulations.**[27] Courtesy: Bee F. Gunn.



NOTE: In this illustration, the Yellow/orange pie chart represents the ***nui kafa*** subpopulation of *Cocos nucifera*. It is shown migrating from the region of southern India westward across the Indian Ocean to the eastern coast of Africa, Madagascar, and Seychelle islands. The ***nui kafa*** is further transported by Vasco de Gama and other Portuguese explorers to west Africa and then on to Brazil. West African trade, primarily in slaves, migrates these germinating coconuts to the Caribbean Sea area. The Green pie chart represents the ***nui vai*** subgroup migrating into the Pacific Ocean Basin. Other colors represent various recent hybrid variants from the two primary subgroups.

Marked in **red** below, are the geographical locations of "tall & wild, football-shaped" subpopulation of *Cocos nucifera* (yellow & orange) ***nui kafa***, spread by 1600. [Island archipelagos off western India are not shown]

Figure #5. **Migration Locations of Cocos *nucifera, nui kafa* Subgroup** [28]

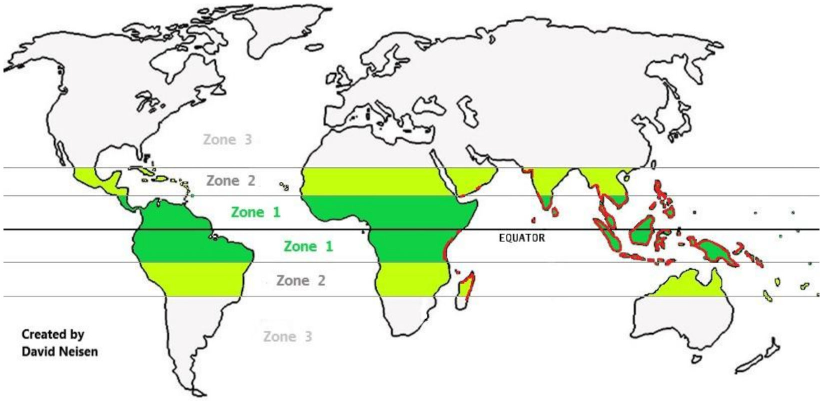


The Age of Our Coconut Fibers

As you will read in Chapter 5, "*Too Old for Dating*," the CCF specimens collected from Oak Island over the past thirty four years and subjected to ${}^{14}C$ and AMS laboratory testing, date the fiber to a timeline from AD 1185 to AD 1330, with a 95% certainty.[29] This reflects the most likely range of accurate specimen radiocarbon dating. Since the life and death of a *Cocos nucifera* seeds development and germination cycle is within a single year,[30] these specimens present less mitigating complexities for proper calibration for the dating process.

There are no rings for dendrologic analysis nor other environmental factors which may cause testing to require further calibration. So, with this scientific fact, putting aside an outlier specimen, thus sets the fibers historical timeline, which becomes the window of focus. With reason, researching coconut coir fiber obtained in the 1500s does little to explain how such older specimens made it to Oak Island. The following world map identifies in **red**, the isolated sources where CCF were known to exist during an expanded window of time to AD 1150-1490.

Figure #6. **Known Range of *Cocos nucifera* (circa *AD 1150-1490*)** [31]



The Quality of Coconut Fibers

The quality of the coconut fiber rests specifically on if and how the CCF was processed for use. In the case of Oak Island specimens, evidence from the California lab used by Robert R. Dunfield in 1976, identified the tested organic matter as coconut coir fiber.[32]

Again, as was explained in Volume One, Chapter Nine, "*Foreign Fibers Found*" and Volume Two, Appendix I, "*Cuckoo for Coconuts*," the process to turn the coconut husk (outside protective pod of the coconut seed) into usable byproducts is called "*retting*." For Coconut husk fiber, this year-long, labor-intensive process of retting transforms the fibrous husk into separatable and usable plant fiber. This retting treats, cleans, and enhances the fiber structure - making fibers stronger, more elastic, more absorbent, more buoyant, antimicrobial, and more saltwater resistant.[33, 34] From as fine as human hair, light to dark brown in coloration from the lignification process which improves its tensile strength; the CCF almost becomes non-biodegradable. The end result is a fiber popularly known as "coir." Pronounced "kāir."[35] The slow decomposition of Oak Island specimens further prove the plant material had been retted. Very few cultures or regional societies knew how to ret a coconut husk, regardless of the presence of coconut palms. However, it has become evident, other species of retted palm fiber are also called *coir* by cultures using them. This has created erroneous assumptions by some that other geographical areas also used CCF.

CCF could then be further processed into hundreds of different products and applicable purposes. In our timeline window, coir was first and foremost used by select locations to sew together boat planks, twisted into cordage and vessel rigging, and as a bulk fiber for caulking. Yet the majority of coconut palm-growing areas used the fibrous coconut husk as a fuel and fertilizing source, or it was simply discarded. The Philippine archipelago became one of the top coconut producers in the world. However, it was not until 1901 that coconut husk retting and byproduct commerce began.[36] Otherwise unused, this organic detritus surrounding the coconut seed would rot and decay like any fruit or vegetable rind, peel, or skin. The husk untreated and left exposed to the elements, would fully decompose within three to four years.[37] Retting removes most all properties which would cause chemical fermentation and decomposition.

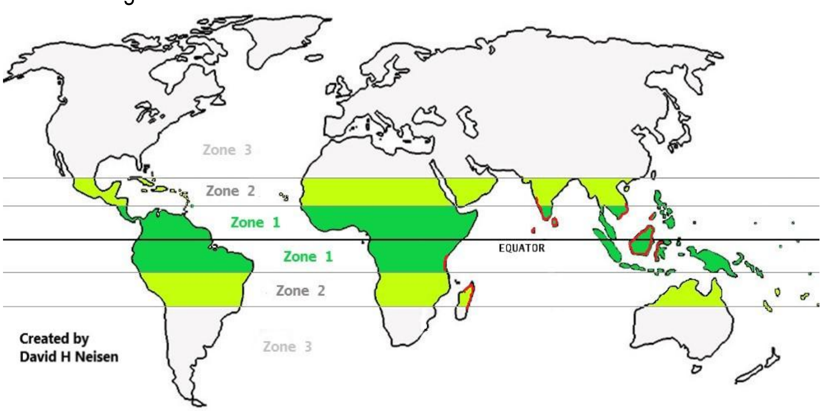
Many Pacific Ocean cultures like the Philippines as mentioned, did not ret Coconut Palm husks, regardless of whether ***nui kafa*** or ***nui vai*** subgroups were handy. Their culture's historic use of other plant fiber options such as sisal, abaca, flax, hemp, ramie, rattan, bamboo, date & doum palm, provided superior fibers which were easier to obtain and did not require lengthy processing. Areas of China, southeast Asian coastal communities amongst the archipelagos of Melanesia, Malaysia, Micronesia, Polynesia, and Indonesia, were not all retting coconut husks.[38,39, 40, 41] In China, regions frequently retted other palm species and called it coir, using those fibers for numerous purposes.[42] One example where CCF was not used was in Sumatra, where In 1811, the *Cocos nucifera* was called *kālapa nīor,* and natives did not convert it to the many by-products it was known for.[43, 44] Author William Marsden wrote,

> *"although by the natives of Sumatra it is not converted to such a variety of purposes as in the Maldives and those countries where nature has been less bountiful in other gifts. Its value consists principally in the kernel of the nut, the consumption of which is very great, being an essential ingredient in the generality of their dishes. From this also, but in a state of more maturity, is procured the oil in common use near the seacoast, both for anointing the hair, in cookery, and for burning in lamps. In addition to these but of trifling*

importance are the cabbage or succulent pith at the head of the tree, which however can be obtained only when it is cut down, and the fibres of the leaves, of which the natives form their brooms. The stem is never used for building nor any carpenter's purposes in a country where fine timber so much abounds. The fibrous substance of the husk is not there manufactured into cordage, as in the west of India where it is known by the name of coir . . . The shell of the nut is but little employed as a domestic utensil, the lower class of people preferring the bamboo and the 'labu' (cucurbita lagenaria) and the better sort being possessed of coarse chinaware. If the filaments surrounding the stem are anywhere manufactured into cloth, as has been asserted, it must be in countries that do not produce cotton."

Unlike the western coast of India, most of Oceana populations used a plant resin called "dammer" to caulk and waterproof vessels. This ubiquitous plant sap was moldable like putty, hardened like rubber and provided a much superior caulking material for sailing ships and local watercraft. Additionally "baruk," a palm frond fiber, cotton wadding, coconut palm tree bark, the bark of the Sugar Palm, and other grasses, were all used as caulking for watercraft in these regions.[45, 46] These ethnobotanical realities shed pragmatic light on the true limited area where the coconut palm was cultivated for CCF usage, regardless if *Cocos nucifera* grew widespread in those areas. The world map below reflects areas which did ret coconut husks, or where archaeobotanical evidence reveal CCF may have had a commercial basis for being there.

Figure #7. **Where *Cocos nucifera* Husks were Retted into Coir** [47]



The Volume of Coconut Fiber

Forensic examination has determined a conservative estimated volume of CCF found in Oak Island, to be a minimum of 1.54 metric tons.[48] The equation can be viewed in Volume One, Chapter Ten, "*Cracking the Nut*." This finding is corroborated with historical reporting by those on scene at searcher operations, in affidavits and by nearby residents. To visualize this volume of coconut fiber, consider it would take as many as 18000 coconuts to produce enough husk to make all of that fiber. This amount of CCF would fill 2½ 40 ft shipping containers, compacted on a 2:1 ratio.[49] And the retting process must be performed within the littoral tropics where warm saltwater for soaking, can be obtained all year round.

As explained, not all communities with coconut palms retted the husk, nor were they knowledgeable of that process. Husks were primarily burned as fuel and those ashes spread as a fertilizer. Many cultures used the coconut palm exclusively to 'tap' the trees *sap* for making an assortment of fermented beverages. Similar to extracting maple syrup, palm tree "tapping" for sap, would completely prevent the *Cocos nucifera* from germinating nuts.[50] *No nuts - no husks to ret… no coir fiber*.

A few places which did ret husks, like the island of Ceylon, and select geographies of Yemen and Oman, did not produce coir on an exportable scale. In Ceylon, retting was not commercialized until the Dutch attempted to control island production, circa 1840s.[51,52] The same scenario existed with French attempts to colonize the Chagos Islands (Diego Garcia) west of India's coast. Both would later become contributing sources for Kerala, India CCF exports.[53] Yemen and Oman are discussed in much more detail later.

It is important to note, in a successful harvest, a mature, healthy coconut palm can normally produce 80, and in perfect conditions, up to 100 coconuts a year.[54] Therefore, one needs to access more than 200 trees, for a two-year period (1 year harvesting /1 year retting), to grow and harvest the number of husks necessary to produce the volume of coir fiber found on Oak Island.

Once the nuts have been dehusked, there is a short window of opportunity, within 5 to 7 days, before it is necessary to proceed with the retting process. In addition, such a large volume of CCF would need to be stored within a covered facility after retting, to protect the volume of bulk fiber from spontaneous combustion, should it get wet.[55] The logistical scale of silviculture and aquaculture necessary to operate, and manage for production this volume of commodity would be unique at that time period. This factor alone eliminates most sites.

Fig. #8. iStock.com [56]

What was all the coconut coir fiber for? Where could one get that much processed fiber back in medieval times? Was it really that old?

If you are one to assume the CCF was used as a packing material to protect whatever cargo was taken to Oak Island, then you should visualize how many barrels this much CCF could have - *topped off*. As crates and barrels were the primary method of storing cargo on sailing ships in the 12th and 13th century, perhaps a calculation as to the number and size of those sailing ships hauling that cargo, can be determined. Therefore, the amount of Oak Island CCF, which was determined in Volume One, Chapter Ten, "*Cracking the Nut*," is used to formulate how many barrels (tons) that fiber could have topped off. The number of barrels will tell us the number of ships needed to move the cargo. The formulation expressed on the following page uses known historical measurements employed during that time period.

Formulation

At one time, a ships tonnage was the estimate of the number of wine barrels or "tuns" a vessel could carry. A tun was determined by a container holding two "pipes" worth of wine (liquid weight).[57] This was an ancient mode of measurement going back to Greek and Roman vessels, in which cargo capacity was measured by the number of amphorae it could carry.[58]

In 1303, King Edward I was the first to levy a tax on ships, based on tons burthen.[59] Subsequently, King Edward III levied a tax on imported wine, for each "tun" which was a barrel containing 252 gallons of wine, or 1.146 cubic meters (m^3) weighing about 2240 lbs. each (1020 kg). This is a weight known today as a *long ton* or imperial ton.[60] A metric ton is equivalent to 2204.6 lbs.

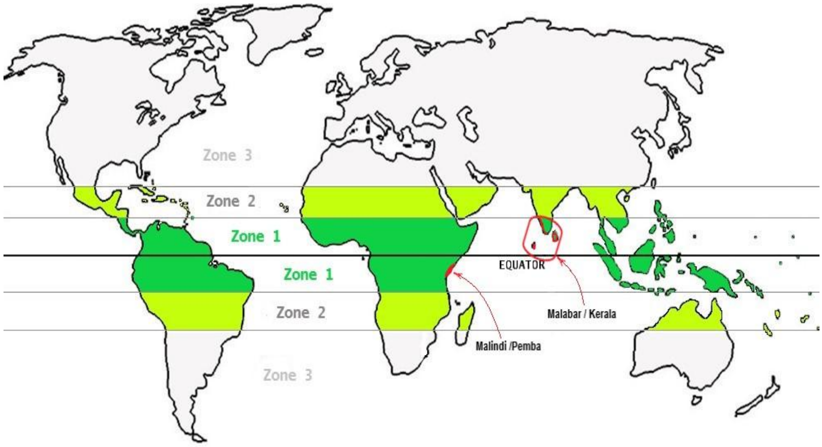
A Spanish Seville Tuneles or "tonel" (*or barrel*) circa 1492, equaled 5/6 of a ton in weight. This barrel held measurement of 2 pipes, which was less than eight cubic cubits, or 1.15 m^3 or 40.61 cubic feet (ft^3).[61, 62] In this equation each barrel (tun) is counted to determine a ships maximum total "tunnage" of the cargo it could carry. According to Diego Columbus, 2nd *Admiral of the Indies* and Christopher's son, he reported the *Santa Maria* was a Nao style ship of +100 tuns.[63]

Now, picture barrels sitting on the pier ready to be hoisted aboard and placed within stowage of the *Santa Maria,* circa 1492. The barrels are ready and filled to 95% (38.58 ft^3) with precious, secret cargo; leaving a 5% void (2.03 ft^3). The CCF fills the remaining void, securing the cargo within the barrel, then sealed. *As* we recall from Volume Two, there was a minimum of 407 ft^3 of fiber found in Oak Island. Thus, there was enough CCF to top off enough barrels to stuff the cargo holds of <u>two</u> *Santa Maria* Nao ships! [407 ft^3 divided by 2.03 ft^3] = 200 tuns.

Since the cargo alone fills up two nao-style ships in 1492, the number of vessels necessary and commonplace, to complement those ships into an appropriately sized flotilla, could also be formulated. A calculation could also be determined for the type of capable vessel transiting such cargo, a century earlier.

The worldwide map below highlights only two locations believed capable of providing such a volume of CCF to voyagers of that period.

Figure #9. **Large *Cocos nucifera* Plantations or Coir Processing** [64]



The Purposeful Use of Coconut Coir Fiber

The purpose or functional application of why CCF was found on Oak Island is primarily discussed and debunked, in Chapter Six, "*Why, Oh Why… Oh Why*." Here however, one forensic hypothesis which reasons why CCF was found on Osland, is briefly explained as it compliments pragmatic logic in considering from where it came.

Had those ancient voyagers been looking for cordage made of coir, perhaps for ship rigging, it was attainable at other locations. Some locations were even without any coconut palms. This would have been the case based on a recent archaeological findings near the Strait of Hormuz, in ancient Julfar.[65] Yet no coir cordage, rigging, twine, yarn or coconut shell has been found on Oak Island. Nothing made from the *Cocos nucifera*; only distributed bulk fiber was ever found there.

If packing was the true intent, would they not know CCF stains whatever it comes into contact with, or coir wreaks an odor which will permeate many types of cargo kept in the same hold or container?[66] And perhaps most alerting, CCF when wetted can become spontaneously combustible.[67] Not a good thing while sailing a vessel.

Finally and most obviously, if using CCF as packing material for crates or casks holding cherished treasures, why not leave it with those items inside those containers, instead of removing it away from protecting those treasurable items, and spreading it under the sandy beach? See the *Endnotes* or Volume Two, Appendix L, "*Dunnage Done – Floater A Foul*" regarding these and other unique dangerous conditions caused by CCF, and thus making its utilization problematic.

Coconut coir fiber is the only natural fiber resistant to saltwater and is highly resistant to abrasion.[68] So, would it reason the ancient voyagers acquired this massive amount of CCF for the same reason why people within the Indian Ocean Basin and adjacent seas, used it? They may have believed CCF was needed for future voyage caulking, making cordage for rigging, and nets for their future flotilla. Perhaps they were planning for a long circumnavigation across tropic seas similar to Indian Ocean climes, and therefore, stocked up accordingly?

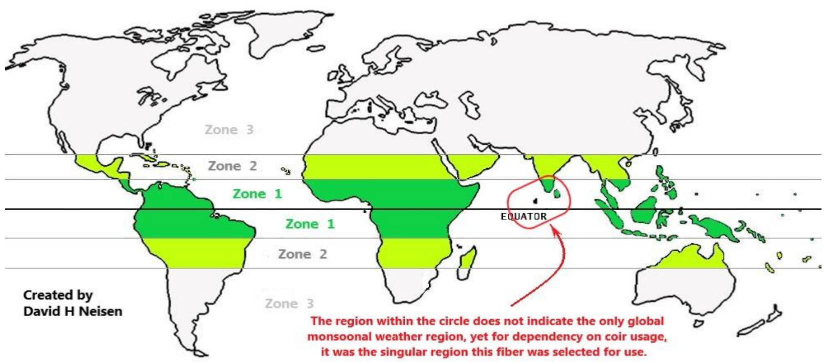
Their interest in CCF may have been its suitability of withstanding a wet, saline environment, specifically noted within the Indian Ocean under its monsoonal weather conditions…

> *"On the whole, the Indian Ocean is considered an evaporative basin as it loses about 1.392 × 104 km3/yr of freshwater in net evaporation to the atmosphere* [Wijffels et al., 1992]*. The variation in the flux parameters therefore can set up seasonal differences in the initiation, sustenance, and variability of salinity transport in the Indian Ocean and its atmosphere especially given the dynamics of processes associated with the monsoons."* [69]

The finding of so much bulk CCF in Oak Island informs us the fiber was an intentional acquisition. And if it is CCF, obviously those ancient voyagers went to considerable effort to obtain it. We can use this understanding to further focus on where in the world those fibers could be exclusively found. The worldwide map on the following page identifies the only region on the planet which could fulfill an order for 1.54 metric tons of retted CCF, at the time of our ancient voyagers travel - based on the radiocarbon dating window already discussed.

Below, shows the unique region where a salty world quests for CCF.

Figure #10. **Region Where Coir Retting is Required** [70]



Our forensic investigation into *Cocos nucifera* has created these parameters to determine the source of CCF used by ancient voyagers, for their constructs on Oak Island, Nova Scotia.

1) **We identified the latitudinal ranges around the world, where the *Cocos nucifera* grew and its requirements to sustain nut germination.**

2) **We identified the subpopulation of *Cocos nucifera* and the historical migration patterns of that palm tree subgroup spread by man.**

3) **We know the radiocarbon-dated age of fiber found within Oak Island, limiting the range of the geographic migratory spread.**

4) **We know Oak Island coconut fibers were processed through husk retting, making them CCF. Knowledge and practice of retting coconut husks was exclusive during the ^{14}C age window of those fibers.**

5) **We've deduced the minimum volume of CCF found on Oak Island, helping identify sources capable of retting and producing such quantities of coir.**

6) **We can strongly postulate where those who acquired such volume of CCF had to travel, based where the functional uses of CCF.**

The next chapter clarifies a litany of historic misinformation about the *Cocos nucifera*; thus explaining perhaps, why CCF has been so ignored by Oak Island searchers and writers as well.

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2. "*Coconut – History, Uses, and Folklore*." By Subhash Chanda Ahuja, CCS Haryana Agricultural University. Article in Asian-History Journal. January 2014. **See ABSTRACT page**

3. "*The Coconut Phylogeny, Origins, and Spread*." By N.M. Nayer, 2021. Academic Press is an imprint of Elsevier. 125 London Wall, London EC2Y 5AS, UK. **See the Introduction page**

4. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

5. "*Oak Island Hydrogeology, Hydrography and Nearshore Morphology, July – August 1995, Field Observations*." By David G. Aubrey, Wayne Spencer, Ben Guiterez*, William Robertson, and David Gallo. Unpublished Draft Report. Woods Hole Oceanographic Institution, Woods Hole, Maine. Apr. 8, 1996. **See pg. 40** https://www.oakislandtours.ca/les-macphie-research.html .

> *"In order to determine whether this material indeed was coconut fibre, we consulted some experts. Unfortunately, the fibre was heavily decomposed, consisting of only about 5% carbon by weight, a low percentage for most vegetative materials. We examined photographs by Scanning Electron Microscope, a sophisticated means to examine materials at very find scale. We sent the SEM photo-micrographs and portions of the original fibre sample to two palm experts […] One thought the fibers might be husk fibers of a coconut, but his comparison with modern fibers was inconclusive. […] She concluded that the SEM photo-micrographs do resemble fibrous bundle sheaths in palm stems. However, without the full bundle (including the xylem to check on the vessel structure), she could not be conclusive. She does not believe the material can be identified by genus and species."*

6. "*Oak Island Mystery Trees and other Forensic Answers – Compendium*." By David H. Neisen, Robert W. Cook, and Christopher L. Boze, 2022. See Appendix J, *History Looks for Coir*. **See pg. J9**

7. "*Oak Island Mystery Trees and other Forensic Answers*." By David H. Neisen, Robert W. Cook, and Christopher L. Boze, 2022. See Chapter 10, *Cracking the Nut*, Section, One Coconut, Two Coconut. **See pgs. 304-310**

8. *"Cocos nucifera L., Production and Cultivation."* Source: FAOSTAT Global Biodiversity Information Facility (GBIF), Copenhagen, Denmark. World coconut production, 2019. https://www.gbif.org/species/113562924.

9. Figure #1. **"***Growing Range of Cocos nucifera.***"** Published in *The Coconut Odyssey – The bounteous possibilities of the Tree of Life*." By Mike Foale, 2003. Australian Centre for International Agricultural Research (ACIAR). **See pg. 21**

10. *"Coconut (Cocos nucifera).*" By Mike Foale and Hugh Harries, 2021. Farm and Forestry – Production and Marketing profile. Specialty Crops for Pacific Islands. Agroforestry. http://agroforestry.net/scps . **See pgs 1-9**

11. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

12. ""*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

13. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

14. ""*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

15. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

16. ""*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

17. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

18. ""*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

19. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

20. ""*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

21. *"Deep History of Coconuts Decoded."* By Diana Lutz. Washington University in St. Louis. Published in *The Source – Science and Technology*. June 24, 2011.

22. "'*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

23. *"Independent Origins of Cultivated Coconut (Cocos nucifera) in The Old World Tropics."* By Bee F. Gunn, Luc Baudouini, Kenneth M. Olsen. 6 22-2011. PLoS ONE 6(6): e21143. DOI:10.1371/journal.pone.0021143. **See Fig. 2 on pg. 4**

24. Figure #2. "*Nui Kafa subgroup Coconut*." Created by Miles & Shane Ballew, 2023. Reference: *Taxonomy and intraspecific Classification*. By N.M. Nayar, University of Kerala. Dec. 2017. https://doi: 10.1016/B978-0-12-809778-6.00003-6. **See pg. 26**

25. Figure #3. "*Nui Vai subgroup Coconut*." Created by Miles & Shane Bellew, 2023. Reference: *Taxonomy and intraspecific Classification*." By N.M. Nayar, University of Kerala. Dec. 2017. https://doi:10.1016/B978-0-12-809778-6.00003-6. **See pg. 26**

26. "*Taxonomy and intraspecific Classification*." By NM Nayar, University of Kerala. Dec. 2017. DOI: 10.1016/B978-0-12-809778-6.00003-6. **See pgs. 44-50** https://www.researchgate.net/publication/312513113_Taxonomy_and_Intraspecific_Classification?enrichId=rgreq.

27. Figure #4. "*Geographical Distribution of Indo-Atlantic and Pacific Coconut Subpopulations*." Published in *Independent Origins of Cultivated Coconut (Cocos nucifera) in The Old World Tropics,* by Bee F. Gunn, Luc Baudouini, Kenneth M. Olsen. 6 22-2011. PLoS ONE 6(6): e21143. DOI:10.1371/journal.pone.0021143.

28. Figure #5. **"***Migration Locations of Cocos nucifera, nui kafa Subgroup*." Created by David H. Neisen. Published in *Oak Island Mystery Trees and other Forensic Answers – Compendium*, 2022. **See Appendix J, *History Looks for Coir*, pgs. J1-2**

29. "*Oak Island Mystery Trees and other Forensic Answers – Compendium*." By David H. Neisen, Robert .W Cook, and Christopher L. Boze, 2022. **See Appendix J. pgs. J1-J9**

30. *"BETA Analytic Report to Richard C. Niemen and to Dan Blankenship, Oct. 6, 1993*." BETA Analytic Labs, Miami Florida.

> *"I just received via telephone the C-14 results from recent coconut fiber test. Date is 820 years before present ± 70 years. Before present refers to prior to* AD 1950, *thus dating the sample to 1950 – 820 =* AD 1130 ± *70. This sample was physically obtained by David Tobias in Smith's Cove behind an old board wall (*first section north side*) and spent 20 years in island museum as sample 'S-2'. Beta Analytic C-14 lab, performed our test, indicated coconut fiber is ideal substance to date since coconut is a growth occurs annually. Compared to dating tree material, coconut material is much superior since a new harvest occurs every year and a comparatively accurate date may be determined."*

31. Figure #6. **"***Known Range of Cocos nucifera (circa AD 1150-1400).*" Created by David H. Neisen. Published in *Oak Island Mystery Trees and other Forensic Answers – Compendium*, 2022. **See Appendix J, *History Looks for Coir*, pgs. J1-49**

32. "2 Page Letter from Robert R. Dunfield responding to Questions." By D'Arcy O'Connor. Oct. 21, 1976.

> *"…#3, Yes. The coconut fiber was analyzed to be "coir," a fibrous mass between the coconut shell and the outer husk, which was used as dunnage in the early days of primitive shipping. The so-called cement is nothing more than limestone."*

33. "*Coir*." Online publication *How Products are Made*. Volume 6. 7 pgs. www.madehow.com/Volume-6/coir.html

34. "*Coconut Fibre: Its Structure, Properties and Applications*." By Leena Mishra and Gautam Basu. National Institute of Natural Fibre Engineering & Technologies Institute. Kolkata, West Bengal India. **See Section Yield of Coconut Fibre, Page 7, para. 10.2.1.3**. Researchgate. Pub. 339284598. Feb. 2020. 27 Pages.

35. "*Coir fiber process and opportunities-2*." By Akhila Rajan, at Govt. College Kozhinjampara. Published in The *Journal of Natural Fibers*, January 2008.

36. "*The Cocoanut*," By William Lyons, 1903. Farmer's Bureau No. 8, Conclusion #8. Bureau of Agriculture. Bureau of Public Printing, Jun. 1, 1903.

37. "*Biofuels from Coconuts*." By Krishna Raghaven. 2010. 107 pages. **See Para. 1.1 *Quantity and Energy Content of Parts of the Coconut Palm*, Fig. 1, Table 1. *Biodegradability Section***. www.energypedia.info/f/f9/EN-biofuels_from_cocnuts-krishna_raghaven.pdf

38. "*The Butuan Boats of the Philippines: Southeast Asia edge-joined and lashed-lug watercraft*." By Ligaya Lacsina. National Museum of the Philippines. Jan. 2015. *Bulletin of the Australasian Institute for Maritime Archaeology* (2015), 39: **See pgs. 126-132**

39. "*The Coconut in Micronesia." Published in The Cultural Extension Circular Number 3*." Published by Division of Agriculture, Department of Resources and Development, Trust Territory of the Pacific Islands. Saipan, Mariana Islands, 1965.

> *"The coconut palm is a poor competitor and will not survive in a natural jungle habitat; it must be tended by man to produce fruit. We use ramie for cordage. Previous to European exploration and trading among the islands, the islanders planted only enough coconuts for their own use for food, drink, and thatch. After the first traders learned the value of coconut dried into copra they urged the islanders to harvest their coconuts and make copra, and also to plant more coconut seedlings. In 1864 a German firm from Hawaii opened a branch office at Ebon, Marshall Islands, for the development & export of copra."*

40. "*The Cocoanut*." By William Lyons, 1903. Farmer's Bureau No. 8, Concl. #8. Bureau of Agriculture. Bureau of Public Printing, Jun. 1, 1903.

> *"The fiber of the cocoanut husk, or coir, has never yet been utilized in this Archipelago, excepting occasionally for local consumption. Second in value only to copra, this product has been allowed to go to waste. Rejected husks are thrown together in*

immense heaps, which are finally burned and the ashes, exceedingly rich in potash and phosphoric acid, are left to blow away."

41. "Galleon of China: Flagship of Trade over Two Centuries." By Adolfo Arranz and Marco Hernandez, May 13, 2018. Published in the South China Morning Post. https://multimedia.scmp.com/culture/article/spanish-galleon/chapter_02.html

"Rigging was used to manage the sails, masts were supported by rope and cables and cords were used to make shrouds. All the rope was made from abaca plant fibre, which was much stronger than the hemp rigging used by European countries."

42. "*Chinese Coir Raincoats*." By Flavinh OSouza, December 30, 2023. Facebook Post.

"Handmade raincoat from palm coir fiber, has a 2000 year history - Glauci Souza."

43. "*The History of Sumatra: Containing an Account of the Government, Laws, Customs, and Manners of the Native Inhabitants*." By William Marsden, 1783. Cambridge University Press. UK.

"Working for the East India Company from 1770-1776. One example where coir was not used in the Pacific was Sumatra. In 1811, the Cocos nucifera was called kālapa, nīor, where natives did not convert it to the many by-products it was known for, just across the Bay of Bengal."

44. "*Indian Shipping: A History of the Sea-Borne Trade and Maritime Activity of the Indians from the Earliest of Times*." By Radhakumud Mookerji, M.A. Calcutta University. Longmans, Green and Co. 1912.

"Early Records of British India." By J. T. Wheeler, p. 54. Major H. Bevan in his Thirty Years in India (1808-1838), p. 14, vol. i., "speaks of the 'Masula' boat is built of planks of wood sewed together with "sun," a species of twine, and caulked with coarse grass, not a particle of iron being used in the entire construction. Both ends are sharp, narrow, and tapering to a point so as easily to penetrate the surf."

45. *"Making the First Global Trade Route: The Southeast Asian Foundations of the Acapulco-Manila Galleon Trade, 1519-1650*." By Andrew Christian Peterson, Aug. 2014. University of Hawai'i at Manoa. **See pgs. 108-130**

"It was here that the Spaniards inquired as to what the locals used to caulk the hulls of their ships. After so long at sea, the Trinidad and Victoria were in a poor state. With hulls leaking and worm-eaten neither vessel would be able to reach home without extensive repairs. It was a Bornean envoy that informed the Spanish of the local mixture of coconut oil and beeswax mixed with abaca, which they used as pitch. In Borneo he said, they use "dammer," resin from a coniferous pine throughout the Pacific."

46. "*The Maldives and Laccadive Islands in Ming Records*." By Roderich Ptak. Source: *Journal of the American Oriental Society*, Oct.-Dec. 1987, Vol. 107, No. 4. **See pgs. 675-694** Published By American Oriental Society. https://www.jstor.org/stable/603307

"Hsieh Fang notes Huang mistook ambergris for pitch. Duyvendak, Ma Huan Re-Examined, 57-58, also notes this confusion; he says Rockhill, "Notes," 392 n. 1, did not translate the character Hsieh. The YYSL (Mills, Ma Huan, 151) contains a similar description of the seams smeared with "foreign pitch." Duyvendak speaks of "native resin" called dammer. Barbosa (Dames, II, 107-08)."

47. Figure #7. "*Where Cocos nucifera Husks were Retted into Coir*." Created by David H. Neisen. Published in *Oak Island Mystery Trees and other Forensic Answers – Compendium*, 2022. **See Appendix J, *History Looks for Coir***. 49 pages.

48. "*Oak Island Mystery Trees and other Forensic Answers – Compendium*." By David H. Neisen, Robert W. Cook, & Christopher L. Boze, 2022. **See Appendix J, *History Looks for Coir***.

49. "*Oak Island Mystery Trees and other Forensic Answers – Compendium*." By David H. Neisen, Robert W. Cook, & Christopher L. Boze, 2022. **See Appendix J, *History Looks for Coir***.

50. "*Coconut – History, Uses, and Folklore*." By Subhash Chanda Ahuja, CCS Haryana Agricultural University. Article in Asian-History Journal. Jan. 2014. **See pg. 229**

51. "*Advent of Europeans in India Upsc Notes: Portuguese, Dutch, English & French*." By Babu R. Pravin, Jun. 1, 2020. https://andedge.com/advent-of-the-europeans/ .

52. "*Bred up under Our Roofs: Domestic Slavery in Ceylon, 1760-1834*." By Lodewijk Wagenaar. https://open.lnu.se/index.php/hn/article/view/2950/2503%7CLodewijk

53. "*Chagossians*." Wikipedia, The Free Encyclopedia. Last updated May 13, 2023. https://en.wikipedia.org/wiki/Chagossians

> *"The French brought some to the Chagos Islands as slaves from Mauritius in 1786. In 1793, when the first successful colony was founded on Diego Garcia, French coconut plantations were established on many of the atolls and isolated islands of the archipelago. Initially the workers were French enslaved Africans, but after 1840 they were freemen, many of whom were descended from those earlier enslaved."*

54. "*History of Coir – CCRI*." Coir Board Ministry of India, Alleppey, Kerala, IN. Central Coir Research Institute. (Accessed 09-15-2020). http://coirboard.gov.in/?page_id=6

> *"See: Products/Coconut. This palm is a long-lived plant; it has a single trunk, 20-30 metre tall, its bark is smooth and gray, marked by ringed scars left by fallen leaf bases. The tree can live as long as 100 years producing an annual yield of 50 to 100 coconuts."*

55. "*Coconut Fiber – Cargo Site Map*." Transport Information Service, Cargo Loss Prevention Information from German Marine Insurers. https://www.tis-gdv.de/tis_e/ware/fasern/kokosfa/kokosfa-htm/#transport

56. Figure #8. "*London Rug & Yarn Factory, circa 1853*." Courtesy, iStock.com

57. "*The Unit of Capacity for Ancient Ships*." By H.T. Wallinga. Published in *Nautika*. 4th Series, Vol. 17, Fasc.1 (1964). Published by Brill. 41 pages.

58. "*The Unit of Capacity for Ancient Ships*." By H.T. Wallinga. Published in *Nautika*. 4th Series, Vol. 17, Fasc.1 (1964). Published by Brill. 41 pages.

59. "*How Tonnage is Applied to Ships*." Published online, *Maritime Archaeology Trust*. (Accessed 6-7-23). https://maritimearchaeologytrust.org/tonnage-applied-ships/

60. "*How Tonnage is Applied to Ships*." Published online, Maritime Archaeology Trust. (Accessed 6-7-23). https://maritimearchaeologytrust.org/tonnage-applied-ships/

61. "*Columbus Ships.*" By Jose Maria Martinez-Hidalgo, Edited by Howard I. Chappell. Barre Publishers, Mass. 1966.

> *"A Spanish Seville Tuneles or "tonel" (or barrel) circa 1492, equaled 5/6 of a ton in weight. Barrel measurement of 2 pipes, which was less than 8 cubic cubits, or 1.15 m^3 or 40.61(ft^3)."*

62. "*Tonnages, Medieval and Modern*." By Frederic C. Lane. Published in the Economic History Review, Second Series, Volume XVII, No. 2. 1964. https://www.jstor.org/stable/2593003

63. "*Columbus Ships.*" By Jose Maria Martinez-Hidalgo, Edited by Howard I. Chappell. Barre Publishers, Mass. 1966.

64. Figure #9. **"***Large Cocos nucifera Plantations or Coir Processing***."** Created by David H. Neisen. Published in *Oak Island Mystery Trees and other Forensic Answers – Compendium*, 2022. **See Appendix J, *History Looks for Coir***.

65. "*Julfar and the Ports of North Oman*." By Timothy Power, Pages 219-244. Published in Ports of Oman, Edited by Abdulrahman Al Salimi and Eric Staples.

> *"Undoubtedly, the most consistently significant port of northern Oman was Julfar, just north of modern Ras al-Khaimah town. When there is greater evidence for maritime trade in the 14th and 15th centuries, for example, Julfar appears as a contingent entity economically orientated towards Iran. For the most part, Julfar exported raw materials (pearls, horses) and bulk goods (dates, cereals) in return for manufactured commodities (guns, textiles, metalwork, pottery) and prestige goods (silk, porcelain), obtained in the great emporium of Hormuz (small island off the coast of Iran).[…] Since [he] believes that the enclosed land was given over to the date-palm groves of an oasis settlement.*
>
> NOTE: Julfar (and all of its other potential locations) did not have coconut palms, but did have coir, most likely from the date palm tree (*Phoenix dactylifera*), of which they along with pearls, were known for. However, on the southeastern end of Oman in the area of Salalah, they did and still do grow plantations of coconut palms. Both hosted Indian fishing vessels of trade and both provided "coir" for their boats repair. Coir is a common name for fiber or cordage from any palm.

66. "*Coconut Fiber – Cargo Site Map*." Transport Information Service, Cargo Loss Prevention Information from German Marine Insurers.
https://www.tis-gdv.de/tis_e/ware/fasern/kokosfa/kokosfa-htm/#transport

> *"Odors - Coconut fiber has a slight, unpleasant odor. A conspicuous musty odor indicates moisture damage inside the bales. Since coconut fiber may easily cause odor-tainting, it must not be stowed together with odor-sensitive products (e.g., foodstuffs). Coconut fiber is sensitive to unpleasant or pungent odors."*

67. "*Coconut Fiber – Cargo Site Map*." Transport Information Service, Cargo Loss Prevention Information from German Marine Insurers.
https://www.tis-gdv.de/tis_e/ware/fasern/kokosfa/kokosfa-htm/#transport

> *"Packaging - Coconut fiber is transported in bales, in hanks and in rolls. The fibers are sometimes wrapped in jute or bamboo mats or are also shipped unpackaged. Steel*

strapping and coir cordage are used to ensure that packages hold together better. The cargo is to be secured so the bales/hanks or strapping are not damaged. If strapping is broken, compression is diminished, which results in an increased supply of oxygen to the inside of the bales. This increases risk of combustion or feeds a fire which has already started. Bursting or chafing of steel strapping lead to sparking and external ignition.

Ventilation - Coconut fiber requires particular temperature, humidity/moisture and possibly ventilation conditions (SC VI). If loaded for shipment in a dry state, it does not have any particular ventilation requirements. Problems arise if the product, packaging and/or ceiling/flooring are too damp. In this case, ventilation measures should be implemented: Air exchange rate: 10 changes/hour (airing).

Gases - Coconut fiber very readily absorbs oxygen. An oxygen shortage may therefore arise in closed holds and containers. Before anybody enters such holds, the holds must be ventilated and, if necessary, a gas measurement carried out."

Spontaneous Combustion - Coconut fiber has an oil content of 2 – 5%. Coconut fiber is assigned to Class 4.1 of the IMDG Code (Flammable solids). However, its specific characteristics and negative external influences cause them to behave like a substance from Class 4.2 of the IMDG Code or ADR. Its high cellulose content makes coconut fiber particularly liable to catch fire through external ignition. Protection from sparks, fire, naked lights and lit cigarettes must always be provided. Smoking is absolutely prohibited. Sparks may arise from bursting or chafing of the steel straps and cause a cargo fire. Lightly compressed bales in particular ignite easily. In accordance with the IMDG Code, ventilation openings leading into the hold should be provided with spark-proof wire cloth. Spontaneous combustion may occur as a result of exposure to moisture, animal and vegetable fats/oils, oil-bearing seeds/fruits, copra and raw wool. This risk is further increased by the coconut oil present in the fiber. Coconut fiber is very highly susceptible to self-heating due to moisture. It is usually "mattress" fibers which are affected in this way, due to the vegetable flesh still adhering the fibers. It is very difficult to extinguish a fire because of excess oxygen in coconut fiber, maintaining the fire from the inside. When fighting a fire, do not break steel straps or open bales, as relieving compression increases oxygen supply and makes it impossible to fight the fire effectively."

68. "*The Art of Coir Rope Making*." By Mia, May 22, 2018. Article #.14455
https://www.themaldivesexpert.com/1910/the-art-of-coir-rope-making

69. "*Seasonal variability of salt transport during the Indian Ocean monsoons*." By Ebenezer S. Nyadjro, Bulusu Subrahmanyam, and Jay F. Shriver. First published Aug. 27, 2011. https://doi.org/10.1029/2011JC006993 ***or***, See...

"*Transport of Freshwater by the Oceans*." By S.E. Wijffels, R.W. Schmitt, H.L. Bryden, and A. Stigebrandt, 1992. Published in *Journal of Physical Oceanography*, 22.
See pgs.155–162 DOI:10.1175/1520-0485(1992)022<0155:TOFBTO>2.0.CO;2.
https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2011JC006993

70. Figure #10. "*Region Where Coir Retting is Required*." Created by David H. Neisen. Published in *Oak Island Mystery Trees and other Forensic Answers – Compendium*, 2022.
See Appendix J.