The Grand Turk Landing Theory

Excerpted from my study, *Columbus's Grand Turk Landing*, and stripped of its notes and illustrations.

It is our duty to proceed from what is near to what is distant, from what is known to what is less known, to gather the traditions from those who have reported them and to leave the rest as it is, in order to make our work help anyone who seeks truth and loves wisdom.

al-Biruni (973-1048)

Error of opinion may be tolerated where reason is left free to combat it.

Thomas Jefferson (1743-1826)

The force of truth is great, but its victory is difficult.

Arthur Schopenhauer (1788-1860)

Beware of false knowledge; it is more dangerous than ignorance.

George Bernard Shaw (1856-1950)

… a scholar must be content with the knowledge that what is false in what he says will soon be exposed and, as for what is true, he can count on ultimately seeing it accepted if only he lives long enough.

Ronald Coase (1910-2013),
awarded the 1991 Prize in Economics in Memory of Alfred Nobel.

Recently, a published expert on early European cartography responded to my complaint that landfall island proponents consistently ignore factual contradictions to their hypotheses. He declared:

> Every candidate island has good evidence for it and against it. Pick an island, then pick the evidence.

I had to object:

> Picking evidence is like picking apples. But when you take the entire tree and leave nothing out, you're no longer picking. You're considering flowers, twigs, suckers, and the entire spectrum of apples from newborn to rotten. This is called a critical investigation.

History is an extension of memory. Like any process of recollection, it's subject to inaccuracies. It's also subject to human vicissitudes of motive in transmission and interpretation. Given these potential vagaries, it's fitting to inquire what constitutes a valid historic theory.

A valid historic theory *takes all pertinent evidence into account and leaves none out.* If any evidence must be rejected or qualified, a valid theory must include a justification for doing so. In the case of Columbus's landing, a valid theory must sail his fleet's ships across the ocean in accordance with the *Diario,* and with what we know of physical conditions at the time, land at an island that conforms with his eyewitness description and contemporary accounts, sail among and safely anchor at four real Lucayan islands, and be consistent with the knowledge we now have of the peoples who lived there. *Again, it must not neglect any evidence*. It is with these criteria in mind that I present the following Grand Turk landing theory.

Crossing the Ocean Sea

The ocean crossing of Columbus's first voyage took place between 6 September and 12 October 1492. But for a jog to the west-northwest and northwest on 20 through 23 September, a correction to the southwest on 25 and 26 September and a change of course to the west-southwest and southwest on 8 through 11 October, the helmsmen of the fleet steered due west according to their compasses.

After thirty-six days of sailing, Columbus logged his landfall island an estimated one thousand ninety leagues westward from Gomera in the Canaries. He reckoned it lay on an east-west line from Ferro, its southwestern neighbor. Successive reconstructions of the first voyage between these points have been made with increasing refinement by several investigators. Factors affecting the accuracy of a reconstruction include, in diminishing order of effect, magnetic variation, surface currents, leeway (the drift of a sailing ship to leeward of the true course), steering error, and day lengthening from westward travel.

In 1986, Luis Marden published a widely circulated study of the crossing in 'The First Landfall of Columbus,' which appeared in *National Geographic Magazine*'s *Columbus Casebook*. Mr. Marden's study represented an improvement in method over the 1941 reconstruction made by John W. McElroy, Jr., whose results Samuel Eliot Morison incorporated the following year into his famous biography of Columbus. However, Mr. Marden overestimated the effect of the westward oceanic currents.

Mr. Marden based his study upon a grid of prevailing current velocities published in the U. S. Navy pilot charts for the North Atlantic. A more reliable method of computing the effect of current across the ocean is to use a grid of current vector averages. A prevailing current velocity is an overestimate of how fast a ship would be set by the ocean currents, while a vector average current is a more accurate estimate of this quantity because it takes into account the movement of surface waters in all directions over time at any given point, resulting in a more probable and lower average figure. The difference between these two methods of computing the effect of current on a month-long voyage across the breadth of the North Atlantic amounts to more than four hundred nautical miles.

Mr. Marden shortened the length of the Columbian league used by Admiral Morison and Lieutenant McElroy from 3.18 to 2.82 nautical miles. He derived this length from equivalents given for the Spanish league in English sailing manuals for the years 1574 and 1594. This is an anachronism. The manuals of the Elizabethan navigators William Bourne and Thomas Blundeville were compiled long after the great Iberian maritime discoveries (including the circumnavigation of the globe) had fomented an explosive advancement in the science of navigation. English sailing manuals of the late sixteenth century are simply not relevant to Mediterranean sailing customs of the late fifteenth century.

Mr. Marden also ignored the metrological research published by d'Albertis in 1893 and Kelley in 1983, 1985, and 1986. As has been shown in chapter 3, these studies contain evidence

that Columbus used a Mediterrenean ‘geometric’ league of two and two-thirds nautical miles. But even with his English shortened league, Mr. Marden was obliged to reduce Columbus’s daily reckoning of distance sailed by nine percent, in order to avoid missing the Lucayan Islands. Finally Mr. Marden gave consideration to leeway, which brought his track southward of McElroy-Morison’s, resulting in a landfall at Samana Cay.

In October and November 1987, as a test of Mr. Marden’s track, Captain Douglas Peck sailed his yacht *Gooney Bird* across the Atlantic in accordance with the bearings and distances in the *Diario*. However, Captain Peck’s terminus was near San Salvador Island. In a paper delivered at the 1988 Annual Meeting of the Society for the History of Discoveries, Captain Peck reported that had he used the Mediterranean ‘geometric’ league of two and two-thirds nautical miles, he would have shortened the track by about three hundred miles, which would have meant a terminus in the open sea. But here, it must be remembered that three hundred miles is very close to the difference in distance between the Gomera-Watlings/San Salvador route and the Gomera-Grand Turk route.

In 1987, Dr. Philip Richardson and Mr. Roger Goldsmith of the Woods Hole Oceanographic Institution completed a computer study of the Columbus track, using the same 1899 van Bemmelen construct of magnetic variation and length of league as Mr. Marden; however, their oceanographic data resulted in lower factors of drift and leeway, as were observed in actuality by Captain Peck. Their simulation was based on current vector averages and did not require artificially reducing the number of leagues sailed. It produced a track whose terminus occurred near San Salvador, just as Captain Peck had realized at sea. Concluding their article Dr. Richardson and Mr. Goldsmith observed that the effect of magnetic variation across the Atlantic was a much larger determinant of the site of the landfall than either current or leeway.

In 1989, Dr. Richardson and Mr. Goldsmith completed a new numerical simulation of Columbus’s first Atlantic crossing using the ‘geometric’ league and data supplied by the author which justified imposing an oceanic magnetic field ending with strong westerly variation in the Caribbean. Their study was published in 1992. In their discussion of the simulation, they conclude that:

> Grand Turk is a reasonable candidate landfall if the magnetic variation of the Lucayan Islands was about one point westerly (11.25°W).

Additionally, they note that:

> … the use of a ‘geometric’ league equaling 2.67 nautical miles also is consistent with Grand Turk’s being the first landfall.

Yet more importantly, this later Woods Hole study shows how a reconstructed field of magnetic variation across the Atlantic for 1492, corroborated by six previously unconsidered contemporary observations of strong westerly variation in the northern Caribbean, can provide at once a rational model for the first voyage and an explanation of a persistent error in the early charts. Even though the cartographic record is further complicated by the Spanish and very early Portuguese customs of using precalibrated compasses, a comparison with charts made after 1525, drawn with a growing reliance upon astronomical observation of latitudes in the New World, confirms the presence of westerly variation in the western Atlantic at the time of Columbus’s first voyage. Thus, given the premises of about twelve degrees of westerly variation in the western Atlantic, Mediterranean navigation with a true compass and use of the ‘geometric’ league, we have a mathematical basis for concluding that the landfall most probably occurred at the southeastern extremity of the Lucayan Archipelago. On page 39 of their report, Dr. Richardson and Mr. Goldsmith declare:

> In summary we think there is ample evidence that westerly magnetic variation occurred in the vicinity of the West Indies and that it caused Columbus's course to be set imperceptibly southward. Documenting the exact field of magnetic variation in the Atlantic and West Indies will permit us to infer how much Columbus was set southward and help reveal his first landfall. The evidence to date implies that Grand Turk is a reasonable choice for the first landfall based on the transatlantic voyage.

Although the landfall research conducted at the Woods Hole Oceanographic Institution has shown that magnetic variation has the greatest effect on the outcome of a voyage across the ocean, it should be noted that, with respect to the relatively short distances Columbus sailed among the Lucayan Islands, magnetic variation has a smaller effect than that of currents. Moreover, since Columbus was navigating among uncharted islands, magnetic variation would affect his perception of their relative positions to one another. Generally, the effect of variation would rotate bearings counterclockwise about twelve degrees and cause a course steered toward the west to set a ship to the south, giving the impression that lands encountered were farther north than in actuality.

The Light of 11 October 1492

The light reported seen by Columbus and certain of his companions the night of 11 October is recorded in the *Diario*, Don Fernando's *Historie*, Oviedo's *Historia General*, Las Casas's *Historia de las Indias*, and the *Pleitos Colombinos*, the depositions of the Columbus lawsuit. Hernán Pérez Mateos's testimony in the *Pleitos Colombinos* implies that the light was seen from *La Pinta* as well. This evidence makes it difficult to question that the light was real.

Bioluminescence on the northeastern rocks of the Mouchoir Bank, 35 miles east-southeast of Grand Turk, might explain the light. I've seen intensely bright displays of it in Turks Island waters near the end of October. Given that the light was sighted four hours before *Pinta* gave the signal for land, the recorded speed of the ships, and their course, one can deduce that the light was seen about 35 nautical miles from land. The breaking water on the exposed rocks of the northeast point of the Mouchoir Bank is close to this distance from Grand Turk.

The first notice recorded in the *Diario* under 11 October is that the sea was running high. That night, the fleet maintained a high average speed of eight knots so it's evident that the wind did not slacken and was probably still accompanied by the high swells of the day. Based on tidal projections for the region of the Turks and Caicos Islands made by the Hydrography Office in Somerset, England, it is estimated that on this day the tide was low at about six in the evening and high at about midnight. According to Admiral Morison, on the night of 11 October, the moon was six days past full and rose after eleven o'clock. With a rising tide, a high swell, and no moon at around ten in the evening, conditions would have been favorable for seeing bioluminescent light reflecting off rising salt water vapor above a reef at sea. As an alternative source of the light, some have suggested a burst of high atmospheric lightning over the mountains of Hispaniola about one hundred miles distant. Although seeing a bolt of lightning at sea is mentioned in the *Diario* during the night of 15 September.

Neither Samana Cay nor Watlings/San Salvador is situated 35 nautical miles west of a potential source of light, unless, as Admiral Morison wryly supposed, it was caused by a Lucayan in a dugout far out to sea lighting a cigar. The Plana Cays are situated some 35 miles west of the northwest point of Mayaguana.

The Islands of the Landfall

We have seen in chapter 1 how Juan Rodrigo Bermejo de Triana saw in the moonlight at about two in the morning *a white head of sand*. Then, raising his eyes, he sighted land. On *Pinta,* a cannon was fired. The fleet drew together, keeping to weather about 2 leagues [5 miles] from the land. At two in the morning, the moon, six days past full, would have been about 70º high in the eastern sky. I submit that the *white head of sand* Juan Rodrigo saw was a reflection of the moonlight off a swirl of white sandy bottom bordered by a dark growth of turtle grass visible at a depth of more than seventy feet, somewhat less than seven miles east of the three largest cays on the east side of the Turks Bank. This is the only logical explanation of seeing a white head of sand before looking up and spotting land. It may also explain why there is no record of the fleet's taking soundings after land was sighted. There was no need to; the bottom was visible. Of all landfall possibilities, only the Turks Islands occupy a bank whose moonlight-visible bottom extends seven miles eastwards into the Atlantic.

The description of the landfall in the *Diario* is not in Columbus's own words. It consists of a paraphrase by Las Casas, which reads:

> At the second hour after midnight, there appeared the land from which they were about two leagues. They hauled down all the sails and kept on the *treo*, which is the mainsail without bonnets, and put themselves bow to the wind, marking time until the day, Friday, when they approached an islet of the Lucayo Indians, which was called in Indians' language Guanahaní.

To this description, Las Casas adds in his *Historia de las Indias* that the pond water on Guanahani was potable. This appears to be an embellishment, as there is no record in either the *Diario* or the *Historie* of the fleet's taking on water until it reached the third island, even though Columbus mentions that natives on the first island offered water in small quantities.

The description of the landfall in Don Fernando's *Historie* contains an even more thoroughly reworded abridgement of Columbus's narrative. After wrestling with an attempt to ascribe spiritual value to the light of 11 October, Don Fernando, through his translator, writes:

> Being then at that time near land, all the ships put themselves bow to the wind, or jogged on and off, it seeming to them a long space that remained to them until the day, to rejoice of a thing so much desired. … Then the day having come, they saw what was an island of 15 leagues in length, flat, and without mountains, full of trees very green, and of very beautiful waters, with a large pond in the middle, populated with many people, who with no less desire gathered together at the shore all astonished and wondering at the sight of the ships, believing they might be some animals; …

After the *Diario* and the *Historie*, the most detailed contact period text describing the landfall is found in Oviedo's *Historia general*. Oviedo never tired of revising and improving this work, whose manuscript he represented he had completed in Santo Domingo before 1523. Between publication of the first issue of the first edition in 1535 and the revised and illustrated second issue of the first edition in 1547, he made several changes in the text. Even after 1547 up to his death in 1557, he continued to modify his *Historia general*, which was published in a second edition long afterwards in 1851-55.

Between 1535 and 1547, Oviedo inserted a correction in the text which follows an account of the light and opens a description of the landfall. It reads:

> On day breaking … the island which the Indians call Guanahaní was seen from the flagship in the direction of the tramontane or north.

The implication is that Oviedo believed this to be a material addition to the "corrected and emended" second issue of his *History*. Commandante Barreiro-Meiro of the Museo Naval, Madrid, showed how this passage discredits the Samana Cay hypothesis, but, at the same time, neglected to refer his readers to a telling sequel to the passage in the following chapter.

Here in Book 2, chapter 6, Oviedo proceeds to identify the landfall island unequivocally in what is at once the most revealing and most ignored account of the landfall. It reads:

> …. And as there presently appeared many islets that are next to and around Guanahaní, the Christians commenced to call them the White Islands (because they are so on account of much sand). And the Admiral named them the Princesses because they were first of the sight of these Indies. And he arrived at them, especially that of Guanahaní, and stayed between it and another which is called Caicos; …

Oviedo acknowledged that he received his information from Hernán Pérez Mateos, a first cousin of Martín Alonso Pinzón, and a captain on Columbus's third voyage. In March of 1493, Mateos happened to be at the port of Bayona in Galicia when Martín Alonso returned from the first voyage in *La Pinta*. Forty-three years later, in 1536, Mateos testified in Santo Domingo that Martín Alonso had *made him a relation of all that had passed.* Within a month of reaching home at Palos (a few hours after Columbus), Martín Alonso died, certainly of mortification and a broken heart, some have thought possibly of illness as well.

In the preface to book 17 of the *Historia general*, Oviedo again declares that the first islands seen were called by the crew the *White Islands,* which the Admiral ordered called the *Princesses*, "because they were the first of the sighting and discovery of these islands and of all the Indies." He adds that *Guanahaní* lay in their midst. Notice how Oviedo twice specifies that the *White Islands* or *Princesses* were the "first seen in the discovery of the Indies." An important difference between the texts of the *Diario* and of Oviedo is that in Oviedo the first land seen consists of islands other than *Guanahaní.* The fact that the first dry land was sighted from Martín Alonso's caravel might explain why there is no mention of the *White Islands* or the *Princesses* in the *Diario*, since Columbus shows a tendency in his writings to elide over matters which were not favorable to him. The best example of this is his *Letter to Santángel*, in which there is neither an untrue statement nor a mention of the loss of the *Santa María*.

Bearing this in mind, it is pertinent to note the wording of the nineteenth question of the interrogatory of the *Pleitos Colombinos* conducted at Palos in October 1515, and at Madrid in May of the following year. In this question there appears the phrase:

> … and that the said Martín Alonso betook himself on one side and discovered the Island Española with [*i.e.* together with or besides] seven other islands of the Babueca Banks …

As has been remarked in the section on cartography in chapter 3, the *Babueca Banks* refer to the Turks Bank and would appear to include the *three landmarks* figured on the 1513 Piri Re'is chart from Spanish documents declared captured in 1501. I'm persuaded that Martín Alonso's seven islands refer to Salt, Cotton, Pinzón, Pear, Long, Round, and Gibbs Cays, south, southeast and east of Grand Turk Island and are an enumeration of the *White Islands* or *Princesses* recorded by Oviedo. I'm equally persuaded that Long, Pear, and Pinzón Cays are the *three landmarks* on the Piri Re'is chart, remembered in subsequent Lucayan cartography as *Triango* or *Triangulo*.

That the sighting of the first land was important to the family and heirs of Martín Alonso and Vicente Yáñez is evidenced in the family's elevation to the dignity of knighthood and in the blazon of the Pinzón arms, granted at Barcelona on 23 September 1519. This reads in part:

> … and to bear as your recognised arms three caravels al natural at sea, and from each one of them there may issue a hand showing the first land which thus they found and discovered …

Finally, in the last chapter of the first issue of the first edition of the *Historia general*, Oviedo alters the Lucayan geography given in Book 2, chapter 6, and places *the islands of Guanahaní, and the Princesses or White Islands* between those of *Manigua* and *Huno*, that is Samana Cay and Long Island where there is open sea. The fact that Oviedo places this *Guanahaní* in open water to the northwest of *Manigua* suggests that he gained this information from the official cartography in the archive of the *Casa de la Contratación* at Seville, where *Guanahaní* was of scant importance. Because this radical and contradictory change occurs at the very end of the book, I infer that Oviedo, who published the *Historia general* in Seville, added the last chapter (in which he suppressed the name *Caicos*), when he discovered that the crown-sponsered geography of the New World differed from his earlier description. We have seen in chapter 3 how the opinion of Ponce de León, which had a precedent in the representation of the Lucayan Islands on the chart of Juan de La Cosa, appears to have been a reflection of the official crown-maintained records, descriptions, and navigations of and to the New World. Assuredly with both geographies incorporated into his work, Fernández de Oviedo, the courtier-author, could be confident that his *Historia* contained the truth, or at least was above censure for want of it.

As has been related above, cartographic evidence sustains Oviedo's first location of *Guanahaní*. It also indicates that there existed an early difference of opinion over the correct placement of this island between the veteran Spanish pilots and mariners living on Hispaniola and the government chartmakers in Seville. One is tempted to suggest that Juan de La Cosa, who accompanied Columbus on his second voyage as well, and had an idea of the quantity of gold that abounded (and still abounds) in Hispaniola, after returning from his own exploratory voyage in 1500, may well have misplaced the no longer important islands of *Someto* and *Guanahaní* (which latter island appears to have ceased even to be cited in Columbus's papers after 1494) on his celebrated chart. Recall that the only native island names that Columbus records on board the flagship are *Guanahaní* and *Saometo* [*Someto*]. One notes also that the name *Caicos* is not figured on the La Cosa chart. It is probable that Martín Alonso learned the name *Caicos* from the three *Guanahaní* captives placed on board *Pinta*, and passed it on to his cousin Hernán Pérez at Bayona in 1493, who later communicated it to Oviedo, his employer. Thus, despite the bewildering ambiguity of the cartographic record, it is certain that Oviedo's first *Guanahaní* is Grand Turk, and that his is the oldest landing account that can be matched to modern geography.

The Turks Islands as the Islands of the Landfall

The Turks Islands occupy a small oblong bank which marks the southeastern extremity of the Lucayan Archipelago. Grand Turk is the largest island on the bank and is situated at its northern tip. Shaped like a pea pod, Grand Turk is about six miles long and a bit more than a mile wide. It lies on a north-south axis. Excluding Grand Turk, the bank contains a total of eight cays, two rocks and one dry sand bank. To the southeast of Grand Turk, a string of five cays and one high rock extend toward the south-southeast.To the south of Grand Turk lie two cays and one long rock. Fourteen miles to the south-southwest of Grand Turk, a sandy cay marks the southernmost land on the Turks Bank. Twenty miles to the west of Grand Turk lie the Caicos Islands.

In Oviedo's first description of the *White Islands* or *Princesses*, emended between 1535 and 1547, the island of *Guanahaní* was situated in their midst and lay to the north of the flagship. This is precisely how Grand Turk appears when approached from the southeast. No other presumed landfall is situated north of a group of cays.

An overlooked point of evidence favoring Grand Turk is found in the Venetian text of the *Historie* of Don Fernando and the Castilian of the *Historia* of Las Casas. Both texts indicate that the landfall island had a length of fifteen leagues, a dimension nowhere to be found in the *Diario*. It is therefore noteworthy that the earliest geographic description of the Lucayan Islands, the *c*.1530 *Espejo de navegantes* of Alonso de Chaves, ascribes a length of fifteen leagues to *los Baxos de Babueca*, the Turks Bank, and to no other island or island group in the archipelago. In all probability, Las Casas took this dimension from the manuscript of Don Fernando, and presumably, Don Fernando, who had access to all the official geographic knowledge of the Indies but had never seen his father's landfall island, mistook the reported length of the Turks Bank for the length of Grand Turk.

When approached from the east, the Turks Bank presents a reef running roughly north-south bordering the bank's shallows punctuated with rocks and cays. Although there is a navigable cut between Long and Pear Cays, it is unthinkable that a cautious mariner far from home arriving at the islands for the first time would consider risking such an approach to a windward shore. Mindful of Oviedo's noting that the island the Indians called *Guanahaní* was seen to the north of the flagship, I infer that the fleet, having sighted islands at mid-bank off Pinzón Cay about five miles to windward of the reef, followed the line of the reef northward at a safe remove.

An ancient safety measure in the age of sail was casting the sounding lead as soon as land was sighted. This gave an indication of depth, a sense of the contour of the bottom, and an idea of what material the bottom was composed. It is therefore curious that in the *Diario* there is no record of taking soundings on the approach to the landfall island. However, as we have seen above, Francisco Vallejo's testimony indicates that Juan Rodrigo Bermejo saw the bottom before he sighted land. This, no soundings were necessary. Additionally, in the account of the landfall published by Antonio de Herrera in 1601, there is a notice that the flagship found soundings on 11 October. This was reiterated by the Abbé Reynal in 1770 and by George Gibbs in 1846, but the source of this information remains a mystery. Perhaps it is a transposition from the 1571 edition of Don Fernando's noting an attempt to find soundings on 19 September.

Rounding the Turks Bank counterclockwise from the southeast would require time-consuming maneuvers to windward to steer clear of the north-northeast reef which juts into the Atlantic with great display of breaking surf. Any mariner would tend to mark so prominent a danger as a point of reference. One reckons that as many as nine hours may have been occupied with hoisting sail at daybreak, sailing north, navigating to windward of the reef, rounding the northern end of the island, heading south and arriving at the first secure anchorage presenting itself to the impatient seamen. This is consistent with evidence that the disembarkment occurred late in the day.

Circling westward round the northern end of Grand Turk, the reef falls away towards a sandy coast protected from the prevailing easterly winds. This first break in the reef faces the northern part of the Island's west coast now known as Guanahani/Pillory Beach. Just off shore there is a clear sandy bottom in deep water which in good weather affords an excellent anchorage. The anchorage is opposite a broad sand beach. There is risky exposure at this anchorage in bad weather and particularly a west or northwest wind, but the wind was out of the east and the sea was calm on the day of disembarkment, as Columbus relates that the natives swam out to the departing ships' boats with items to trade.

Grand Turk, the Island of San Salvador and the Disembarkment

For more than two full days from 12 to 14 October, Columbus remained at the landfall island he named *San Salvador*. He noted that it had green trees, fruits, a beach (on a protected shore) off which he anchored and two days later reconnoitered with the ships' boats. The island had many places of water, a sizeable pond in the middle, a reef surrounding it and a large reef-protected anchorage near a peninsula where there were very green trees and much water. The peninsula had six houses on it and might be separated into an island with two days of work. Columbus noted a total of three or four settlements on the island. He also understood that the island people were indicating:

> that there was land to the south and to the southwest and to the northwest, and that these [people] of the northwest came to combat them many times.

Even though the fleet remained at this island for two full days and nights, Columbus did not record taking on fresh water until he reached the third island.

One finds a striking agreement between the geography of Grand Turk and what Columbus apprehends from the natives of *Guanahaní* on 13 October. The natives indicated that:

> going to the south, or rounding the island for the south…there was a king who had…very much [gold].

This fits perfectly with the reality of gold-rich Hispaniola to the south of Grand Turk. The statement makes little geographic sense when applied to Watlings/San Salvador or to West Plana Cay which are too far north and west, and none when applied to Samana Cay, which has no west coast to round. Considering that a significant percentage of the aboriginal pottery excavated to date on Grand Turk was made in Hispaniola, there appears to have existed a direct communication between the inhabitants of Grand Turk and the Macorís people of the north shore of Hispaniola. The same statement indicates that Columbus's disembarkment occurred at a place from which direct access to the south was obstructed by part of the island.

During 13 October, Columbus remarks a large pond, a *laguna*, in the middle of the landfall island. Much effort has been spent on ascertaining the meaning of Columbus's term, *laguna*. A *laguna*, or pond, is simply a diminutive of the term *lago*, or lake, which can either be salt or fresh. Columbus himself defines the term *lago* in his letter to the sovereigns on the third voyage simply as *a place of water*. In the middle of the northern half of Grand Turk, inland from the deduced site of disembarkment, lies North Creek, a large salt pond about a mile and a half long, a half a mile wide, and four fathoms deep. It fits Columbus's observation well, as it would be eminently visible from the poopdeck of a *nao* anchored off the northwest coast of Grand Turk.

On Watlings/San Salvador there is an extensive interior system of lakes, which might fit this description also, except that Columbus only speaks of one pond. There is no evidence, however, of there ever having been an interior body of water on Samana Cay. Mr. Pickering's photo of West Plana Cay shows that it possesses at least three interior bodies of water, but none in the center.

Columbus did not note seeing native settlements until the second day after disembarking. When the Lucayan site was discovered on Grand Turk in 1989, its location conformed precisely with the description in Columbus's *Diario*.

On Watlings/San Salvador, Charles Hoffman excavated a substantial Lucayan settlement, contemporaneous with the landfall, close to the coast of Long Bay, where advocates of this landfall suppose Columbus landed. Dr. Hoffman describes the Long Bay site as lying "between 100 and 200 meters from the beach of Long Bay." The site is

suspected to “cover quite a few hectares” and may “involve a linear distance of some 7km.” By Columbus’s account, it was not until the second day after he anchored that he first saw a native village. In view of the apparent size and proximity to Long Bay of the San Salvador settlement, it does not fit Columbus’s description of settlements containing no more than fifteen houses.

Only with an island as small as Grand Turk is it possible to account for Columbus’s description of the *shallow ridge of rocks that rings all that island to the back*. The text of the *Diario* implies that Columbus’s circuit of his landfall island was made in two parts; half by the fleet on 12 October and half by the ships’ boats on 14 October. Both the length and width of San Salvador are three times greater than those of Grand Turk. It is too big to conform with Columbus’s description.

Rowing near the edge of the intermittent western reef southward from the site of the Lucayan settlement on Grand Turk, one soon reaches the nearest of four narrow cuts in the reef leading to Hawks Nest Anchorage. Hawks Nest Anchorage is bounded by Grand Turk to the northwest, the eastern barrier reef and lesser Turks Islands to the east and the western reef to the west. Columbus describes the area between his landfall island and the surrounding reefs:

> And in between it remains deep and a port for as many ships as there are in all Christendom.

Hawks Nest is approximately fifteen square miles in size. This is ample room for a large flotilla of sailing vessels of Columbus’s day.

Columbus gives an account of a peninsula near the reef-protected anchorage he entered. He writes:

> I might be able to make a fort and I saw one piece of land that is made like an Island though it is not one… This piece one might be able to cut off as an Island in two days… And then joined with said Islet there were gardens of trees, the most beautiful that I have seen and so green with their leaves…and much water.

The greenery in Columbus’s description can be interpreted as red mangroves bordering the inland side of the peninsula. The mangrove is a tropical tree that grows in salt water elevated on a remarkable tangle of roots. The red mangrove always grows in shallow salt water, the black mangrove grows on land that is sometimes inundated by the sea and the white mangrove grows on dry land with its roots in salt water. Red mangroves bloom perennially, but most noticeably in May and October. Their leaves are a rich tender green that contrasts distinctly with the terrestrial vegetation of the Lucayan Islands.

In our expedition of November 2014, we examined a promising site for Columbus’s peninsula suitable for building a fort on Grand Turk. It consists of high ground overlooking Hawk’s Nest Anchorage, where a cannon emplacement was built in the 1790s. It borders the sea on its south side and the estuary known as South Creek to its north. The peninsula begins at a neck of sandy ground separating the south branch of South Creek and the sea, which seemingly could be dug below water level by a team of workers in two days. South Creek abounds in red mangroves. To the best of my knowledge no one has searched for evidence of six Lucayan houses on the level ground just south of the neck between the Creek and the sea. This site would be well situated to serve native fishermen departing for seasonal food-gathering camps like Cotton Cay.

Graham’s Harbor on the north side of Watlings/San Salvador has an area of approximately five square miles. In terms of area, it could contain a third as many ships as Hawks Nest, but, except in an emergency, it is not recommended as a harbor by mariners today because of the coral heads which dot its interior just below the surface. There is no

protected large anchorage near Samana Cay or near West Plana Cay.

Both Grand Turk and Watlings/San Salvador have geographical features that could fit Columbus's description of the port and peninsula. Small islands can be seen from both. While Lucayan artifacts have been found on the Watlings/San Salvador peninsula, there is no vegetation near it that suggests "a garden of trees." The sandy peninsula on Samana Cay does not qualify, however, as it is not more than three hundred years old. There is nothing resembling a peninsula on West Plana Cay.

The last detail Columbus records on 13 October is particularly fascinating. Here, Columbus expresses impatience to *strike upon the Island of Cipango* (Japan). Could something the natives offered for barter have provoked Columbus to write this?

The Lucayan settlement on Grand Turk discovered in 1989 is distinguished by a profusion of minute torus-shaped shell beads. These beads, white and rose pink in color, were fashioned largely out of jewelbox (chama) and spiny oyster (spondylus) shells. With respect to other Lucayan settlements, the site appears to have been unique; no other Lucayan site has ever been found to contain such an abundance of shell beads.

One of Columbus's own books, still preserved in the Biblioteca Colombina, is a 1485 imprint of a Latin edition of Marco Polo's travels. In the second chapter of the third book, which describes the island of Japan, Columbus marked the paragraph containing a reference to the red pearls said to abound there. It may be that Columbus's impatience to "strike upon the Island of Japan" was provoked by his receiving a string of pink shell beads or a pink conch pearl from the natives of Grand Turk.

Perhaps Columbus's *Diario* tells us as much about the landfall island by what it does not record than by what it does. There is no mention of fresh water, with which the men would have certainly wished to fill their casks after thirty-six days at sea. But for spun cotton, neither agriculture nor water in quantity is mentioned in the *Diario* until 16-17 October on the third island, *La Fernandina*. Grand Turk has been consistently known as a dry island, famous in the nineteenth century for the quality of the salt raked in its salinas. This is not the case on Watlings/San Salvador, where instances of standing fresh water have been noted during the October rainy season.

The Caicos Islands, the Islands of Santa María de la Concepción

When Columbus sets sail from the landfall island, he describes in the *Diario* an island or group of islands approximately 7 leagues (19 miles) west of *San Salvador*, with a 5 league (13 mile) north-south coast facing it and perhaps some 20 leagues (53 miles) of coast running east-west. The Caicos Islands lie 20 miles west of Grand Turk, have a 14 mile north-south coast facing it and about a 50 mile coast running northwest by west and then west by south from the northeast Caicos breaker to Fort George Cut in the barrier reef. Mr. Pickering has generously opined that this geography only agrees with the respective landfall island possibilities of Grand Turk and West Plana Cay. Neither the Watlings/San Salvador hypothesis with a second island of Rum Cay to its southwest, nor that of Samana Cay which has nothing but open sea 19 miles west of it, matches up so well geographically with the *Diario*.

Many islands are visible to the west of Grand Turk. Advocates of Watlings/San Salvador either postulate a route sufficiently westward of that island to allow sighting Cat and Conception Islands and Rum Cay, or suppose that the hills on Rum Cay gave the illusion of being many islands. Advocates of the Samana and West Plana Cays hypotheses presume that the hills of Acklins Island gave the same effect.

In the Grand Turk theory it is deduced that Columbus set sail on a southwest course

late in the day on 14 October from his anchorage by the first break in the reef off Guanahani/Pillory beach, Grand Turk. Proceeding across the Columbus Passage, and near mid-gulf, he sees the hills, possibly of Ambergris Cay which has an elevation of 90 feet, but certainly of South Caicos. Probably changing course, he steers toward the largest island, South Caicos. With dusk falling, he heaves-to in order to spend the night at a safe distance from shore. Next day, having most likely drifted north-northeast with the current, he presumes that the tide has distanced him from the east side of East Caicos. He remarkes this coast to be a 5 league (13 miles) coastline running north-south and facing *San Salvador* at a distance or 7 leagues (19 miles).

The current generally runs north-northeast up through the Columbus Passage. Depending on the wind, tide, moon, and season this current can attain a rate of 3 knots. The same factors have also been known to cause the current to reverse itself. With the rise and fall of the tide, the sea flows onto and off of the Caicos Bank into the Columbus Passage through channels among the islands between South and East Caicos. An ebbing tide can be felt for a short distance out at sea and is a potential danger to a becalmed sailing vessel near shore. I propose that several hours of the fleet's being exposed to a northeast current at night may have drawn it eastward away from the second island, causing Columbus to observe *the tide detained me*. There appears to be no comparable phenomenon off Rum Cay or between Samana or West Plana Cay and Acklins Island.

Following this delay, Columbus navigates round the northeast reef of East Caicos according to the Grand Turk theory, and follows the coast towards the west. Here wind and current work in his favor. By midday, he notes that the north coast extends more than 10 leagues (27 miles). As dusk approaches and the fleet nears the northwest bend of North Caicos, he sees the heights of Blue Hills on Providenciales and, *charging all his sails*, steers round the west cape of the island to seek a protected anchorage before nightfall similar to the one he left on Grand Turk. This results in an approximately 50-mile track at a safe remove north of the Caicos Islands beginning at the far breaker of the northeast reef and ending at Fort George Cut opposite Pine Cay northeast of Providenciales. Following the reef toward the south, the fleet navigates through the mile-wide Cut from the indigo deep into the turquoise protected waters off Pine Cay where it anchors in an open roadstead with a clear sand bottom and spends the night. Columbus names this long string of islands *Santa María de la Concepción*. He intimates that *Santa María* is a group of islands [*Diario* 11v6-9, cited in note 183].

At this point it should be remarked that the Grand Turk theory exhibits a navigationally sound pattern regarding Columbus's choice of places to anchor. It will be seen that the pattern is consistent throughout every anchorage believed used by Columbus's fleet between Grand Turk and the Ragged Islands. Along this route, the anchorages uniformly follow the three necessary criteria: they offer protection from the prevailing wind, they are open roadsteads, and they have clear sandy bottoms.

Mayaguana, the Eastern Part of Fernandina

In the morning of 16 October while exploring *Santa María*, Columbus and his captains scramble to man the fleet threatened by a change of wind blowing toward shore. While readying the ships to stand off to sea, Columbus repeats in his logbook that he sees an island to the west. The fleet weighs anchor and departs to seek this new island against an adverse wind, requiring maneuvers in order to proceed to the west.

Here is how Columbus first describes the third island, which is not the island he has seen to the west, but one pointed out by the solitary Lucayan in a dugout in open sea whom

he welcomed aboard the flagship:

> And it was from this island of Santa maria to this other one nine leagues east west, and all this part of the Island runs northwest southeast. And it appears that there were in this coast well more than about twenty-eight leagues on this face. And it is very flat without any mountains… And all beaches without rocks.

From this text it is clear that Columbus perceives that the island he named *Fernandina* lies to the west of *Santa María*. Given a six-hour passage between the two islands, the effect of a surface current in the Caicos Passage in the same direction as that reported in the Columbus Passage could give a navigator the false impression that Mayaguana lay due west of the Caicos. Columbus notes that the wind, initially from the northwest and north, subsides, but does not indicate when. However, since he records the next morning [17 October] that the wind blows from the south, this shows that it has clocked round from the northwest and north. In any event, seeking to navigate west with a northwest wind calming and clocking east would have required an initial series of maneuvers, which likely explains how Columbus encountered a single native in a dugout at mid-gulf between the islands. Also in the course of his maneuvers to advance toward the west, Columbus could not help but see that the island he twice noted lying to the west [Providenciales] was a continuation of "the islands of *Santa María*." Accordingly, I propose that he estimated the distance to *Fernandina* from the part of *Santa María* closest to it, concluding ultimately that *Fernandina* lay 8 leagues almost east-west from *Santa María*. Altering course to welcome the solitary Lucayan aboard the flagship with his dugout and following his directions to the third island might also account for Columbus's changing his estimate of the distance from the second to the third island from 9 to 8 leagues and the bearing from east-west to almost east-west.

Watlings/San Salvador advocates posit a 16-mile westward sail from the southwest cape of Rum Cay to the rocky northeast coast of Long Island. It has been shown that Columbus lands at the *sandy southern end* of the third island. West Plana and Samana Cay advocates require a 27-mile sail west from the northwest cape of Crooked Island, where there is a prominent feature, bird rock, unmentioned in the text (but identified more recently by Admiral Morison as *Isabela*'s *isleo*), out to the rocky ironshore weather coast of Long Island.

In the Grand Turk theory, an imagined composite of Mayaguana and Acklins Islands is postulated to consist of the east and west parts of *Fernandina*. Only the eastern part is explored on 17 October.

Columbus remarks on sighting the third island before nightfall on 16 October that it "appears" to have 28 leagues (75 miles) of coast. It is certain, however, from the text that Columbus never sailed anything near 28 leagues along the third island. One must conclude that he inferred the length of this coast from some other source, presumably from the natives he carried from *San Salvador* or treated with off *Fernandina*. Mayaguana's coast, on its southern side, is about 23 miles long. It is noteworthy that the cited 28 leagues is a multiple of 7, which is the average distance a Lucayan could cover in a dugout in a day.

There is no physical placement of Columbus's first anchorage the morning of the 17th on *Fernandina* in the *Diario.* However, reckoning backwards, one can estimate where he was. Columbus found his second anchorage on *Fernandina* by sailing northwest from his first. Tracing his path backwards to the southeast, one finds a suitable anchorage on Mayaguana on the southeast coast just off of a sandy beach. At this first anchorage Columbus and his men took on water. Just behind this beach on Mayaguana there used to be a well where conch fishermen from Providenciales could count on finding fresh water 70 years ago, which is shown on some older British survey charts. In the course of our Following Columbus Expedition of November 2014, we learned that Hurricane Irene had buried the well featured on the charts.

Columbus writes of his second anchorage off *Fernandina*:

> …I found a very wonderful port with one mouth though one can say of it two mouths because it has an isleo in the middle and both are very narrow and inside very wide for a hundred ships if it were clear and deep at the entrance.

Abrahams Bay, on the south coast of Mayaguana, conforms geographically with Columbus's description. It is about five square miles, much smaller than Hawks Nest Anchorage, and large enough to hold a hundred fifteenth-century ships, but too shallow for the draft of a fifteenth-century ocean-going vessel.

Columbus relates that the two mouths of the harbor are separated by an *isleo*. One of the two meanings of this term signifies a train of craggy rocks perilous of access. In Portuguese usage dating from the time of incipient navigation to India, this definition included rocks exposed at low tide. The *isleo* is thus a description of the reef that shelters the harbor. The tidal projections of the British Hydrographic Office indicate a low tide at Abrahams Bay at eleven in the morning. If Columbus reached his second anchorage in the early afternoon, the tide would be low enough to expose much of the reef, which has openings to the south and the north.

On 17 October in the course of his first exploration of *Fernandina*, Columbus notes that the natives of the third island appear slightly different in dress and customs from those of the first two islands. Archæology has shown that the Lucayan Archipelago was peopled from the east end of Cuba and/or the west end of Hispaniola via Great Inagua sometime around the year 700. Around the time of contact there were people on Grand Turk who were not Taíno, as has been evidenced by several excavated sites in the Island's coral soil. However, according to Dr. William Keegan, they imported 90% of their pottery of largely volcanic material from Hispaniola. This suggests that they were commercially allied with the Macorís and may well have had blood ties with them. At contact, the Macorís occupied a strip of the northern shore of Hispaniola between the Rio Yaqui del Norte in the west and Samaná peninsula in the east. *Macorís* is a Taino name that means 'unfriendly.' To judge from this and the Taino incursion into the Caicos Islands, the Taino and Macorís peoples were antagonistic. On Middle Caicos, part of *Santa Maria de la Concepción* to the northwest of *Guanahaní*/Grand Turk, Dr. Shaun Sullivan excavated a Taino settlement containing the unique ceremonial court in all the Lucayan Islands and what appears to be a quarter reserved for the captive workers who gathered salt in the nearby salina. The Watlings/San Salvador, Samana and West Plana Cay hypotheses are not supported by anthropological evidence as there is a consistency of pottery over the centuries giving no indication that there were dissimilar cultures in this region. Archæological evidence shows that the people of the modern Bahamas islands used different pottery from those of the Turks and Caicos.

The Grand Turk theory incorporates the evidence that the people of the first island were sporadically attacked by people from islands to the northwest. This can be explained by a Macorís presence on Grand Turk and a Taíno presence in the Caicos Islands, and the fact that the Taíno had displaced the Macorís from their lands on Hispaniola. It also includes the evidence that there were cultural differences between the peoples of the Turks and Caicos Islands and those of Mayaguana. In contrast, the San Salvador hypothesis requires nonidentical cultures on it and Rum Cay, both different from that of Long Island. The Samana and West Plana Cay hypotheses require nonidentical cultures on each of them and Crooked-Acklins, both dissimilar to that of Long Island. There is no evidence to support these differences. Only the Grand Turk theory accords with a pattern of pre-Columbian settlement in the Lucayan Islands evidenced by archæology.

18 October, in Quest of *Saometo*

The first time Columbus sails at night among the islands occurs the evening of 17 October. Having reached the part of the coast of *Fernandina* which runs east-west, he reverses his intended course endeavoring to backtrack to the southeast against an adverse wind. He does this because the *San Salvador* natives aboard his ship redirect him in his quest for gold.

> …All these indians said again that this Island was smaller than the Island Samoet [Saometo, Someto], and that it would be well to turn back to be on it more quickly.

The fact that Columbus is willing to sail at night implies that the coast of *Fernandina* is a protected and not a weather shore. Because the protected western or southern coasts of the Lucayan Islands are generally more sandy than rocky, this is consistent with Columbus's description of the sandy coast of the third island. The only Lucayan Island possessing a protected predominantly sandy shore leading to a noteworthy harbor and a coast curving towards the west is Mayaguana.

Later, after standing to sea, he navigates with the purpose of keeping himself at a distance from the land. He records his intent to go to the southeast cape of the island, where he hopes to anchor. He knows this spot because he was there that same morning.

During our Following Columbus Expedition as we motored without wind away from the coast of Mayaguana near its southwest point at dawn, we noted that the western end of the south coast of Mayaguana gave the impression of continuing indefinitely towards the west, supporting an illusion that Mayaguana and Acklins are one island.

With adverse winds, Columbus tries to navigate to the southeast. His stated objective is the southeast point of the island. I infer that, intending to keep safely south of land, Columbus was inadvertently forced to the southwest, where by late afternoon of the following day with the wind probably clocking now to blow from the north, he found himself obliged to follow the wind until he came within sight of Hogsty Atoll.

South of Mayaguana, the prevailing current runs towards the northwest. The farther south one goes the more the current sets towards the west and south. Possibly because of such a current, during the night of the 17th and also all the following day, Columbus may have been carried much farther west and south than he reckoned, and by sunset of the 18th hastened to anchor on the south side of the southwest cay of the Hogsty Reef, where there is a holding ground protected from a north wind with a clear white sand bottom. He does not go ashore because the only land is two minute sandy cays. Next morning, he sets out to find his objective, *Saometo*.

Watlings/San Salvador advocates believe that Columbus sailed southeast along the weather shore of Long Island to the southeast point he never reaches in the *Diario*. West Plana and Samana Cay advocates posit that Columbus sailed at night along the eastern weather shore of Long Island which he had presumably already explored on the 17th. When examined closely, it would seem that neither interpretation accords with Columbus's choice of words. Columbus writes specifically: *en derredor dla Isla*, "on from the back of the island." By choosing this phrase Columbus implies that he was out of sight of the coast of *Fernandina* on 18 October.

Great and Little Inagua, *Isabela* and the *Isleo*

We have seen in chapter 4, in the description of *Isabela*, how Columbus deployed his

fleet to find *Saometo* the morning of 19 October with the wind blowing from the north. Having sailed thus in formation for three hours up to about nine in the morning, land is seen to the east probably by *Pinta*'s lookout sighting the 60-foot elevation of Little Inagua. Approaching the land, Columbus notices before noon that it consists of an *isleo* to the north of a larger island's north point. Off this fourth island he relates that the fleet:

> … approached it, all three ships before midday at the northern point whereat there is an *isleo* and a shallow ridge of rock outside it to the north, and another [ridge] between it and the large Island, which these men of *San Salvador* whom I bring denominated *la Isla Saomete*, to which island I gave the name *la Islabela* [*sic*].

We encountered the two meanings of the term *isleo* in chapter 4. The second meaning signifies a small portion of land surrounded by water situated nearby the mainland or a larger island. In the Grand Turk landing theory Great and Little Inagua are identified as *Isabela* and the *Isleo*. During our expedition as we passed Little Inagua, we noted a reef on its north side, a very rocky shore on its northwest side, a beachy shore studded with pristine coral heads on its southwest side, and rocky shallows to its south. Five miles of open water separate Little Inagua from the north point of Great Inagua from which an extension of rocky shallows runs to the north.

In chapter 3 in the long description of the Juan de La Cosa planisphere, there is an island near *Guanahani* named *Someto*. What is interesting about *Someto* is that one can make out a smaller island adjacent to it, resembling somewhat how Little and Great Inagua are situated in actuality. Since there is no pair of islands like this to be found in the central Bahamas, one is impelled to think that La Cosa misplaced the islands of *Someto* together with *Guanahani* too far west on his chart.

Isabela was the most beautiful of the Islands that Columbus found. He described it thus:

> … All this coast and the part of
> the island that I have seen is almost all beach and the island
> the most beautiful thing that I have seen. For if the others
> are very beautiful, this is more. It is of
> many trees, both very Green and very large, and this
> land is higher than the other islands found,
> and on it some hillock, not that one may call it
> a mountain, more a thing that embellishes the other, and it seems
> of many waters. Thither at mid-Island from this
> part to the northeast it makes a great cape [or headland] and
> has many thickets, both very dense and very
> large. I tried to go anchor on it in order to Go out
> to land and see so much beauty, but the bottom was
> shallow and I was unable to anchor save out from
> land and the wind was very good for coming to
> this Cape whereat I have now anchored, to which I
> gave the name cabo hermoso, because thus it is so. …

Great Inagua's beachy coast follows the graceful indented curve of Ocean Bight. Towards the western end of the Bight just south of the tree-adorned great cape or headland of Polacca Point, James Hill, a landmark 90 feet high, is crowned with a green thicket of trees, setting it off from the rest of the coppice.

The protected anchorage next to Northwest Point, *Cabo Hermoso*, offers a clear sandy bottom and deep water close to shore, a satisfactory protected anchorage for the fleet in an east wind. Columbus continues:

> … And on
> my arriving here at this cape there came from the land so good
> and exquisite the scent of flowers or trees that it was
> the most sweet thing in the world. …

He adds:

> … This here I call cabo her-
> moso – I believe it is an Island apart from Saometo and still
> there is even another small one in between. …

Anchored off *Cabo Hermoso* [Cape Beautiful], Columbus savors the floral redolence of the island which indicates that the wind has now shifted to blow out of the east. In the Grand Turk theory *Cabo Hermoso* is identified as Northwest Point, a tongue of land off the west coast of Great Inagua jutting northwest into the sea. It is easily the prettiest part of Great Inagua. Just inland from its west side, offering a protected open roadstead and a sandy bottom in about 25 feet of water, there is a small creek running to the sea parallel to the coast from the northwest. Farther south, a large pond running southwest-northeast gives the impression that this point is cut off from the rest of the island by a broad creek. This is too close a correspondence with Columbus's description to be ascribable to chance. There is nothing that remotely resembles this geography on Long Cay/Fortune Island.

The next day Columbus desires to sail counterclockwise around *Isabela*, but is thwarted by the unfavorable east wind and a shallow and foul bottom along the island's south shore. In his description of *Isabela* he states that he gave the southwest cape the name, *Cabo de la Laguna*, 'Cape of the Pond.' Close to the southwest point of Great Inagua is a salt pond. Advocates of the Watlings/San Salvador, West Plana, and Samana Cay hypotheses identify the southern end of Long Cay/Fortune Island as the southwest cape of the fourth island. At the south end of this island there is a small pond, but it is on the eastern or weather side of a southern point and Long Cay/Fortune Island has no southern coast to navigate past.

Retracing his route in a clockwise direction with a contrary wind, Columbus spends the night of 20 October hove-to, the faster caravels having reached shore to anchor. Next morning, the flagship anchors near the *Cape of the Isleo* and the fleet remains there until midnight, 23 October. Just to the west of North Point on Great Inagua there is an anchorage protected from the east tradewinds with a clear sand bottom not far from shore. In the Grand Turk theory this is the last of Columbus's anchorages in the Lucayan Islands, other than south of the Ragged Islands.

Columbus relates that there was abundance of fresh water on Isabela, recording on 22 October that he and his men fill water casks in one of the ponds near the *Cape of the Isleo*. The northern end of Great Inagua has fresh water ponds. These still serve as the habitat of a unique species of freshwater turtle, *Chrysemys malonei*, discovered some years before the outbreak of the Second World War. The 'serpents' that members of the crew and Martín Alonso kill by the ponds are most certainly freshwater crocodilians related to the present-day freshwater Haitian and Dominican cayman.

Walking among the high trees he describes near these ponds, Columbus delights at flocks of parrots whose flight obscures the sun. In the course of our expedition visit, we learned from Mr. Nixon, Keeper of the National Flamingo Park on Great Inagua, that wild green parrots still inhabit the island in such profusion that they're considered pests. Caymans, on the other hand, are not to be found today outside Haiti and the Dominican Republic.

Acklins Island, the Western Part of Fernandina

At midnight on 23 October, Columbus breaks for the second time his prohibition against sailing at night within sight of land. This second instance during the early morning of 24 October is similar to his first night sail of 17 October. Columbus gives his intended course as west-southwest from the *Cape of the Isleo.* He knows from his deployment of the 19th, that there are six hours clear sailing to the west-northwest. Thus he is safe to sail for the remainder of the night, providing he has navigated sufficiently out to sea from his anchorage to skirt the western part of Isabela when he sets his west-southwest course.

At daybreak of the 24th the wind calmed and it rained. Columbus writes that he was thus with little wind until past midday. One suspects that, as a result of an advancing cold front, the wind has shifted to blow out of the south and southwest, forcing Columbus to follow the wind toward the north, blowing initially, as he terms it, "very loving." The fact that he hoists all his sails and goes "on the way" implies that he is now sailing downwind. With a favorable current and the wind increasing to a meaningful blow, Columbus sails on until approaching dusk, and reckons he is now 7 leagues or 19 miles southeast of the green cape of what he believes is the south end at the west part of *Fernandina*, which we identify as Castle Island off the southwest end of Acklins. As he expresses it:

> … the green cape of the island Fernandina was lying off me — it was lying off me to the northwest and it made from me to it seven leagues.

On motoring to Castle Island from Hogsty Atoll in the absence of wind, we noted toward evening that Castle Island gave the appearance of being a southwest continuation of Acklins.

Respecting the force of the wind now grown intense, Columbus continues on in the faint moonlight, passing Castle Island with only the foresail. Then while the wind yet increases, he sees through the rain a very great thunderhead, decides to haul down the foresail and drift under bare poles. At this point he estimates he goes maybe five miles for the rest of the night. I infer that this brings the fleet to a point about 55 miles distant from the eight southernmost Ragged Islands lying toward the west.

This interpretation permits a reconstruction of Columbus's route which is consistent with the experience of sailors navigating the lower Bahamas in the fall. Normally, when a front passes through the islands, there is a period of calm followed by rain accompanied by stiff gusts of wind. Following the rain, the wind usually blows from the southwest and clocks gradually round during the next day or so until it blows out of the east. If Columbus's fleet experienced the passage of such a weather front, it could not have held a course toward the southwest after the rain stopped and simply followed the wind to the north, "going on the way."

Finally, if Long Island be *Fernandina*, as advocates of Watlings/San Salvador, and West Plana and Samana Cays assert, then its western part cannot lie other than north of its eastern part. This geometric fact invalidates both central Bahamas landfall hypotheses. Moreover, the southern extremity of Long Island is distinguished by a broad flange of grey rock separating sea and scrubweed, whereas Castle Island is covered with green trees.

The Sand Islands

The night of 24 October, Columbus lay-to under bare poles. He estimated that he went not two leagues. I propose that he drifted northwest in the direction of the Diana Bank, finding himself at daybreak about 55 nautical miles east-northeast of the Ragged Islands. It was these islands that Columbus reached and anchored south of the next day, the only point of his track among the

Lucayan Islands that has escaped dispute. The entry in the Diario for 25 October is in the paraphrase of Bartolomeo de Las Casas, signifying that the text of the 'actual words' of Columbus has come to an end. The fleet sails some 13 miles to the west-southwest, then 29 miles to the west, proving that the wind now blows from the east. At this point the fleet is 13 miles off the eight southernmost Ragged Islands which Columbus names *Las Islas de Arena* [the Sand Islands]. Late afternoon is spent navigating the bank immediately south of these islands to anchor for the night. The next day it departs for Cuba.

Christopher Columbus's Testimony on the Location of *San Salvador*

We have seen that, on 13 October 1492, Columbus noted in his logbook that the island at which he had arrived the day before lay on the same parallel as the Island of Ferro in the Canaries. We have also seen that at the end of the fifteenth century the north latitude of Ferro was deemed to be 27½°. On 15 February 1493, on board the caravel *Niña* off the Azores, Columbus dated his report to the Spanish Court, known today as his *Letter to Santángel*. It consists of a summary of his discovery and the wonderful things he had seen. Following a description of *La Española*, where gold had been found and where he had planted a settlement of some forty men, Columbus remarked on the intensity of the sun's heat, noting that the settlement was *twenty and six degrees from the equinoctial line* [the equator].

These two latitudes, recorded in the undisputed writings of Columbus, allow one to deduce the distance he believed lay between the north shore of Hispaniola and the landfall island. As a result of Columbus's reckoning, this distance of one and one-half degrees or 90 nautical miles is almost exactly the distance between Grand Turk and the north coast of Hispaniola. Any presumed landfall island in the central Bahamas is simply too far distant from Hispaniola. We therefore have Christopher Columbus's own reckoning and testimony that he first landed at Grand Turk.

ENVOI

We've now reached the terminus of our historic navigation. The conformation of textual evidence with physical reality sustains the premise that the landfall island at which we've arrived is Grand Turk.

Columbus's own reckoning and testimony is presented above.

The shallow Turks Bank extending seven miles eastward into the Atlantic from the three easternmost cays of the Bank is the only place among all possible landfall islands where Juan Rodrigo Bermejo could have seen the bottom before sighting land.

Only the Turks Islands satisfy the criteria in Columbus's *Diario* and Oviedo's *Historia general*. They include the *White Islands or Princessas* , later called "the seven islands of the Banks of Babueca," which were "the first seen of the Indies," and lay south of *Guanahaní*. The geography of these islands together with the blazon of the Pinzon arms granted in 1519 substantiate Oviedo's statements, recorded sometime before 1523, referring to the first seen islands of the Indies and remarking that the fleet *stayed between it* [Guanahaní] *and another which is called* ***Caicos***.

Grand Turk conforms with Columbus's description of the landfall island.

The Caicos Islands accord with the description of the Islands of *Santa María de la Concepción*. The beachy south shore of Mayaguana matches the coasted south shore of *Fernandina*. Great Inagua satisfies remarkably the long description of *Isabela*. The assumptions in thus plotting Columbus's inter-island track are realistically limited to three: 1) existing

currents, maneuvering with a fading contrary wind, and following the solitary Lucayan's directions were responsible for Columbus's belief that Mayaguana, *Fernandina*, lay almost on an east-west line from Pine Cay in the Caicos, *Santa María de la Concepción*, and that in the course of his maneuvering he saw that Providenciales was part of *Santa María* and accordingly estimated the distance to *Fernandina* from it. 2) Columbus believed that the south coast of Mayaguana, *Fernandina*, continued to the west (as we remarked it to appear to do during our expedition) to join the east coast of Acklins. 3) Columbus followed an incipient cold front south wind toward the north during the latter part of 24 October.

Only on the inter-island track of the Grand Turk landfall theory are all Columbus's anchorages in open roadsteads off protected shores with clear sand bottoms. All central Bahamas' tracks require at least one anchorage off a weather shore with a rocky bottom.

Because putative central Bahamas landfall islands fail to conform with the physiography of Columbus's *San Salvador*, or because they present mismatches to his second, third, or fourth islands, there remains only one satisfactory solution to the landfall island puzzle.

It's time that Grand Turk regain its rightful historic distinction as the first recorded place of contact between a stone-age offshoot of Asia and a relatively modern one of Europe, between a world without iron and the world of the Renaissance, where Christopher Columbus joined the hemispheres and where America began.