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Egg Island is the Landfall of Columbus — A Literal Interpretation of His Journal

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ABSTRACT

This paper will explain why there is a landfall “problem”, where geographers have gone wrong in reconstructing the route of Columbus, how the overwhelming weight of evidence from multiple sources converges to a landfall in the northern Bahamas, and why most geographers seem reluctant to modify their positions.

There would not be a landfall problem today if 19th Century geographers had recognized the imperfections in the third-hand copy of the *Journal* found by Navarette. Otherwise, they would have developed their route reconstructions by synoptic consideration of all 98 clues in the *Journal*, and surely would have rediscovered the Egg Island landfall of the northern Bahamas route. As it was, when they backtracked the route from Cuba, an apparent mistranscription of 70 leagues as 7 locked them into the central Bahamas. With this erroneous start, geographers developed a variety of central routes having uniformly weak congruences with the other 97 clues in the *Journal*. Understandably, many of these succeeding misconstructions in the central Bahamas challenged others to find a “better way”.

This paper shows that Columbus explored the Bahamas along a northern route and that the four islands he visited were probably Egg Island, New Providence, Andros (north end), and Long Island (southwest coast). Quantitative scoring of the northern route congruences with the 98 clues gives a 4-to-1 advantage over the currently accepted central route, with many of its features showing startling agreement with the *Journal*. The Egg Island landfall is confirmed by summation of his daily components of transatlantic travel. It is also strongly supported by three important quantitative descriptions of the discoveries from Independent contemporary sources. First, the Columbus letter to Santangel places his discoveries at 26 degrees latitude (rather than the 24 of the central routes). Second, in 1513 Ponce de Leon recorded the latitude of San Salvador as 25 degrees and 40 minutes (barely 10 miles north of Egg Island). Finally, the 1537 Chaves “rutter” (by the Spanish Pilot-Major) seems to place the landfall 6 miles to the southwest of Spanish Wells — on the south beach of Egg Island!

The 20th Century geographers seem to reject the Egg Island hypothesis because they insist on a perfect match with an imperfect source document. If they would accept the overwhelming weight of evidence for the northern route, the landfall “problem” would disappear overnight.

INTRODUCTION

Despite the official recognition of Watlings Island by the Bahamas Parliament in 1926, reinforced by the imprimatur of S. E. Morison in 1942, this identification of San Salvador is still very much in doubt.¹ The continuing debate climaxed in 1985 with publication of "In the Wake of Columbus — Islands and Controversy", which presented arguments for northern (Egg Island), central (Watlings), and southern (Grand Turk) landfalls.² This paper summarizes my 37-page contribution, arguing for a northern route with its landfall on Egg Island at the entrance to Northeast Providence Channel.³ (See Figure 1.)

My methodology has been to compare all the clues in the *Journal* of Columbus with the earliest available descriptions of known locations along the northern route, aware that changing conditions since 1492 might have altered some of the congruences, for better or for worse. Because of its widespread availability, I selected the Cecil Jane translation of the *Journal* as the primary data source. Nevertheless, in several important and revealing instances I have pointed out how his translation was transparently adjusted to better accommodate the official route.⁴ From this primary data source I have synthesized an alternative to the official route which has a much better congruence with the *Journal* clues.

My analysis is presented in three parts: the transatlantic navigation of Columbus; his route through the Bahama Islands; and other contemporary data sources. All three of these analyses converge to a landfall at Egg Island!

PART I TRANSATLANTIC NAVIGATION

Columbus departed from Gomera in the Canary Islands on September 6, sailing due west along his departure latitude of 28 degrees until October 7, or so he recorded in his *Journal*. Although he never revealed his method of navigation, it was clearly his intent to sail due west from Gomera to his Oriental objective, Cipangu (Japan). For when his daily components of travel are summed through October 7, they describe his perceived location as about 900 leagues west of Gomera and only six leagues north!

On October 7, Columbus altered his course to WSW to follow the route of the migrating birds until the afternoon of October 11, when he resumed his westward course to his landfall. Again, if we assume his *Journal* entries are accurate, then summation of his daily travel components through October 12 places his landfall along the southern shore of Northeast Providence Channel!

The actual latitude of his landfall is strongly dependent on whether Columbus navigated by latitude sailing or dead reckoning. Latitude sailing to a strange shore is far safer than dead reckoning, since one of the ship's coordinates is always known, independent of errors in ship's speed and heading. With this technique, the navigator sails a fixed latitude by

maintaining a constant elevation angle to the solar and stellar meridians. Each morning and evening, weather permitting, he would check the heights of the circumpolar stars above the northern horizon. If he found himself drifting away from the latitude, he would adjust his compass as necessary, thereby correcting for changes in compass variation as he crossed the ocean. With the aid of this accurate celestial navigation, he knows he (or any subsequent rescue party!) will eventually reach the far shore at the desired latitude, although speed errors may alter his time of arrival. The major limitation of latitude sailing is that it can only be used efficiently when the objective lies at the same latitude as the point of departure, as was apparently the case with Columbus.⁵

In contrast, dead reckoning combines compass headings with speed estimates to obtain the increments of ship's position. One advantage of this form of navigation is that it is applicable to any direction of sail, not just those along a fixed latitude, an attribute of no apparent use to Columbus in his quest for Cipangu. A second advantage is that it can be conducted in cloudy weather as it requires absolutely no reference to the stars. However, Las Casas recorded two instances when Columbus noted variations between his compass and Polaris, an indication that he performed this ritual daily at twilight and was, in fact, utilizing latitude sailing. The disadvantage of dead reckoning is that it is dangerously inaccurate for transatlantic navigation, being subject to speed estimate errors, compass variation, unknown currents, and leeway. It was this inaccuracy which led Columbus's contemporaries to rely on latitude sailing when venturing out on their first Atlantic crossings. Morison himself cites the 1497 performance of John Cabot, who employed latitude sailing to reach Newfoundland from Ireland with only four miles of error.⁶ Again, in 1534, Jaques Cartier used the same method of navigation to reach Newfoundland from Saint-Malo, France, with only three miles of error.⁷

In light of these exceptional performances, it is not surprising that the independent navigation experts all seem to believe that Columbus must have used latitude sailing on his first voyage to the New World. This list includes modern-day explorers such as Thor Heyerdahl⁸ and Tim Severin,⁹ as well as the theoreticians G. J. Marcus¹⁰ and *The Oxford History of Technology*.¹¹ Morison, on the other hand, publicly argued that dead reckoning was the navigation method of Columbus, in order to explain how compass errors might have caused him to drift 90 miles south of the course described in his *Journal*. But, in 1972, Morison answered my query responding "Of course Columbus was attempting latitude sailing."¹²

If Columbus used latitude sailing, it still remains to determine whether its accuracy could have permitted him to unknowingly drift 90 miles south to Watlings Island. Note that during his ocean crossing Columbus would have seen the bright star Duhbe trace its diurnal circle around the north celestial pole, tangent to a line about 2.5 degrees above the northern horizon. Thus, the heavens provided him with an accurate and simple

reference for maintaining a 28 degree latitude by watching the Big Dipper take its nightly scoop from the North Atlantic.¹³ If he had drifted 90 miles south, then Duhbe would have been a full “isba” (finger width at arms length) closer to the northern horizon! Columbus’s Arabian contemporary, Ahmad Ibn Majid, wrote that it would be *disgraceful* for a latitude sailor to be off by as much as a quarter isba (22 miles), “especially when making landfalls on routes which are almost due east and west.”¹⁴

In summary, I (and the independent experts) believe that Columbus used latitude sailing because this method of navigation was many times more accurate than dead reckoning for reaching an objective due west of Gomera. Summation of his daily travel components in the *Journal* brings him into the Bahamas off the north coast of Eleuthera at the edge of the reefs lining Northeast Providence Channel. The first anchorage accessible to his fleet was where the reef ends at Egg Island, the aptly-named birth-place of Western Civilization in the New World! (See Figure 2.)

PART II THE BAHAMA ODYSSEY

This part of the paper compares the four islands of my northern route with some of the 98 clues I extracted from the Columbus *Journal* and have italicized in this text. I have tried to include enough examples of Morison’s weak congruences to convince the reader that the overwhelming evidence favors the northern route.

San Salvador (Egg Island)

Rodrigo de Triano sang out “Tierra!” from the rigging of the Pinta on that fateful morning of discovery when he spotted the surf of low-lying Man Island *two leagues* (6 miles) off the port quarter. Figure 2 shows that Columbus jogged at the mouth of NEP Channel until daybreak before following the reef to its first break where he came to an *islet* now called Egg Island. He found a comfortable *anchorage* on the Bahama Bank just off the south beach of Egg Island. Watlings Island has problems with both these clues because its limestone cliffs would have been clearly visible at twice that range,¹⁵ and the Morison reconstruction necessarily has him casually pass up an adequate anchorage at French Bay for a very rough one in Fernandez Bay after 36 days at sea.¹⁶

When Columbus went ashore to claim this 200-acre *isleta* for Spain, he correctly noted that it had a large *lagoon* in its center (See Figure 3), and had *no beast of any kind... except parrots*. In stark contrast Watlings Island fails to match any of these clues. At 60 square miles it is far too large to be described as an *isleta*,¹⁷ has at least half a dozen *lakes* rather than a single lagoon,¹⁸ and has eight reptile species including the Giant Iguana,¹⁹ a reportedly delicious morsel which the Tainos certainly would have offered to these “Gods”.

On Saturday, the first full day in the New World, the Indians came by *dugout canoe* from Royal Island, Spanish Wells and Eleuthera. Using ships chalkboard or outlines in the sand they managed to sketch their island shapes for Columbus, although they must have had some difficulty in conveying size and the distinction between islands and banks. Of primary importance were their route instructions for Cuba which could be reached by *going to the south or going around the island to the south*. This clue makes immediate sense at Egg Island because of the Indians possible concern about whether his large ships could have passed over the Bahama Bank on a direct route to Cuba. It is senseless at Watlings which has a deep-water route directly south to Cuba. Of secondary importance, his emphatic declaration that San Salvador lay *in one line from east to west from Hierro* fits Egg Island far better than Watlings.

But the biggest support for Egg Island comes from Sunday's exploration of Royal Island, *la otra parte, que era de la otra del Leste que habia*.²⁰ It probably took his men two or three hours to row the 3 miles NNE *along the island* to reach Royal Harbour, one of the best natural *harbors* in the Bahamas *large enough for all the ships of Christendom, the entrance to which is very narrow*.²¹ There they literally found *the sea no more disturbed than the water in a well, a piece of land . . . that could be converted into an island in two days*, and the source of *freshwater* clearly marked on British Admiralty Charts. Returning to the Egg Island anchorage, he saw a lovely *group of trees* at the south end of Royal Island and *so many islands*. Even ignoring the impossible 20-mile rowing circuit imposed by Morison, not a single one of Sunday's eight important clues is as well-matched on Watlings Island!

Space doesn't permit the review of all 26 San Salvador clues. Suffice it to say that Egg Island received a 10-fold scoring advantage over Watlings in my detailed analysis. The only significant clue won by Watlings is when Columbus describes it as being *fairly large*, which I have generously balanced against the *isleta* clue, although this discrepancy is better explained on the banks of northern Eleuthera than it is at Watlings Island. Thus the Egg Island landfall from Part I is strongly reinforced by the Admiral's detailed description of San Salvador's latitude, harbor, flora, fauna, and geography.

Santa Maria de la Concepción (New Providence)

Columbus departed his Egg Island anchorage *Sunday afternoon* in order to take advantage of the strong tide flowing off the Bank from Current Cut that would have opposed him if he had waited for Monday morning.²² As yet unsure of his Indian guides, he chose to awkwardly stand off the Bank until sunrise. That same *tide* flowing out NEP Channel kept him from making the exactly *seven leagues* in a *southwest* direction (as shown on Figure 4) until midday. Returning to the Bahama Bank near Rose Island, his lookouts spotted the blue hills behind Nassau on *the larger island to the west*, and he

resolved to *sail all day* along the *east-west side* past Paradise Island to reach the *westerly cape*, even though his Indian guides probably had warned him that there were no safe anchorages on the way.²³ Apparently combining New Providence with its eastern islets, he overestimated its size as *five by ten leagues* before safely anchoring south of Lyford Cay. On Tuesday morning a canoe came from Clifton Point (*de otro cabo*) as he was departing his anchorage.

The only clues matched as accurately by the central route are the distance and direction from Watlings Island to Rum Cay. Otherwise, this candidate offers no reason for his early San Salvador departure, no tide to impede his progress to Rum Cay, which is far too small in area and has no larger island visible to the west, and has him sail both (!) sides of the island past a good anchorage at Port Nelson in mid-afternoon to barely reach a non-existent one at its western end, which also lacks the dual cape. My detailed scoring for this second island of discovery also gave a 10-fold advantage to New Providence over the weak congruences of Rum Cay.

Fernandina (Andros)

Tuesday morning, Columbus departed the *islands* of New Providence for Andros Island, lying almost *8 leagues* across the Tongue of the Ocean. In the middle of this *Gulf*²⁴ he picked up an Indian in a canoe before continuing on to this *very flat* island exactly *28 leagues* in length. On Wednesday he *anchored* on the reef in front of Mastic Point which he precisely described as *this cape where I came, and all this coast, runs NNW and SSE* as shown in Figure 5. After rowing in from the reef he enthused about the many varieties of *reef fish* and for the first time mentioned *lizards*,²⁵ which are found in great abundance on Andros. At Mastic Point he quaintly described the groves of *mastic trees*²⁶ with their many varieties of epiphytic vegetation.

Returning to his anchorage, he was informed that the Indians thought it would be easier to *round Andros in a NNW direction* than trying the direct route to Cuba across the shoal water south of the Tongue of The Ocean. *Two leagues from the head of the island* he anchored outside Conch Sound, *more than wide enough for 100 ships*, which would have been a *wonderful harbor*, except that it was too *shallow*, and it looked like *the mouth of a river*. After filling his *water casks*, Columbus sailed to the north end of Andros where the *coast runs east and west*.

Up to this point, *all* of the first 20 clues describing Fernandina have had a closer congruence with Andros than with Long Island. In fact, most of the clues don't fit Long Island in the slightest while having a near-perfect congruence with Andros. Long Island is too close to Rum Cay; not separated by a gulf; too short; too dry; too rugged; without anchorages; without the described cape; without the mastic trees; without the reef fish; and without the wide but shallow harbor that looks like the mouth of a river. On top of all that, there is no sensible reason for his ships to sail counter-clockwise

around Long Island — in fact, Morison himself admits that it would have been impossible!²⁷

That Wednesday afternoon, one of the most important wind changes in history forced Columbus to discontinue his counter-clockwise circuit of Andros which almost certainly would have brought him to the shores of Florida and re-written the history of the Western Hemisphere. A strong norther, so typical of the northern Bahamas after the hurricane season, swept across Northwest Providence Channel and drove him down the Tongue of The Ocean on a direct route to Cuba.

Since my long route down the Tongue of The Ocean differs markedly from Morison's, it is important to justify my interpretation of the *Journal* in some detail. My first point is to demonstrate how certain we are that Columbus faced a very large storm by comparing his *Journal* with a modern description of winter northers which "typically start with the wind veering to the South and Southwest (*Wednesday midday*). When the cold-front arrives the wind shifts suddenly to Northwest (*Wednesday afternoon*), then works through North (*Friday*) and blows itself out from Northeast (*Saturday*). In mid-winter this cycle takes several days...and varies...from brisk sailing breezes, through 20-25 knot winds, to anchor-rattlers."²⁸ Since the easterly tradewinds were not re-established until Wednesday, we can be sure that this was indeed a massive storm that drove Columbus to Long Island.

My second point is that the Cecil Jane translation may have distorted the translation of "el era poco y..." by assuming "viento" for the missing noun. However, this noun occurs 62 words earlier in a text which has subsequent masculine nouns. In fact, "tiempo" occurs only 5 words earlier and may make more sense in the face of a norther. Whatever the correct translation, we know that Columbus did *not* anchor that night, and that a huge high-pressure system was relentlessly pushing into the Bahamas. Therefore, we can be certain that he had access to high-velocity winds through most of the night.

Isabela (Long Island)

By now Columbus must have developed considerable confidence in his Indian guides, for he ran all night before the storm with unfurled sails at speeds that must have approached seven or eight knots.²⁹ By morning he was *at the end of the island to the south-east*, about 100 miles SSE of Mastic Point. That morning he *sailed before the wind* and extended his exploration well into the shoal water south of The Tongue of The Ocean. This day has by far the shortest entry in his *Journal*, reinforcing his implicit difficulties in sailing 60 miles across this shoal water. In contrast, the central route has Columbus averaging only three or four knots that windy night, and has no explanation of why he only sailed 10 or 15 miles the next day without any mention of shore explorations.

Dawn Friday, Columbus fanned out his fleet between ESE and SSE as he ventured from the Bahama Bank into the deep waters west of Long Island, far from the Egg Island home of his Indian guides. Before sailing three hours, they saw *an island to the east . . . and all three vessels reached it by midday*. (See Figure 6) They saw an “isleo” *pointing back towards Andros Island with a reef of rocks at the northern end and another between it and Long Island*. From there *the coast ran for twelve leagues to a cape (Cape Verde) which was round and in deep water with no shoals off it*. Columbus noted that this island was *higher than the others, had much water in the center, and had a sharply curving coast on its north-east side*. All of these clues fit the northern route. Few of them are congruent with the central route.

By Sunday morning the storm had blown itself out to the northeast. It was not until Wednesday when the tradewinds began to reassert themselves that Columbus was able to start his journey for Cuba. Here occurs the single clue which cannot be explained along the northern route, for Columbus recorded . . . *Cape Verde, in the island of Fernandina . . . lay to my northwest and was seven leagues distant from me*. This clue fits the central route pretty well, except that the south end of Long Island was really only five leagues distant, no such cape had been previously hinted at on the central route, and there was no valid reason for identifying this xerophytic limestone cape as “verde”. My northern route fits this clue not at all without my assumption that 70 leagues was miscopied as 7 leagues in this third-hand account. But after this assumption is made, the northern route provides an excellent fit because Mastic Point lies 70 leagues (exactly 4 degrees, each of 17.5 leagues) to the northwest, as shown in Figure 1, and fits the name “verde” perfectly.

Considering all the clues for Isabela, the central route comes out surprisingly well with a score that is essentially equivalent to that of the northern route. However, taking the scores for all four Bahama islands together, the northern route scored an impressive four-to-one advantage over the central route! Thus, Part II of the analysis remarkably converges to the same Egg Island landfall specified by the analysis in Part I.

PART III INDEPENDENT DATA SOURCES

Both contemporary latitude measurements strongly support the northern route. In his letter announcing the discoveries to Santangel,³⁰ Columbus describes them as being at 26 degrees, while 20 years later Ponce de Leon³¹ suggests greater precision in placing San Salvador at 25 degrees and 40 minutes. Consider that Egg Island is only 10 miles south of this latitude, while Watlings is 100 miles away, and the other candidates even further removed.

Another source is Ferdinand's biography³² of his father which describes San Salvador as 15 leagues in length with a peninsula which would have required "at least three days of hard rowing to round." This description does not come close to any of the candidates, most especially little Egg Island. However, it does correspond well with Eleuthera, which may have been accepted as the landfall location at the time of the biography. Such an extension in concept could also explain why Las Casas described San Salvador as having the shape of a large bean. For while Egg Island and some of the other candidates can be considered as vaguely bean-shaped by their advocates, only Eleuthera appears to have been so described by independent assessment.³³

Subsequent *Journal* entries along the coast of Cuba are as supportive of the northern route as they are of any of the central routes. In particular, on November 20 the 12-league distance from Isabela while sailing 25 leagues from Puerto del Principe³⁴ is as good a congruence with the southern end of Long Island (northern route) as with the Crooked-Acklins group (central route).

However, there is one very important document from 1537 which strongly supports the northern route while completely rejecting all others. The "Espejo de Navegantes" was compiled by Alonso de Chaves while he was pilot-major of Spain and certainly would have had complete access to the journals and maps of the explorers. While his description of Guanahani fits none of the candidates, it could be construed as the northern part of Eleuthera. However, Chaves describes "Samana" as being 8 leagues WSW of the landfall.³⁵ The physical description of "Samana" fits New Providence so perfectly as to rule out every other island in the Bahamas. Residents of Nassau know that they are very close to 8 leagues (25 miles) WSW of Egg Island, giving new and substantial support to the northern route. But the strongest support from Chaves is his description of "Triangulo" as an "isla de los Lucayos, son unos tres isletas puestas en trianulo al nordeste de Guanahani, y distaran de ella 2 leguas."³⁶ While this clue makes absolutely no sense at any of the other suggested landfalls, it fits Egg Island *perfectly*. For 6 miles to the NE of Egg Island's south beach are located the 3 islets named Russell, St. Georges, and Charles arranged along the legs of a triangle at Spanish Wells. (See Figure 7.) Not only do these islets fit geographically, but they fit functionally because Spanish Wells was so-named for the importance of its sweet water to Spanish seamen. This earned them a mention in the Espejo while scores of larger islands were ignored. This fortuitous mention provides strong independent confirmation of the Egg Island landfall from Parts I and II, while having an extremely negative affect on all of the other candidates.

SUMMARY

Columbus employed accurate latitude sailing to arrive at the mouth of Northeast Providence Channel according to his *Journal* entries. It follows

that Egg Island is a logical choice for San Salvador because it would have been the first land accessible to his fleet along the southern reefs of NEP. The extreme weight of evidence from the *Journal* also supports a route through the Bahamas from Egg Island to Cuba, and rescues Columbus's reputation as a precise navigator. Finally this route also fits the quantitative independent data sources far better than any other candidate route.

The single *Journal* entry that is totally at variance with the northern route is the description of a cape 7 leagues to the NW when it probably read 70 leagues to the NW in the original *Journal*. Geographers should not abandon the northern route because of this single mistranscription in the third-hand copy of the *Journal*. They should consider the weight of evidence rather than expecting a perfect match with an imperfect source document. If they did this, they would certainly conclude that there really was a landfall problem because of the overwhelming weight of evidence from all sources points to Egg Island.

Once this identification of the landfall is established, it is possible to clear up several mysteries that have previously clouded the history of the Bahamas. Knowing that Ponce de Leon's latitude measurements are accurate, we now realize that he must have returned to the Little Bahama Bank rather than entering the Gulf of Mexico. This means that his fight with the Indians took place not at Charlotte Harbor, Florida, but 400 miles to the east at Cherokee Point on Abaco! Finally, from the Chaves "Espejo", we can now confidently identify the early names of Bahama Islands such as New Providence, Abaco, Andros and Cat Islands. Thus correct identification of the landfall is not just a stimulating puzzle, but the keystone to Bahama's early history.

NOTES

1. Samuel Eliot Morison, *Admiral of the Ocean Seas*, vol. 1. (Boston, 1942).
2. Louis De Vorsey, Jr. and John Parker, eds., *In the Wake of Columbus — Islands and Controversy* (Detroit, 1985).
3. *Ibid.*, pp. 113-149.
4. Cecil Jane, trans., *The Journal of Christopher Columbus*, ed. L. A. Vigneras. appendix by R. A. Skelton (New York, 1960). Some of the simple words mishandled by Jane include *isleta*, *laguna*, *cabo*, and *golfo*, all which are vital to an exact reconstruction of the route followed by Columbus. Jane also occasionally mistranslates literal phrases as idioms when necessary to better fit the *Journal* to the officially accepted reconstruction of Morison.
5. Samuel Eliot Morison, *The European Discovery of America: The Southern Voyages* (New York, 1974). The Martin Behaim globe, reproduced on pp. 32-33, shows the twenty-eighth parallel slicing through the Canary Islands and northern Cipangu.

6. Samuel Eliot Morison, *The European Discovery of America: The Northern Voyages* (New York, 1971), p. 174.

7. *Ibid.*, p. 346.

8. Letter from Thor Heyerdahl to A. B. Molander, 8 June 1981.

9. Letter from Tim Severin to A. B. Molander, 17 May 1983.

10. G. J. Marcus, *The Conquest of the North Atlantic* (New York, 1981), p. 118.

11. C. Singer, et al., *A History of Technology, Vol. III, from the Renaissance to the Industrial Revolution, circa 1500-1750* (London, 1969), p. 544.

12. Letter from Samuel Eliot Morison to A. B. Molander, 17 November 1972.

13. Latitude sailing requires no knowledge of absolute latitude, only detection of latitude differences. Thus, the 30 minute horizon refraction errors reported by Bowditch, *The American Practical Navigator* (Washington, D.C., 1977) are of no concern in latitude sailing. However, small latitude sailing errors are introduced by random fluctuations in this refraction angle. Bowditch estimates the magnitude of these random variations at from two to three minutes of arc, tantalizingly close to the navigation accuracies achieved by Cabot and Cartier.

14. G. R. Tibbetts, *Arab Navigation in the Indian Ocean Before the Coming of the Portuguese*, a translation of the works of Ahmad b. Majid al-Najdi (London, 1971), p. 93.

15. The horizons can be calculated as 13 miles for the barren limestone hills and 8 miles for Rodrigo in the rigging of the Pinta, giving a detection range of about 20 miles in the clear daylight atmosphere of the Bahamas.

16. In May 1983 we made a comfortable overnight anchorage at French Bay. The next day we were dissuaded from attempting an anchorage in Fernandez Bay by the large swells that forced us to take refuge in the nearby man-made harbor.

17. Columbus later used the term *isleta* to describe 15 identifiable islets along the north shores of Cuba and Hispaniola. He never applied this term to islets having more than a couple square miles of area.

18. The biased translation of Cecil Jane renders this term as "lake", which is still a poor fit with the multitude of separate lakes shown on DMA Chart 26281.

19. William P. Mclean, Richard Kellner and Howard Dennis, *Island Lists of West Indian Amphibians and Reptiles*, Smithsonian Herpetological Information Service, No. 40 (1977). This reference indicates that no reptiles are now found on Egg Island.

20. While Columbus seems to have added the final two words for emphasis, Cecil Jane mysteriously renders this as "and its character", while Eugene Lyon, in his recent contribution to the *National Geographic* position (*A Columbus Casebook*, a supplement to "Where Columbus Found the New World") simply ignores these two words of emphasis. As every island

has an eastern side, it seems unlikely that the efficient text of Columbus would have wasted a dozen words to thus describe the landfall unless it truly did have a separate part which lay to the east.

21. There is no question that Royal Harbour fits the mold of the flask-shaped harbors that Columbus identified along the north coasts of Cuba and Hispaniola, while Graham's Harbour would have barely fit his criteria for anchorages. I have recently satisfied myself as to the suitability of Royal Harbour for a match to the large size described by Columbus. For, on December 21 he measures the harbour at Santo Tomas at 5 leagues, which corresponds closely with the length of protected anchorage in front of the harbor mouth, while the harbor proper is less than one league in length. I believe that Columbus was telling his sovereigns that all the ships of Christendom could have safely anchored on the Bank while waiting their turn for Royal Harbor.

22. Harry Kline, ed., *The Yachtsman's Guide to the Bahamas*, 22nd ed. (Miami, 1972). A map on page 181 shows a strong easterly set adjacent to the Egg Island anchorage which well could have impeded his headway through most of the morning.

23. Hurricane Hole on Paradise Island would have been a difficult anchorage to reach that afternoon with headwinds and a strong current now flowing against him in the Nassau Channel.

24. Cecil Jane incorrectly translates *golfo* as *channel* aware that the open ocean between Rum Cay and Long Island could in no sense be described as a gulf. Along the coasts of Cuba and Hispaniola, Jane is not constrained by Morison's reconstruction. He thus feels free to correctly render *golfo* in almost every subsequent use.

25. Maclean et al. list 20 species for Andros on page 13.

26. George Burbank Shattuck, *The Bahama Islands* (New York, 1905) restricts the Mastic tree to the northern islands of Eleuthera, New Providence and Andros on page 205 of their comprehensive description of Bahama flora. On the other hand, it describes the xerophytic growth of Long Island on page 239 and mentions on page 594 the once-thriving salt industry on Rum Cay and Long Island, hardly compatible with the growth conditions required for the forests that Columbus strolled through.

27. Morison, *Admiral of the Ocean Sea*, p. 243.

28. *Guide*, p. 18.

29. While Columbus only averaged about 4 knots on his trans-atlantic run, 8 of those days included periods of "calm". On those days in which he did not mention any "calm", he averaged almost 5 knots, assuming Morison's length for the league. On his best three days he averaged 2.5 leagues per hour (8 knots) *around the clock*, exceeding even this speed during the last 8 hours prior to the landfall. Surely, the massive high-pressure system then flowing into the Bahamas could have propelled him at average speeds of 6 or 7 knots through Thursday afternoon.

30. Cecil Jane, pp. 191-202.
31. Antonio de Herrera y Tordesillas, *Historia General de los hechos de los Castellanos en las islas i terra firma del mar oceano*, trans. Thomas Frederick Davis (Jacksonville, 1935), p. 16.
32. Fernando Colombo, *Historie del S. D. Colombo*, (Venice, 1571).
33. *Skindiving Magazine*, (September, 1981), describes Eleuthera as having the shape of “a snap bean pod”. On 1 November 1986, Ms. Consuelo Varela assured me that Las Casas was not describing an individual bean but, rather, “a green bean pod.”
34. Cecil Jane, p. 66.
35. P. Castaneda, M. Cuesta and P. Hernandez, *Alonso de Chaves y el Libro IV de su “Espejo de Navegantes*, Madrid, 1977, p. 87.
36. *Ibid.*, p. 88.

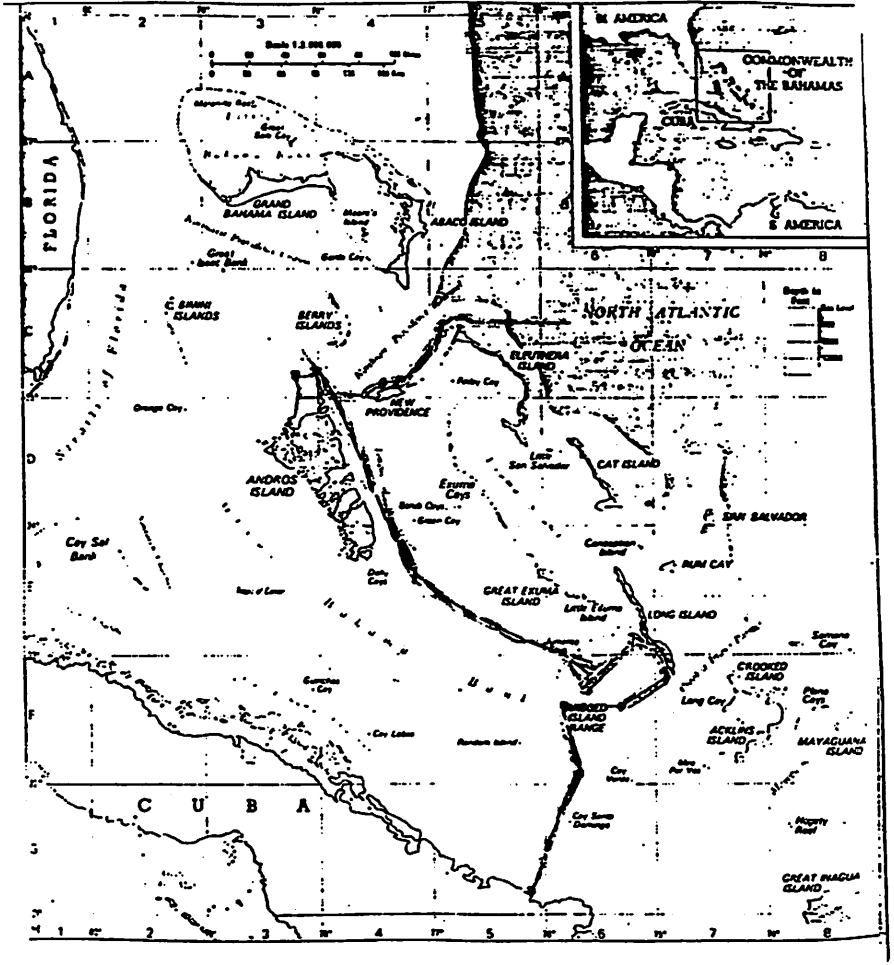


Fig. 1. The Route of Columbus — A Northern Viewpoint



Fig. 2. Northern Eleuthera

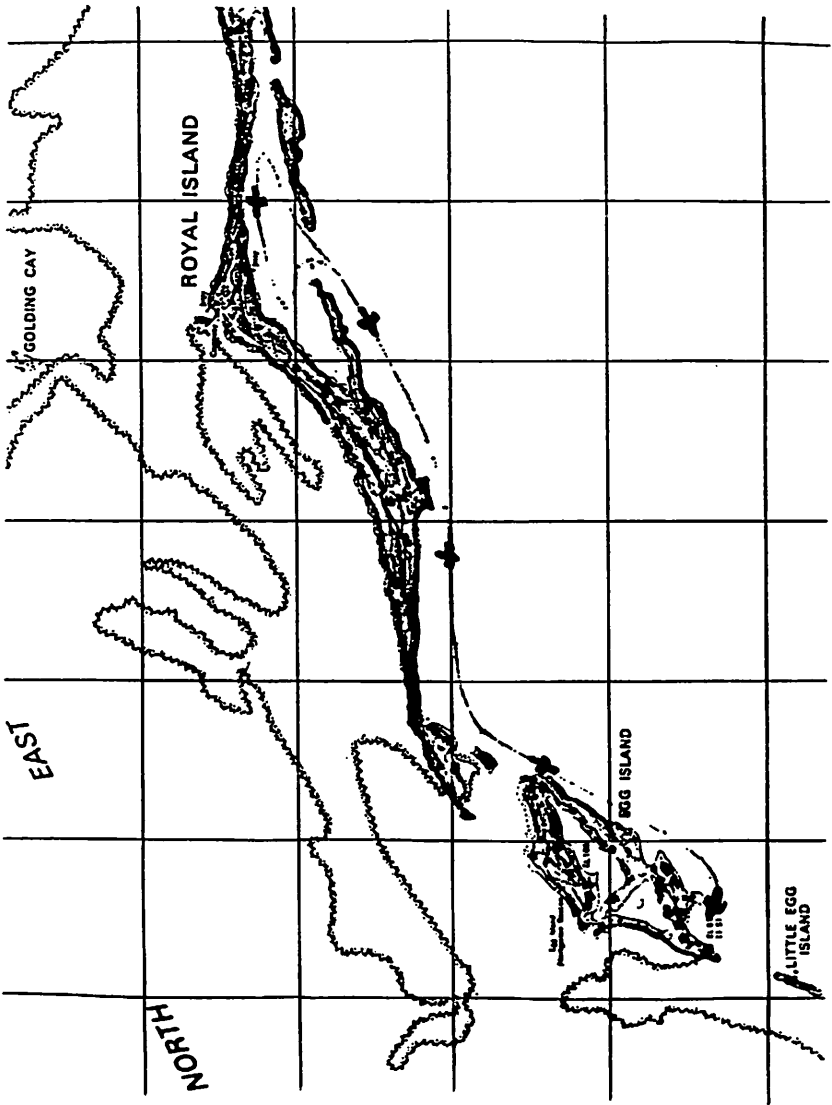


Fig. 3. Egg and Royal Islands (San Salvador)

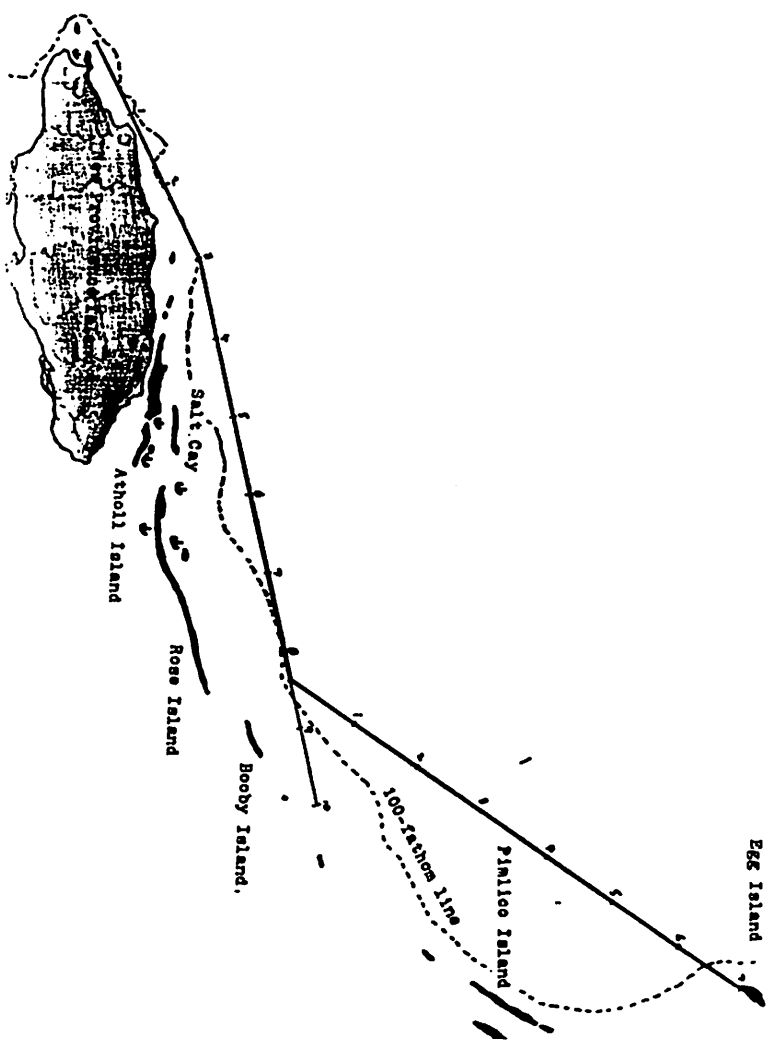


Fig. 4. New Providence (Santa Maria de la Concepcion)

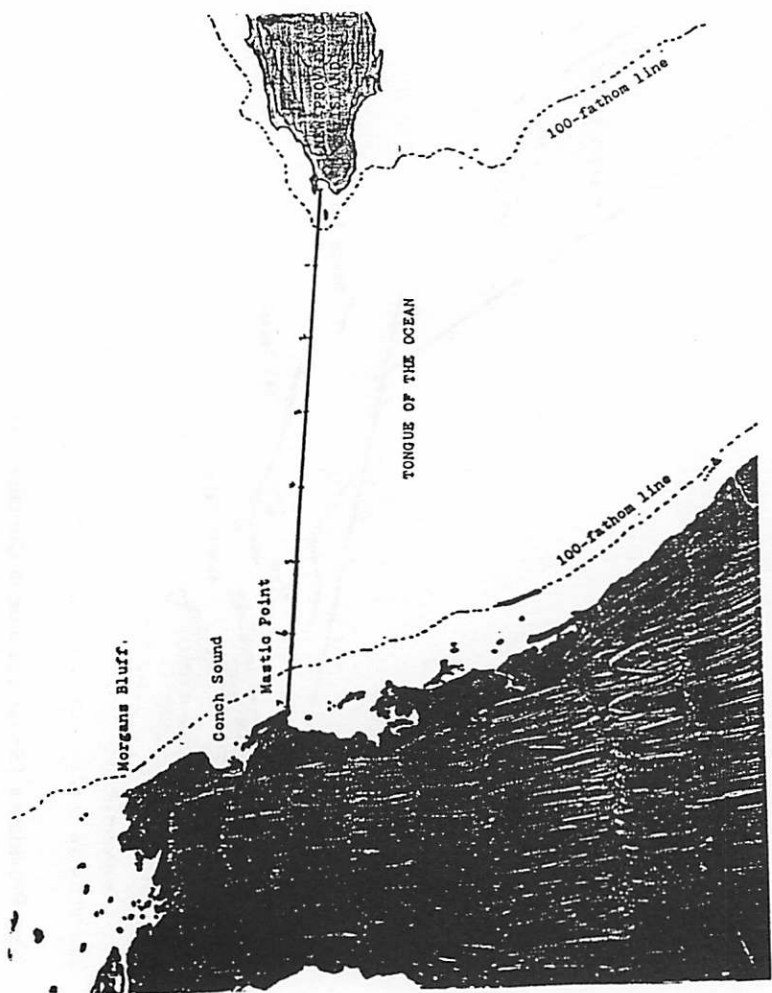


Fig. 5. Northern Andros (Fernandina)

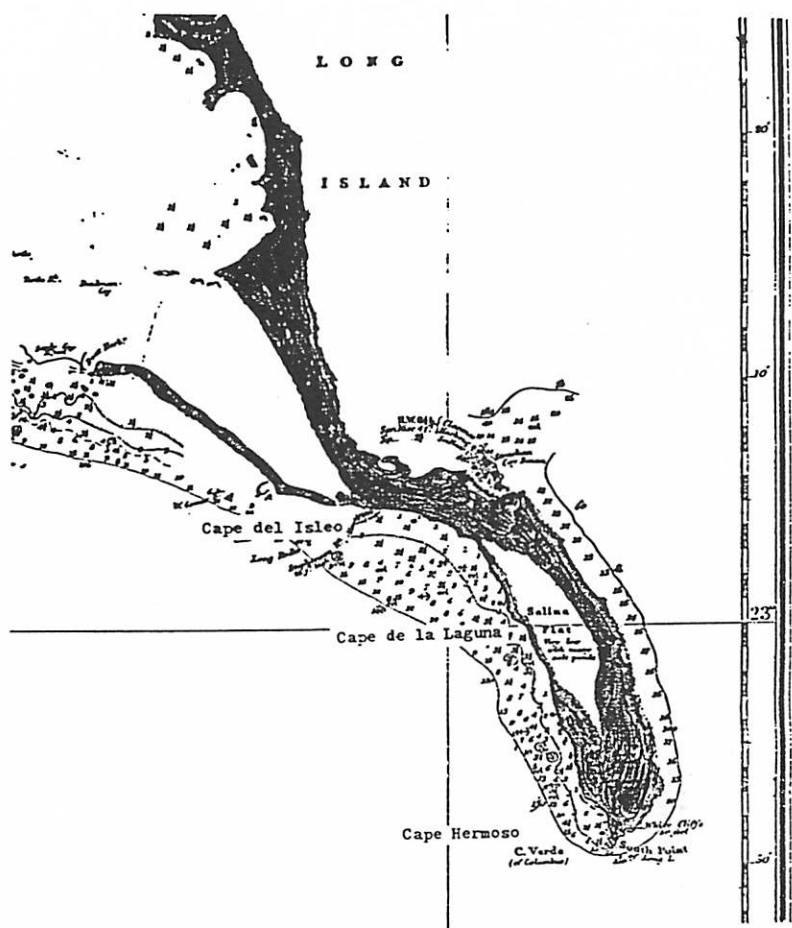


Fig. 6. Southern Long Island (Isabela)

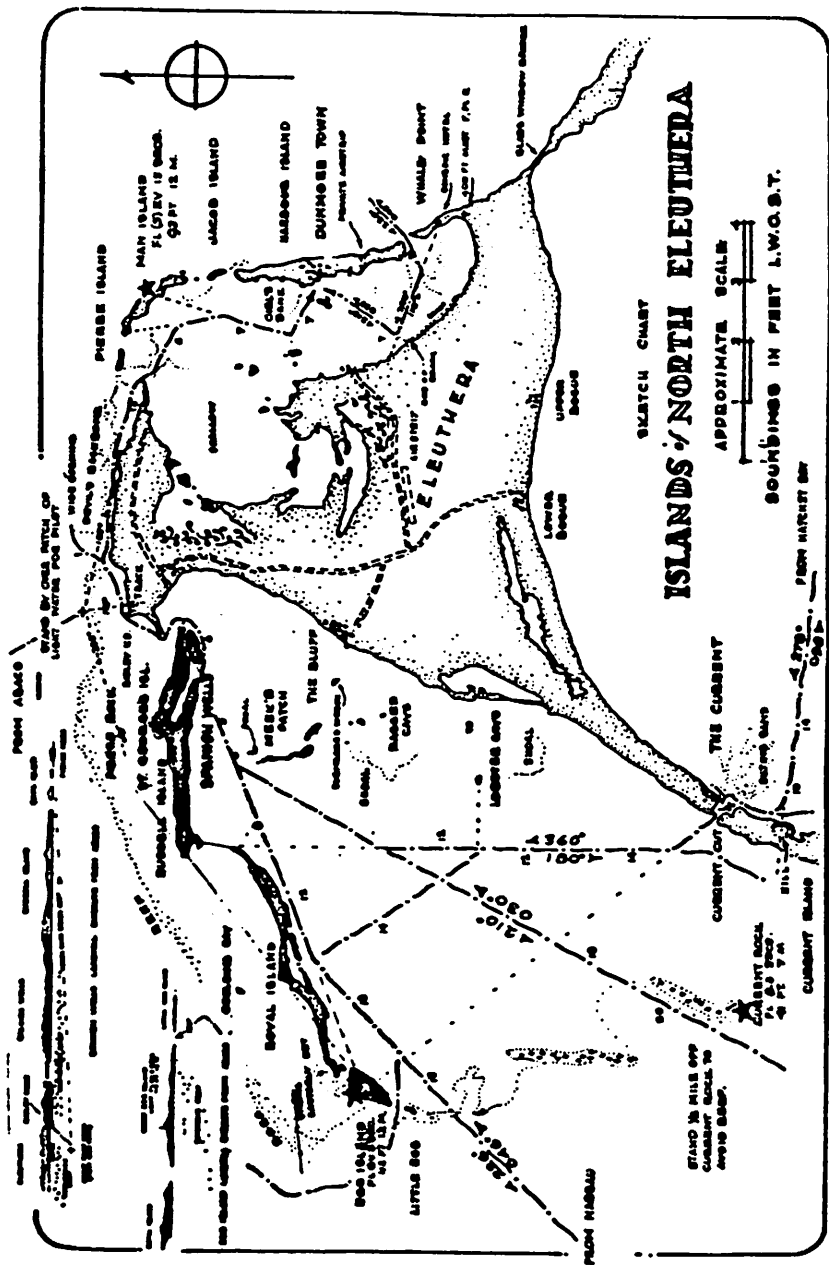


Fig. 7. Guanihani and Triangulo from Chaves

		CLUE WEIGHT		
		3	2	1
CLUE MATCHING	3	9	6	3
	2	6	4	2
	1	3	2	1

Fig. 8. Scoring Method used in Evaluating Alternative Route Reconstructions

Clue No.	Clue Description	Candidate Scoring		
		Northern Route	?	Central Route
S-1	Disputed Columbus sighting of light 36 nm before landfall sighting		2	
S-2	"...land appeared, at a distance of about two leagues from them."		3	
S-3	"...they reached a small island (isleta) of the Lucayos,"	4		
S-4	"which is called in the language of the Indians 'Guanahani'."		2	
S-5	"Immediately they saw naked people..."		1	
S-6	"...they saw very green trees and much water and fruit of various kinds."		1	
S-7	"...come here from the mainland (tierra firme) to take them for slaves."		1	
S-8	"I saw no beast of any kind in this island, except parrots."	4		
S-9	"...in one line from east to west from the island of Hierro in the Canaries."	6		
S-10	"...in boats which are made of a tree trunk like a long boat and all in one piece."		1	
S-11	"...going to south or going around the island to the south..."	4		
S-12	"...there was land to the south and to the southwest and to the northwest,"		3	
S-13	"So I resolved to go to the southwest (the following afternoon)..."		3	
S-14	"This island is fairly large and very flat."			4
S-15	"...in the center of it, there is a very large lake (laguna)..."		2	
S-16	"...(cotton) grows here on this island..."			2
S-17	"...went along the island in a NNE direction to see <u>la otra parte, que era de la otra del Leste que habia...</u> "	9		
S-18	"...I soon saw two or three villages..."		2	
S-19	"...some brought us water..."	4		

Fig. 9. Columbus Route Evaluation Summary

Clue No.	Clue Description	Candidate Scoring	
		Northern Route	Central Route
S-20	"...a great reef of rocks which encircled the whole of that island,"		2
S-21	"while within there is deep water (entre medias queda hondo) and a harbour large enough for all the ships of Christendom, the entrance to which is very narrow."	3	
S-22	"...inside the reef there are some shoals, but the sea is no more disturbed than the water in a well."	6	
S-23	"...a piece of land, which is formed like an island although it is not one, on which there were six houses; it could be converted into an island in two days..."	6	
S-24	"Near the said islet, moreover, there are the loveliest group of trees that I have ever seen; all green and with leaves like those of Castile in the months of April and May..."	2	
SAN SALVADOR SCORING SUMMARY		53	6
M-1	"I saw so many islands that I could not decide to which I would go first...they mentioned by name more than a hundred."	6	
M-2	"I sought for the largest (island)...it is 5 leagues away from this island of San Salvador, and of the others, some are more and some are less distant."	4	
M-3	"All are very flat, without mountains, and are very fertile; all are inhabited..."	1	
M-4	"I stood off that night, fearing to come to anchor before daylight, as I did not know whether the coast was free from shoals."	2	
M-5	"...and as the island was more than 5 leagues, being rather about 7,"		3
M-6	"...and the tide was againstme, it was mid-day when I arrived at the island."	6	
M-7	"...the side which lies toward the island of San Salvador runs N-S for a distance of 5 leagues, and the other side, which I followed, runs E-W for more than 10 leagues."	6	
M-8	"...from this island I saw another and larger to the west..."	6	

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring		
		Northern Route	?	Central Route
M-9	"I set sail to go all day until night, since otherwise I should not have been able to reach the westerly point (cabo del Oeste)."	6		
M-10	"...about sunset, I anchored off the said point (cabo)...My wish not to pass any island without taking possession of it...and I anchored there..."	9		
M-11	"...there now came from another direction (de otro cabo) another small canoe"	6		
M-12	"with a man who wished to barter a ball of cotton..."			1
M-13	"...all the coasts are free from rocks, except that they all have some reefs near the land under water..."		2	
M-14	"...the waters are always very clear and the depth can be seen."		2	
M-15	"At a distance of two lombard shots from land, the water off all these islands is so deep that it cannot be sounded."		3	
M-15	"I departed from the islands of Santa Maria de Concepcion when it was already midday..."	4		
SANTA MARIA DE CONCEPCION SCORING SUMMARY		56		4
F-1	"This island is distant from that of Santa Maria about 8 leagues, almost from east to west..."	3		
F-2	"...and this point (cabo) where I came, and all this coast runs NNW and SSE;"	6		
F-3	"It seems that on this side the coast may extend for some 28 leagues or more;"	4		
F-4	The island is very flat, without any mountains..."		2	
F-5	"Being in the middle of the channel (golfo) between these two islands..."	6		
F-6	"...I stood off and on all that night until day when I came to a village and anchored..."	6		
F-7	"...they brought us water...I sent the ships boat ashore for water, and they...showed my people where the water was and themselves carried the full casks to the boat..."	4		

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring		
		Northern Route	?	Central Route
F-8	"These people...seem to me to be somewhat more domesticated and tractable..."		1	
F-9	"I saw quite 20 leagues of it, but it did not end there..."		3	
F-10	"This island is very green and flat and fertile..."	2		
F-11	"I saw many trees...one branch has leaves like those of a cane and another leaves like those of a mastic tree, and thus, on a single tree, there are 5 or 6 different kinds..."	6		
F-12	"...there are some (fish) shaped like dories of the finest colors in the world, blue, yellow, red and of all colors...there are also whales."		4	
F-13	"I saw no land animals of any kind except parrots and lizards."		2	
F-14	"(Pinzon) told me that one of them had very definitely given him to understand that the island could be rounded more quickly in a north-northwesterly direction."	6		
F-15	"I saw that the wind would not help me for the course which I wished to steer and that it was favorable for the other course, and I sailed NNW."		3	
F-16	"...two leagues from the head of the island, I found a very wonderful harbor...with two mouths, since there is an islet (isleo) in the middle, and both mouths are very narrow, and within it is more than wide enough for a hundred ships, if it be deep and clear and there be depth at the entrance."	6		
F-17	"...I anchored outside it, and went into in with all the ship's boats, and we saw that it was shallow. And as I thought...that it was the mouth of a river..."		9	
F-18	"...showed us a village near there, where I sent the people for water...and as it was some distance away, I was kept there for the space of two hours."		4	
F-19	"There are here mastiffs and small dogs..."		1	

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring		
		Northern Route	?	Central Route
F-20	"Navigating so far to the NW that I discovered all that part of the island until the coast runs east and west."	6		
F-21	"...Indians repeated that this island was smaller than the island of Samoet and that it would be well to turn back in order to arrive at it sooner."			4
F-22	"I therefore turned back and navigated all that night in an ESE direction, sometimes due east and sometimes south-east...to keep clear from the land, because there were very thick clouds and the weather was heavy. There was little wind and this prevented me from coming to land to anchor."(el era poco)			3
F-23	"...it has rained, more or less, every day since I have been in these Indies..."	1		
F-24	"We are at the end of the island to the SE, where I hope to anchor until the weather clears..."	2		
FERNANDINA SCORING SUMMARY		82		7
I-1	"When the weather had cleared, I sailed before the wind and continued the circuit of the island when I could do so, and anchored when it was not well to navigate. But I did not land, and at dawn I set sail."			6
I-2	"...sent the caravel Pinta to the ESE, and the caravel Nina to the SSE, while I in the ship went to the SE...before we had sailed for 3 hours, we saw an island to the east... and all 3 vessels reached it before midday,"		3	
I-3	"at its northern point, where there is an islet (isleo) and a reef of rocks on its seaward side to the north (fuera de él al Norte) and another between it and the main island...and said islet (isleo) lay on the course from the island of Fernandina, from which I had navigated from east to west."		3	
I-4	"Afterwards the coast ran from that islet (isleo) to the west and extends for twelve leagues to a cape, which I named Cape Hermoso."	9		

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring		
		Northern Route	?	Central Route
I-5	"It is on the west coast...round and in deep water, with no shoals off it. At first the shore is stony and low, and further on there is a sandy beach...there I anchored this night, Friday, until morning."	4		
I-6	"All this coast, and the part of the island which I saw, is mainly a beach;"		2	
I-7	"the island is the loveliest thing that I have seen...It has many trees, very green and tall,			1
I-8	"and this land is higher than the other islands which have been discovered. There is in it one elevation, which cannot be called a mountain, but which serves to beautify the rest of the island,"		2	
I-9	"and it seems that there is much water there in the center of the island."			4
I-10	"On this north-eastern side, the coast curves sharply (de esta parte al Nordeste hace una grande angla)..."	6		
I-11	"I wished to anchor there...but the water was of little depth and I could only anchor at a distance from the shore,		2	
I-12	"and the wind was very favorable for reaching this point (cabo) where I am now lying at anchor..."		2	
I-13	"...many herbs and many trees which will be of great value in Spain for dyes and as medicinal spices..."		1	
I-14	"There is no village except further inland."		1	
I-15	"I believe that it is an island separated from that of Samoet, and even there is another small island between them."	4		
I-16	"Today, at sunrise, I weighed anchor from... the south-west point (cabo) of this island of Samoet, to which I gave the name <u>Cape de la Laguna</u> ..."		3	
I-17	"...in order to steer to the northeast and east from the southeast and south (para navegar al Nordeste y al Leste de la parte del Sueste y Sur)."			3

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring	
		Northern Route	Central Route
I-18	"I found the water everywhere so shallow that I could not enter or navigate to that point, and saw that, following the route to the southwest (del Sudueste), it would be a very great detour."		3
I-19	"Therefore I determined to return by the way which I had come, to the NNE from the west (del Nornordeste de la parte del Oeste) and to round this island in that direction."		3
I-20	"At ten o'clock I arrived here at this <u>Cape del Isleo</u> and anchored..."		3
I-21	"...only a single house...There are very extensive lagoons, and by them and around them there are wonderful woods..."	2	
I-22	"...flocks of parrots darken the sun, and there are large and small birds of so many different kinds and so unlike ours..."		2
I-23	"As I was going round one of these lagoons, I saw a snake, which we killed...it is seven palms in length (56 inches)..."		2
I-24	"Here I recognized the aloe, and tomorrow I am resolved to have ten quintals brought to the ship..."		2
I-25	"...in search of very good water, we arrived at a village near here, half a league from where I am anchored...I asked him for water; and after I had returned to the ship, they came presently to the beach with their gourds full...I was anxious to fill all the ships casks with water here..."		2
I-26	"I shall presently set out to go round the island...after that I wish to leave for another very large island, which I believe must be Cipangu...They call it 'Colba'..."		2
I-27	"Beyond this island, there is another which they call 'Bofio'(Hispaniola)...The others, which lie between them (son entremedio), we shall see in passing..."	2	
I-28	"But I am still determined to proceed to the mainland and to the city of Quisay."		2
I-29	"They brought...some skeins of cotton..."		2

Fig. 9. (continued)

Clue No.	Clue Description	Candidate Scoring	
		Northern Route	Central Route
I-30	"We took water for the ships in (en) a lagoon which is here near Cape del Isleo..."		2
I-31	"I see that here there is no goldmine..."		1
I-32	"I weighed anchor from...Cape del Isleo, which is on the north side (de la parte del Norte) where I had stayed..."		3
I-33	"...they indicated to me that I should steer WSW to go there. This I am doing..."		3
I-34	"...little wind until after midday, and then it began to blow very gently...until night-fall, when Cape Verde, in the island of Fernandina, which is on the south side in the western part (de la parte de Sur a la parte de Oueste) lay to my northwest and was seven leagues distant from me..."		9
I-35	"...that night we made less than two leagues ...After sunrise...made five leagues. Afterwards he changed the course to west...and went (11 leagues). They then sighted...7 or 8 islands in a row, all lying north and south. They were five leagues distant from them, etc."		6
ISABELA SCORING SUMMARY		35	37

<u>SCORING TOTALS</u>	<u>Northern</u>	<u>Central</u>
San Salvador	53	6
Santa Maria	56	4
Fernandina	82	7
Isabela	35	37
	226	54

Fig. 9. (continued)

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