

VILHJALMUR STEFANSSON



*Franklin*

# ULTIMA THULE

FURTHER MYSTERIES *of the* ARCTIC

## **\* A Distributed Proofreaders Canada eBook \***

This eBook is made available at no cost and with very few restrictions. These restrictions apply only if (1) you make a change in the eBook (other than alteration for different display devices), or (2) you are making commercial use of the eBook. If either of these conditions applies, please check with a <https://www.fadedpage.com> administrator before proceeding. Thousands more FREE eBooks are available at <https://www.fadedpage.com>.

This work is in the Canadian public domain, but may be under copyright in some countries. If you live outside Canada, check your country's copyright laws. **If the book is under copyright in your country, do not download or redistribute this file.**

*Title:* Ultima Thule: Further Mysteries of the Arctic

*Date of first publication:* 1940

*Author:* Vilhjalmur Stefansson

*Date first posted:* Sep. 8, 2019

*Date last updated:* Sep. 8, 2019

Faded Page eBook #20190915

This eBook was produced by: Stephen Hutcheson & the online Distributed Proofreaders Canada team at <https://www.pgdpcanada.net>



VILHJALMUR

**ULTIMA  
THULE**

STEFANSSON

By  
VILHJALMUR STEFANSSON

My Life with the Eskimo, 1913  
Anthropological Papers (American Museum of Natural  
History), 1914  
The Friendly Arctic, 1921  
Hunters of the Great North, 1922  
The Northward Course of Empire, 1922  
The Adventure of Wrangel Island, 1925  
My Life with the Eskimos (abridged), 1927  
The Standardization of Error, 1927  
Adventures in Error, 1936  
The Three Voyages of Martin Frobisher, 1938  
(With collaboration of Eloise McCaskill)  
Unsolved Mysteries of the Arctic, 1938  
Iceland: The First American Republic, 1939  
The Problem of Meighen Island, 1939  
Ultima Thule, 1940  
Greenland, 1942  
The Friendly Arctic (new edition), 1943

BOOKS FOR YOUNGER READERS

(In collaboration with Violet Irwin)

Kak, the Copper Eskimo, 1924  
The Shaman's Revenge, 1925  
The Mountain of Jade, 1926

(In collaboration with Julia Schwartz)

Northward Ho!, 1925

# ULTIMA THULE

## *Further Mysteries of the Arctic*

By VILHJALMUR STEFANSSON

*Illustrated by Alexander Popini*

NEW YORK      1944  
THE MACMILLAN COMPANY

*Copyright, 1940, by*  
THE MACMILLAN COMPANY.

All rights reserved—no part of this book may be reproduced in any form without permission in writing from the publisher, except by a reviewer who wishes to quote brief passages in connection with a review written for inclusion in magazine or newspaper.

*Set up and electrotyped.*  
*Fourth Printing.*

SET UP BY BROWN BROTHERS LINOTYPERS  
PRINTED IN THE UNITED STATES OF AMERICA  
AMERICAN BOOK—STRATFORD PRESS, INC., NEW YORK



# CONTENTS

	PAGE
<a href="#"><u>PYTHEAS AND ULTIMA THULE</u></a>	1
<a href="#"><u>DID COLUMBUS VISIT THULE?</u></a>	109
<a href="#"><u>WERE PYTHEAS AND COLUMBUS RIGHT ABOUT ARCTIC CLIMATE?</u></a>	255
<a href="#"><u>BIBLIOGRAPHY</u></a>	363
<a href="#"><u>INDEX</u></a>	367



# MAPS AND ILLUSTRATIONS

PLATE	PAGE
I. <a href="#">Ancient Greek Merchantman</a>	viii
II. <a href="#">The world according to Herodotus</a>	20
III. <a href="#">Itinerary of Pytheas according to Broche</a>	21
IV. <a href="#">Umiak with forty-nine Eskimos</a>	<i>facing</i> 46
<a href="#">Inside of umiak</a>	<i>facing</i> 46
V. <a href="#">Drawing of Irish skin boat</a>	<i>facing</i> 47
<a href="#">Modern Eskimo skin boat</a>	<i>facing</i> 47
VI. <a href="#">Ancient Greek war galley</a>	76
VII. <a href="#">St. Christopher with the Christ-Child</a>	108
VIII. <a href="#">Map of the North based on Claudius Clavus</a>	126
IX. <a href="#">Sigurd Stefansson map</a>	128
X. <a href="#">Ptolemy's farthest North and West</a>	144
XI. <a href="#">Langlois' map of the North Atlantic</a>	163
XII. <a href="#">The North Atlantic, according to Juan de la Cosa</a>	201
XIII. <a href="#">The northern limit of life and of habitability according to certain geographers</a>	224
XIV. <a href="#">Conception of the globe, according to Crates of Mallus</a>	238
<a href="#">Conception of the zones, according to Macrobius</a>	238
XV. <a href="#">Map of the world, according to Petrus Vesconte</a>	239
<a href="#">Conception of the world in Iceland and Norway, 12 14 centuries</a>	239
XVI. <a href="#">Arctic sun-bathing</a>	<i>facing</i> 344

XVII. Map showing 1917 and 1938 limits of Soviet  
agriculture

349

**PLATE I**



# Ancient Greek Merchantman.

# PYTHEAS AND ULTIMA THULE

## INTRODUCTION

Pytheas, around whom centers the question of Thule, was considered for two thousand years the champion liar of antiquity. After perhaps the most overdue of rehabilitations, he is now in our books and belief an outstanding leader in Greek science and a foremost explorer—the earliest of the known great explorers. If he appears to us less than Columbus in some ways he appears greater in others, particularly as a scientist. He has been referred to as a Columbus with a flavor of Darwin; he appears to have been more nearly a composite of James Cook and Galileo.

Pytheas, though his reputation fell to the lowest depths within three centuries after his death, was seemingly honored throughout his lifetime by his home town, the Greek colonial city of Massilia that is now Marseilles—honored primarily as a scientist but also as a truthful explorer who had a great journey to his credit, about which he wrote at least one book. He may have been similarly respected by the whole contemporary Greek world, in so far as his fame had spread, although the highbrow Greece that we think of as typified by Athens may have been skeptical about him from the start; for Athens was a stronghold of philosophy, with doctrine tending to rank as fact. And it was philosophy that robbed Pytheas of his reputation, to make his name a by-word of two millenniums.

However, the travel report of Pytheas, and not his scientific work done at home in Massilia, was what the philosophers denounced. Indeed, writers kept exclaiming for twenty centuries how strange it was that a man who had been respected by all who knew him, until he began to travel, should have developed into an egregious liar as soon as his vessels got north beyond the countries familiar to the Mediterranean world.

The statements which made Pytheas a Munchausen to the Greeks are so commonplace now that we find it hard to grasp why anyone should ever have disbelieved them. He reported that as he traveled north to the extremity of Britain, and beyond its north tip for a six-day ocean voyage to Thule, he met conditions only a little different from those of Mediterranean countries. The people he saw all had two legs, instead of being unipeds. They milked and tended their farm animals somewhat as the peasants did in Greece. There was threshing of corn and a making of it into bread and into beer. The ocean was no more frozen to the bottom than the land was perpetually snow-covered; even well beyond Britain he had seen no proof that he was approaching boundaries of animal and plant life. The sun had power even in Thule to change a tolerable winter into a summer warm enough for the purposes of man.

To the Mediterranean world these allegations were patent lies. They fell between two stools. The learned had theories according to which such things could not possibly be true; the populace had lore according to which they could not be true either. Pytheas can have made friends in neither camp. We do not know just what the populace said of him, for their opinions

died with them or lived vague and changed in folk memory. The opinions of the scholars were preserved in books. What they were in general we shall indicate as we follow the particular theme of our investigation, the dispute on what country, if any, Pytheas reached by a six-day ocean voyage beyond the north tip of Scotland.

As a background for solving the problem of Thule we must describe, in so far as bears on Pytheas, the Mediterranean world of 340 B.C. We must describe his city, Massilia, and bring out why that Greek community was better fitted to believe in and trust Pytheas than was the rest of the Greek world. We must show why it was that later ages were even more skeptical than his own century. Finally, we must discuss Pytheas himself—villain of twenty centuries, hero to our own.

After defeating the Persians in the fifth century B.C. the Greeks developed swiftly both in real importance and in the feeling that they were important. They had become distinctly *the* people; the rest of the world were barbarians. They did, true enough, sometimes look up to the same people they looked down upon—in Egypt, for instance, they sensed a hoary wisdom.

Only a small tract was, properly speaking, real to the Athenian Greeks. It did not extend west materially beyond the Pillars of Hercules; it went a little way south into Africa and east into Asia. North into Europe it went scarcely beyond the Alps or beyond the hinterland of the Black Sea.

Upon the small patch of earth which they knew, and upon a



great faith in the power of the human intellect, the Greek philosophers built tenets of geographical and astronomical doctrine which to them admitted no contradiction and which, therefore, made it impossible for them to believe much of what we find in their own literature and which we are frequently tempted to consider was their knowledge.

We must keep steadily in mind while working on the Pytheas question that, to the Greek philosopher, a statement which conflicted with accepted belief was not fact but folklore.

From Pythagorean times the earth had been spherical to learned Greece. Their ideas were similar to ours on how the sun warms the earth, with the important difference that, at least in earlier times, they thought it much closer to the ground. From 400, or perhaps 500 B.C., it was considered known that life is impossible because of the heat if you go too near the sun, and impossible because of the cold if you go too far away from it.

“Too near” and “too far” became approximate mileages on the surface of the earth. At least a majority of the Greek cosmographers felt their own country was at about the right distance from the sun—the weather was sometimes too warm and sometimes too cold but, on the whole, comfortable and certainly livable. But if you went south from Greece into Africa you would come to where it was distressingly hot because of nearness to the sun; if you tried to go farther you would die from the heat. Beyond was a lifeless region where the rocks were burning hot and the water, if any, scalding. Similarly, traveling north from Greece you would arrive where it was distressingly cold because the sun was too far away;

beyond that you would die.

It was, then, a fundamental of Greek thinking that just as life was impossible too near the sun because of the heat, so was it impossible too far from the sun because of the cold. At one period the philosophers believed that the southern boundary of the eternally silent and dead Frozen North would be up in Scythia, about where we now think of central Russia. Three hundred years after Pytheas, Strabo considered the northern edge of life to be just on the far side of the British Isles.

With their doctrines of symmetry and balance, and with an assumed knowledge of where the sun was, how high it was, and how its temperatures affected the temperature of the earth, there was bound to be on the south side of the Burning Tropics another Temperate Zone. It would be for all time a matter of theory to the Greeks whether this had plants, animals and people; for no one could ever cross the Burning Tropics. Similarly demonstrable, though unreachable, was another Frozen Zone in the remote south.

That approximately this was the orthodox Greek belief is clear from the record—see, for instance, J. K. Wright's *Geographical Lore of the Time of the Crusades*. We are, then, patently wrong when we say that the Greeks knew that the Phoenicians had crossed the Torrid Zone—they knew there were such stories but they did not take them seriously; and you do not properly speaking know a thing just from hearing the truth about it unless you also believe what you hear. The yarns of African circumnavigation in their own literature were to the Greek philosophers, and to the learned men of Europe who followed them all the way down to Prince Henry the Navigator

in the fifteenth century, mere folk tales. In so far as these stories implied crossing the Tropics, they were to the Greeks no more credible than Jack's beanstalk is to us.

The world properly knowable by hearsay to the Greek philosophers was, then, restricted to those countries which they could convince themselves would lie north of the Burning Tropics and south of the Frozen Arctic. If a tale seemed to come from too far south, or from too far north, either it had to be disbelieved entirely or else it had to be adjusted by supposing that the northing or southing had been exaggerated.

However, it was only the learned who would have to disbelieve Pytheas by the compulsion of the theory about the earth being divided into five zones—one uninhabitable because of nearness to the sun, two habitable because they were at a moderate distance, and two uninhabitable because they were too far away from the sun.

To accept the truth with regard to the Far North must have been, however, nearly as difficult for the simple as for the erudite, though because of a different reason. Certain lore which was fact to them differed from the truth as much as did the philosophy of the scholars. In folk belief the cold winds blew not from a frozen zone in the north that surrounded the Pole equally in all directions, but from the Rhipaeen Mountains, a range only moderately far north in Europe, beyond which, if you could penetrate that far, you would find an earthly paradise with caressing airs, golden fruit, and one-legged people, the Unipeds, who had many agreeable qualities and strange ways, such as not properly growing old but just making way for the next generation by committing

suicide at the right time.

We say here, perhaps unnecessarily, that our sketch does not attempt a profound analysis of Greek folklore or of Greek geographical views. In our brief statement we dispense with most of the qualifying and give, in broad strokes, merely that part of the intellectual background of the Greeks which made it hard for them to believe what Pytheas told about his northern voyage.

It should not be difficult for us to sympathize with the classic world, for there is still so much Greek philosophy in our thinking that many even today find it difficult to believe simple reports concerning the North. For instance, as recently as the summer of 1937 the man in the street was surprised at the newspaper dispatches which came from Papanin and his Soviet expedition by radio—as, for instance, that it was raining at the North Pole, that birds were flying around the camp, that bears were prowling with their young cubs, that seals were sporting between the ice floes, that the water in the leads was thick with shrimps, and that the traps and nets of the scientists brought animals and plants to the surface of the polar ocean from all depths, showing a life gradient down towards the sea bottom like that of the more southerly oceans. The difficulty we had in believing Papanin's description of the immediate vicinity of the North Pole was of one root with the difficulty Greeks and Romans had two thousand years ago in believing the Pytheas account of the lands and seas north of Britain. These two millennia have been continuously obsessed with the doctrine that there is a region in the Far North so distant from the sun that neither plants nor animals can thrive there.

That Greek philosophy has a stronger hold upon our thinking even now than do the findings of modern science can be reinforced by many examples. Those which relate to heat and cold are specially pertinent and we develop two of them here; for in a study of the Thule problem it seems less dangerous to overemphasize than to understate this part of the evidence.

It was a tenet, or at least an inevitable deduction, of Greek philosophy that in the ocean, as well as upon the land, animal life would decrease in quantity northward because of decreasing warmth until there came a limit where all of it disappeared. Beyond lay a vast zone of death which, as we have said, was thought by Strabo to begin just north of Scotland. Against this philosophical doctrine was placed, at least as early as Sir John Murray when he formulated the results of the *Challenger* voyages more than fifty years ago, the scientific conclusion that ocean animal life has the smallest tonnage per unit of water at the equator and that the quantity of animal life per unit of ocean increases on the average as you go away from the equator.

By the square contradiction which Murray posed between Greek philosophy and modern science we can determine which of the two has the stronger hold upon us. According to the Greek deduction, life was not to be expected in the ocean at the North Pole; according to the findings of the *Challenger* voyage, and of all subsequent studies of oceanography, life was to be expected there. Now it is within the personal knowledge of every reader of this book that practically all his friends were surprised (as we have just said) when the 1937 explorers reported from the North Pole an abundance of life. So your friends and mine were basing their thought upon

ancient philosophy and not upon modern science.

For our second test between philosophy and science we pass from the ocean to the land and choose from the scores of examples which are available the contradiction that according to ancient Greek View it would be surprising to find July temperatures of  $100^{\circ}$  in the shade anywhere north of the Arctic Circle, while according to the scientific view such midsummer temperatures are to be expected upon Arctic lowlands that are far from the sea. Try that one out on your friends, perhaps by telling them that the U.S. Weather Bureau has reported  $100^{\circ}$  in the shade in midsummer at Fort Yukon, Alaska, which is a few miles north of the Arctic Circle and which fulfills the condition of being on lowland, remote from the sea.

If you find most of your friends either surprised or incredulous of  $100^{\circ}$  in the shade July temperatures in Arctic Alaska you will have your own proof that the average American, more than half a century after we bought Alaska from the Russians, still pictures its climate in terms of Greek theory rather than either through reports of those who have been there or through the findings of modern science.

So it may be the reverse of strange that the Greeks, disciples if not inventors of the belief that life can exist in only two of the earth's five zones, should find it impossible to credit Pytheas when he was telling them concerning one of these hypothetically lifeless zones not things which he had deduced from a philosophical concept but things he had seen, or had learned from dependable hearsay. For remember, the learned Greeks "knew" not merely that the sea where Pytheas claimed

to have navigated a ship was frozen to the bottom and that the countries from which he had reported living things were lifeless, but also that Pytheas himself could not have stayed alive if he had gone where he claimed to have gone.

As we have said, the part of the Greek world that appears to have been least hampered in believing the reports of Pytheas was his home town. That was because of its past history and present connections.

Massilia seems to have started as a Phoenician trading post, for its name is Phoenician, meaning "Settlement." It became Greek around 600 B.C. when it was taken over by Phocaeen sailors from Asia Minor, the foremost seamen of the Greek world.

It is thought that Massilia increased in size considerably around 534 B.C. when the Persians conquered the Phocaeans and when, likely enough, a good many of their people fled to the prosperous western city which spoke their language and knew their institutions.

Communities dependent on Massilia grew into a chain along the northern Mediterranean coast, forming a kind of empire from Nice to Spain. By the fourth century B.C. she had been successful in war against the Etruscans and against the Carthaginians; she was friendly with the Celts that dwelt inland to the north, and, for the time, may have been friendly with Carthage. She was an ally of Rome.

In the time of the voyage to Thule, Massilia was trading with the entire Hellenic world. She also traded northward deep into



present France, and may have colonized sporadically. Around 340 B.C., Massilia is thought to have had treaties with the nations of the interior; certainly she was receiving commodities from the north, among them, amber, tin, copper. The traffic in tin was continuous and thriving, the metal coming from the mines in Cornwall to the Breton coast and thence by river transport to Massilia. By hearsay or by personal knowledge of their commercial agents, there would have been considerable information regarding conditions round about the English Channel, and a keen desire for further details. By their overland journeys and northern trade affiliations they must also have known the Baltic coasts pretty well, directly or through hearsay, by the fourth century B.C., if not earlier. Furs were an article of trade, moving south from remote northern lands to the Mediterranean. And why not? In our own day, summer furs have had a strong hold at least as far south as Rome.

Thus in the latter half of the fourth century, the time of our story, Massilia was at the zenith of her wealth and power. The town was favorably situated; its walls were strong; its harbor was excellent; the people are thought to have retained an exceptional purity of Greek culture and blood. They had brought with them from Phocaea a leadership in seafaring and had developed this not only along “practical” but also along theoretic lines—they were pioneers in the application of mathematics and astronomy to navigation. Foremost of their leaders in that field was Pytheas.

These inheritors of Phocaea also had Spartan slants to their culture. They maintained a strong army and a ready navy. Their military power bears on our case for, according to some,

the exploratory voyage of Pytheas started out by running the Carthaginian blockade of the Strait of Gibraltar; or possibly the explorers had an armed convoy that accompanied them openly by the Pillars of Hercules.

Carthage had long been able to maintain a firm control of the Strait, bottling up the seafarers of the Mediterranean so they had no access to Atlantic commerce. Important in this commerce was the tin trade with the Cassiterides, which route Carthage exploited steadily and wished to keep for herself alone. Then there would be the further motive of reserving for exploitation the Celtic and African coasts that were known to the Carthaginians from the Himilco, Hanno and doubtless other voyages the results of which had been kept secret from the Greeks.

But Carthage did not rely solely on her blockade of the Strait of Gibraltar; she sought to discourage attempts to evade or force the blockade by circulating terrifying stories of impassable seas, filled with horrifying monsters. These tales doubtless had some effect upon the Greeks, but they must also have stirred in them curiosity and skepticism—they had heard rumors of certain Phoenician voyages and would be prepared to discount the alleged terrors at least to that extent. Besides, Malye thinks, the Massilians were on good terms with the Spanish populations, from whom they must have picked up considerable information about the ports of the western coast of Spain, and this would help them further towards discounting the fearsome Carthaginian tales. Such information as the Massilians received would have made those enterprising sailors long for more, and they would be eager to explore the whole maritime route from Massilia to the

Cassiterides. They would chafe at a blockade which kept them prisoners within the Mediterranean. So there may have been attempts before Pytheas to force a way to the Atlantic. However, if any succeeded, the records have been lost.

Then, says Malye, one suddenly hears “that a Massilian navigator, Pytheas, has doubled the famous Pillars of Hercules, has made without obstruction the longest voyage yet known from antiquity and then has returned to Marseilles without difficulty. . . . What had happened?”

It has been suggested, as for instance by Malye, that perhaps there was in just the Pythean span of years no blockade to run, no need for an armed convoy. He believes there is evidence to make it probable that the spectacular rise of the Macedonians to power over the Greek and adjacent lands, and the reverses suffered by the more easterly Phoenician cities, hypnotized Carthage into believing that Greek domination, as represented by Alexander the Great, was inevitable. Perhaps just for this reason, and perhaps in addition because Massilia had refrained from supporting the Sicilian Greek communities in their struggle with Carthage, there may have been a special indulgence from Carthage towards the Massilian Greeks, so that to them was now available not merely a permitted exit through the Strait of Gibraltar but also a series of friendly introductions to the string of Phoenician, or Phoenician-influenced, cities north along the west coasts of Europe all the way up to the tin mines of Cornwall.

It is certainly true that there is in the preserved records no indication that Pytheas met hostility at the Strait or anywhere along the whole European west coast, either going or

returning.

We know there was a rigorous Carthaginian blockade of the western mouth of the Mediterranean just before Pytheas, and also just after him. The blockade which followed after will be among the causes for the discredit which fell on his memory. For had the Greeks been free to repeat his voyage they would have found substantial truth in his narrative. Thus, except for the Carthaginian barrier which fenced off the Atlantic from the Greek world during a long time after Pytheas, he would have been a Columbus to the Greeks, having opened to them a new world.

Deprived of the chance to make voyages which would have confirmed the findings of the Thule explorers, the Greeks relied upon their system of philosophy which, as we have seen, contradicted the narrative and descriptions of Pytheas.

We can now recognize it as the hard luck of the Greeks, and one of the serious handicaps which their philosophy placed upon the development of Europe, that neither the third century, nor many centuries thereafter, doubted the necessary truth of principles which made it necessary to consider Pytheas a liar.

But, of course, we are not saying that Greek philosophy, as a whole, was a handicap to Europe. We are merely saying that those paragraphs of it which made a belief in Pytheas impossible were bars to progress.

By the time of Massilia's western preeminence the cited theories of climate had crystallized in Greece proper into philosophical doctrines according to which, among other

things, the ocean to the north of France was frozen and lifeless. Knowledge by the Massilians that this doctrine was not true for the Baltic Sea, a by-product of their overland commerce with northerly France, may have been the moving cause that sent Pytheas north.

What we have just said about Massilia is a blend of known facts and reasonable conjecture. What we are about to write on Pytheas is similarly composed.

The great military overland journey of the Macedonians to the east and south was made about the time of the great Massilian sea voyage to the west and north. We think, however, that Pytheas may have been ten, twenty or even thirty years older than Alexander—who, after all, was scarce beyond his youth when he died. Pytheas can not well have been young at the time of his voyage; he already had too many achievements to his credit.

Had Pytheas not led the first known great expedition of geographical discovery, had he never left home, he would still have been one of the world's greatest geographers. For it was he who first marked places on the earth by dependable signs from heaven.

Even those scholars of antiquity who ridiculed the travel reports of Pytheas usually admitted that he was a great astronomer. In that field a sample of his independent and keen observation is that he corrected Eudoxus who believed that there is a real Pole Star in the heavens—the one which we still call the Pole Star. Pytheas determined that this star is not at the Pole, and that there is in fact no star located precisely there.

But he did find three stars in that vicinity so placed that if you were to imagine a fourth to complete the rectangle, then this imaginary star would be approximately at the North Pole.

Had Pytheas been just the typical philosopher of his day, he would have been satisfied with the determination of the North Pole by his predecessors. He was instead the true scientist who proves all things and holds fast only to that which survives the most rigorous checking. He was, too, a Leonardo da Vinci in coordinating the power of his brain with the skill of his hands. He could build scientific instruments from the descriptions of others. He devised new tools of precision. When he became the first in known history to measure accurately the distance of a place from the equator, he was fixing the latitude of Massilia by instruments of which he was the inventor.

Not merely was Pytheas, on his “practical” side, a man who did not rest until he had made the best instruments that were possible with the means at his command; for then he did not rest, as the Pole Star instance shows, until his measurements with these instruments were as close as their precision and his faculties allowed.

*Britannica*, more temperate in laudation of Pytheas than several recent works, names many accomplishments and then says in addition that he was “first among the Greeks to arrive at any correct notion of the tides, and to note their connection with the moon, and their periodic fluctuations.”

Had Pytheas been just a rough and tumble seaman like Erik the Red or Francis Drake, the Pole Star would have been nearly

enough true north for him. He would have spent little of his thought on problems of the rise and fall of tides.

It is central to the greatness of Pytheas that scholarship made no mere schoolman of him; it did not bind him to his precise instruments and to written and spoken disputations, after the style of the philosophy then current. In the true manner of Erik and of Drake he steered for open and unknown seas. It is today the considered verdict of the students of exploration and of navigation that “in spite of” being a true scientist he deserves to rank as high among the practical sailors of the fourth century B.C. as ever any sailor has ranked in his own time.

The eminence of Pytheas in the field of discovery, as shown by his Thule voyage, has never been questioned by anyone who did not first doubt whether the voyage had been made at all. Today we are agreed that Pytheas really made the journeys which he claimed to have made—our doubts are no longer of him but only concern the adequacy of the record that has been preserved to us.

Pytheas stands firm in history as a many-sided genius, a great man.

### **THE NAVIGATOR AND HIS JOURNEY—THE BACKGROUND**

What we know of Pytheas has come to us in fragments and garbled. We have not the precise years of his birth, of his voyage, or of his death. Aristotle does not mention him but his pupil Dicaearchus does, from which some scholars infer that the explorations must be placed after the death of Aristotle in



322 B.C. Malye says it was some time between 340-306. About the latest date seriously mentioned is 285. Broche, the most recent of the voluminous contributors, thinks the voyage fell within the period 333-323, justifying the earlier date by literary allusions and by reasoning that it would require ten years for Pytheas to write up his results and for the news of his work and of his writings to become familiar enough to the scholars for quotation.

For the political reasons which we have mentioned, several scholars have placed the voyage later than 322 B.C. Cary gives 310-306 as the likeliest years, for at that time Carthage was defending herself against Syracuse and would no doubt have been forced to relax the vigilance of the Strait of Gibraltar blockade. There was no blockade around 300, upon which circumstance those writers have relied who set the date of the Pytheas voyage as late as 285.

From the titles *On the Ocean* and *Description of the Earth* (which may refer to the same work), it would appear that Pytheas wrote a scientific and philosophical report rather than a narrative of his explorations. In any case, his own book is lost and we are dependent upon short extracts which have come to us through the borrowings of one contemporary and of two later scholars whose works are also lost. The historian Timaeus is believed to have used a good deal of information direct from Pytheas; and the astronomers Eratosthenes and Hipparchus relied on his statements, as we know from the criticism of Polybius two centuries after Pytheas.

Not only are the writings of Timaeus, Eratosthenes and Hipparchus missing, but so are, too, those books of Polybius

which had the comments on Pytheas. Most of our information, therefore, is from Strabo, three hundred years after Pytheas, who used extracts from his predecessors. But Strabo was often careless and inaccurate in his quotations; moreover, he adopted the prejudices of Polybius against Pytheas, adding to them his own general prejudices and his special dislike, of the Massilian.

Most of the glimpses we catch of Pytheas, then, are through the eyes of a man who had distrust and contempt for him, and who refers to his work chiefly for the purpose of showing how fraudulent and unsound he was as a geographer—he did acknowledge Pytheas's soundness as a mathematician and astronomer.

The mystery which surrounds the Massilian yields fertile ground to discussion and conjecture. We summarize the points on which there is general agreement, and then discuss more fully the part of the explorations of Pytheas which is most controversial—the voyage to Thule.

We have dealt with Pytheas as mathematician, astronomer, inventor, close observer and just reasoner. He is the first known scientific explorer. Markham says of him: "It is probable that there was no other man, in the days of Alexander the Great, who could have prepared for a voyage of discovery by fixing the exact latitude of his point of departure, and selecting correctly the star by which he should shape his course."

Thus prepared by his own studies and furnished with the knowledge of his time, Pytheas set out on his voyage just about

when his countryman Alexander was marching east towards India on that military expedition which, of all chronicled military ventures, most nearly becomes an exploratory expedition. Pytheas sailed west past the Pillars of Hercules, felt his way north along the various coasts of Europe, and returned to the Mediterranean in something between eight months and three years (the scholars differ).

Polybius says the Massilian was a poor man and scoffs at his having been able to carry out so great an undertaking. But in the light of the history of exploration since his time it would be more surprising to be told that he was rich, for almost without exception the leaders of great exploratory ventures have been men without personal fortunes. The usual modern opinion is that Pytheas was the commander of a government expedition—likely enough an expedition financed, partly or wholly, by the city of Massilia.

At this time Massilia was a powerful city which carried on trade with many and distant places. The Massilians were good sailors. They were keen about the tin and amber that were brought to them down the Rhone and were reported to have been secured in countries far to the north. Their commercial instincts, their nautical prowess and their curiosity would incline them to want to know more about these products and the lands from which they came.

Then, too, there was the question of prestige, for it was a time of great undertakings; and Massilia, proud of her might, would desire a share in the glory of commercial and scientific exploration. Pytheas, after his years of philosophical study and preparation, would no doubt be eager to put his theories to a

practical test and to see for himself the wonders of northern regions. It does not strain the imagination to picture him enlisting the support of various groups, spurring his countrymen on to this great adventure.

If it was a government expedition, the city of Massilia would have had no difficulty in furnishing Pytheas with an adequate vessel, or vessels, and with the needed equipment. Some consider the ship would be a trireme, as best adapted to a long voyage. Further, a trireme would inspire respect among the distant peoples whom the expedition might visit. Others contend that biremes were more seaworthy and would have been chosen.

Markham says: “A large Massilian ship was a good sea-boat, and well able to make a voyage into the northern ocean. She would be from 150 to 170 feet long—the beam of a merchant ship being a quarter, and of a war-ship one-eighth the length—a depth of hold of 25 or 26 feet, and a draught of 10 to 12. Her tonnage would be 400 to 500, so that the ship of Pytheas was larger and more seaworthy than the crazy little *Santa Maria* with which, eighteen hundred years afterwards, Columbus discovered the New World.”

Such ships were equipped with square sails. Through the auxiliary power of their oars they escaped complete dependence on the wind.

Markham tells us that “The rowing power of ancient galleys, supplementary to the sails, has been looked upon as the equivalent to the [auxiliary] steam-power of modern times. [Markham was writing in 1893.] In the Grecian ship there was

a narrow gangway on both sides, . . . lower than the upper deck, and just above the rowlocks for the upper tier of oars. The rowing apparatus . . . was in the centre part of the ship. . . . In a large trireme there were fifty-four . . . bottom rowers, fifty-eight . . . middle, and sixty-two . . . upper rowers, making one hundred and seventy-four all told. . . . The sailors or rowers were of course much more numerous than the . . . marines. The . . . officer in command of the rowers had a lieutenant, and not the least important person on board was the . . . piper, by whose music the rowers kept time.”

Pytheas then probably set out in one or more biremes or triremes, each with a crew of from one hundred to two hundred men. Some students have considered that the expedition sailed in midwinter; Broche argues that this would not have been good sense and thinks that the departure was in April.

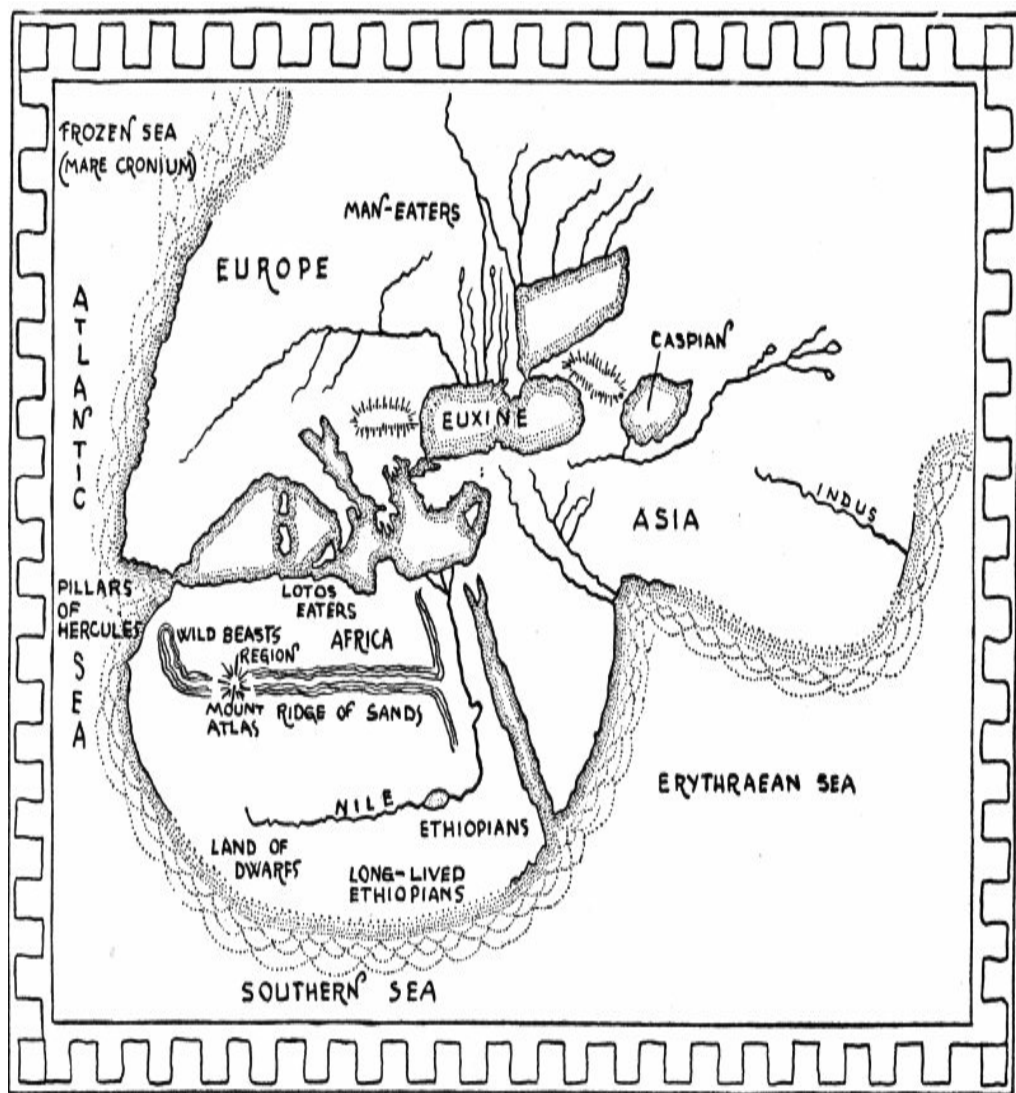
Leaving Massilia, Pytheas emerged from the Mediterranean through the Strait of Gibraltar and proceeded to the Sacred Promontory (now Cape St. Vincent, Portugal), then the western limit of the districts properly known to the Greeks. He coasted northward along the shore of Portugal, and made his first recorded time observation for a place where the longest day was fifteen hours—therefore off Oporto.

Usually the scholars agree upon the course of Pytheas as far as Cape Ortega. Then there is argument on whether he cut boldly across the Bay of Biscay or whether he cautiously followed the long shore route, for he is not definitely heard from till he reached the island of Ushant, which he called Uxisama, off the Breton coast. Thence he sailed for England.

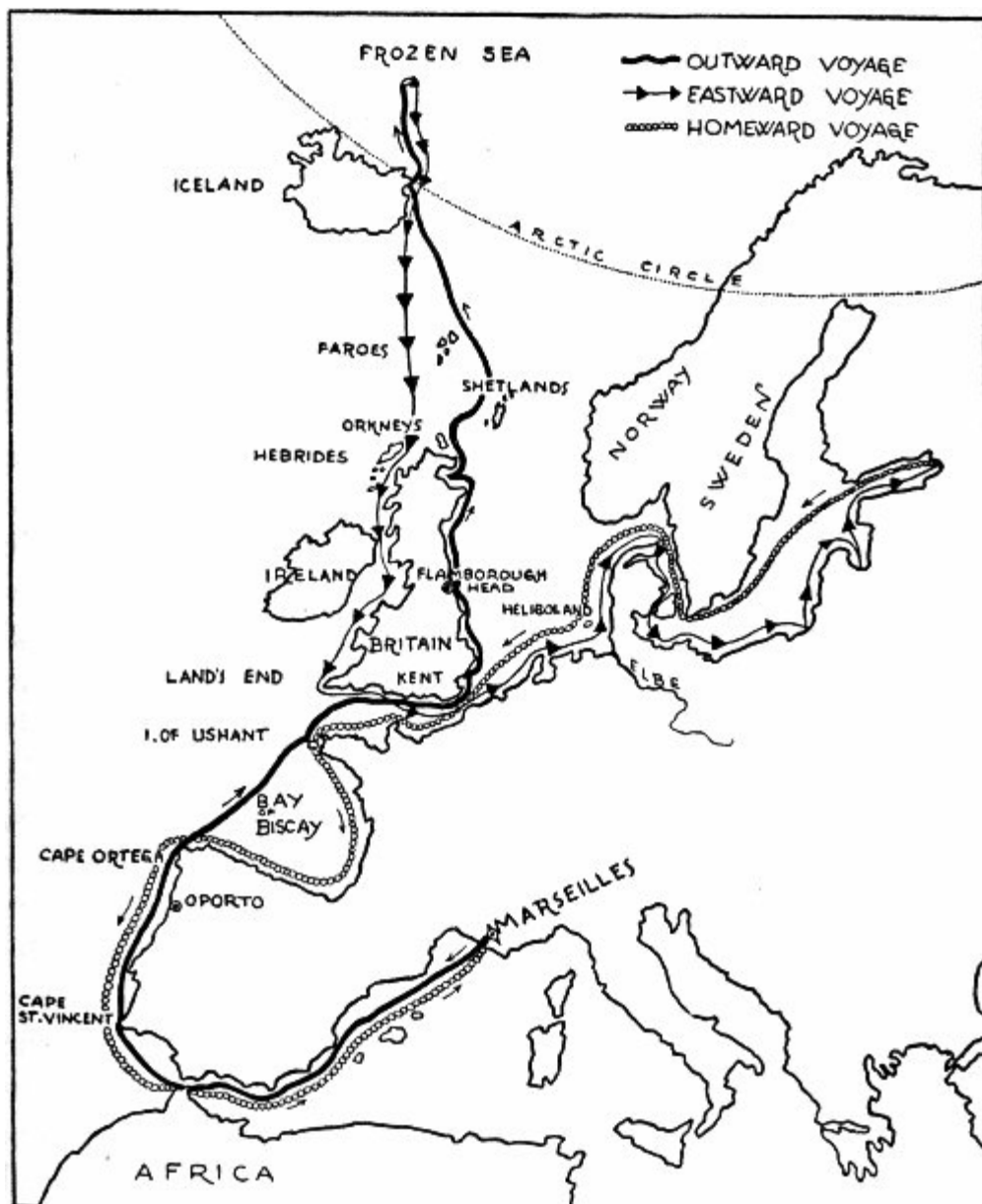
Here again the authorities differ. Some think Pytheas went first to Kent, others consider it more probable that he followed the well established route to Land's End, Cornwall. Certain it is that he visited both places, for he gave descriptions of the inhabitants and their manner of living. We quote his Impressions of Cornwall in a passage which Diodorus likely got from Timaeus:

“The natives of Britain by the headland of Belerium are unusually hospitable, and thanks to their intercourse with foreign traders have grown gentle in their manner. They extract the tin from its bed by a cunning process. The bed is of rock, but contains earthy interstices, along which they cut a gallery. Having smelted the tin and refined it, they hammer it into knuckle-bone shape and convey it to an adjacent island named Ictis. They wait till the ebb-tide has drained the intervening firth, and then transport whole loads of tin on wagons.”

## **PLATE II**



The world according to Herodotus, fifth century, B.C.



Supposed itinerary of Pytheas, based on the reconstruction of his “periplus” by Prof. Gaston-E. Broche, according to the various texts.



Pytheas apparently circumnavigated Britain, for he describes the land as being triangular in shape and he gives measurements of its three sides, which measurements, however, exaggerate the size of the island. On this point Cary says:

“The most serious charge against Pytheas is his habitual overstatement of distances. . . . But the real crux of this question lies in the dimensions which he gave to Britain. Reckoning its sides as 7,500, 15,000 and 20,000 stades (825, 1,650 and 2,200 miles) in length, he computed that Britain had a perimeter of 42,500 stades (4,675 miles), i.e., more than double its actual circumference. It has been suggested in Pytheas’ defence that his own estimates of distance were given in days’ sailings, and that some later Greek writer applied a false scale in converting days into stades. But what conceivable scale could have given double value to Pytheas’ measurements? At best, Pytheas must have grossly overstated the size of Britain. But before we discredit Pytheas on this charge, let us remember that ancient seafarers had not even a tolerably accurate device for reckoning naval distances. Herodotus exaggerated the length of the Black Sea, Pliny the Sea of Azov, and Nearchus the distance from the Indus to the Persian Gulf, in much the same proportion as Pytheas swelled out Britain. Yet nobody would maintain that the Greeks had not explored the Black Sea and Sea of Azov, or that Nearchus burnt his boats and sneaked home by land.”

Leaving Belerium, Pytheas likely followed an anti-clockwise course, stopping in Kent and at other places along the shores of Britain. He traveled inland sufficiently to get an idea of the customs of the people, as shown by his description of the

farming methods of Cantion. Polybius said that Pytheas claimed to “have walked all over Britain.” He was scoffing, but there are now students who maintain seriously that Pytheas crossed Britain on foot.

As Pytheas goes northerly from Cantion, various points on his route can be checked by remarks on the length of the day. The observation of a longest day of seventeen hours places him in the neighborhood of Flamborough Head. He gave the longest day in the most northern part of Britain as eighteen hours, and says that there was a longest day of nineteen hours in an inhabited country to the north of Britain, which would be the Shetlands. One or other of these places Pytheas called Orcas, for he mentions it as being the northermost point of the triangular-shaped Britain. Some authorities therefore argue that by this he meant the mainland of Britain, hence Scotland; while others think it is the place of the nineteen-hour longest day, therefore on Unst Island, the northernmost of the Shetlands.

The common learned name of the Middle Ages for the Orkneys was Orcades.

It would be gratifying if we could fix definitely upon the location of Orcas, for it is important in the story of Pytheas. From Orcas, according to some scholars, he set out on his voyage to Thule; it was Orcas, according to others, which was his farthest north and where he received at second hand his information concerning Thule.

After completing the circumnavigation of Britain (whether interrupted by a voyage to Thule or not), Pytheas recrossed the

Channel, sailing thence, according to some, to the mouth of the Elbe and to the island of Heligoland, the source of amber; according to others he reached the Baltic.

Among those who believe that Thule was Norway, and that Pytheas visited Norway, there are two subdivisions. It was formerly commonest with these scholars to have Pytheas sail east from northern Scotland to the Bergen vicinity; of late years several have contended that after leaving England southbound and following the north shore of the continent east, he reached Norway from the south, by way of Denmark.

Probably there was just one expedition, but there are those who maintain that Pytheas returned to Massilia from Britain and that he visited the amber country on a second voyage. With that we need not concern ourselves here. So we return instead to Orcas, and to the problem of Thule. That troublesome question is usually discussed under three possibilities:

1. Pytheas made the voyage to Thule; most of his information is first hand; Thule is Iceland.
2. Pytheas made the voyage to Thule; most of his information is first hand; Thule is Norway.
3. Pytheas did not visit Thule; the information which he gives concerning it is based on what he learned at Orcas, beyond which he did not go.

While those have been the main views debated, a fourth is also worth considering. It may be that the Scots of Orcas told Pytheas about an island in the ocean to the north and told him also about another land to the east. Then, through some

ambiguity in the writing of Pytheas himself, through an inadvertent or designed ambiguity by a later writer, or through mere loss of connecting information, it may have come about that some of the description of the land to the cast was assigned to the island in the north.

We have come upon no writer who states this last view explicitly, but it is implicit in such books as *The History of Iceland* by Knut Gjerset. For in one part of his treatment Gjerset says that the island in the ocean north of Britain, called Thule, probably was Iceland; but in another place he says that certain of Pytheas' descriptions of Thule fit Norway, do not fit Iceland. If those two sections of the Gjerset presentation are brought together they amount to the view which we have just stated.

Before discussing the voyage to Thule we might talk about the origin and meaning of the word. There are several interpretations; every one of them has been questioned.

First is the claim that, irrespective of meaning and derivation, the name Thule did not originate with Pytheas, but was already old with the Greeks of his time. Benediktsson would trace it at least as far back as Ctesias of Cnidus (fifth century B.C.) whose now lost work containing the reference is quoted by the grammarian Servius of the fourth century after Christ. Well before Pytheas, then, Thule was a name for a place remote and fabulous to the Greeks.

Burton, in his discussion of the etymology of Thule and its sundry variants—Thula, Thyle, Thile, Thila, Tyle, Tila—quotes Sibbald: “Some derive the name Thule from the Arabic

word Tule . . . which signified ‘afar off,’ and, as it were with allusion to this, the poets usually call it ‘Ultima Thule;’ but I rather prefer the reason of the name given by the learned Bochartus, who makes it to be Phoenician, and affirms that it signifies ‘darkness’ in that language. Thule . . . in the Tyrian tongue was ‘a shadow,’ whence it is commonly used to signify ‘darkness,’ and the island Thule is as much as to say, an ‘island of darkness’ . . .” Others, according to Burton, have traced Thule to the Carthaginian word for “obscurity,” which resembles closely words having the same meaning in Hebrew and Arabic.

The school which believes that Thule is a word of Germanic origin has many representatives, of whom we mention a few.

Professor Björn Collinder, the Swedish philologist, thinks it probable that Thule is of the same stem, or is the same word, as Old Norse *thaul*, as in *thaularvágr*, a bay in which one can easily get locked up. So Thule would mean “land of the narrow bays,” a name descriptive of parts of the Norwegian coast.

When Nansen was writing his great work, *In Northern Mists*, he requested an opinion on the various Thule derivation suggestions from a leading student of the applicable languages, Professor Alf Torp. Torp examined claims of several proposed derivations, both Germanic and Celtic, and found in most cases that the word from which Thule has been supposedly derived did not exist at all in the ancient forms of these languages.

About the only constructive suggestion which Torp made was that a Germanic derivation is more likely than a Celtic, in that

the Celtic tongues of the period did not have words that began with the sound of “th”, but that the Germanic languages then did have such words.

Knut Gjerset, in his *History of Iceland*, goes into no learned philological reasoning about the name, and rests on common sense. He says that:

“... since the name was applied [in A.D. 825] to Iceland by Dicuil after he had spoken with Irish monks who had been there, it is not unlikely that it was the old Irish name of the island which Pytheas had learned from the Britons, and that Iceland was known to them when he made his expedition to the North in 330 B.C.”

There are two groups of contenders that Pytheas made no voyage to Thule. The first just call the Massilian a fictionist, writer of imaginary voyages. The second group think Pytheas went to Orcas, the north tip of Scotland, but not beyond, and that he learned there about Thule, reporting in his original book as hearsay what later scholars, after the disappearance of the fundamental work, misunderstood to be eyewitness reports.

Those who discredited Pytheas successfully through two millennia are in their turn so thoroughly discredited now that it is no longer worth while discussing whether Thule was an imaginary land. That he did not make a voyage to Thule but gave information about it as hearsay is, however, worth considering. We shall go into that (treating it by implication in our discussion of possibilities of discovery before Pytheas) after we have first examined the various

identifications of Thule.

Thule has been identified with the Orkneys, with the Shetlands, with Iceland and with Norway.

There is in our brief discussion room only for saying that the identification of the Orkney group with Thule, though made occasionally through nineteen hundred years, now has few serious defenders.

Some still treat gravely the claim that one of the Shetlands was Thule. This is in part because it had for advocate one of the great scholars of the nineteenth century, Müllenhoff.

A cornerstone of the Shetlands contention was that to Tacitus, famous as a writer on Europe north of the Alps, Thule was one of the Shetland group. The Roman fleet under Agricola, sailing up the east coast of Britain, was said by him to have sighted Thule (*dispecta est et Thule*). Broche explains this upon alternative views—Tacitus was just not very well up on this part of the subject; or else he knew better, but was trying further to magnify the reputation of his father-in-law, Julius Agricola, by seeming to bring him into a close relation with much-discussed Thule.

Broche suggests that, with Tacitus, the case of Thule resembled the one of Britain. He thinks it more likely to have been propaganda than simple ignorance when Tacitus wanted his readers to believe that his father-in-law was the man who first determined the insularity of Britain. To one who would go that far with a comparatively well known place like Britain, it would not seem much to pluck Thule from its remote site in

the ocean and stick it down among the Shetlands.

A full list of those who have identified Thule with Iceland would be too long. We give samples only.

The Venerable Bede, writing in the eighth century, speaks of Thule and seems to mean Iceland. Dicuil certainly meant Iceland when he wrote of Thule in 825—the scholars agree on that. Iceland was Thule to Adam of Bremen in 1075. It was Thule to Saxo Grammaticus in the twelfth century, to Columbus in the fifteenth, to Ramus and Casaubon in the sixteenth, to Bougainville in the eighteenth. From the swarm of nineteenth century witnesses we do not give even samples.

So far as this discussion is concerned, the roll of claimants that Iceland was Thule closes with the book *Pythéas le Massaliote*, by Professor Gaston-E. Broche of the University of Paris, published in 1935.

The other chief Thule contender of the present, Norway, had for a long time small support, as compared with Iceland, but she did receive some moderately early support. The first writer to identify Thule with Norway, or with the Scandinavian peninsula, may have been Procopius, sixth century after Christ. But in a way Procopius was not much of an authority, for he was Byzantine, remote geographically and not so very well informed even at second hand about northwestern Europe.

However, it appeared to various scholars in later centuries that Procopius had guessed right. Especially during several recent decades most published critical writings have been on his side, until it seems to many, as it did to Nansen in his *In Northern*



*Mists*, that Norway has really proved her case.

For instance in 1933, only three years before Broche demonstrated in French to his own satisfaction that Thule was Iceland, another Frenchman, Jean Malye, took it for granted at a meeting of the Classical Association in Nottingham, England, that all scholars today agree Thule is Norway.

We shall now do our best to present without bias the facts and theories about the lands which at present contend for Thule honors, taking Iceland first because most of the literature was for so long on her side.

### **DISCOVERY OF ICELAND BEFORE PYTHEAS POSSIBILITIES AND PROBABILITIES**

For the solution of the Thule problem it is necessary to consider first the possibility and then the probability of Thule being known to the British before the Massilians, under the command of Pytheas, arrived at northern Scotland. For, be it remembered, two groups of scholars have used in their solutions of the Thule mystery the assumption, or probability, that the Britons had already discovered Iceland (or, at any rate, Thule) and that, as one of these groups believes, they gave Pytheas correct information about it which he used in his report; or, as the second group believes, that they were able to tell Pytheas where to find Thule, perhaps guiding him there.

On such problems as whether Iceland was known to the British before Pytheas there are two main schools. They draw their

thinking from different sources and hold premises squarely opposed. The main premise of one of them is that the nearer to us you date the beginnings of deep sea navigation the likelier the estimate is to be correct; the other favors large time estimates, considering small ones inherently doubtful.

The school favoring a short time scale was practically the only one as recently as 1900. The author of a "General History" textbook would smile patronizingly at Archbishop Ussher; but he was still not uninfluenced by the Archbishop's verdict that the earth had been created in 4004 B.C. These textbook historians felt it was delving into antiquities high for Europe if they went all the way back to Homer, through eight or ten centuries B.C. The physicists revered in 1900 had demonstrated that the sun could not be more than 10,000,000 years old; and Professor Penck of Berlin created a sensation in Boston when he declared in a course of Lowell Lectures that man had been in the Alps at least 40,000 years.

With this background, we thought ourselves broad-minded when we allowed that the Phoenicians, then touted as the earliest of navigators, might have begun creeping timorously north along the western coasts of Europe as early as five hundred or six hundred or even a thousand years B.C. This we pictured as the beginning of sea navigation in the world, and it was taken for granted that these supposed pioneers did not venture upon the high seas. They just took chances when the weather was fine, and the wind a gentle offshore breeze, to dodge from point to point along the beach, always scrambling ashore if the weather threatened to get bad.

Those who still find it hard to credit the British with having

reached Iceland during or before the fourth century B.C. are the inheritors of this nineteenth century tradition. Their sources are mainly if not purely literary. They rely chiefly on the books of Greece and Rome, with secondary dependence on what is deciphered from Egyptian records or those of the Fertile Crescent. They insist doggedly that the burden of proof is on whoever wants to extend the history of navigation backward, that he must prove every step, preferably justify each step from literary sources.

The other school has for the background of its thinking not Ussher but astronomy and the sciences that deal in astronomical figures. They have in mind that the observatories photographed last night stars or nebulae by light which started from them a million years ago. To them our earth has aged to not less than 3,000,000,000 years beyond the scant 6,000 total permitted by Ussher. They read with equanimity in the *New York Times* of August 20, 1938, Waldemar Kaempffert's report that the British Association meeting which he was attending had agreed that Swanscombe Man lived 250,000 years ago where now is London, that he was far more recent than England's Piltdown Man, and that he differed little from men who walk Piccadilly now. From this, it is said, the Association went on to deliberate upon the Middle Stone Age of only 140,000 years ago in England; which, in the thinking of the British Association, apparently was getting pretty well down to our own time.

To scientists with that sort of background, a time estimate is radical and suspect if small; it is conservative and probable if large. They are predisposed to believe, among other things, that navigation of the high seas was a commonplace long

before those Phoenicians who looked like pioneers to nineteenth century thinking.

Our twentieth century slant on the probability of high or low antiquity for deep sea navigation will also depend upon our idea as to how old boats are as an invention.

The development of boats to notable seaworthiness, as for crossing ocean gaps that are fifty or a hundred miles wide, is, to begin with, carried back for us through archaeology the larger part of ten thousand years, at a minimum. But that is surely nowhere near the whole time span to their beginnings. A number of archaeologists who have been consulted by letter feel that the boat, on score of probability, should be considered at least as old an invention as the bow and arrow or the harpoon. This would make the probable antiquity of boats easily double that definitely proved for them through archaeology (perhaps four or five times that many years)—which in turn pushes coastwise sea travel almost if not quite as far back into prehistory.

We take as an example of this scientific (as opposed to the literary) school of thought the presidential address of Dr. A. W. Brögger, delivered before the International Archaeological Congress in 1936. He points out that ships depicted in Norwegian rock carvings from the Bronze Age are very suggestive of the canoes by which South Sea Islanders are known to have discovered practically or quite every habitable island in the Pacific Ocean. Waiving the question of whether the known outrigger boat voyages were first discoveries or rediscoveries, he mentions such commonly accepted facts (see *Britannica*, for instance) as two-thousand-mile boat

journeys from Samoa to the Hawaiian Islands not later than A.D. 500; and the discovery of tiny Easter Island, perhaps about the same time or a little later, by a voyage that likely was more than a thousand miles.

On the basis of archaeology, supported by literary fragments, Brögger pictures a great age of navigation which had been in force a thousand years before the Phoenician period of our nineteen hundred school books. At the height of this cycle he considers that man of the Bronze Age visited all the island groups west of the Iberian Peninsula and northern Africa, mentioning, for instance, a large cache of Phoenician coins of the fourth century B.C. discovered in the Azores. He mentions, too, as if it were a commonplace among the archaeologists whom he was addressing, that centuries before Pytheas the Bronze Age navigators seldom followed the coasts of western Europe but made direct, practically speaking by great circle, such voyages as the five hundred miles from Cape Finisterre to the southwest tip of England, thus not merely crossing the Bay of Biscay far out of sight of land but even passing by the northwestern capes of France without going ashore. He finds equally well established that there was a Bronze Age commerce in every direction across the North Sea. Among its routes, and perhaps one of the easiest, was the sailing from north Scotland by way of the Orkneys and Shetlands to southwestern Norway. Bronze Age remains from perhaps 1200 B.C. are being dug up by archaeologists in the Shetlands, and Older Stone Age remains too.

To Brögger, the Age of Bronze was the first great age of navigation. That age is usually thought of as being older in southern than in northern Europe and older in Europe than in

southeastern Asia. However, it was by the culture of the Bronze Age, or that of the preceding late Stone Age, that all or nearly all islands of both Atlantic and Pacific were discovered. It follows that America is likely to have been visited repeatedly from Europe, if not Europe from America, long before Pytheas.

Generalizing, Brögger finds that the very earliest written Mediterranean evidence contains a few memories from the Great Age of Navigation. One of these was the conception that there is an ocean around all the lands (which conception was superseded eventually by the Ptolemy theory, which went back to Hipparchus for the idea that there were lands surrounding all the oceans).

With the decline of the Bronze Age, according to this view, came a decline of navigation. The early part of the Iron Age was at the trough of the depression, and navigation had to work its way slowly up again until that great revival which we think of as the Viking Age, centuries after Christ.

During the height of Bronze Age navigation, thinks Brögger, the European centers of it may have been in the Iberian Peninsula or in the Mediterranean; but he considers it likely that the greatest center of all, the focus of supreme activity, was in the Baltic and North Seas, with Scandinavia and Britain playing important roles. That would have been long before Pytheas.

With particular reference to southwestern England we have from Hencken supporting testimony on navigation prior to 2000 B.C.; therefore preceding the Bronze Age, which he

considers to have begun in Cornwall around 2000 B.C. He thinks that Stone Age flint implements found in Cornwall represent a culture which was probably introduced before 3000 B.C. Hencken notes several things bearing on navigation, among them:

“It need occasion no surprise that Cornwall and Brittany were in communication so early [in the epipalaeolithic] for though a broad belt of water probably separated them even then, boats were already known in the British Isles. At least some epipalaeolithic folk were able to sail from Scotland to the Island of Oronsay at this remote time when the shore was 30 feet above its present level.”

Hencken sees a later impact on Britain of that food-producing culture of Mesopotamia, Egypt and the Near East which around 3000 B.C. began to be widely disseminated, and “passed gradually through the Mediterranean and northward along the Atlantic coast of Europe by sea, also up the Danube valley into Central and Western Europe, . . .”

The most lasting elements of this new culture were the megalithic tombs that have been found in the Scilly Isles, in Cornwall, and elsewhere in Britain—the “cromlechs” and “Druid altars” of the older antiquaries—dating from around 2500 B.C. In considering them Hencken pays tribute to the seamanship of our pre-Bronze Age ancestors. He says:

“. . . it must not be forgotten that the extraordinary permanence of their tombs has preserved this one feature of their civilization, while others of equal importance, such as their obviously well-developed social organization, are only hinted

at. If indeed their ships instead of their tombs had been made of indestructible material, prehistorians . . . would compare the megalithic folk with the Vikings. One must in fact have the most profound respect for the hardihood and seamanship of these old voyagers who could cross the Bay of Biscay and the wide end of the Channel, sail up the Irish Sea to the most weather-beaten and inaccessible of the Scottish islands, and finally cross the North Sea from John o' Groats to the Baltic."

After saying this of navigation two thousand years before Pytheas, Hencken remarks on the special problem of British commerce in the Bronze Age. His views here support Brögger's on the navigation of that period in general. He concludes from archaeological evidence in Cornwall that there was a flourishing trade between Britain and the Mediterranean during the period following 2000 B.C. and that after 1400 B.C. Cornwall's importance in the sea trade declined. This decline came about because, with the opening up of overland routes between Mediterranean and northern countries, trade was diverted into new channels, particularly toward Scandinavia, so that Cornwall no longer was needed as a half-way station to Ireland and elsewhere.

Then in the Late Bronze Age, which ran from approximately 1000 B.C. to the years of Pytheas, we find the pendulum on a return swing. "Trading vessels were now visiting Cornish harbours again, where commerce was even more thriving than in the Early Bronze Age, and though the old sea route from the eastern Mediterranean to the Baltic was not revived, traffic was extensive along the Atlantic littoral. With this reviving trade, West Cornwall seems to have become an important commercial centre. . . ."



Thus do the objects dug up by the archaeologists tell the story of a sea trade beginning at least as far back as 3000 B.C., a west European sea traffic that flourished throughout some centuries, that declined through others, and that perhaps at no time completely died out.

Hencken's views on Stone Age navigation make pertinent the frequent reminder of T. A. Rickard that those remarkable seamen of the New World, the Eskimos, were not only men of the Stone Age but men of the very early Stone Age. Rickard, mining engineer and world traveler, has made the relation of man to metals his special study and has had a chance to see the Eskimos in their own country—as confirmed by the titles of two of his books, *Man and Metals*, and *Through the Yukon and Alaska* (in 1908).

To the scientific school of historians of navigation, who believe in these prodigies of navigation through not only centuries but millenniums before Pytheas, it will seem that the burden of proof is upon whoever claims Iceland differed from most of the rest of the world's islands in remaining untouched by deep sea navigators of the Bronze Age.

(In speaking of one school as literary and the other as scientific, we do not mean to imply that the "scientific" theory is necessarily more nearly correct. What we do mean is that one class goes for evidence chiefly to literary sources, while the men who argue along the line of Brögger, whether they agree with him or not, do so on the basis of evidence largely obtained from scientific—archaeological, geological—as opposed to literary sources.)

When making the assumed primitive voyages from Scotland to Iceland, it is first like crossing a river to the Orkneys; thereafter it is 50 nautical miles from the Orkneys to the Shetlands, with Fair Isle lying nearly midway between the groups; it is then 160 miles from the Shetlands to the Faroes and 240 from the Faroes to Iceland.

To those who believe that Bronze Age navigators swarmed all over the Atlantic two thousand and perhaps three thousand years before Christ there seems no difficulty worth mentioning about crossing any of these three gaps during any of numerous centuries before Pytheas. To the others the difficulty will be greatest about the last gap, the 240 miles from the Faroes to Iceland. We shall consider this more in detail when we come to the study of the Pytheas records, but we remark here that the last jump toward the discovery of the Hawaiian Islands cannot have been from nearer than Kingman Reef, which is more than three times farther than it is between the Faroes and Iceland. The South Sea people who are known to have made that jump around A.D. 500, and who may have made it earlier, were not in the Iron Age nor yet in the Bronze Age—their weapons and tools were of wood and stone.

Those who concede the possibility that the Greeks reached Iceland during the fourth century, but not that the British could have done it, rest that discrimination commonly on two main propositions, the general one that the Britons were savages and the special consideration that they are reported by Caesar, three centuries after Pytheas, as having primitive canoes of leather stretched on a wicker frame.

We concede that in the sense here required the Britons were

savages in the fourth century B.C., and examine merely the question of whether savages who are on the level here presumed are necessarily without means of crossing wide and stormy waters.

We accept the suggestion that around and before 325 B.C. the boats of the people living in what are now Scotland and Ireland were most likely of skins stretched over a wicker frame, and we consider the seaworthiness of that kind of boat.

There are three main sorts of skin boats which are known to have been used by primitive man on stormy seas. They are the Eskimo kayak, a wholly enclosed boat on the lines of a modern racing shell; the Eskimo umiak which resembles a dory; and the Irish curragh which, both according to models which date nearly from the time of Pytheas and drawings of three centuries ago, resembled in their lines an Algonquin canoe.

These three boat types are of rawhide sewed with waterproof seams and stretched on a wicker frame. The kayak is for paddles only. It is debated how far back the sail goes as used upon umiaks. The curragh appears to have had sails, “in the remotest antiquity,” as well as oars or paddles.

The kayak, the one-man boat (sometimes two-man or even three-man) of these modern Stone Age people, has been the marvel of all beholders. Like the bigger umiak, it is of rawhide stretched over a wicker frame. When Frobisher met the Eskimos of what is now Baffin Island, during the reign of Elizabeth, the natives saucily paddled right up to the British rowers and, when pursued by what were then about the finest oarsmen of Europe, they just paddled away again, leaving the

English as if tied to a post. Later when Canadian travelers had acquired admiration for the boatmanship of the Algonquins, who canoed at speeds that were a wonder to Europe, they took them along on northern exploration and found, on the lakes and rivers of northern Canada, that the Iroquois were having about the same chance in a race with Eskimo kayakers as Frobisher's men had had in the earlier contests.

Today, with the kayak not in the slightest improved from what it was when Europeans first saw it, the Greenlanders paddle far out upon nearly the stormiest seas of the world, Baffin Bay and Davis Straits, where gales may sweep down with violence and without warning. Among mountainous waves the kayakers stay out at sea or make their way back to shore. They do not drown unless the human machine gives out through weariness—unless the canoer rather than the canoe fails.

Testimonies for what we have just said are innumerable from Greenland. Thence westward the one-man canoe is less used and there is less skill in using it until you pass the Mackenzie Delta going toward Bering Sea. In that sea the art of kayaking reaches the other of its twin peaks among the Eskimos proper and their cousins the Aleuts who impress the tourist now as they impressed the early Russians. G. H. Von Langsdorff, speaking from knowledge gained on his 1803-07 voyage, says:

“ . . . The Aleutians often run out to sea even to a considerable distance upon their hunting parties, and then commonly several go together in company, always carrying with them their kamleika, or rain garment. If a heavy storm comes on, they bind two or three of the baidarkas together, and then have

nothing to fear. . . .

“In my opinion, these baidarkas [kayaks] are the best means yet discovered by mankind to go from place to place, either upon the deepest or the shallowest water, in the quickest, easiest, and safest manner possible. . . .”

While the small canoe is the greater marvel, nearly the same admiration has been given the larger umiak. The usual boat, thirty-five to forty feet long, is big enough to carry two tons, is light enough for two men to carry. It is so strong and so fitted for rough handling that this was perhaps the chief reason why the Yankee whalers of northwestern Alaska, when developing there a shore whaling industry during the last two decades of the nineteenth century, discarded the New Bedford whaleboat for the umiak when pursuing the bowhead. You can run the umiak at considerable speed up on a boulder shore with fear of only slight damage. You can bump it into ice with impunity where a New Bedford whaler would be stove and sunk.

It seems agreed that much island discovery is likelier to have been by chance than design. Best for discovery, then, is a craft which combines what is usually looked upon as a major disadvantage with what is always considered a major advantage—that it shall be bad in making great leeway but good in that it keeps afloat.

In these qualifications the umiak is nearly perfect. Being light itself, and having a flat bottom, it draws only a few inches when normally loaded and sticks out of the water several feet. It is hopeless trying to row such a boat ashore against a gale

unless you are comparatively near land, for its tendency to drift is so strong that the rowers would presently be exhausted. With poor knowledge of astronomy and of sea currents in the early days, it must have happened frequently that craft of this style, when tempted into crossing the mouth of a bay or when making a passage between islands mutually visible, would be carried out of sight of land. It is a human trait—no doubt always was—that many who lose their way have a strong feeling they know in what direction to travel. Upon the let-up of a gale our boatmen would likely enough paddle in the wrong direction, especially in cloudy weather. In such fashion might an island be discovered that was a hundred or several hundred miles away.

Having noted that, with the possible exception of balsas and reed boats generally, no craft is “worse” (or, in the accidental-discovery sense, better) than that seemingly very ancient form, the flat-bottomed skin boat, we turn to the question of seaworthiness. For you do not find new lands by drifting out of your course, or away from your home, unless the boat in which you drift stays afloat. That the umiak is likely to stay afloat will leap to the understanding when it is spoken of as “a kind of dory.”

For it is a commonplace that one of the safest boats known is the dory. When fierce gales sweep the Newfoundland Banks and men are lost in dories, the general belief is that few of them are swamped—that most of the people so lost die from thirst or exposure while astray upon the sea.

The fishers who go adrift in Newfoundland dories are single men, or perhaps two or three of them; but Eskimos travel

Bering Sea with ten, twenty and thirty in a boat; men, women and children. The Britons, when they had skin boats of dory or other types, were apparently of a culture similar to that of the Eskimos as we have known them the last few hundred years; and, like most primitive people, Stone Age Britons may have traveled commonly in families, sometimes two or three families together. With a flat bottom (which, as we have said, is both the advantage and the drawback of the dory type) they would make rapid leeway before strong winds. If that drift took them where no land was ever seen they would die eventually of hunger or thirst. If the drift took them to an island, one of two things would follow: a return voyage home, or a colonization of the new discovery.

The umiak of the modern Stone Age of the American Arctic is our best clue to what such boats were like and could do in the European Stone Age, so we think it necessary to dwell further upon their position in the scheme of sea craft. No group of men has a better combination of opportunity for studying the umiak and of theoretical and practical modern seamanship than the officers of the U.S. Coast Guard. Few of these officers have more experience, or better qualification in the modern sense, than Captain E. D. Jones, Commandant, U.S. Coast Guard Academy, New London, Conn. Under date of August 25, 1938, he writes concerning those qualifications of the umiak which we here discuss. We quote in part:

“ . . . the umiak . . . is perfectly capable . . . of remaining afloat in almost any weather.

“Your supposition that the early British might have been the first to reach Iceland seems entirely plausible . . . the umiak

could have done it. . . .

“I do not know enough about the weather in the Iceland, Faroe, Shetland region to compare it with that of the Bering Sea. Both have bad weather and both have enough fine weather in the summer to permit voyages in open boats over distances of 230 nautical miles—the maximum distance involved—or for the boats to stay afloat as long as the hides kept the water out. A light, high-sided, boat of the umiak type drifts very rapidly before the wind and ships very little water even in a rough sea.”

The first of two comments on the letter of Captain Jones is that he is rather modest about knowing little of Iceland weather, for he has been in command of Coast Guard ice patrols to the south of Greenland. The second is with reference to his remark that umiaks would “stay afloat as long as the hide kept the water out.” That this period is only a few days has been correctly stated by men who have used umiaks in warm river waters during the middle of the Alaska summer where temperatures run about 80° and even above 90° in the shade, and where the nights are almost as warm as the days because the sun does not set. However, it is uniform experience on the Alaska north coast that the type of skin which begins to loosen at the seams by the end of ten days or two weeks of river travel will last much longer at sea. This is no doubt in part because the salt of sea water preserves rawhide in a boat somewhat as brine preserves meat in a keg.

But it is academic, really, to discuss the decay of an umiak within two weeks of river travel in northern Alaska, for this could scarcely happen except with the inexperienced. Those



who know the causes of leather decay, whether from theory or from practice, will never allow it to happen. Primitive man knows empirically, and we do theoretically, that the micro-organisms which produce the decay of leather work slowly. Primitive man discovered what we also know, that desiccation is fatal to these organisms, so he knows that if you dry leather frequently it will not decay. The Eskimo rule of thumb is that you must not wear a skin boot during summer more than two days without drying it, and that you must dry your skin boat, when using it on a warm river or lake, not less often than every four days—preferably every three.

That skins used for river boats have indefinite life when frequently dried seems not to have been an Eskimo trade secret. For Hornell speaks of leather-covered wicker boats that were in use, evidently for long journeys, on the Tigris and Euphrates rivers. Those streams must have water a good deal warmer than Alaska streams, and therefore decay must be more rapid; for although an occasional Alaska day may run to a hundred in the shade, not cool even for weather in the Fertile Crescent, Alaska summers are not as long as in the Near East and northern rivers flow through beds that are cooled by the frozen subsoil. Probably the Tigris would average enough warmer than the Colville so that a skin boat would have to be dried twice as often—at least every other day.

Recent testimony to the seaworthiness of the umiak in open waters swept by strong gales is furnished through an Associated Press dispatch dated Barrow, Alaska, July 28, 1938, and carried by the newspapers next day. It says in part:

“Father Bernard Hubbard, Alaska’s ‘glacier priest,’ sailed 700 miles in a primitive forty-foot skin canoe through Bering Sea and the Arctic Ocean . . .

“. . . Father Hubbard said today, he and his party of eight men encountered such stormy weather on their twenty-day voyage they never would have survived if they had a more modern craft. . . .”

The dory and the umiak are seaworthy because they float high and steady on flat bottoms and are in other ways designed so that they do not readily ship water. The kayak, which we have discussed earlier, is (like its modern colleague the racing shell) about as steady on rough water as a man on a swaying tight-rope; its seaworthiness is through the skill of the paddler, through the long double paddle, and through being so decked over that the occupant sits in a manhole. In some districts the boat’s one opening merely fits the hunter’s body rather snugly so as to give water small opportunity for entrance; or there may be an arrangement such that the waterproof hooded coat of the occupant shall be lashed to the rim of the manhole so that paddler and canoe are of one piece—the water being prevented by tight lashing from entrance not merely through the manhole but also through the sleeves and neck of the coat.

The two boat types of Stone Age man represented today by the umiak and kayak are not the only seaworthy forms we know from the time before metals. We mentioned a third at the beginning of this discussion, the curragh, which has a design that is widely familiar through being like that of Algonquin bark canoes and their commercial descendants which are sold by sportsmen’s outfitters, for instance the Peterborough. The

ancient curragh might be a large craft, though it is now represented in Ireland by canoes frequently eighteen and seldom more than twenty-five feet in length. Even these, however, are trusted there for stormy seas and rough landings, as by the people of the Aran Isles.

A source on the skin boat which probably deserves more attention than it has received from historians of geographical discovery is Irish folklore with its many tales of *Imramha*, voluntary voyages undertaken in skin boats. As in several other cases which we consider in this chapter, and shall consider in the one on Columbus, skepticism has been based upon “extravagances” and “absurdities”; but at least some of these, we now feel, are statements of the eminently reasonable.

One of the supposed absurdities about the curragh in Irish lore was the claim that the larger of them were ocean-going vessels carrying sixty or more people; as, for example, in the *Voyage of Maeldun*, where sixty were specified and where the number was later increased to sixty-three for a voyage covering several weeks. Joyce does not comment on the number of passengers carried or weight of cargo but has other pertinent remarks:

“This voyage would appear from internal evidence to have been made in the beginning of the eighth century (O’Curry says about the year 700); for I think it likely that Maeldun did actually go on a voyage, which was afterwards made the framework round which some ingenious ollave [poet] wove his fanciful story of the hero’s adventures.”

Hornell, not as skeptical as most, considers that “we have to allow much latitude for exaggeration by the story-tellers when

dealing with the dimensions of the curraghs used in these sea adventures.” He refers to the *Voyage of Teigue, son of Cian* which tells of a raid on Munster by sea-rovers from Fresen, near Spain. The raiders had carried off Teigue’s wife, kindred, and many other people and Teigue was determined to rescue them. He built a great curragh provided with twenty-five thwarts, covered it with forty ox-hides of hard bark-soaked leather and fitted it with enough necessities so that it could remain a year at sea if necessary. He had the usual marvellous adventures, succeeded in his quest and returned safely home.

Joyce and Hornell are among writers familiar with both the history and the present state of the Irish curragh and the British coracle. The usual historians have apparently thought of the curragh in terms of the coracle described by Julius Caesar, as a boat suited through its design for the crossing of rivers rather than of seas. Some of those historians who are familiar with modern Irish curraghs but not with the curraghs of old have thought that twenty-five-footers were of maximum size, assuming that if larger boats had ever existed they would still be in existence—this apparently on the modern inclination to feel that things constantly improve, at least along technological lines, so that everything is better (or at least bigger) now than it used to be. Last, there seems to have been with historians the feeling that a boat for sixty passengers and a rough sea was inconceivable in terms of a wicker frame and a covering of hide—that boats of that kind, if so big and so loaded, would wriggle themselves to pieces gradually in a seaway, if they did not collapse at once.

We have already made the point that the skin boats of the

Stone Age people of northwestern Europe may have been as good as the skin boats of the Stone Age people of northwestern America; this on the premise that it is not absurd to suppose that the white race, under given conditions, may accomplish things which are known to have been accomplished by a dark race under like conditions.

If this claim of race equality be admitted, then one has to concede that it is not absurd to believe an Irish story about sixty passengers in a skin boat if one is able to believe an Alaska story about as many Eskimos in a skin boat. Now Lisiansky tells us, from his expedition of 1803-06, that the natives of southwestern Alaska in his time had boats of leather for ocean use which carried seventy people. This is the largest number of passengers we have found cited by an observer who is considered to be reliable; but there are many staid references to cargoes only a little smaller.

Captain E. D. Jones, Coast Guard officer experienced in Bering Sea navigation, who supplied the photograph of an umiak with forty-nine passengers which we use for an illustration in this book, has read without skepticism Lisiansky's account of the carrying power of the umiak as he found it around Kodiak Island at the beginning of the nineteenth century. [See [Plate IV](#).]

Captain Jones does not know the length of the boat photographed carrying forty-nine passengers, with the amount of freeboard shown in our reproduction; but he is disinclined to think it was more than forty feet, since boats larger than that have not been measured in recent years from the King Island district. Lisiansky does not give the length of the boats that

carried seventy persons. However, boats sufficiently larger to account for twice the forty-nine passengers shown by our photograph have been reported from Greenland. Egede mentions umiaks that were sixty feet long. Crantz, speaking also for western Greenland, confirms this by saying that the umiaks were “commonly six nay eight or nine fathom” long—ranging from thirty-six to fifty-four feet in length.

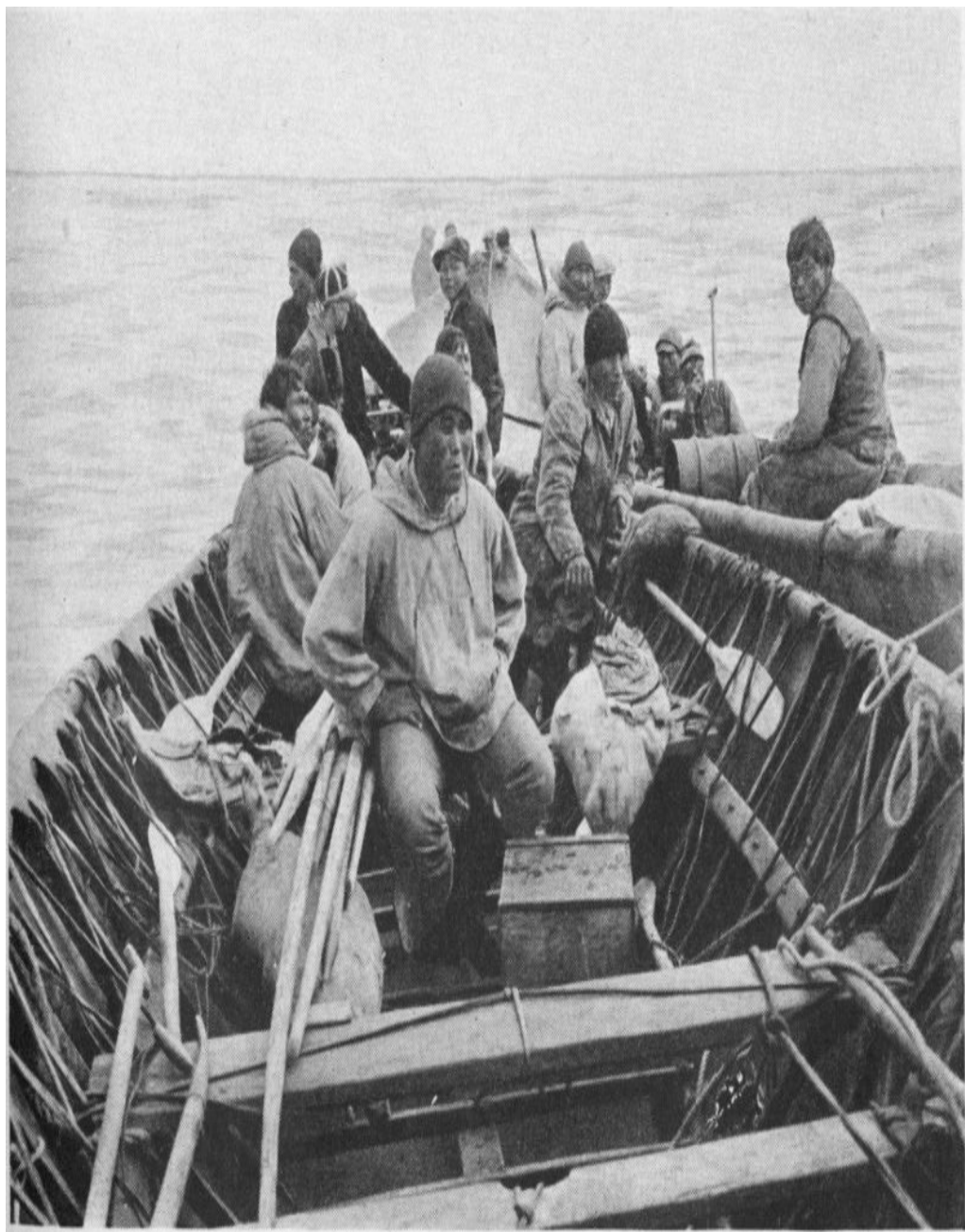
The Irish folklore reference to sixty passengers in a skin boat is, then, not extravagant but sober. Instead of showing unreliability it tends to show that there may be somewhat more fact and less fancy than we had thought in the ancient seafaring tales.

That the development of boats and of navigation must have been slow is to be kept in mind as we study the seaworthiness of ancient craft. One of the best lights on the static element in olden European boat design comes from Ireland, the country both of the Aran Islanders and of Dicuil.

## **PLATE IV**

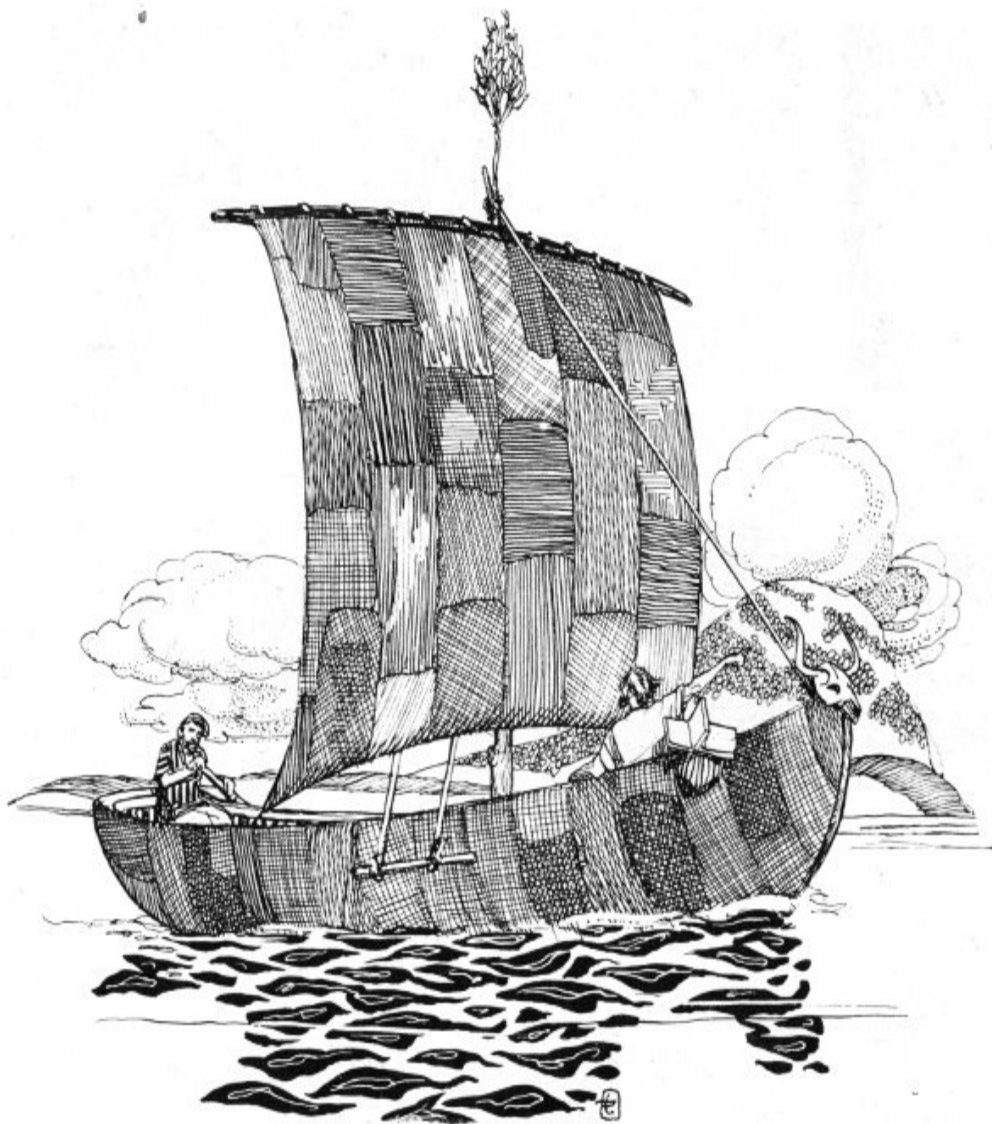


Umiak with forty-nine Eskimos.



Inside of umiak.





Drawing of Irish skin boat of ca. 200 B.C.



*Photo by Capt. M. A. Healy.*

### A Modern Eskimo skin boat in Bering Sea.

In the Broyghter Hoard, now preserved at Dublin, is a small gold model of a curragh that was in Irish use about 200 B.C. Clowes says that, being small and somewhat rough, the model cannot show great detail, but that it “exhibits the general form of the vessel and its eight rowing-thwarts and oars, together with mast, yard and steering-oar.” He goes on to say that a comparison of this model with a drawing entitled “Wicker Vessel used by the Wild Irish,” made in about A.D. 1685 and preserved in the Pepysian Library, “shows a vessel of very similar type to that represented by the gold model, made nearly nineteen hundred years before.”

With the general agreement of prehistoric archaeology that, on the average, changes are slower the farther back we go, it would seem elementary that if a curragh of eight thwarts did not change materially in the nineteen hundred years which follow 200 B.C., it had probably not changed materially either in the nineteen hundred years which preceded that date.

This would take the curragh, in about as seaworthy a form as it ever had, back to eighteen hundred years before Pytheas.

Since it is agreed, also, that the umiak of the modern Stone Age Eskimo is more than capable of spanning the widest gap between islands that is found on the road from Scotland to Iceland, and since it appears also agreed that the curragh of 200 B.C. and its lineal descendants, such as the boats now used in the Aran Isles, were and are in design almost as seaworthy as the umiak, we seem to have an adequate physical basis for thinking it reasonable that Iceland had long been familiar to the British when Pytheas came their way in the fourth century B.C. For if the Britons did not have the dory type of skin boat, which seems ideal for the discovery of oceanic islands, they had the curragh, which is adequate too.

This is not saying, of course, that ancient man necessarily used mainly or chiefly craft of the umiak, kayak or curragh type. Their boats may equally well have been cousins of the wooden South Sea vessels through which we know most of the Pacific islands were discovered.

We learn from that part of the testimony of Pytheas which no one doubts, and which we shall cite hereafter, that the British of the fourth century were on a level of culture which, by our

usual standards, was higher than that of the Polynesians either when they arrived at Hawaii, perhaps in the fifth century after Christ, or when they were visited there by Captain Cook in the eighteenth century.

The Polynesian sailors no doubt had a crude astronomy. Even if it was not so very crude, even if it was superior to the British of Pytheas, it can hardly have been equal to that of Pytheas himself, a foremost astronomer and mathematician of the Greek world.

One hears in discussions of Polynesian seafaring that outrigger canoes are about the most seaworthy craft possible. They can have been much more seaworthy than the Viking ships which, to our knowledge, prowled about the North Atlantic in thick and stormy weather, week after week out of sight of land, and brought to distant (and sometimes unexpected) ports men who eventually composed long narratives of their voyages, usually without a suggestion that they had been in danger from the gales and high seas.

Those Viking ships were smaller than the vessels of the Massilian Greeks; Viking astronomy was inferior to that of Pytheas.

It may be true, doubtless is, that the Greek ships of 300 B.C. were not quite equal for seaworthiness to the Norse of A.D. 800, although they were larger than the Viking craft. Even then, we are probably not justified in assuming that Greek vessels and seamanship were so inferior to the Norse that a voyage to Iceland was particularly risky for them. For not many will disagree with what we quoted from Markham—the ships of the

Greeks in 325 B.C. are likely to have been better than the vessels of Columbus, and a voyage from Scotland to Iceland is surely not more difficult than from Spain to the West Indies.

Dicuil, whom we shall consider a bit farther on, tells in his book of A.D. 825 about Irishmen who went to Iceland “in a boat of two thwarts.” The scholars have never doubted the voyage referred to by Dicuil was actually made. That faith is justified not merely by such facts and reasoning as we have used with regard to the Stone Age but also from what is known of small boats in recent times. We have from the last two centuries classics of open boat adventure that are here instructive; for instance, Shackleton’s 800-mile voyage, below the Roaring Forties, through the stormiest ocean known to man, and Bligh’s 4000-mile escape through quieter seas in an open boat from the *Bounty*. And then there is what we have said of the comparatively small boats of the Aran Islanders that were formerly of skins and wicker but are now of canvas and wicker, and seldom if ever more than seventeen feet long.

Those who believe, and want others to believe, that the Vikings of the centuries after Christ were the first deep sea navigators of the North Atlantic are prone to dwell upon a supposed inclemency of weather between Scotland and Iceland. Numerous arguments have been used by them and others to make, for instance, the tropical Pacific seem easier for the dark races to navigate than the North Atlantic was for the blond races. Chief of the talking points is temperature—it is “so much nicer and warmer in the South Seas.” This question has several slants.

North Atlantic waters doubtless carried Gulf Stream temperatures in the days of Pytheas, as now. The air over the North Atlantic between Scotland and Iceland is not today colder than Britons are used to, at least in Scotland—a little cooler in summer, somewhat warmer in winter. The English like it a bit cooler than southern England usually is in July and therefore they visit Scotland—they go by choice to a country that is near in temperature to the sea weather between Scotland and Iceland. A climate which men seek because they like it cannot be, on its temperature side at any rate, a serious bar to navigators. It is therefore hard to see how discovery of an island like Iceland by navigators of the Stone Age could have been advanced in time by a climate-changing magician, so long as he confined his sorcery to merely increasing the temperatures of the ocean weather between Europe and Iceland.

A high midsummer temperature has at least one disadvantage for long sea voyages in small boats: it brings about more perspiration and a greater need for drinking water. If voyages were made by the British across the 240 miles that separate the Faroes from Iceland, they will not have been at sea more than a third as long as were the Polynesians when they crossed the 1,000 or 1,200 miles between Easter or Hawaii and the nearest inhabited islands. The problem of drinking water would, thereby, seem considerably less for the British—not merely a less distance but also less perspiration and therefore less water required per day.

But it is one of the common devices of primitive man to capture rain for drink. Undoubtedly the forebears of the Polynesians and the British alike were familiar with that trick

thousands of years before any human saw Easter or Iceland. The water problem may not have been serious for the discoverers of either island.

In speculations on discovery, it is not to be forgotten that Iceland is mountainous, and that North Atlantic mirages are pronounced. The mountains of southern Iceland have been reported frequently in recent years to be visible through mirage at more than a hundred miles, less frequently at two hundred, once at a distance of more than three hundred. Among the things which this means is that people living in the Faroe Isles might occasionally see Iceland across their 240-mile gap of sea. Although mirages are less pronounced as you move south into the Atlantic, it is likely that the Faroes would be seen from the Shetlands, or from the Orkneys, across one hundred and sixty miles and eighty miles, respectively.

The greatest well-authenticated mirage known for Iceland was observed the summer 1939 by the famous Arctic navigator and explorer, Captain Robert A. Bartlett, from his ship the *Effie M. Morrissey*. Bartlett was looking northeast toward southwestern Iceland, as the Faroese might be looking northwest toward southeastern Iceland where the mountains are of comparable height. Professor William H. Hobbs, also distinguished in northern field exploration and versed in its literature, reports on Bartlett's observation in a letter to *Science* which was published December 1, 1939:

“On July 17, the schooner was from its noon observation in sunshine found to be in latitude 63° 38' N and longitude 33° 42' W. The ship's three chronometers had been checked daily by the Naval Observatory signal, and the air was calm and the

sea smooth. At 4 P.M. with sun in the southwest the remarkable mirage appeared in the direction of southwestern Iceland. The Snaefells Jökull (4,715 feet) and other landmarks well known to the captain and the mate were seen as though at a distance of twenty-five or thirty nautical miles, though the position of the schooner showed that these features were actually at a distance of 335 to 350 statute miles. A checking observation of the sun made at 6 P.M. gave the latitude at that time as  $63^{\circ} 42' \text{ N}$  and longitude  $33^{\circ} 32' \text{ W}$ . It was warm and rainy; the air had throughout been calm and the sea smooth. Captain Bartlett writes: 'If I hadn't been sure of my position and had been bound for Reykjavik, I would have expected to arrive within a few hours. The contours of the land and the snow-covered summit of the Snaefells Jökull showed up almost unbelievably near.'"

Through the *Annals of the Association of American Geographers*, December, 1937, Hobbs published numerous examples of authenticated mirages which had been seen at from 100 to 300 miles. He says, in the *Science* letter from which we have just quoted, that "The example furnished by Captain Bartlett is somewhat in excess of the examples already described."

Whatever the cause that took the discoverers of Iceland to seaward—a wind that drove them, a haze which lost them the way, a desire to check up on a mirage, or a mere curiosity to find whatever lay beyond the horizon—in any case they did not have to go much more than halfway from the Faroes until, with normal visibility, they would see Iceland. By contrast Easter is low, it is smaller, mirages are not so common or strong in the tropical oceans. Therefore, in addition to being



more than three times as far away from the home of the discoverers, Easter might perhaps be said to have been three times as hard to find, through lowness and smallness and poorer visibilities.

As for Iceland itself being cold: there is only one month of the year that averages below freezing at Reykjavik, which makes January there about the same as January in Milan or Philadelphia. The Massilian Greeks, who customarily made trading journeys into the center of France, were used to January cold snaps there more severe than any they would have met with in Iceland.

Besides, no one has shown Pytheas must have done his Thule voyage in midwinter. He likely would have preferred midsummer because of the daylight, for a great advantage of the North Atlantic to primitive discoverers over the tropical Pacific was that in midsummer the night disappeared. In the latitude of Easter Island you would not have useful daylight for more than thirteen or fourteen hours at any time of year, while in the latitudes of the jumps between islands from Scotland to Iceland, by way of the Shetlands and Faroes, you would in midsummer proceed rapidly from three or four hours of dark each night when you left Scotland to no darkness at all when you were part way from the Faroes to Iceland.

Having day for the twenty-four hours has a double advantage. You can do most things better in the light, and you escape fear of the dark—a fear which, on the average, is greater the farther you go back in the culture of the race.

The better visibilities of the North Atlantic are of so much

consequence when we attempt getting light on discovery problems from tropical comparisons that we should perhaps emphasize it. A case in point, then, is that of the International Polar Year flyers who rose a mile high over southern Iceland on numerous occasions during their studies of 1932-33 and who were accustomed to flying in the Dutch East Indies. One of them stated that a mountain seemed as distinct and near in Iceland when it was a hundred miles away as it did in the East Indies when ten miles away. Whether or not precisely right, this at least conveys a general impression upon which most will agree who have visited, let us say, both Iceland and Tahiti.

We have favored, above, the common theory of how remote islands were discovered, that primitive navigators lost their way or were driven by storms. Now, if you once get boats and seamanship developed in northern Scotland so that you can do more than cross a river, you will cross the Pentland Firth six or eight miles to the nearest of the Orkneys. Thereafter a considerable number of boats would not prowl around the Orkney group very long until one of them, through a combination of wind and thick weather, would find itself, when the sky cleared, in view of the Shetlands. In like manner boats plying around either the Orkneys or the Shetlands could easily discover themselves in sight of the Faroes—or if not easily, at least more easily than the like could happen with Easter Island and with many another of the South Pacific isles which were inhabited when Europeans first reached them and which therefore must have been discovered by what we call savages.

The Faroes known, voyages to them would be made

intentionally. But even with navigation what it had become a thousand years after Pytheas through the Vikings, or seventeen hundred years after him through the Portuguese, you are going to miss such a small target as the Faroes occasionally if you steer for it from a considerable distance. With a prow that had been aimed toward them from the Orkneys or Shetlands, you would not go by them very far in thick weather and with a fair wind until you were in a position to see Iceland when the skies cleared.

Of the many known cases of discovery by overshooting a mark that you barely miss, we cite as bearing on the hypothetical Stone Age discovery of Iceland the Iron Age voyage of Leif Eriksson. In the spring of the year A.D. 1000 this citizen of the Greenland republic left Norway to make a direct course for the south tip of his own country. He missed Cape Farewell in thick weather. When the skies cleared he saw directly ahead a land which he knew was not Greenland, and which we know was the North American mainland, or Newfoundland.

Iceland may have been discovered by some unknown Stone or Bronze Age navigator somewhat as this known man, born in Iceland, discovered the mainland of North America.

Whether "the island named Thule" was Norway to the east of Britain or Iceland to the north, and with no recourse to such speculation as ours on a prehistoric golden age of navigation, it seems clear to most students from the Pytheas fragments themselves that the people of northernmost Scotland (Scotia Minor) were in touch with Thule by voyages across the sea. They, according to the fragments, could point to the location of Thule and could tell the Greek explorers what sort of land it

was. This must have been either because they were already navigating their own craft to Thule or else because the people of Thule were in the habit of visiting Scotland.

While it may be “inherently more probable” that the voyages were between Scotland and Norway than between Scotland and Iceland, the fact remains that those who insist the waters between Scotland and Norway were being crossed by local vessels in the fourth century B.C. are, by that very contention, prevented from maintaining that Scotland cannot have been in touch with Iceland. For if boats and seamanship are good enough for crossing to Norway then, by the same token, they are already of a character which permits travel on the high seas generally. There is little difference between the open-sea gaps involved, when the longest jump on the Scotland-Norway route is 215 miles and the longest on the Scotland-Iceland route is 240. The difference is small when taken at face value. It becomes less when you remember that not merely is southeastern Iceland much higher than southwestern Norway but also that the Faroes are much higher than the Shetlands. You are really out of sight of land roughly the same distance in crossing the two gaps.

Even if we do not accept the archaeologist view which we have cited from Brögger, that high sea navigation was well along on a declining cycle at the time of Pytheas, we must, throughout our discussion, avoid the common preconception that after the transition had once been made from boats to proper ships, the ships must have improved in their seaworthiness steadily through the centuries; that they must have been less manageable and less safe the farther back we go.

No doubt, going back, we would eventually come to a time when ships were poor. But the literary evidence, even without the support available from archaeology, shows that this does not happen within the time sector involved. We have already compared 300 B.C. favorably with A.D. 1500 by quoting Sir Clements Markham to the effect that the Greek merchant ships of Pytheas' time were larger and in several other respects better than the vessels of Columbus. We now fortify that view by referring to William Hovgaard, Professor of Naval Design at the Massachusetts Institute of Technology, a foremost student of the history of navigation. His comparison of Viking ships (A.D. 800-1000) to those of Columbus resembles that of Markham's Greek comparison. In general, but especially on a lee shore, there had been, according to Hovgaard, a decrease in safety during the five hundred years that immediately preceded Columbus.

To sum up:

With the one possible exception of Iceland, every large island in every tropical and temperate zone ocean was inhabited by man when we Europeans of historic time "discovered" them. All of these islands, some of them much farther than Iceland from the next land of any sort, were first reached by what we call savages. Then, why is it "inherently improbable" that the Massilian Greeks reached Iceland? And why is it unlikely that the Britons had reached it earlier, and that they were able in the fourth century before Christ to tell Pytheas about it and to guide him there if they and he wished?

The answer must be that ethnology, geography and

archaeology have combined to force upon history the acknowledgment that, so far as mere probabilities are concerned, it is likelier than not that the people of what are now Scotland and Ireland were in the habit of visiting Iceland long before the time of Pytheas.

### **VISITS TO ICELAND AFTER PYTHEAS**

Probabilities on voyages from northwestern Europe to Iceland before Pytheas are somewhat affected by whether there were like voyages in the centuries following Pytheas. We must study that problem; but we need not do so longer than to A.D. 850, when those Norse voyages to Iceland began which led to the colonization that followed 870. Icelandic history is about as well known from that date as Massachusetts history following 1620.

We examine, then, the period from 300 B.C. to A.D. 850. But we do not study further the question of whether boats and ships were available following Pytheas that could have made the voyage to Iceland, since no one has suggested a decline in these centuries that would have put them, in navigation, far behind the earlier time. What we now seek are literary references.

There may be no references to Iceland during a thousand years after Pytheas from any literature except that of Ireland; the first three centuries through which we have a glimmering of light from manuscripts depend for it solely upon Irish documents, so far as we yet know. From the side of our study, as from many

others, it is therefore the greatest pity that in addition to all the vast quantities of Irish manuscripts which are known to have been destroyed during and since the Middle Ages there are thousands, if not tens of thousands, regarding which we know practically nothing except that they exist, stored in places of varying degrees of safety.

What may be the first Irish reference is by the historian Adamnan (624-704) in the biography of his predecessor at the monastery of Iona, Columba (521-97). Adamnan tells of a man named Cormac who, in Columba's day, made three voyages in search of "an uninhabited island in the ocean"—which, it is conjectured, was Iceland. There is here no identification of the uninhabited island with Thule.

When one deals with saints and miracles, things are a bit tricky; but it may not be unreasonable to agree with those who have said that Cormac's searching for a specific tenantless island presupposes that he knew such an island was there—that he knew Iceland was there.

But this leads on to the reflection that Cormac would not have had much trouble finding Iceland if voyages to it by his countrymen had been at that time frequent. Accordingly, there would seem to have been a gap between voyages, of decades if not of centuries, but with a surviving tradition. A like reasoning is frequently applied nowadays to Columbus—that one of the things which led him to sail west in the fifteenth century was that there had been preserved by the Church of Rome the knowledge that Leif Eriksson, on a missionary voyage in their service, had found a land on the western side of the Atlantic five hundred years before.

Adamnan, as we have quoted him from the seventh century, may have been talking of an Iceland known to Ireland in the sixth. The Venerable Bede, in the eighth century, beyond much doubt was talking of Iceland when he mentioned people coming to Ireland from Thule and reporting the sun visible through several consecutive nights each midsummer. That would be on the north coast of Iceland.

The first reference where no one has questioned that Iceland is Thule is to the south coast, and is found in *De Mensura Orbis Terrae*, which was written on the Continent about A.D. 825 by an Irish monk, Dicuil.

This writer we shall quote at some length, and beyond his remarks strictly applicable to Iceland, for his works are available as yet only in Latin; he is less known than most of the authorities we cite, and offers us contributions from at least two sources that do not seem to have been used by other scholars of the Middle Ages.

All that we know of Dicuil himself is what we gather from his own writings: He was Irish. He taught in the Frankish Kingdom during the so-called “Carolingian Renaissance,” probably at the court of Charlemagne and of Louis the Pious. Between 814 and 816 he compiled installments of an astronomical treatise as a series of yearly gifts to Louis the Pious. Benedict Fitzpatrick in his *Ireland and the Foundations of Europe* tells us (pp. 141-42): “Dicuil intended to present this book to Louis on the occasion of the Frankish festival on May 14 when the nobles would be making their annual presents to the king; but it would appear that Louis had an eye for more costly presents than the intellectual labors



of Dicuil, for the author complains that though the monarch attended while Dicuil was reciting his verses he would not give ear to what the author had to say nor offer any reward.”

From Dicuil’s own statements, and from the implications of his writings, we think of him as grammarian, astronomer and geographer. He was a wide reader, for he no doubt read more authorities than he cites, and he cites at least thirty.

The *De Mensura Orbis Terrae* is a work on geography. *Britannica* gives as Dicuil’s chief distinction that this work “. . . contains the earliest notice of European discovery of and settlement in Iceland and the most definite western reference to the old fresh-water canal between the Nile and the Red Sea, blocked up in 767.” There is plenty of evidence from other sources that what Dicuil tells about the Nile canal is substantially correct; the sufficient confirmation of his report that the Irish were cultivating Iceland around 785 is that the Norsemen who began to visit Iceland around 850 tell us that when they arrived they found Christian Irish people there before them.

The *De Mensura* has been printed three times, as said, in Latin: the Walckenaer edition, Paris, 1807; the Letronne edition, Paris, 1814; and the Parthey edition, Berlin, 1870. The first two are printed from a tenth century manuscript in Paris (Biblioth. Nat. 4806), and the last from a tenth century manuscript in Dresden (Regius D. 182). Later MSS. are to be found at Venice, Oxford, Rome, Vienna, Munich and Cambridge.

Dicuil tells us in this book that he has received information

from a scientific enterprise about which we seemingly have no other record, an expedition (or series of them?) sent out by the Emperor Theodosius for the measurement of the earth. Both the most recent editor, G. Parthey, and the *Encyclopaedia Britannica* tell us that it is not known whether the Emperor “Saint Theodosius” referred to by Dicuil was the first (“the Great”) or second Roman emperor of that name. (Such an enterprise would appear to be more in keeping with the character of Theodosius II; but since Dicuil refers to “Saint” or “holy” Theodosius it would appear that the Emperor Theodosius III, who ended his life in a monastery as an ordained priest and who was famed for miracles, might also enter into the picture, if we suppose that he could have undertaken such a survey in his brief reign of only about a year, 716-718.) The other special source, again known to us only from Dicuil himself, is the verbal report of clergymen who had been in Iceland thirty years before the writing of the *De Mensura*, 825.

The section which deals with Thule is a discussion of the classic authorities and of their geographical ideas with regard to northern lands. He cites the testimony of people who had been in Iceland thirty years before, and does it to prove that certain scholars of antiquity, and those who still follow them, are mistaken, particularly in how daylight and darkness vary in Iceland throughout the year, and on where the frozen sea begins.

As the first unquestioned literary reference to Europe’s knowledge of countries and conditions west of the Atlantic, Dicuil’s passage on Iceland has been much studied, with a resulting division into two camps. One faction holds that

because Dicuil's is the first (undoubted) reference to Iceland, the country must have been then a recent discovery. The opposing group considers that the wording and context show Thule had long been known. They urge that if a man, especially when he is writing a work of geography, finds a chance for being the first to convey to the learned world information about a new country, he is sure to enlarge upon it. Dicuil, this faction insists, does just the opposite. His off-hand treatment of Iceland, they say, implies the country had been long known, even though not correctly understood in some details. Moreover, Dicuil speaks as if there never had been any doubt of its being Thule—as if that question had been decided not alone definitely but also long enough ago so that interest in the debate (if there ever was one) had died out. He concerns himself only with disputed *philosophical questions*—the nature of the sun's motion, the amount of its light at a given place and season, and how far from the sun (and from Iceland) the frozen sea begins.

The passage from *De Mensura*, then, is of such importance for our study that we must quote all that is pertinent to our discussion. We translate from the Parthey edition:

“Ever since I got together a pamphlet about ten questions involved in the art of grammar, I have thought a book ought to follow about the extent of the earth's regions, according to the authority of those whom the holy Emperor Theodosius sent to measure those regions; and I wish to show, with some supplementary material, following the distinguished authority of Pliny the Younger, what the extent of these lands is.”

From page 1 of the Parthey edition, where the above is found,

we skip to page 18 where we find an obscure passage, the Latin bad probably through copyists of the manuscripts. We gather (the contrary of which would have been strange) that Dicuil adheres to the conception of a world uninhabitable at its middle because of heat and uninhabitable toward the north because of cold. That is, then, a strictly philosophic adherence; for, as we shall see, he goes so far on the practical side as to call those liars who would have always cold a certain part of the Far North regarding which he has contrary information from travelers.

In Chapter 7 of the *De Mensura*, between pages 41 and 44 of the Parthey edition, are the sections that interest us most, the statement of the clergy who had been in Iceland and paragraphs introductory thereto in their subject matter.

“We do not read of any islands being in the sea west or north of Spain. Around our own island of Hibernia [Ireland] there are islands, but some are small and others are infinitesimal. Near the island of Britain there are many islands, some large, some small, and some middle-sized; some are in the sea to the south and others to the west, but islands are found more abundantly in the region of the Arctic Circle and the north. Upon some of these I have dwelt, others I have landed upon, others I have just seen, and others read about.

“Pliny the Younger in his Book IV informs us that Pytheas of Marseilles relates that Thule is six days’ sailing distant from Britain. In Book XIV he speaks of it as always deserted. Isidore in his *Etymologiae* writes as follows: ‘Thule; the remotest island of the ocean between the northern and western zones beyond Britain, taking its name from the sun because the

sun makes there its summer solstice.’

“Priscian in his *Periegesis* speaks of it more clearly than Isidore:

‘He skims with his ships the open plain of Ocean,  
Coming to Thule which gleams both day and night  
With Titan’s rays, he ascends with his car to the poles  
Of Heaven, kindling the boreal realms with his torch.’

“Julius Solinus, in that portion of his selections dealing with Britain, writes more clearly and fully than Priscian about this same island, thus: Thule, the remotest isle, where during the summer solstice when the sun crosses the constellation of Cancer, there is no night, during the winter no day.

“It is now the thirtieth year since some monks who dwelt upon that island from the Calends of February [February 1] to the Calends of August [August 1] told me that not only during the summer solstice but also during the days near that time, towards evening the setting sun hides itself as if behind a small hill, so that there is no darkness for even a very short time; but a man may do whatever he wishes, actually pick the lice from his shirt just as if it were by the light of the sun; and if they [the monks] had been on top of the mountains the sun probably never would have been hidden from their eyes. In the middle of that short period of time it is midnight in the middle of the earth; and so I believe that, on the other hand, during the winter solstice, and during a few days around that time, dawn occurs for only a brief time in Thule, that is to say, when it is mid-day in the middle of the earth. Therefore [it is evident that] those are lying who have written that the sea around

Thule is frozen and that there is continuous day without night from the vernal to the autumnal equinox; and that, *vice versa*, from the autumnal to the vernal equinox there is perpetual night; when those monks who sailed there during a time of year when naturally it would be at the coldest and landed on this island and dwelt there, always had alternate day and night after the solstice; but they found that one day's sail from it towards the north the sea was frozen."

After claiming that the wording of this passage indicates that Iceland was a new discovery, one school of interpretation usually goes on to say that there can not have been much travel between Ireland and Iceland in Dicuil's time, which assertion they next proceed to use as a further argument that Iceland had just been discovered.

To such reasoning the opposed faction makes a variety of replies:

Where Dicuil tells us about men who sailed from Ireland in midwinter to visit Iceland he is really saying that there was traffic between the two countries throughout the year. If the voyage had been unusual it would have been thought to be dangerous, and then it would surely have been made in summer, for that season has at a minimum the advantage of continuous daylight, as against midwinter when there are each day only a few hours of sunlight and bright twilight combined.

It appears from modern records of commercial sailings, which are now weekly or oftener, that the seas between Britain and Iceland are somewhat rougher in winter than in summer. The weather, though colder, seldom averages below freezing during

any winter month. The very coldest part of the year is exactly that period of late January or early February in which was made the voyage to Iceland which Dicuil reports. For him to say, without comment, that the journey was made in February surely indicates that the voyage was not looked upon in A.D. 795 as particularly dangerous, and that traffic back and forth was continuous throughout the twelve months; which in turn would be a sign that the traffic was extensive and therefore of no recent origin.

It has been argued that there can not have been a long Irish occupation of Iceland because archaeological remains showing a pre-Norse Irish settlement have not been found. To this several answers have been made:

Comparatively little archaeological work has yet been done in Iceland, and it may be that ruins clearly Irish will be found hereafter. Waiving this, we point out that it is undisputed the Irish were in Iceland at least from 795 on; for Norsemen, who arrived between 850 and 875, confirm Dicuil by telling us that they found Irish people in Iceland ahead of them. The records say that these fled the country because the Norse were heathen, and that they left behind them books and crucifixes which were evidence that they must have been Christian. Is it reasonable for disputants first to admit that no archaeological traces have yet been identified from those Irish who are known to have been in Iceland before the Norse, and then to contend that still earlier Irish cannot have been in Iceland without leaving archaeological traces that would have been discovered before now?

Nothing is said in the historical record about the known Irish

having left in Iceland ruins of churches or homes. This may indicate that they had lived in tents, in sod houses, or in some other form of dwelling that does not leave conspicuous and lasting remains. That can well have been—there are cultures known from many parts of the world which leave few mementoes behind.

It is also possible that a given people may leave numerous and lasting memorials through a period of centuries and may thereafter cease to leave them through other centuries. An example of this are the Eskimos of the north coast of Canada between Cape Lyon and King William Island and up into the islands to the north. A few centuries ago they used to live in houses of earth, bone, wood and stone, the remains of which are still conspicuous. But during the last one or several centuries they have been spending the winter in snowhouses, which leave no sign. It is also true, at least in parts of this district, that formerly the people used to bury their dead in graves of stone or wood, which structures have remained and have tended to preserve skeletons. But more recently there has come about the practice of laying the dead upon the surface of the ground and of not protecting them from wolves or dogs, so that not merely are graves lacking but the skeletons themselves have little chance to survive. In other words, you find in this section many clear archaeological proofs the Eskimos were there five hundred years ago but few or no such proofs that they were there fifty years ago.

Most of the published discussion about the Irish in Iceland has been on the explicit or tacit assumption that a land is colonized just as soon as it is discovered. But surely this has not been the uniform course of known history. Only in



periods of expansion has it been the rule (even then with many exceptions) that discovery was followed by immediate colonization; nor is it uniform that lands, once colonized, thereafter remain permanently inhabited. A majority of writers (among them *Britannica*) believe that the Azores, for instance, were known to the Bronze or Early Iron Age, and repeatedly visited, if not colonized, in that case apparently by Carthaginians. Yet the islands were uninhabited when they were rediscovered by Europeans in the Middle Ages. St. Kilda, in the Hebrides, was inhabited for centuries, but its people moved out a few years ago and it is now tenantless.

The period of European history following the Renaissance was a time of energy and of colonization. Yet there were lands then discovered that remained for hundreds of years uncolonized, and some have not been colonized to this day. Striking in that regard are the territories of northeastern North America. Many now agree that the British, and other nationalities, used to sail into Davis Strait in the period immediately before Columbus; everyone agrees that European nations sailed into the Strait in the period after Columbus. Yet they made no settlements on either side—in Greenland, Baffin Island, North Devon or Ellesmere. No Europeans began permanent colonization in that quarter before the Danes in 1721. That was on the Greenland side. Buildings which would leave considerable ruins of European type, such as might be discovered and identified centuries hence by archaeologists, have been erected only within the last century in Baffin Island. In Devon or Ellesmere they were not built till within the memory of our own generation.

There are islands on the New England coast which had sheep

through long periods without anybody living on them—people just went over seasonally to butcher or make other use of the sheep. We have records that the Faroe Islands, subsequent to a colonization, were for a long period uninhabited by man but the home of many wild sheep, of which people from other lands seemingly made sporadic use somewhat as the New Englanders made seasonal use of the sheep on their islands.

Accordingly, one of the possibilities is that before the Norse settlement, which followed A.D. 847, Iceland had been used from the British Isles as a sheep preserve. More likely it was then as now a fishery, with craft resorting there at certain times of year but with few people in residence, or possibly none. Eiderdown may have been valued by prehistoric Europeans as it was through the centuries of known history. Iceland has always been one of the great sources of down, the harvesting of which requires only a visit covering a few weeks each summer.

That far territories were resorts for hunting and fishing is well known from mediaeval European history and is so natural that the practice likely goes back well beyond history. One example is that from the eleventh to the thirteenth century Europeans of the Greenland Republic, who had their permanent homes mostly south of where now is Holsteinsborg, used to go hundreds of miles north along the coast, many seasons if not all, for the hunting of such game animals as were more abundant in the north than they were in the south. But it is usually considered by historians that the mediaeval Europeans did not, properly speaking, live in these northerly hunting districts during those centuries.

If, then, you take a world outlook, and are guided both through archaeology and history, you find it common that islands are long known without being colonized and that islands are colonized and later deserted. Likewise islands once inhabited remain without habitation for centuries and are then re-colonized.

When islands are frequented without colonization, it is no doubt the rule that archaeologists would have difficulty a thousand years later to say whether people had ever been there.

Nor must it be forgotten that one of the commonest habits of man in every land is to make his own dwellings from the ruins of those that were before. Imposing and handsome structures disappeared in this way from the Mediterranean countries. The recent inhabitants of Greenland have built houses from the stone ruins left by mediaeval Europeans. It is not unlikely that the Icelandic Norsemen similarly took building material from the houses of Irish predecessors without making any record of the practice that has come down to us.

The Icelandic sagas do not state that there were no Irish house ruins when the Norsemen arrived. What they say is merely that crosses and books were found which showed that the Irish had been Christian. It is not specified whether these were found in abandoned churches and residences or whether they were just discovered lying around.

In the absence of statement for or against, is it not more reasonable to suppose that the crucifixes and books were found in abandoned churches and homes? The ruins of these

buildings may all have disappeared through the material being used for later structures. Then, as previously implied, it is not hopeless that pre-Norse Irish remains may yet be found in Iceland.

We may have labored our two points, that it is not unreasonable to suppose the British knew Iceland long before Pytheas and that it is not unreasonable to think of them as continuing their visits to Iceland, systematically or at variable intervals, from the days of Pytheas to those of Dicuil. We felt we simply had to make those things super-clear. For we could not let one school, those favoring Norway as Thule, get away with putting a nearly insuperable burden of proof upon the other side just by assuming in our pages, as they do in their own, that the probabilities are heavily against the attainment of Iceland, whether by Pytheas or by other navigators, in the centuries immediately before and after 300 B.C.

## **THE VOYAGE TO THULE**

By agreement of the two factions (Thule was Iceland; Thule was Norway) we have Pytheas at the north tip of Scotland, somewhere around 300 B.C., with a ship larger and probably safer than the vessels of Columbus and with at least one undoubted superiority, an auxiliary power of oars which Sir Clements Markham has estimated as being similar to the auxiliary power of steam that was usually available to British sailing vessels of comparable size (400 to 500 tons) around 1890. In this craft Pytheas now sets out for Thule.

Further, the two factions agree in their admiration of Pytheas the man and of the voyage undertaken by him on his departure from northern Scotland. This general attitude is well expressed by Nansen, a foremost advocate of the view that Thule was Norway:

“It has seemed incredible to many—not only in antiquity, but in our own time as well—that Pytheas should have penetrated not only so far into the unknown as to the islands north of Scotland, but that he should have ventured yet farther into the absolutely unexplored Northern Ocean, and found an extreme country beyond this. He would thus have pushed back the limit of the learned world’s knowledge from the south coast of Britain to the Arctic Circle, or about sixteen degrees [1,000 miles] farther north. As a feat of such daring and endurance has appeared superhuman, a great deal of ingenuity has been employed . . . to prove that Thule was Shetland, that Pytheas himself did not get farther than the Orkneys or the north of Scotland, and that he heard from the natives of the country still farther north, which he never saw. But in order to do this almost all the statements that have been preserved on this part of Pytheas’s voyage must be arbitrarily distorted; and to alter or explain away one’s authorities so as to make them fit a preconceived opinion is an unfortunate proceeding. . . .”

We submit the fragmentary statements to which Nansen refers, and comment upon the use which has been made of them to support arguments on both sides of the controversy.

First we consider the distances and location of Thule. The main references are:

*Pytheas says that Thule is, by ship, six days away from Britain towards the North . . . (Strabo)*

*As Pytheas of Massilia writes occurs on the island of Thule, six days' distant sailing north from Britain. (Pliny)*

*The last of all the islands which have been mentioned, Thule. (Pliny)*

*Seeking Thule from the promontory of Caledonia . . . The sailing from the Orkneys to Thule is all of five days and nights. (G. Julius Solinus)*

*Thule is an island of the Ocean northwest of Britain (literally, "between the northern and the western zone beyond Britain"), next after the Orkneys and Ireland . . . (Servius)*

Some of the round number distances involved in the dispute between the advocates of Norway and of Iceland are, in nautical miles: Shetlands to Norway, 180; Shetlands to Faroes, 160; Faroes to Iceland, 240.

The Iceland and the Norway advocates agree in taking Pytheas from Scotland first to the Shetlands. This required two days. Thereafter, according to the Iceland advocates, during four days the course was for Iceland—without sighting the Faroes, or at least without the Faroes being mentioned in any fragment of the Pytheas account that has been preserved to us.

The southeast corner of Iceland reached, there is no preference between taking Pytheas west along the south coast and then north along the west coast, or north along the east coast and then west along the north coast. But we have to

deliver him, somehow, at the northwest corner of Iceland; for one of the main points in the identification of Thule with Iceland is that Pytheas reached the margin of the Arctic pack by a day's sailing north from Thule. This can have been from the northwestern corner but not from the northeastern.

It would seem that Pytheas spent more time on the north coast of Iceland than upon any of the other coasts, for many of his comments are either specifically said to be for the north coast or else fit that coast better than they do the others.

The first thing to note about the voyage from Britain to Thule is that the authorities agree rather well on the distance and direction of Thule from northern Scotland. The distance is either five or six days; the direction either north or northwest.

But in noting this agreement we remember that the authorities were pretty much quoting each other. There seem to have been three or more writers, contemporaries of Pytheas or immediately following him, who copied his work respectfully; and, therefore, presumably with a desire for accuracy. But, as we have explained, the works of all these men are as lost as the book or books of Pytheas himself; and the writers who have come down to us are not merely quoting Pytheas at second or third hand but are also quoting him disparagingly. The first of our quotations above is, for instance, a section from a paragraph in Strabo which scoffs at Pytheas and which, in fact, calls him a liar.

But perhaps it should be remarked on the other side that favorable testimony from hostile witnesses is, in law and logic, more convincing than from disciples.

We shall later give Norway's claim to being Thule the advantage of following in most of our discussion her best advocate, Fridtjof Nansen. We do the like now for Iceland through following generally the presentation of Gaston-E. Broche in his *Pythéas le Massaliote* who became an Icelandophile during the fifteen years which he devoted to the sources and to the critical literature upon which rest his conclusions.

According to Broche's analysis of the testimony of the ancient writers, Pytheas, coming up the east coast of Britain, arrived at the north tip of Scotland in June. There were almost nineteen hours of full light and the remaining five were twilight rather than true night. Here the natives told him of a land to the north where, at this time of year, there was still more daylight.

Broche imagines the feelings of these visitors from the south, how the sun-loving Greeks would already have been impressed by the lengthening daylight and how eager they would be to see for themselves this marvellous land of the midnight sun that lay to the north. Pytheas and his comrades were proud of the discoveries they had made and wanted to experience as many other marvels as possible which they could relate to their admiring countrymen upon their return to Massilia. They would have confidence in their ships and in their ability to navigate unknown waters.

Moreover, Pytheas was a scientist and his eager and inquiring mind would not rest until he could see physically those northern behaviors of the sun which he foresaw intellectually through his grasp of astronomical principles. Britons would have been impressed by the fine vessels of the Massilians and



would have seen how the combination of sail and oars made them independent of calms and moderate head winds. Encouraged by the customary Massilian gifts and promises, the natives would willingly agree to act as pilots on the northward voyage. Thus there would be enthusiasm for the trip on the part of leader, crew and pilots.

On the first day, according to Broche, they passed the Orkneys; on the second they would sight the Shetlands, noting they were more easterly than Britain. Thereafter the ships would take a northwestern course; so that “Pytheas, by a first direction northeast towards the Shetlands and by this new direction northwest would make a direction north toward Thule.”

Nansen’s rebuttal argument here is:

“Nor is it likely that Pytheas should have continued his voyage at haphazard across the ocean, unless he had heard that he would find land in that direction. To this must be added that Iceland lies so far away that the distance of six days’ sail will not suit it at all. Finally, if Pytheas had sailed northward at haphazard from Scotland or from Shetland, the least likely thing to happen was for him to be carried towards Iceland; neither the currents nor the prevailing winds bear in that direction; but, on the other hand, they would carry him towards Norway, and it would be natural for him to make the land there, perhaps just between 63° and 64° N. lat. or thereabouts.”

Strabo’s statement that Thule “lies six days’ sail north of Britain” does not rule out Norway, says Nansen, if we understand “north of” to mean “farther north than.” He

considers this the only reasonable meaning in view of other statements attributed to Pytheas where the same expression has this meaning—for instance, where he described places in Brittany and in Britain as being north of Massilia.

Eratosthenes, who based his views on information obtained from Pytheas, appears to place Thule to the northeast of Britain, “precisely where Norway lies.” Pytheas had no way of determining longitude, nor of getting his position in overcast weather, so that he might well have trended to the northeastward when he thought he was going north.

This argument by Nansen is one of several rather material cases where it may seem he forgets his own cautionary remark, which we quoted a few pages back, that “to explain away one’s authorities so as to make them fit a preconceived opinion is an unfortunate proceeding.” He says, for instance, that because Pytheas spoke of places in Britain as north of Massilia it is fair to assume he would similarly speak of Norway as north of northern Scotland. How about the reader trying this on himself? Take a map of Europe, place yourself in the south of England, and see whether you would not be likely to speak of London as north of Marseilles. Then go, on the map, to the north tip of Scotland and ask yourself whether, if you were standing there, you would speak of Norway as north of John O’Groats.

On trying this you will probably discover it to be a fact that from the north tip of Scotland you will feel Marseilles to be south, Norway east, and Iceland north. In short, you will feel that Nansen’s arguing that to Pytheas it was north to sail from the Pentland Firth to Norway is a case of explaining away his authority in order to support a preconceived opinion.

By more specific reasoning than this of ours, Broche rejects the argument that Pytheas would believe himself to be progressing north when he was really being swept from his course by eastward currents and by prevailing westerly winds during the four days following the sighting of the Shetlands, finally landing on the Norwegian coast. That view, he feels, underrates Pytheas as astronomer and navigator. But, admitting that he committed so great an error, he would, on reaching the Norwegian coast, once more get his bearings and would see the Scandinavian coast lying *to the south*. “How, then, could he believe, and say in his account [which we shall quote later], that *to the south of this Thule* is found the great British isle!” Britain is not south of Norway.

We might here reinforce even the strong wording of Broche by recalling what we have said earlier (and a thing upon which all authorities concur): Pytheas was such a stickler for precision that he refused to agree with Eudoxus who said that the North Star (our North Star) is straight north—that it is at a pole of the heavens. A man who is known to have split hairs that way, in his capacity of astronomer, is not likely to have been so careless, in the role of navigator, as to say his course had been north when it actually had been nearly east from northern Scotland; for the Norway advocates want Pytheas to have made the Bergen district, or farther south.

From Scotland to Iceland, by a route at first curving eastward toward the Shetlands, the distance is a little over six hundred miles, which requires for the Greek explorers an average of just over one hundred miles per day.

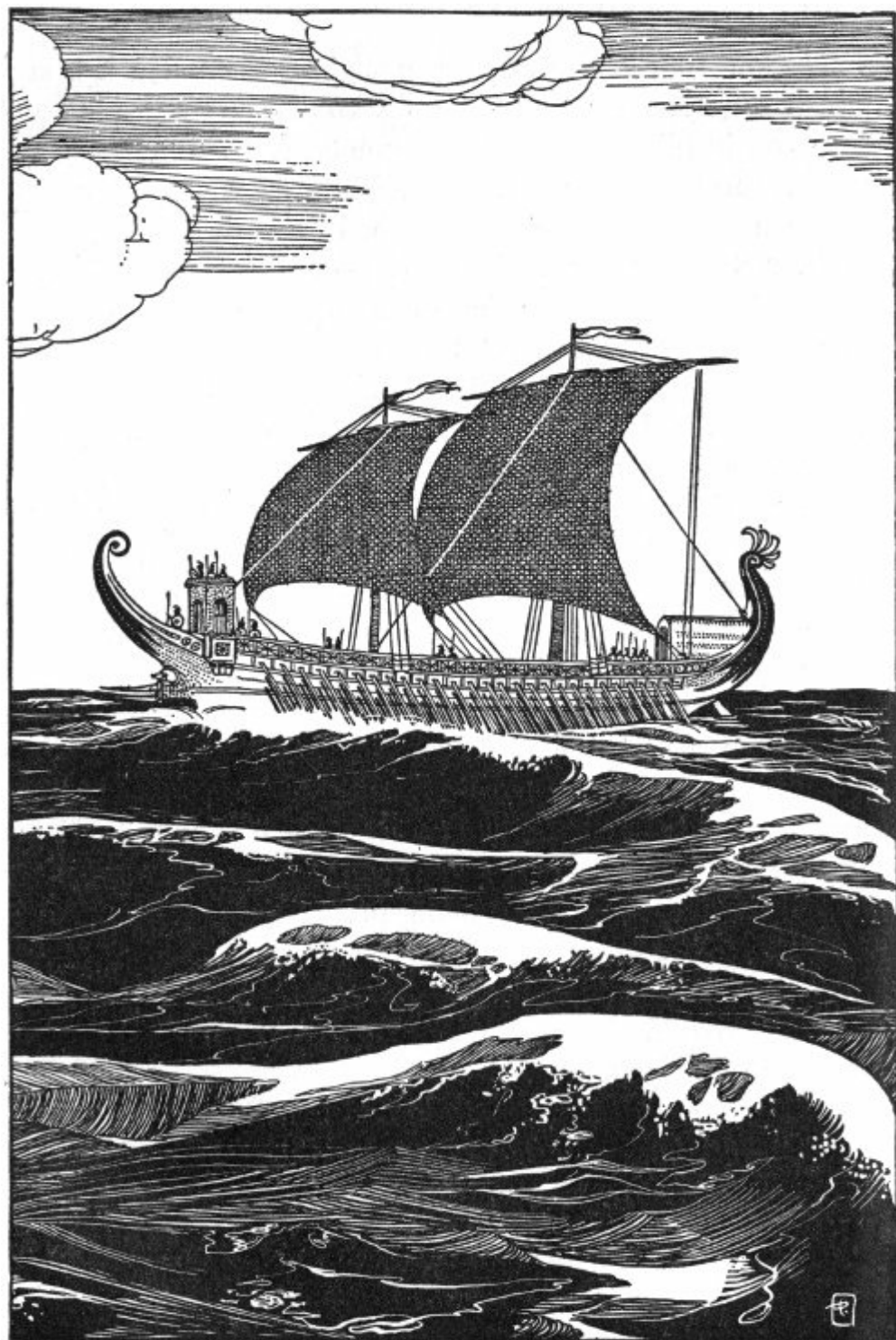
Broche arrives at probable daily mileages for Pytheas by

comparison with known speeds of vessels plying between Mediterranean ports. Pytheas, he feels, would have had no difficulty in maintaining an average of ninety miles in twenty-four hours during the first four of the six days.

That speed would take him past the Faroes on the fourth day. But in the fragments of Pytheas that have come down to us there is no mention of the Faroes. Broche suggests that perhaps he made a notation concerning them which has been lost; perhaps he had only a distant and confused view of them and failed to mention them, being preoccupied with thoughts of the great land toward which he was headed. (The Norway advocates naturally use the non-mention of the Faroes as an argument that the voyage really was from the Shetlands to Norway.)

By the fifth day Pytheas would have progressed far enough north so that there would be no need to slacken speed at night—there would now be no darkness. By means of alternate shifts of rowers, the double or triple banks of oars, aided by the sails, would speed the ships forward day and night. Now the maximum rate would be attained, with men exhilarated by the perpetual daylight. But it would only be necessary for them to do a bit over one hundred miles during each of the last two days in order to reach Iceland at the end of the sixth day out from the north of Britain.

## PLATE VI



## Ancient Greek war galley.

Six days from Scotland to Iceland is a speed less than that which, according to Strabo, was sustained for three days between Rhodes and Alexandria. Hovgaard says the maximum speed of Viking ships, similar to those of Pytheas in line and in sails but inferior to Greek ships for rowing, was about one hundred and seventy statute miles per day—half again the speed here suggested for Pytheas.

Avienus, in the fourth century after Christ, basing his figures on the old narratives, says that it took seven days to go from the Pillars of Hercules to the capes of the ancient province of Roussillon, in southwestern France, a distance of about six hundred and fifty miles, therefore around ninety-three miles per day. And that would be with daylight for only perhaps fifteen hours a day, while Pytheas had sun or bright twilight for twenty hours each day when he left Scotland and for twenty-four a day when he was half way thence to Iceland. So we need not worry on the score of speed about those who contend that in six days Pytheas could have reached only the Faroes.

The Faroes cannot well have been Thule, for it is always spoken of as a single land. The Faroes are bound to strike anyone who approaches them as a group of islands, islets, and pillar rocks.

The contentions that Pytheas could not have reached Iceland from Scotland in six days have been growing more numerous and heated of recent years. This is perhaps because our age of steamships is forgetting the power of rowers. We have

mentioned *ante* that Sir Clements Markham, who belonged to the age of sail and rowing and had studied as a contemporary the early use of steam as an auxiliary of sail, found normal a six-day voyage in a Greek bireme from Scotland to Iceland.

The champions of Norway as Thule, among them Nansen, usually fail to mention the auxiliary power of oars in a Greek ship of 300 B.C. and arrive at the conclusion that Thule could have been Norway, and could not have been Iceland, in large part on the basis of speeds they feel would result from the combined effect of sails and of ocean currents.

We quote, direct and through summary, the reasons given by Nansen for believing that Thule was Norway and not Iceland:

“All the statements about Thule which have been preserved answer to Norway, but to no other country; and even if it may seem a bold idea that there should be communication over the North Sea between the Scottish islands and Norway 300 years before Christ, or 1,000 years before the age of the Vikings, we are compelled to accept it, if we are to rely upon our authorities as they stand, without arbitrarily altering them; and Pytheas will then be the first man in history to sail over the North Sea and arrive on our [Norway’s] coasts.”

Assuming that Norway is Thule, Nansen does not think it strange that Pytheas mistook it for an island—that he did not realize it was part of the mainland of Europe. The voyage, thinks our reasoner, led Pytheas from Scotland to the Shetlands and thence to the Norwegian coast. When he returned to Scotland and later sailed along the north coast of Germany, to or beyond the Elbe, there would be nothing to tell him that

Norway was an extension of the same continent. Even the Romans, centuries later, believed Scandinavia to be an island.

Somewhere along the route visualized by Nansen, perhaps in Scotland, perhaps in the islands to the north of it (the Shetlands), Pytheas seemingly picked up information concerning Thule. This would imply that there had been intercourse at this early date between Norway and the British Isles. Nansen does not consider this unlikely, for he finds much evidence pointing towards an early development of seamanship among the Norsemen.

At least two ancient writers of weight cast their ballot against Norway being Thule:

*There are those who tell about other (islands); the Scandinavian, Dumnian, the Bergians, and, largest of all, Norway, from which one can go by sea to Thule. (Pliny)*

*Thule is opposite the shores of the Bergians, celebrated in both our songs (poems) and those of the Greeks. (Pomponius Mela)*

Broche thinks it fair to assume that these passages, although not credited to Pytheas by their authors, were nevertheless based on him; since Pytheas is our only known source for information about Thule. Whether the assumption is fair we might as well leave to the reader. Perhaps he will conclude, upon studying the arguments for and against, that each contender believes what he wants to believe.

Anyhow the writers near the beginning of our era, whom we here quote, did not look upon Norway as Thule. That was never done, so far as we know, until by Procopius of the sixth



century after Christ, as we have mentioned.

We must comment in advance upon the next series of quotations.

On the north coast of Iceland there are places at the heads of deep fjords where, looking north, you cannot see the midnight sun in midsummer, or at least not the whole of it. There are many places on the Icelandic north coast where you can see most of the sun, or the whole of it, for one, two or three twenty-four-hour periods. There are some promontories where you can see the midnight sun skimming the northern horizon, or clearing it, for several days continuously.

The like is not true for the north coast of Norway. There the sun does not skim a midnight horizon in midsummer but is high up in the northern sky. Nor is it there visible continuously for a mere several days—it does not set for many weeks.

So if you favor Norway you have to select a point on the west coast that suits our forthcoming quotations. This you can do, for western Norway stretches far south into the temperate zone and far north into the Arctic. To make it still more convenient, the coast runs northeasterly, and so there are many places where the horizon due north is ocean.

Read the Greek and Latin authors carefully and then be equally careful scanning the map of the west coast of Norway. You can mark there a point which will fit the quotations.

As for those coming passages which have the sun in the sky for six months (with a black night for the other six)—those are

mere deductions from astronomical theory, and don't, of course, fit Iceland, Norway or any land upon earth, whether continental or insular.

*1. For those living still farther north of the Propontide, the day of greatest length consists of sixteen equinoctial hours, and for those still farther north the longest day is seventeen and eighteen hours. It appears that Pytheas of Massilia also arrived at these places. He says, at any rate, in his account On the Ocean: "the barbarians showed us where the sun goes to rest." For it happened in these places that the night was very short, in some places of two hours' duration, in others three hours, so that the sun, going to rest, rose again after a short interval. (Geminus of Rhodes)*

*2. Pytheas the Massilian says in his work On the Ocean that, having arrived at the northernmost regions, the barbarians there showed him the resting place of the sun, that is, that place which was to them always the source of the nights. (Cosmas Indicopleustes)*

*3. In reference to the island called Thule, where rumors say that the philosopher, Pytheas of Massilia, went, it is said that the entire circle described by the sun at the summer solstice is above the horizon, so that it coincides in these places with the Arctic Circle. In these regions, when the sun is in Cancer, the day lasts one month, if at least all the parts of that sign are visible. (Cleomedis)*

*4. Accordingly, Pytheas of Massilia says that the regions of Thule, the northernmost of the British isles, are the last (habitable regions), and that because of this the tropic circle of*

*summer is the same as the Arctic Circle. (Strabo)*

(This passage, true for the north coast of Iceland, must not be taken to show that Strabo was accepting the word of Pytheas. Strabo thought Pytheas had invented this description for he thought Pytheas had invented Thule.)

*5. Thule . . . on that island . . . the nights in summer are light, because at (throughout) that time of the year, the sun, mounting higher, without being itself visible, nevertheless illuminates with its neighboring splendor the places which are nearest to it. But during the solstice there are no nights because then the sun shows not only its radiance but also the greater part of itself. (Mela)*

*6A. During the days of the solstice, the sun, approaching nearer to the pole of the world, and describing a circle, lights with continuous day during six months all the lands that are underneath it, and contrariwise, the night continues when the sun, at the winter solstice, passes to the other side of the earth; and it is that which occurs in the isle of Thule, as Pytheas the Massilian writes. (Pliny)*

*6B. Thule, where we have shown there are no nights in the summer solstice, when the sun crosses the sign of Cancer, and where, conversely, there are no days in the winter solstice, and this, it seems, is the case for six months on end. (Pliny)*

*7. Cutting forward through the waves of the Ocean by a long way you will reach the isle of Thule on a good ship; (Thule) where, from the sun that has approached the arctic pole an evershining fire spreads out through days and nights.*

(Dionysius Periegetes)

8. *There are many other islands around Britain, of which Thule is the farthest, on which there is no night during the summer solstice when the sun is crossing the sign of Cancer; likewise, during the winter solstice, no days.* (Solinus)

9. . . . . Thule  
Here where the fires of Phoebus touch  
the chariots of the Pole.  
In the luminous night the wheel of the sun  
burns with a flame  
Continuous, and the emulous night  
Brings in the clear day.  
For the sun is turned upon the oblique  
axis of the world  
And as it nears the axis of the West  
Sheds its downward rays  
Until anew the South (South Wind)  
Swallows the panting steeds in the sinking sky.  
(Rufus Festus Avienus)

There are also several authors who describe a behavior of the sun that fits neither that part of the Norwegian coast which most of the Norway advocates favor, nor any part of Iceland. Their descriptions fit the Shetlands or the Orkneys. So we may take it that this group accepted the view of Tacitus (they are all later writers than he) that Agricola saw Thule, whereupon Thule would have to be either the Orkneys or the Shetlands—where the longest day is around twenty hours.

1. *Accordingly Thule has her longest day as 20 hours.*

(Ptolemy)

2. *On this segment, that is on the parallel of Thule, [the longest day] is 20 hours.* (Agathemerus)

3. *Thule, a great island in the ocean, in the northernmost regions, where the sun on the summer solstice makes a day of 20 equinoctial hours and a night of four hours; on winter days, the opposite is true.* (Stephanus)

As we have said, it is possible to select a point on the west coast of Norway which will fit any of the quotations, even those that fit the Shetlands. Nansen considers that “Pytheas may have sailed from Shetland with a southwesterly wind and a favorable current towards the northeast, and have arrived off the coast of Norway in the Romsdal or Nordmøre district, where the longest day of the year was of twenty-one hours, and where there is a free outlook over the sea to the north, so that the barbarians may well have shown him where the sun went to rest. From here he may then have sailed northwards along the coast of Helgeland, perhaps far enough to enable him to see the midnight sun, somewhat north of Dønna or Bodö; this depends upon how early in the summer he reached there. On midsummer night he would have been able to see a little of the midnight sun even at about  $65\frac{1}{2}^{\circ}$  N. lat.; or south of Vega.”

Although it is nowhere said that Pytheas himself saw the midnight sun, Nansen thinks it likely that his reports concerning it are based on personal observation rather than upon hearsay. In support of this he quotes the Roman geographer Pomponius Mela, who, about three centuries after

Pytheas, says in his description of Thule: “But at the summer solstice there is no night there, since the sun then no longer shows merely a reflection, but also the greater part of itself.” Such a detailed description, says Nansen, is more likely to be based upon Pytheas’ findings as they were transmitted to Pomponius Mela, through intermediate writers, than upon the geographer’s theoretical reasoning.

Broche and the rest of the Icelandophiles insist that since the passages which tell about the sun skimming the northern horizon at midsummer, when viewed looking north from Thule, fit the north coast of Iceland and do not fit the north coast of Norway, they must obviously belong to Iceland rather than to Norway.

A continuous day for a month is about right for the north coast of Iceland, if you mean that for a month there is not enough darkness to interfere with ordinary work; or as we would say, if there is “light enough for reading a newspaper at midnight.” The Irish clergymen who had been in Iceland from February to August, the year A.D. 795, made clear to Dicuil that on the south coast of Iceland, where the midnight sun is never visible, there is, nevertheless, light enough at midnight around midsummer so that you do not need a candle for picking lice from your shirt—which was that century’s equivalent of our figure of speech that you can read a newspaper. Had they been telling of the north coast, the monks would have assured Dicuil that candles were unnecessary for louse picking through several weeks, and would have added that in the middle of this period the sun itself could be seen at midnight.

To illustrate the latitude of interpretation we should give to

statements in the Pytheas fragments about such things as the length of the Thule day, we use a modern example of the difference between an astronomical day and a practical day in Iceland. The calendars now used in the south of the country will give the time of sunrise and sunset even for the longest day, by which statements you can prove that there is a night every twenty-four hours at Reykjavik. But it is also true, and provable through the terms of the country's laws, that Icelandic lighthouse beacons are not lighted for about three months, so that in this very practical sense there is no night for three months. You could thus speak of a three-month day.

Ocean travelers frequently describe countries as they look when their ship approaches. It is claimed by the Icelandophiles that the next two quotations referring to Thule fit Iceland.

*From here if anyone should speed along the vast seas in a swift boat, and to the north should impel his vessel, he would come upon Thule rising with immense summit* [rising with its imposing mass]. (Avienus)

The characterization of Thule as “rising with immense summit,” or “rising with its imposing mass,” surely fits Iceland much better than it does those parts of Norway which Pytheas might have approached from west or south. The view of Iceland, when approached from the south, is usually considered by world travelers more spectacularly grand than any in Europe, if seen in clear weather. Norway south of the Arctic would not seem imposing to a Mediterranean sailor familiar with such headlands as the Rock of Gibraltar.

*There where are the anvils of Vulcan in the Lipari Islands and Stromboli, which are part of the Aeolian archipelago, it seems that Vulcan himself works. That is why one hears both the crackling of fire and a resounding noise. And they said formerly that he who wished to carry there some unwrought iron and return the next day could get it back as a sword, or any other thing of his choice, by throwing into the gulf the price of this work. It is this which Pytheas relates in his "Description of the Earth," saying moreover that the sea there is bubbling [boiling]. (Apollonius of Rhodes)*

The Apollonius quotation does not at first sight have much to do with Thule, and one feels that the name of Pytheas is dragged in. Scholars have considered, however, Bessel perhaps first among them, that the reference to Thule is pertinent because the story itself, though given in Mediterranean imagery and with the names of Mediterranean gods, is northern. It is contended that not merely is the tale wanting from southern mythology; it is against character for southern gods to take pay from mortals, especially from just anybody who comes along with the price. But such stories, this group of interpreters say, are consonant with northern mythology; and the northerners were familiar with no volcanoes except those of Iceland (which statement, of course, assumes that Iceland was known to northern Europe). The argument runs that Pytheas, or someone else, brought from the north a mythological tale of superhuman smiths that labored beneath volcanoes; the Mediterranean people were in the habit of giving the names of their own gods to foreign gods; so they did the same with the northern demigod of this yarn and then localized his workshop in a Mediterranean island volcano.



Apollonius wrote six centuries after Pytheas, so there had been plenty of time for reports to grow vague, confused, poetic. It has been suggested, besides, that Pytheas was likely enough a poet as well as scientist and man of action, and that the poetic phrasing may have been his. Such versatilities are not incompatible with Greek tradition. They have, indeed, been found down to our own time; as, for instance, when Oliver Wendell Holmes ranked about equally high in poetry and in anatomy. Just as Holmes was precise in his anatomical descriptions but somewhat vague and flowery at times when he wrote as a poet, so may Pytheas have given both scientific and poetic descriptions of the things he saw.

Admittedly, this is tenuous reasoning. We introduce it here partly to show the character of the Thule dispute. Scholars of reputation sometimes go even farther afield than we have done here in conjecture, constructing elaborate foundations for houses of cards.

The selection from Geminus, No. 1 of the first group above, is the only direct quotation preserved to us from the works of Pytheas. It cites his book, from which it is taken, and gives us in the explorer's own words the statement: "The barbarians showed us where the sun goes to rest."

Partly because it is direct from the explorer, the statement about the barbarians showing where the sun went to rest has been discussed perhaps at greater length than any other sentence connected with Pytheas. The interpretations run all the way from Elton, who thinks it very simple (just a folklore tale of the sun's being held prisoner in a cave

during the winter) to Hugo Berger who says he cannot understand it. We cite from this voluminous literature only part of one man's comment, Nansen's:

“It may be thought that Pytheas is merely relating a legend current among the barbarians that the sun went to its resting-place during the night, a myth which is moreover almost universal. But it seems more probable that as an astronomer he had something else in his mind. If he had had the two points accurately indicated to him, where the sun set and rose on the shortest night of the year, he must easily have been able, by measuring the angle between them, to ascertain how long the sun was down.”

Nansen is plausible, and so are many of those others who think they know what the passage means. After reading them, we feel like agreeing with Berger in having no idea what is meant by the sun going to its resting place.

However, the Geminus citation, about the barbarians showing the Greeks where it was the sun went to rest, makes it clear that the Thule of Pytheas was inhabited and that it was these inhabitants who showed him the place to which the sun retired.

Some have maintained that Strabo's description (see *post*) of food habits and harvesting methods applies to the inhabitants of Thule. Because Diodorus gives a similar description of the customs of Britain, and for other reasons, Nansen concedes that in the harvesting discussion Strabo probably was speaking not of Thule by itself but of the northern countries in general. Other students think that either Strabo made here one more of his characteristic errors or that he simply got tangled in his

language and that the description of customs should be applied specifically to the natives of Britain—not to those of Thule, irrespective of whether Thule was Norway or Iceland.

Everything seems finally to hinge on whether Pytheas in the Strabo passage was throughout talking about one country or whether he was dealing with two different countries—one of them when he spoke of its direction, distance from Britain, and distance from the frozen sea; another when he spoke of the honey and the threshing conditions. Perhaps the best way to arrive at a verdict on this crucial point is to read the whole quotation with this in mind. For that purpose we borrow its translation not from a geographic disputant, who is committed to a thesis, but instead from a scholar who is merely translating Strabo in an intelligent, routine way. We select the Bohn's Classical Library translation by H. C. Hamilton, London, 1903, and take the extract from Vol. I, [pages 299-300]. The footnote is Hamilton's.

“The account of Thule is still more uncertain, on account of its secluded situation; for they consider it to be the northernmost of all lands of which the names are known. The falsity of what Pytheas has related concerning this and neighbouring places, is proved by what he has asserted of well-known countries. For if, as we have shown, his description of these is in the main incorrect, what he says of far distant countries is still more

<sup>[1]</sup> likely to be false. Nevertheless, as far as astronomy and the mathematics are concerned, he appears to have reasoned correctly, that people bordering on the frozen zone would be destitute of cultivated fruits, and almost deprived of the domestic animals; that their food would consist of millet,

herbs, fruits, and roots; and that where there was corn and honey they would make drink of these. That having no bright sun, they would thresh their corn, and store it in vast granaries, threshing-floors being useless on account of the rain and want of sun.”

Now, is Strabo quoting Pytheas on Thule for the entire paragraph? Or is he quoting him on Thule only while saying Pytheas is wrong, and then quoting him on such lands as Britain and southern Norway for the rest of the passage?

Early in his discussion Nansen puts all his eggs into one basket: he says that entirely apart from Pytheas’ description of where Thule is located, and of how far the frozen ocean lies from it, we must conclude that that country is Thule which was inhabited at the time of Pytheas and which was correctly described in those Pytheas fragments which tell about threshing and honey.

The field thus restricted, Nansen begins by arguing that Iceland must have been uninhabited in the time of Pytheas, because it had just been discovered when Dicuil’s monks were there from February to August, A.D. 795. However, on this interpretation of Dicuil a majority of the commentators is probably against Nansen; for they are usually in accord with the view, which we developed earlier, that Dicuil’s wording indicates not that Iceland had been discovered just before 795 but that, like Britain or France, it had been so long known that there was no novelty about it. For, be it remembered, Dicuil is not arguing that his own Irish countrymen are wrong in their views of Icelandic daylight and darkness. On the contrary, he is merely arguing that the philosophers and geographers of the

Mediterranean lands, such as Strabo, were wrong about Iceland. He cites Irish eye-witness testimony against the theorizing of the ancients.

That Dicuil was on the Continent when he wrote his *De Mensura Orbis Terrae* gives a point to his saying that he had talked with clergy who had been in Iceland. For no doubt he was not merely debating his thesis verbally with the scholars by whom he was surrounded—men who were more familiar with Greek doctrine, as brought to them through Rome, than they were with the reports of travelers who had been in Iceland. He was in addition passing on to Mediterranean scholars as information things that were commonplace in Ireland.

Writers not mainly concerned with which country was Thule have frequently come to the view that the second part of our Strabo quotation has reference to other lands, more southern than Thule. For instance, Charles I. Elton, in his *Origins of English History*, says that “We may now . . . consider the few details of a more valuable kind which are all that remain of the description of Britain by Pytheas . . .” Then, in his summary of this description of Britain, Elton includes (from Strabo on Pytheas) that “‘The natives,’ he said, ‘collect the sheaves in great barns and thrash out the corn there, because they have so little sunshine, that our [i.e. Greek] open thrashing-places would be of little use in that land of clouds and rain.’ He [Pytheas] added, that they made a drink ‘by mixing wheat and honey,’ which is still known as ‘metheglin’ in some of our country districts; and he is probably the first authority for the description of the British beer . . .”

So, by Elton's reading, it is Britain and not Thule that Pytheas is describing in this passage upon which Nansen, in an early part of his argument, seems to rely when he contends that Norway must be Thule because the Pytheas characterizations fit that country and do not fit Iceland. We use the expression "seems to rely," for Nansen does concede uncertainty.

At first you gather from Nansen that for support of his contention he is claiming that Thule must have been Norway because Pytheas speaks of cereal culture in Thule, of beer brewing, and of honey, none of which (says Nansen) could well have been in Iceland although they could have been in Norway. Later, however, he disconcertingly goes on to admit that, since wild bees can scarcely be in question, it seems strange Pytheas would talk of a bee industry in Norway for it is unlikely to have existed there at that time. Finally, leaving us still more confused, he admits that probably the Greek navigator was talking about northwestern Europe in general and not about Thule in particular when he discussed the threshing and the beer brewing.

Is not this really equivalent to Nansen's agreeing with the common view (which we have given through Elton) that although Strabo had been quoting Pytheas on Thule in the first half of his paragraph, he was only quoting Pytheas on Britain in the second half?

When this passage has been practically surrendered by Nansen there remains little from Pytheas to suggest that Thule was inhabited in his time—in fact, only the statement that the barbarians in Thule showed him the place where the sun goes to rest.

But since the fragment on the barbarians (who told about the sun's behavior) does not say that the same barbarians cultivated cereals or made beer, they might just as well have been inhabitants of Iceland as of Norway. They could have been fishermen or shepherds of either country.

There are, then, three Nansen stages. First he warns us against controversialists who explain away their authorities when they are found to oppose a preconceived view of the debater; then, in due course, he goes on to discredit or interpret away those statements of his authorities which fit Iceland and do not fit Norway, doing this on the ground that, since Norway and not Iceland was inhabited and since Pytheas describes an inhabited country, he must have been describing Norway and cannot, therefore, have meant what he seems to have meant in those statements that do not fit Norway. The third and final stage (when he comes to the threshing, the beer and the honey) is to admit that the passage which fits Norway most definitely, and most definitely refuses to fit Iceland, is after all probably not about Norway but about still another country—Britain (or northwest Europe, generally).

So the only statement which Nansen himself does not either expressly or by implication concede as probably referring to a country other than Norway is, as we have seen, the one about the barbarians of Thule telling Pytheas where it was that the sun went to rest. On the strength of this single paragraph (and of Iceland being “probably” not inhabited at this time) he wants us to disregard, or to interpret away, the statements about the length of the day in Thule, about how far from Thule and in what direction was the frozen sea, about what direction Thule was from Scotland, all of which fit

Iceland and do not fit Norway. For good measure we are to disregard also the less definite statements which fit Iceland better than they do Norway, such as the one upon the appearance of Thule when it arises from the sea to the view of an approaching mariner.

The question which is then up to the reader is whether he wants to agree with Nansen that since Norway was certainly inhabited and Iceland was probably not, we should base our whole position on the statement that the barbarians of Thule told the Greeks where the sun went to rest.

A serious part of the dispute on which was Thule, Norway or Iceland, lies in how near these lands are, and how near Pytheas says Thule was, to the “frozen sea.”

In quoting the relevant passages we want to be sure that we do not favor Iceland by shading the translations, so we take them from Nansen:

*Thule, which Pytheas says lies six days’ sail north of Britain, and is near to the congealed sea.* (Strabo)

*Beyond Thule we meet with the sluggish and congealed sea (“pigrum et concretum mare”).* (Solinus)

*After one day’s sail from Thule the frozen sea (“mare concretum”) is reached, called by some “Cronium.”* (Pliny)

The Pytheas fragments thus say the frozen sea was reached seventy-five or one hundred miles north from Thule, for that is about a day’s sail.



Nansen admits that you cannot reach the nearest sea ice in a day's sail from any part of Norway, and that you can from Iceland. He also admits that the description of the margin of the pack as given by Pytheas is true and graphic, as if he had seen it. But while owning here that this description fits Iceland and not Norway, he insists elsewhere that Thule must still be Norway—because the Pytheas descriptions (which we have discussed) of the people of Thule fit Norway and do not fit Iceland.

Those who contend that Thule is Norway maintain, as we have already seen, that when Pytheas spoke of the sun skimming the ocean horizon to the north, he was looking north from a suitable point on the Norwegian west coast near the Arctic Circle.

If, while that contention is still fresh in mind, you revert to the statement that “Pytheas discovered the frozen sea one day's sail to the north of Thule,” then you will understand that sea ice was discovered by him at a point about one hundred miles directly north of the said midnight sun observation post. So you have ice being discovered practically within sight of the Norwegian west coast and at a distance of only a hundred miles north of the Arctic Circle. But that is an absurdity. Not since the last ice age, 5,000 or 10,000 years before Pytheas, can there have been a piece of ice in that locality.

None of those who favor Norway as Thule maintain that Pytheas went to the north tip of Norway. But supposing he did, he could not from there reach sea ice within the stated one-hundred-mile distance. You would be lucky to find ice within two hundred miles of Norway's North Cape. Three hundred is

more like it.

But if you sail one hundred miles north from Iceland's North Cape, Horn, you are already well within where ice may be. You might find ice in twenty-five, fifty or seventy-five miles. Indeed, there are times when, with northwesterly or northerly winds, the ice comes right down upon the north coast of Iceland, particularly upon the northwest coast in the vicinity of Horn.

In all matters of direction and distance it is crucial to remember that Pytheas was a scientist—astronomer, mathematician and geographer. He was a specialist in latitude measurements.

Besides, it was likely more of a scientific than a commercial motive that led Pytheas north from Britain. Those who favor Iceland as Thule then visualize the Massilian navigator steering north from Iceland as he had previously steered north from Scotland.

If we give weight to what Pytheas is said to have said (and all disputants do whenever the trend suits them) we take it not merely that Pytheas went north when he said he did but also that (using our previous estimates of mileages) he went about seventy-five or one hundred miles in a day. There he met a condition of sea and air which he recognized as the beginning of the Frozen Ocean about which he may have heard from the Britons and concerning which he no doubt held the view of the Greek theoreticians—that you were bound to discover a frozen sea if you were able to get far enough away from the sun.

Pytheas may have been as surprised already as his critics were

later skeptical that he had been able to travel so far north from the Pillars of Hercules without meeting ice.

The description of what Pytheas found a day's sail north from Thule is one of the most interesting and hotly contested passages. We have it in the phrasing of Strabo; for reasons previously given, we use Nansen's translation.

Strabo makes Pytheas claim to have explored the whole of Britain, and that

*He had also undertaken investigations concerning Thule and those regions, in which there was no longer any distinction of land or sea or air, but a mixture of the three like sea-lung, in which he says that land and sea and everything floats, and this (i.e., the mixture) binds all together, and can neither be traversed on foot nor by boat. The substance resembling lung he had seen himself, as he says; the rest he relates according to what he has heard. This is Pytheas' tale, . . .*

You can just see what fun the scholars would have with this report in its Strabo form. That it was Strabo who gave us the form which we have is significant; for he was constantly trying to make Pytheas seem ridiculous. One of the best ways to accomplish such a purpose is by misquotation and exaggeration—to overstate the case.

If you suppose, however, that Strabo quotes scrupulously from another who gave faithfully the wording of Pytheas, then you have to explain some of the words and figures. The commonest explanations seem the most reasonable.

Take, for instance, the “sea-lung.” Scholars have suggested that a jellyfish, either found in the Mediterranean or known to the Mediterranean world, may have had in the time of Pytheas the popular name of sea-lung, just as there is that name now for sea creatures in European languages. Or it may be that Pytheas was just using a figure of speech. It would not be more unreasonable for a Greek sailor to speak of water in a certain condition as a lung than it is for our sailors to speak of air in a certain condition as soup. Nothing is more common than to have a sailor tell you not that the weather is like soup but that it is soup. This kind of man will tell of a fog so thick that you could cut it with a knife and pile up the chunks. Such language even gets into print with us; so why might not its counterpart be written by a Greek?

There had been numerous comments upon this Strabo passage by men of high scholarly attainment, but Nansen was the first who brought to it not merely scholarship but also personal knowledge of the North, based upon his explorations of the polar sea by ship and sledge. We give, as introduction, Nansen’s comment on the form of the passage:

“This much-disputed description of the sea beyond Thule has first passed through Polybius, who did not believe in Pytheas and tried to throw ridicule upon him. Whether Polybius obtained it directly, or at second hand through some older writer, we do not know. From him it came down to Strabo, who had as little belief in it, and was, moreover, liable to misunderstand and to be hasty in his quotations. The passage is evidently torn from its context and has been much abbreviated in order to accentuate its improbability.”

Nansen then goes on to say that “. . . As it has come down to us the passage is extremely obscure, and it does not even appear clearly how much Pytheas asserted that he had himself seen, and how much he had heard; whether he had only heard of the stiffened and congealed sea (the Polar Sea), while he had really seen the condition that he compared to a lung. . . . What Pytheas himself saw may have been the ice sludge in the sea which is formed over a great extent along the edge of the drift ice, when this has been ground to a pulp by the action of waves. The expression ‘can neither be traversed on foot nor by boat’ is exactly applicable to this ice-sludge. If we add to this the thick fog, which is often found near drift ice, then the description that the air is also involved in the mixture, and that land and sea and everything is merged in it, will appear very graphic.

“But that Pytheas should have been far enough out in the sea north of Norway to have met with drift ice is scarcely credible. If, on the other hand, he wintered in Norway, he may well have seen something similar on a small scale. Along the Norwegian coast, in the Skagerak, there may be ice and ice-sludge enough in the late winter, and in the fjords as well; but in that case it is probable that he would also have seen solid ice in the fjords, and would have been able to give a clearer description of the whole, which would have left no room for such misunderstandings on the part of Polybius and Strabo.

“It may also appear unlikely that Pytheas should not have known ice before; he must, one would think, have seen it on pools of water in the winter even in Massilia, and from the Black Sea ice was, of course, well known to the Greeks. But then it is strange that he should have given such an obscure

description of such a condition, and have said that the land was also involved in the mixture; unless we are to regard the whole passage as figurative, in which case the word land may be taken as an expression for the solid as opposed to the liquid form (the sea) and the gaseous (the air).”

Nansen concludes that Pytheas probably did not himself view the polar sea but that he based his account of it upon descriptions by the natives of the northern countries which he visited.

Partisans of Iceland as Thule will feel there are many weak links in this Nansen chain of evidence and reasoning. They note, for instance, that while Pytheas could not well have been “far enough out in the sea north of Norway to have met drift ice,” he could very well have been far enough out in the sea from Iceland to write from his own observation that description of the edge of the pack which Nansen himself calls graphic, essentially correct, and like that of an eye witness.

Broche is rhetorical but not unreasonable when he makes up from the Strabo passage and from his own imagination a picture of the Massilian voyage at its farthest north. We summarize his introductory paragraphs and then quote:

The Greek vessels sailed from northern Iceland toward the Pole. But after one day’s advance they met the scattered ice that heralded the pack lying beyond. Upon further advance, the pieces would multiply with disquieting rapidity. Presently the ships would be able to work ahead only with great difficulty between the floes through brine that was in the first stages of freezing. The oars could not function in this

mush ice, which still would not support a man on foot. The dull surface would be rising and falling slightly, giving the effect of the respiration of a jellyfish.

“Then [says Broche] upon this ocean already so changed in a manner so mysterious and so disquieting, there descends the milky polar fog, so thick that one could cut it with a knife, which prevents them from seeing from one end of the trireme to the other. . . . There is no question of going on! For they no longer have sea which the prow of the galley can split . . . nor land that they can step upon, but a frightening synthesis of all these things, like a gigantic and gloomy matrix of the world! This, Pytheas and his companions *see with their own eyes!* They had reached the limit which the gods permit to men in the understanding of the cosmic mystery. They are then seized with a religious terror that strengthens their oars to escape from punishment for their almost Promethean temerity. . . .

“They do escape. Their enterprise, audacious to the limit of impiety, is crowned with success. Their story will be handed down to later ages for the astonishment of all, the admiration of some, the incredulity of many . . .”

It was mentioned early in our discussion of Pytheas that his own townsmen of Massilia probably believed his reports because they had heard similar things before through the channels of their northern overland and river trade. We have supposed also, with some evidence to back us up, that the rest of the Greek world was more obsessed than Massilia with philosophical doctrines about the Lifeless Frozen North; and that the domination of these philosophies, strong at the time of

Pytheas, grew stronger after his time; until in the first centuries, B.C. it became practically impossible to be at once a product of Greek civilization and a believer in the veracity of Pytheas.

We have also dwelt on how those who quoted Pytheas did so frequently with scarce another purpose than to ridicule him, and we have mentioned Strabo, famous geographer of the century before Christ, as an example. Yet we have not so far quoted Strabo in terms that call Pytheas a liar. This lag is because we have been quoting only things special to our purpose, and the jibes at Pytheas are with Strabo usually general. Now we are at last in a position to give selection where the feelings of this geographer on the veracity of Pytheas are linked with statements about Thule.

*Pytheas, from whom we get the story of Thule, has shown himself (elsewhere) to be the greatest of liars. Other writers who have seen Britain and Ireland tell us of many small islands round Britain but do not mention Thule. (Strabo)*

*The account of Thule is still more doubtful because it is so far away. Of all known places it is reckoned farthest north. The falsity of what Pytheas tells concerning this island and neighboring places is proved by how wrong he is on well-known countries. When, as we have shown, he is mainly wrong on them (the near places) he is still more likely to prevaricate on remote lands. (Strabo)*

*True, Pytheas of Massilia claims that the farthest country north of the British islands is Thule, where he says the summer tropic and the arctic circle are one. Other writers, however,*



*tell us nothing on this subject, nor even that there is an island named Thule, nor that lands continue to be habitable up there where the tropical circle of summer is the same as the arctic circle. I think, for my part, that the northern boundaries of the habitable earth are much farther south. Modern writers tell us of nothing beyond Ireland, which lies just north of Britain, where people entirely savage live miserably because of the intense cold. Here, in my opinion, is where the bounds of the habitable earth should be fixed. (Strabo)*

An important text variant on the paragraphs we have just quoted is that while some versions speak of Thule as *an island* about which nothing is known except from Pytheas, there are others which imply that concerning Thule it was *not even known whether it was an island*. Another variant of consequence is that some versions speak of Thule as the most northerly of the British islands; while others say that it is the most northern known land, adding that it is north of Britain.

H. C. Hamilton, translator of the London, 1903, edition of *Strabo's Geography*, has at this passage a note on latitudes:

“The tropic being placed at 24° from the equator by Strabo, and most probably by Pytheas also, the latitude of Thule, according to the observation of this traveller, would be fixed at 66°, which corresponds with the north of Iceland.”

As we scan the literature from the vantage of two thousand years we think it either particularly unfair or incredibly naïve of Strabo to blame Pytheas, as he does above, for there having been in the intervening time no confirmation of his report on Thule. For there is nothing in Strabo, or in the writers whom he

cites, to indicate that anybody known to them had made a voyage north beyond Britain in the interval. The fact is that the three intervening centuries had contributed nothing in the way of direct report of explorers, but that they had conferred on the Lifeless Frozen North of the philosophers a verisimilitude which made it seem unnecessary for Strabo to check the reports of Pytheas—they just couldn't possibly be true.

Strabo does say frequently that the Massilian reports could not be true; and there he is speaking with the voice of his time. But his age, though it reasoned from wrong premises, demanded a strict logic in the reasoning; and surely there was no logic about condemning a man for not having been supported by later witnesses in a field which no one had in the meantime investigated.

Modern commentators are almost unanimous in their belief that Pytheas reached a high latitude, so the Thule controversy is one of longitude. From this point of view, Broche pays a deserved compliment to a predecessor when he notes that three centuries ago Gassendi said that if no lands had been found beyond the Arctic Circle Pytheas would still be considered a liar. But now, says Gassendi in 1636, people sail freely to Iceland; and at the summer solstice they observe there the conditions described by Pytheas.

In the same connection Broche notes that in 1681, just after Gassendi, Regnard wrote from Copenhagen, "The king of Denmark is still master of the island of Iceland, which is believed to be the Ultima Thule of the ancients."

Our discussion to this point seems to have proved that Iceland is the Thule of Pytheas. We summarize it:

From what we know about the discovery of remote islands by “savages,” it is in accord with the world picture that the Britons would have reached Iceland before Pytheas. There is accordingly no inherent improbability but, on the contrary, a probability that the Britons would be able to tell Pytheas about Iceland.

Irish boats of only a century later than Pytheas are known to have been of a size and type capable of voyages to Iceland. Since this boat is known to have changed hardly at all during nineteen centuries after 200 B.C. it can be fairly considered to have been capable of Iceland voyages during several centuries before 200 B.C. and therefore in time to give the people of Ireland and Scotland that familiarity with Iceland which Pytheas says they had with Thule.

By A.D. 795 Iceland had been so long visited from the British Isles that no one any more took interest in when or how it had been discovered.

Pytheas is said to have reported Thule as north from Britain. Iceland is north from Britain (a little west of north) while Norway will be considered east from northern Britain.

Pytheas locates Thule on the Arctic Circle. Iceland is so located.

On the north coast of Iceland you have the midnight sun itself. The Pytheas reports say that from Thule the midnight sun could be seen skimming an ocean horizon to the north for

several successive nights at midsummer. This is as precise a description of what you will see from the north coast of Iceland as an intelligent but non-technical modern traveler would give. Fitting Iceland, this description does not fit Norway, which extends so far from south to north that you have dark nights in midsummer at its southern tip while at the northern you have the midnight sun not for several days, as given in the Pytheas records, but for many weeks.

Pytheas reports the frozen sea a day's sail north from Thule. That is reasonable for Iceland; it is preposterous for Norway.

Descriptions linked with Pytheas have Thule rising from the sea massive, striking. The Norwegian coast would nowhere seem particularly striking to a man like Pytheas who had already sailed past the Rock of Gibraltar and past other conspicuous Mediterranean and Iberian headlands. But Iceland rises from the sea as a more striking sight than any Pytheas could have seen in Europe.

The summing up for Iceland, then, appears conclusive. It seems as if her attorneys might await the decision of the jury with confidence. They appear, in fact, to have reestablished a position on Thule that was held by a majority of scholars some two generations ago, when it was summarized by Burton.

Richard F. Burton, known to some as a great figure in the history of nineteenth century travel, thought of by many in connection with the Arabian Nights, admired as belonging with Caesar among those who can both do things and write about them, published in 1875 a two-volume work, *Ultima Thule; or, A Summer in Iceland*. His first thirty-

five pages contain a summary of the Thule problem, with many Latin references for those who are still classicists. He presents a chronological view of how the name of Thule was used:

“Firstly, It was attributed poetically, rhetorically and *per synecdochen*, to the northern ‘period of cosmographie,’ and to its people, real or supposed.

“Secondly, It was applied to Iceland, and to Iceland only, from the earliest ages of its exploration.

“Thirdly, In the centuries when imperial Rome extended her sceptre to the north of ‘the Britains;’ it was given to the outlying parts, Ireland, Scotland, the Orkneys, the Shetlands, and features known only to fabulous geography.

“Fourthly, The later Roman writers prolonged it to the ‘Scania Island,’ modern Norway, Sweden, and Lapland. This Thule should be called ‘Procopiana’ [for reasons we have given *ante*].

“Fifthly, Between the establishment of Christianity in England, and the official or modern rediscovery, the term Thule was once more, as of old, limited to Iceland.”

However, in 1940 we must extend the summary which Burton made in 1875, reversing its trend. For soon after he published his work the scholars began to swing in the direction that Norway is Thule. From Burton to Nansen, and since Nansen, most of the most respected writers favored a country other than Iceland, usually Norway, until Malye, whom we have quoted, did not much overstate when he said at the meeting of the

Classical Association in Nottingham, England, in 1933, that by common modern scholarly agreement Thule is Norway.

But even as Malye said this, his countryman Broche was publishing the result of fifteen years of study, to the effect that Thule is Iceland.

So the word Thule, true to its character for more than two thousand years, remains engraved on a pendulum. The pendulum's most recent swing is away from Norway, back towards Iceland. That situation is just right for a book like ours which, dealing with unsolved mysteries, aims to present the facts, the theories, the arguments, leaving the verdict to the reader.

However, we might perhaps tie up a few loose ends and summarize the main points before we turn over the case to the jury.

### **MINOR CONSIDERATIONS—AND A SUMMARY**

Near the beginning of our Thule discussion we had three chief views: that Pytheas did not visit Thule but received his information at Orcas, which was the north tip of Scotland; that Pytheas did visit Thule, which was Iceland; and that he did visit Thule, which was Norway. We have mentioned other views, hitherto little discussed.

The chief minor view has the working hypothesis that Pytheas might have visited both Iceland and Norway. He would then have written about them separately. But after his own book

was lost, and when his report survived only in fragments scattered through the works of others, it can have happened that statements were brought together which had belonged to different countries but which were now, through honest mistake or through a desire to ridicule Pytheas, attached to each other and represented as describing one place.

In considering this fourth possibility we must remember, among other things, that there are two schools of those who say that Pytheas visited Norway. The numerically stronger faction, for which we have made Nansen spokesman, require Pytheas to sail east from northern Scotland. The other, perhaps best represented by H. P. Steensby, make Pytheas cross south from Britain to the European mainland, follow the coast east and then pass north by way of Denmark to Norway and up along the Norwegian west coast.

So if your judgment rebels against believing with Nansen that Pytheas went east from Scotland when he thought he was going north, and if you still want Norway to be Thule, then you can bring Pytheas into Norway from Denmark. At least he would then be traveling north when he said he was traveling north.

If Pytheas went both from Scotland to Iceland and from Denmark to Norway, most of the statements in the Pytheas fragments will fit in with our modern knowledge. It is then true for Iceland that Pytheas went north to it from Scotland, that he found it to lie on the Arctic Circle, and that he discovered the margin of the Arctic pack a day's journey north from the island—that far north from its northwest corner. On a second journey north from Europe you now have Pytheas reaching Norway

from Denmark, where threshing is done in barns and where honey is used for brewing mead—this last, of course, only if you prefer assigning to Thule those husbandry passages which British historians, of whom we used Elton as sample, usually have assigned to Britain.

Or you are still free to choose for solution what we gave as the first theory, that Pytheas did not go beyond the north tip of Scotland and that he met there people who told him about Thule. That theory you can bifurcate. Along the first branch you would say that the Scots were in touch with Thule to the north and with Norway to the east, that they told Pytheas about both of them, and that either he or a later copyist got the stories mixed up with each other. The second branch is that the people of Orcas told Pytheas of a Thule which really lay to the east but which he misunderstood them to say lay to the north. (The difficulty about that is, of course, that we do not then explain whence it was that Pytheas got his correct and vivid description of the margin of the Arctic pack—for, as even Nansen admits, it is not thinkable that the edge of the pack can be reached in a day's sail from Norway.)

In truth you are still free to adopt any of the views that have been discussed, whichever fits your predilections. For one thing, nearly all disputants on Thule have started with predilections, so why shouldn't you? For a thousand years and longer, most of them pleaded for Iceland at least partly because in their day most of the other scholars favored Iceland; for a half century which ended ten or twenty years ago many pleaded for Norway because the best names were then favoring Norway. Recently the spokesmen for Iceland have been gaining at least the strength of numbers.



Sometimes the scholars have argued for Iceland because they were Icelandic, for Norway because they were Norwegian. It may be that Danes, like Steensby, have favored Denmark as the Pythean road to Norway because, thoroughly familiar with Denmark, they discovered things in Pytheas which seemed Danish. Or there may have been a slight, doubtless subconscious, desire to bring their country into the limelight. Besides, if Pytheas, returning southward from Britain, went far east along the north coasts of the Germanic lands, as many have believed, then he could well have bent north along the Danish mainland and islands and crossed to Scandinavia, perhaps to Sweden at Malmo—where the voyage is so short today that we call ferries the boats which make the crossing.

If your high school and college “General History” courses still rest upon you heavily, then you can feel it absurd to suppose that the Greeks of the fourth century B.C. were, by outlook or equipment, fitted for deep sea voyages. Hereupon Thule becomes Norway, unless it was the Orkneys or Shetlands. On the other hand, if your leanings are anthropological and archaeological, modernly historical, you will find nothing more reasonable than to suppose that Iceland, like practically every other habitable island of either tropic or temperate zone, had been visited by savages long before it was “discovered” by one of the cultures which we recognize as high, such as the Mediterranean or the Chinese. If that is your slant, you will take as literally correct most of what is said to have been said by Pytheas, and then you will doubtless feel that Thule was Iceland.

The problem of Thule is geography’s nearest equivalent to Mayerling, the perfect mystery. In either case a number of

solutions are ready for your acceptance, any of which you may choose and be in good company. On the other hand, you will know that a fresh, definitive solution for Thule, as for Mayerling, will be coming along most any day.

## **PLATE VII**



St. Christopher with the Christ-Child, drawn after the miniature on the world map of Juan de la Cosa, dated 1500—symbolizing Columbus carrying the gospel to the Indies.

## DID COLUMBUS VISIT THULE?

Did Columbus visit Iceland? The first comeback might be another question: Who cares? Perhaps we had better clear that up first.

Columbus, if listening in, would care about the verdict. For there are few things which he said about himself, or which others have said he said, that have been used so effectively to smudge his character. His claim that he visited Iceland, or the claim that he claimed to have done so, has been now an entering wedge and now a final crushing sledge hammer in numerous and on the whole successful attempts to prove that he was a liar, a braggart, an ignoramus.

Alternatively this question of Iceland has been used to show Columbus the victim of schemers who were trying to undermine his reputation, or the victim of injudicious boosters who were trying to build up for him a reputation as navigator that was quite beyond his deserts.

Spain cared a great deal about whether Columbus visited Iceland. The kingdom, then a growing power, was trying to gain and to hold control over a new world. They used many arguments to bolster their claim, one of them the contention that no one had known about America, and least of all Columbus, before he “discovered” it as Spain’s agent in 1492.

But Europe knew in the fifteenth century that the Icelanders knew about America; it was, therefore, necessary for Spain to show that Columbus could not have known what the Icelanders

knew. The first step was to prove that he never saw the place. The statement of Ferdinand Columbus that his father had visited Iceland in 1477 was, in effect, an attack upon the discovery angle of Spain's claim. This attack had to be met and repulsed.

The papacy cared whether Columbus had visited Iceland, or at least the Pope did. For Alexander VI, who came to the Throne of Peter in 1492, was Rodrigo Borgia, a Spaniard. There are few virtues claimed for this pope, but it is claimed for him by historians that he was loyal to his family, therefore to one of the leading families of Spain; and that he was loyal to Spain as his native land. Nothing that tended to weaken the case of Spain for ownership of the New World could have been pleasing to this Spanish Pope.

Then Alexander VI had a personal reason. Most of the crimes, sins and improprieties which we associate with the name of Borgia were even then associated with him and he was in consequence not very secure in the Petrine chair. As the King of Spain needed the support of Rome to make good his claim to the New World, so did the Pope of Rome need the support of the King of Spain to make good his hold on the papacy. Or at least this is so widely believed that even the staid *Encyclopaedia Britannica* confirms it.

It was, then, nearly as much a concern of the papacy as of the Spanish kingdom that as few as possible, preferably nobody, should believe that Columbus had visited Iceland.

But unfortunately, as it must have seemed by the end of 1493, the pope himself had written a circular letter during 1492 in

which he referred to the farthest dominion of the Church, the one beyond the Atlantic—Greenland, which had been a bishopric since 1124.

Strategically, the position of the Church could scarcely have been worse for defending as novel Spain's discovery claim to America. A church historian, Adam of Bremen, had told about the North American mainland in connection with Iceland and Greenland in his book *Historia Hammaburgensis Ecclesiae*, finished about 1075. The Emperor Frederick II of Hohenstaufen had referred to Greenland as a well-known country in that best seller, *De Arte Venandi cum Avibus*, which he finished about 1244, extant during the fifteenth century in numerous libraries throughout Europe. That there was land beyond the Atlantic was even so well known that around 1396 the Saracens demanded, and received, Greenland falcons in ransom for a Christian prince whom they captured.

Worst of all, there were communications from the popes at least as far back as Innocent III, 1206, showing their knowledge of how the Atlantic was crossed and their awareness of countries beyond the Atlantic. There is no telling the original number of these documents, but a dozen of them were exhibited at the Chicago World's Fair in 1893 by the Vatican.

This World's Fair exhibit is a point in our discussion: The intimacy which had existed between the Church and countries west of the Atlantic from the inception of New World Christianity in 1000 A.D., was apparently never officially acknowledged by the papacy between the writing of the 1492 letter and the opening of the Chicago Fair, which was the

400th anniversary of that event which had induced the Church, through Pope Alexander VI, to draw a veil over the transatlantic part of her history and over all things therewith connected.

In recent times the disputes on Columbus have not been matters of national claim to land west of the Atlantic but of national pride in one of the great figures of history. The rule has been that scholars of Latin extraction (while disagreeing violently as to whether Columbus was an Italian, a Spaniard or a Portuguese, and in any case whether he was a Jew) agree that either he did not visit Iceland or that if he did he learned nothing of America from the Icelanders, directly or indirectly. There has been a corresponding tendency for Scandinavians to maintain that Columbus did visit Iceland and that he learned a lot there.

The Americans, British, French and Germans are sort of in between, although closer to the Scandinavians than to the Latins in that while Scandinavians are nowhere near being a unit the solidarity of the Latins is rarely disrupted. Some of the most effective criticism of the Iceland story has, indeed, come from a minority that is non-Latin; as from Thoroddsen the Icelander, Vignaud the American and Ruge the German. What Latin defections there have been are mild and ineffective by comparison.

The controversy is with us still. For instance, views diametrically opposed to each other were put forward recently by two authorities whom we shall quote in due course, the American historian, Charles E. Nowell, who writes in the July, 1939, *American Historical Review* on "The Columbus



Question,” and the Spanish diplomat and historian Salvador de Madariaga y Rojo, whose volume *Christopher Columbus* appeared in January, 1940. One of them knows Columbus did go to Iceland; the other that he did not.

As we study the evidence, it will appear that the dispute on the voyage to Iceland is in our day not merely active but emotional. Each of the two main groups, those who believe everything and those who disbelieve everything, consider the other to be without plausible ground for its view. On the whole, the deniers are the more emotional, the more prone to epithets. Now it is deeply ingrained in most of us to assume him in the wrong who gets violent and abusive. We must guard against that bias in this inquiry. Disbelievers in the Iceland voyage are not proven wrong by the single fact that their manners are worse.

### THE DOCUMENTS IN THE CASE

The dispute on whether Columbus visited Iceland started through a passage in the life of the Admiral that was written by his son Ferdinand. There is but one other source of consequence, the *Historia* of Las Casas.

Ferdinand wrote the life in Spanish some time before 1539. The manuscript is lost and what we have is an Italian translation, *Historie nelle quali s'ha particolare & vera relatione della vita & de' fatti dell' Ammiraglio D. Christoforo Colombo, suo padre; et dello scoprimento, ch' egli fece dell' Indie Occidentali, dette Mondo Nuovo, hora possedate dal Sereniss. Re Catolico. Di lingua Spagnola trad. nell' Italiana*

*dal S. Alfonso Ulloa. Venetia 1571.* There was a second edition at Madrid in 1592.

Apparently the sole translation into English is one that is found in three places wedged into cumbrous sets of voyages, the eight folio volume Churchill, London, 1704; the eighteen octavo volume Kerr, Edinburgh, 1724; and the seventeen quarto volume Pinkerton, London, 1812. Kerr and Pinkerton are, as implied, reprints from Churchill; the name of the translator is not given.

The comparative neglect of Ferdinand's biography of the Admiral of the Ocean Sea is worth comment, the more so when we look into the career and reputation of its author. As a boy of fourteen he accompanied his father on the fourth of the Spanish voyages, 1502; he was eighteen when the Admiral died. Thereafter he made two voyages to America and accompanied Charles V to Italy, Flanders, Germany and other countries, traveling eventually pretty well over Europe and making journeys to Africa and Asia. He was respected both for his character and for his learning as a cosmographer. He had at least some of the papers and charts of his father, and was possessor of a library of twenty thousand volumes printed and in manuscript when he died at Seville in 1539. A book by a writer so qualified you would think would command attention when it deals with about the most famous man whom Europe ever produced, and one of still greater, or at least more direct, appeal to readers in the Americas.

However, we have indicated at least one reason already for Spanish neglect of Ferdinand and, as we shall see, of Las Casas; for their books contained and are the only

works known to us which did contain the statement that Columbus had made a voyage to Iceland—where he might have learned about five centuries of relation with countries west of the Atlantic, to the embarrassment of a government that claimed it had sent west the first ship that ever crossed the ocean.

The *Historia de las Indias* by Fray Bartolomé de las Casas, bishop of Chiapas, “the Apostle of the Indians,” was written in Spanish between 1551 and 1561, but was not printed until 1875 in Madrid.

By those who do not claim that both works are more or less fraudulent it is considered that the *Historia* of Las Casas confirms the *Historie* of Ferdinand—shows, at least, that the disputed passage about Iceland was not concocted by an Italian who was perhaps not entirely friendly to the Spanish discovery claim on the New World. It is generally agreed that Las Casas must have had the original *Historie* manuscript in his possession while he was writing the *Historia*. He himself says he had and used Ferdinand’s life of his father.

We find in studying the dispute on whether Columbus visited Iceland that the debaters usually, perhaps always, quote by separated sentences or by short extracts of several sentences the material which they wish to confirm or dispute. We think it fair to print Ferdinand’s chapter practically in full. More than three-fourths of it is beside the point, in one way; but it is all pertinent as giving our picture a setting—which is all the more important in that some of the critics tell their readers that the chapter as a whole does, or does not, predispose one to belief in the Iceland part.

In Volume II of the Churchill collection the title of the *Historie* reads:

“The History of the Life and Actions of Adm. Christopher Columbus, and of his Discovery of the West-Indies, call’d The New World, Now in Possession of his Catholick Majesty. Written by his own Son D. Ferdinand Columbus.”

We feel it throws some light on Chapter IV, which is our main concern, to quote the introductory paragraph from the author’s preface:

“I Being the Son of the Admiral Christopher Columbus, a Person worthy of Eternal Memory, who discovered the West-Indies; and having my self sail’d with him some time, it seem’d to be but reasonable, that among other things I have writ, one and the chieftest should be his Life, and wonderful Discovery of the West-Indies, or New-World; because his great and continual Sufferings, and the Distempers he laboured under, did not allow him time to form his Notes and Observations into a Method fit for History; yet knowing there were many others who had attempted this Work, I forbore, till reading their Books I found in them, that which is usual among Historians, viz. That they magnify some things, lessen others, and sometimes pass that over in silence, which they ought to give a very particular Account of. For this reason I resolved to undergo the labour of this Task, thinking it better I should lie under the censure my Skill and Presumption shall be subject to, than to suffer the Truth of what relates to so Noble a Person to lie buried in oblivion. For it is my Comfort, that if any fault be found in this my undertaking, it will not be that, which most

Historians are liable to, viz. That they know not the truth of what they write; for I promise to Compose the History of his Life, of such matter only as I find in his own Papers and Letters, and of those Passages of which I my self was an Eye witness. And whosoever shall imagine, that I add any thing of my own, may be assur'd, I am satisfied, I can reap no benefit thereby in the life to come; and that the Reader alone will have the benefit of it, if it be capable of yielding any."

Chapter IV has the title "How the Admiral employ'd himself before he came into Spain." We reproduce this in the Churchill orthography and give all of it, with all its errors of printing or of translation, except the last paragraph. This we omit not merely because the reader already has the full setting of the Iceland material but also because it contains misprints or bad renderings that make it unintelligible.

"The Admiral having gain'd some insight in Sciences, began to apply himself to the Sea, and made some Voyages to the East and West; of which and many other things of those his first days, I have no perfect Knowledge, because he died at such time as I being confin'd by filial Duty, had not the boldness to ask him to give an Account of things; or to speak the truth, being but young, I was at that time far from being troubled with such thoughts. But in a Letter writ by him in the Year 1501, to their Catholick Majesties, to whom he durst not have writ any thing but the truth; he has these following words.

"Most Serene Princes, 'I went to Sea very young, and have continued it to this day; and this Art inclines those that follow it, to be desirous to discover the Secrets of this World; it is now forty Years that I have been Sailing to all those parts, at

present frequented; and I have Dealt and Conversed with wise People, as well Clergy as Laity, Latins, Greeks, Indians and Moors, and many others of other Sects; and our Lord has been favourable to this my Inclination, and I have received of him the Spirit of understanding: He has made me very skilfull in Navigation, knowing enough in Astrology, and so in Geometry and Arithmetick. God hath given me a Genius and hands apt to draw this Globe, and on it the Cities, Rivers, Islands and Ports, all in their proper Places. During this time I have seen, and endeavoured to see, all Books of Cosmography, History and Philosophy, and of other Sciences; so that our Lord has sensibly opened my understanding, to the end I may Sail from hence to the Indies, and made me most willing to put this in execution. Fill'd with this desire, I came to your Highnesses. All that heard of my undertaking, rejected it with contempt and scorn. In your Highnesses alone, Faith and Constancy had their Seat.' In another Letter written from Hispaniola, in January 1495, to their Catholick Majesties, telling them the Errors and Mistakes commonly made in Voyages and Piloting; he says thus, 'It happened to me that King Renee, whom God has taken to himself, sent to me to Tunis to take the Galeasse call'd Fernandina; and being near to the Island of St. Peter by Sardinia, I was told there were two Ships and a Barack with the said Galeasse, which discompos'd my Men, and they resolved to go no further, but to return to Marseilles for another Ship and more Men; and I perceiving there was no going against their Wills, without some contrivance, yielded to their desires, and changing the point of the Needle, set sail when it was late, and next morning at break of day, we found our selves near Cape Cartegna, all aboard thinking we had certainly been sailing for Marseilles.' In the same manner in a Memorandum, or Observation he made to

show, that all the five Zones are Habitable, and proving it by Experience in Navigation, he says, ‘In February 1467, I sail’d my self an Hundred Leagues beyond Thule, Iceland, whose Northern part is 73 degrees distant from the Equinoctial, and not 63 degrees as some will have it to be; nor does it lie upon the Line where Ptolemy’s West begins, but much more to the Westward; and to this Island which is as big as England, the English Trade, especially from Bristol. At the time when I was there, the Sea was not Frozen, but the Tides were so great, that in some Places it swell’d 26 Fathoms, and fell as much.’ The Truth is, That the Thule Ptolemy speaks of, lies where he says, and this by the Moderns is call’d Frizeland. And then to prove that the Equinoctial or Land under it is Habitable, he says, ‘I was in the Port of St. George de la Mira belonging to the King of Portugal, which lies under the Equinoctial, and I am a Witness that ’tis not Inhabitable, as some would have it.’ And in his Book of his first Voyage, he says, ‘He saw some Mermaids on the Coast of Menegueta, but that they are not so like Ladies, as they are painted.’ And in another Place he says, ‘I observed several times in Sailing from Lisbon to Guinea, that a degree on the Earth, answers to 56 Miles and two Thirds.’ And farther he adds, ‘That in Scio, an Island of the Archipelago, he saw Mastick drawn from some Trees.’ In another Place he says, ‘I was upon the Sea 23 Years, without being off it any time worth the speaking of; and I saw all the East and all the West, and may say towards the North, or England, and have been at Guinea; yet I never saw Harbours for goodness, like those of the West-Indies.’”

The fourth chapter’s Icelandic paragraphs may have been a large reason, but they were not a reason admissible by Spaniards, for casting discredit upon Ferdinand’s life of his

father. There were reasons which could not be hidden and therefore were not, such as the disputes which arose in Spain during the later part of the life of Columbus and after his death as to how much authority and property he and his family were to have as a result of his part in acquiring title for Spain to lands beyond the ocean. Defamation of character was a natural part of this struggle, which included making out Columbus as much of a liar and charlatan as possible and discrediting his friends and supporters as much as possible.

An easy way of discrediting Ferdinand was to say openly or by innuendo that he was born out of wedlock—"what can one expect from a bastard?" But, now that centuries have passed, this has developed into a boomerang, and we can say that Ferdinand's character and scholarship must have been in reality the more remarkable since he was able to make a secure and respected position for himself even during his lifetime in face of the double handicap of being a partisan in a vicious struggle and being illegitimate. For it has seldom been denied, and more rarely of later years, that he was a man of integrity and consequence.

With Las Casas the tendency of the *Historia* to undermine the case of Spain for rights of discovery in the Americas was again not an admissible reason for getting him and his book into disrepute. Besides, there were fundamental and overwhelming reasons of a different sort.

Las Casas took holy orders in 1510 and went to Cuba in 1511. His vain attempt to check the massacre of Indians soon after he got there led to his becoming, during the next few years, a violent and, as the majority of Spaniards felt, virulent



champion of the rights of the Indians. He did not want them enslaved, he did not want them massacred. He wanted them to be treated like human beings, more or less the equals of Spaniards. As a result, his popularity with the upper classes of Spain was in 1560 about like William Lloyd Garrison's popularity in 1860 south of the Mason and Dixon Line. At a minimum, he was hated and reviled by a majority of those Spaniards who were directly concerned with the New World. He was perhaps the most reviled Spaniard then living—one who might not have lived long except that he was to a degree protected by the Church, and indeed favored by certain high powers of the Church.

The hatred of Las Casas, and of the things for which he stood, survived his death in 1566 and has smouldered longer than such hatreds usually do. One sign of this is that although the learned world has “always” realized that he had written in his *Historia de las Indias* one of the most important source books of American history, this work was not available to scholars, except as laboriously handwritten and therefore possibly inexact copies, until after 1875 when the mentioned edition was published at Madrid.

Even with that edition before us we still are in doubt that the world of scholarship yet has free and full access to all that the Bishop of Chiapas wrote that bore on what Columbus may have known before 1492 about countries beyond the Atlantic. And here we must remember that Iceland itself is a country beyond the Atlantic, from the European point of view, since it lies west of the main channel of the ocean and within sight of the next west American country, Greenland. For there is known to be a considerable variation between

manuscripts—more, apparently, than what would result from unintentional copyists’ mistakes and omissions. Take, for example, what the scholarly house of Quaritch said in their Catalogue 547, issued during 1938, in connection with their offer of an *Historia* manuscript that was “Folio, a finely written MS. of 941 pages, with an index of 21 pages; calf gilt, with the arms of Lord Stuart de Rothesay on the sides. 17th Cent.” They noted there that “Manuscripts of this work differ largely in their contents. The above is exceptionally complete.”

As with the fourth chapter of the *Historie*, the Iceland part of Las Casas has been used by the controversialists, whether they were for or against the Iceland voyage, chiefly in the form of separated brief quotations, or at most as a whole quotation of the Iceland material taken out of its setting. We propose doing for Las Casas what we did for Ferdinand, to quote enough of the context so that the reader can form his own judgment somewhat more easily and with better chance of accuracy.

The Bishop of Chiapas had many abilities, but a clarity of style was not one of them.

We have not discovered any ready-made English translation of all the parts of the *Historia* which apply, some of them directly and the rest indirectly, to the problem of whether Columbus made an Iceland voyage. So we had to make our own translation, using the Madrid, 1927, edition which is apparently a verbatim reprint of the 1875—is, in effect, not a second edition but a second printing. We have been under temptation to clarify as we translate, but decided against; for it seems to be anybody’s guess just what the Bishop meant in some places. Then it is not our chief purpose to entertain but

rather to give the reader his own ground for a decision on the merits of the case. Accordingly, we try to give him the same impression that we receive ourselves from Las Casas; which is rhetorically one of confusion at times although historically in general one of enlightenment.

It is a pity that Las Casas forgot so often to use verbs where they were needed, forgetting, too, long before the end of a sentence, just what he had been talking about at the start of it. We relieve slightly the tedium of the Bishop's involved passages by omitting here and there sections that depart from our theme; using, however, enough of these digressions, we feel, so that you will get an impression of what they usually are like. We omit, too, those parts of what Las Casas copied from Ferdinand that do not bear on the Iceland problem—parts that we used in full when reproducing the Churchill translation of the fourth chapter of the *Historie*.

We translate, then, from the beginning of Chapter III in *Historia de las Indias*:

“We have already told of the origin, fatherland, descent, parents, appearance, deportment, way of talking, of Christopher Columbus, which were all natural to him. We also spoke briefly of his Christianity. These things are in accord with the knowledge which it is said he acquired and his way of life before he came to Spain, according to what we can gather from letters written to the Sovereigns and other persons, and by others to him, and from other of his writings, and also from the *Historia portuguesa*, and not least from the works which he accomplished.

“While he was a child his parents had him learn to read and write, and he emerged [from this training] able to write such a beautiful and legible letter (the which I have seen many times) that he was able to make a living by it. From this he went to arithmetic and also to design and painting, in order to be able to live by these also in case he should want to. He studied in Pavia the first rudiments of literature, especially grammar, and became quite an expert in the Latin tongue. In this the above-mentioned *Historia portuguesa* praises him, saying that his Latin was eloquent and correct, and of how much use this was to him, enabling him to understand human and divine history!

“These were the fundamentals which occupied his childhood and with which he entered upon the other arts which in his adolescence and young manhood he worked to acquire. And since God gifted him with high power of judgment, a great memory, and a powerful zeal, he had much communication with learned men, and through his indefatigable work of investigation and especially what I can and must conjecture as assured and so must believe, because of the singular ability he had for the mission for which he was designed, he obtained the necessary ‘marrow’ and substance to learn other sciences, such as geometry, geography, cosmography, astrology or astronomy, and nautical science. All this one gathers very clearly from what he has written on the voyages which he made to these Indies, and from some letters to the Sovereigns which have come into my hands; in which, as he was a God-fearing and upright man and considering the royal personages to whom he was writing, it is to be believed that he did not exceed the truth; and from which I have decided to insert herein some passages, because I believe that although they are

manifest to all they are worthy [of being included].

“‘Most exalted Sovereigns: From a very tender age I have navigated the sea and continued until this day; the same art inclines those who follow it to know the secrets of this world; and now forty years have passed during which I have been in this practice. I have gone to all those places that are navigated today. I have held intercourse and communication with learned people, ecclesiastic and secular, Latins and Greeks, Jews and Moors, and with many others of other sects; to this my desire I found our Saviour very propitious and I received from Him the spirit of intelligence. In navigation he gave me abundant knowledge; he gave me enough of astrology and also of geometry and arithmetic, and capacity in mind and hands to design this sphere, and the cities, rivers and mountains, islands and ports upon it, each in its proper place. During this time I have seen and endeavored to see all the writings, cosmography, histories, chronicles and philosophy and other arts, in such a way that the Saviour has opened my understanding with a palpable hand that I might navigate from here to the Indies, and he has strengthened my will for the execution of this, and with this fire I came to your Highnesses. All those who knew about my enterprise denied it with ridicule and scorn; all the sciences of which I have spoken were of no avail, nor were the authorities of these; in your Highnesses alone remained faith and constancy.’

“These are the words which the Admiral wrote to the Sovereigns in the year 1501, I believe either from Cáliz [sic] or Seville, and with the letter he sent them a certain figure, round or spherical. In another letter which he wrote to the same high Sovereigns from the Island of Hispañola, for the month of

January, 1495, making mention of how frequently those err who pilot ships in their navigations, mistaking one thing for another, whence it comes that many ships often run into danger, he speaks thus:

“‘It happened to me that King Reinel, whom God has taken, sent me to Tunis to capture the galley *Fernandina* . . . [here follows that episode practically as we had it from the Churchill translation of the *Historie*, ante].’

“‘In some notes which he made about how all five zones are habitable, proving this by the experience of his navigations, he speaks thus:

“‘I sailed in the year 1477 in the month of February beyond Tile island a hundred leagues, of which the southerly part is distant  $73^{\circ}$  from the equinoctial, and not  $63^{\circ}$  as some say, and it is not within the line which includes the west, as Ptolemy says, but is much further west, and to this island, which is as large as England, the English go with their merchandise, especially those from Bristol, and at the time that I was there the sea was not frozen, although there were very big tides [*mareas*], such that in some parts twice a day they went up 25 brazas and descended as much again.’ It is quite true that Thule, the one of Ptolemy, is where he says, and that this one the moderns call *Frislandia*; and further on, proving that the equinoctial zone is also habitable, the Admiral speaks thus:

“‘I was in the fortress of la Mina . . . [Here follows that episode, practically as we had it from the *Historie*].’

“From all these things which I have now narrated, the great expertness, practice and experience, study and solicitude which Christopher Columbus had in sea matters become apparent, as well as the foundations and principles and theory which were required to be a great expert in everything concerning the art of navigation. In these arts those having no sufficient knowledge may err in navigation many times, and they will err, as we see how many mistakes the pilots make and how much damage they cause in the navigation of these Indies because they usually get things right only by chance. And thus we believe that in the art of navigation Christopher Columbus without any doubt excelled all in the world at his time, because God conceded to him more than to anyone else these gifts, and because He elected him more than anyone else in the world for the most sublime task which the divine Providence had in the world at that time.”

Quite as much to our purpose as the light which is thrown by the *Historia* in its third chapter upon the direct Iceland passages is the discussion in Chapter VII which contributes to what we know from a number of other sources about the passion of Columbus for proving that all five zones are habitable. We quote from that chapter somewhat at length for the reasons given before, among them not to be forgotten the situation that there does not seem to exist in English any translation of more than a few isolated sentences from this chapter.

As we translate we insert once more a caution to remember the opposite positions of the interpreters. Some think that Columbus got solely from books, and from verbal cosmographic discussions in the Latin countries, the idea that

the Arctic would probably turn out to be habitable—since the tropics had been found to be so by Henry the Navigator, his colleagues and successors. The reverse position is to accept what Columbus is said to have said—that he himself had been in the tropics and found the heat endurable, in the polar regions and found the cold not excessive; from which he had concluded that the Arctic as well as the tropics would be habitable.

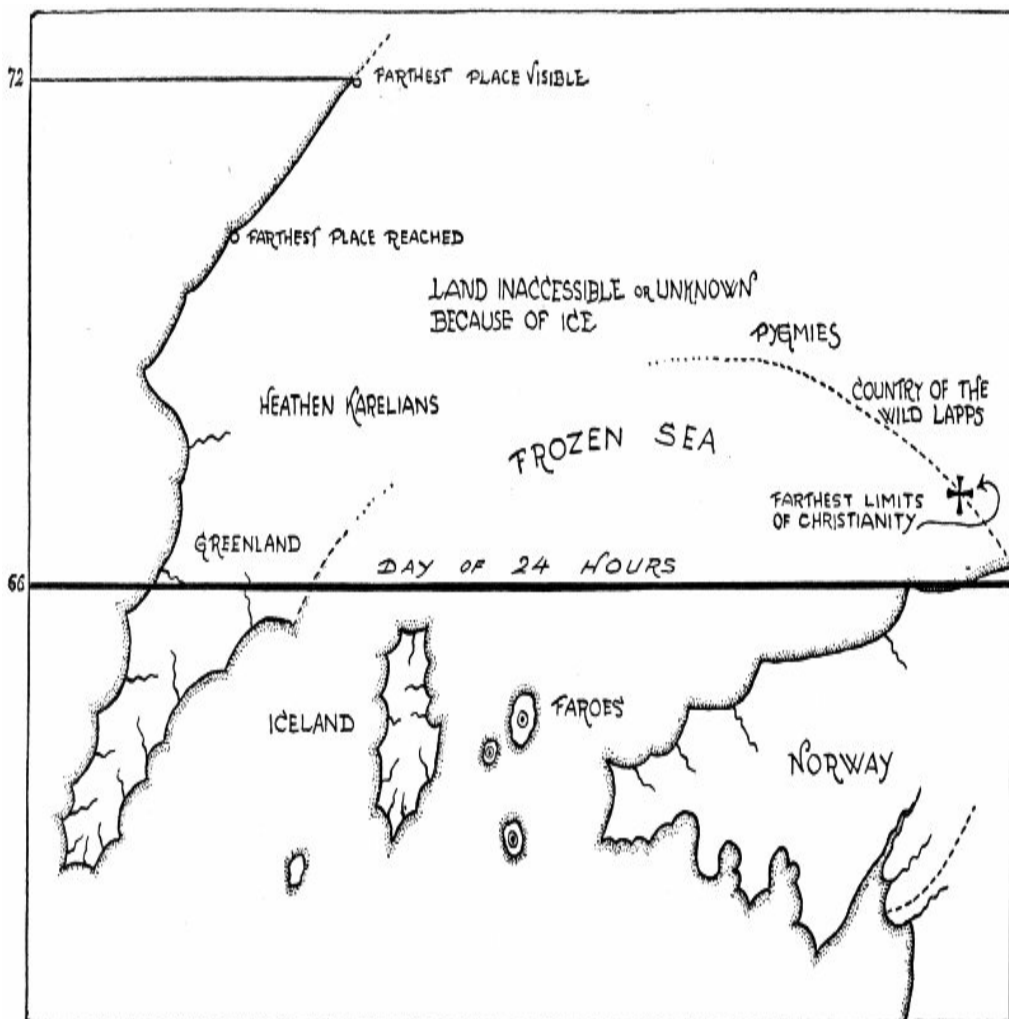
We quote, then, from Chapter VII of the *Historia*:

“In the two preceding chapters we have given the reasons adduced by the ancient philosophers, and other natural reasons, which Don Ferdinand, son of the same Admiral, adduced, which may have motivated the discoverer of these Indies. In this chapter I want to give some other reasons which not only prove, as far as I can see, but which make it evident that there were inhabited lands in the Ocean Sea towards the West, lying along the region of the South, or at least that the Admiral could believe that these lands were inhabited, since they were habitable. And to these reasons we shall add the opinion of some authorities. . . .”

We here interrupt our translation to point out how the idea that inhabited lands west of the Atlantic might extend to the south may well have been supported, cartographically and otherwise, by things known to or believed in by Columbus.

## PLATE VIII





After a map constructed by A. A. Björnbo on the basis of a descriptive text found with the “Vienna copy” of the Claudius Clavus map.

It is now agreed that Claudius Clavus drew, about 1427, a map which shows Greenland, in approximately its true position and shape, as an inhabited land reachable by sailing northwest from the British Isles. This map also records, pictorially and by legend, the belief of the time that Greenland

was connected with Russia around the north end of the Atlantic by a continuous land. That map was not published in the early printed atlases; but another by the same author and conveying the same ideas, drawn around 1430, was published in 1482 through the Ulm edition of Ptolemy, so that Columbus might have seen it in print about ten years before the Palos voyage, even supposing that in spite of all his probing for information about western lands he never encountered a manuscript copy prior to the issue of the mentioned printed Ptolemy.

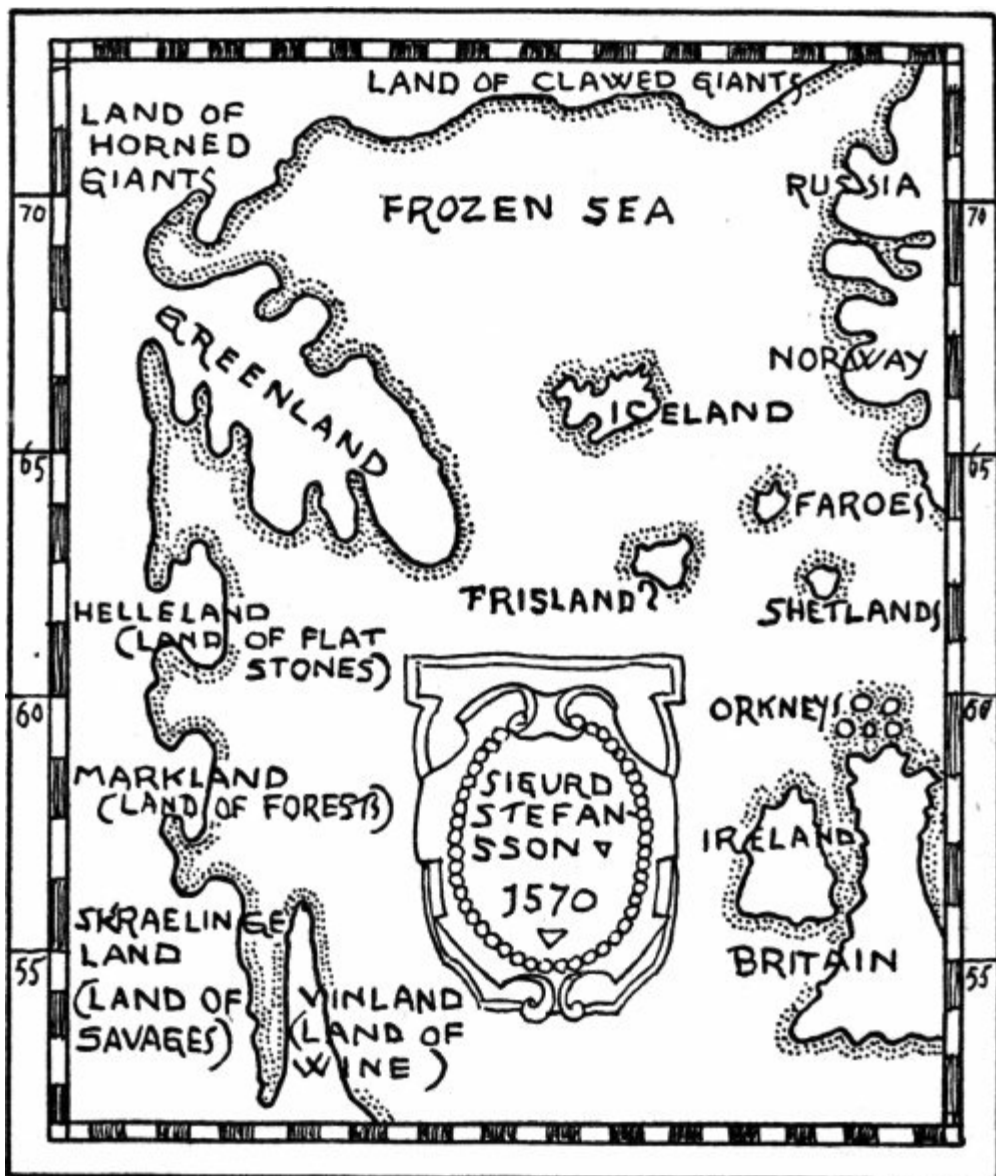
Then it must be remembered that even if Columbus never saw either a manuscript or a printed version of the Claudius Clavus map he can well have talked with one or more scholars who had seen it, who described it to him, and who perhaps gave him by their own verbal conjecture the idea of peopled countries beyond Greenland.

It is agreed by students of the Icelandic literature that Markland, the part of the North American continent best known to the Icelanders, was looked upon by them as a forested island southwest of Greenland, which would then be either the southern part of Labrador (cut off by the Gulf of St. Lawrence) or else Newfoundland. Beyond this forested island lay Vinland, about which the Icelandic literature is not clear on whether it was thought of as a second island, then of great size, or as a part of a land so great as not to be considered an island.

In either case the Icelandic sources are definite that the farthest points reached by the men whose journeys are described were not at the southern termination of Vinland, nor was there any indication that a terminus was being approached.

If Columbus learned such things in Iceland, if he learned them from Bristol sailors who cultivated Iceland, if he learned them from scholars of the Church who were familiar with papal and other documents related to countries west of the Atlantic—if your beliefs fall under one of these three subdivisions of a group of scholars whom we discuss hereafter, you will feel that Columbus may have reasoned:

## **PLATE IX**



After the map constructed by Sigurd Stefansson in the sixteenth century to illustrate the Icelandic *Gripla Saga*. Upon his inclusion of the island of “Frisland” the mapmaker comments: “What island this is I do not know, unless it be that to which a Venetian came and which the Germans call Frisland.”

“Greenland, west of the northern Atlantic, is inhabited; I have heard of at least two lands southwest from there, Markland and Vinland, which are also inhabited. Now Markland, according to Icelandic belief, is an island; Vinland may or may not be an island, for its southern extension has not been determined. Accordingly, it is not unlikely that still farther south will be an extension of it. Or there may be islands south of Vinland.”

The next step of such hypothetical Columbus reasoning would be: “If these other lands south of Vinland do exist they are pretty sure to be inhabited. If they lie in the temperate zone they are habitable by universal agreement; if they lie in the torrid zone they are habitable according to what the Portuguese and the rest of us have discovered during the last hundred years.”

If you hold anyway such views as we have just outlined you will see in the paragraph we have quoted from Las Casas that he is explaining and supporting your views. Conversely, if you are of the opposite school you will need to find, and will doubtless succeed in finding, a different explanation.

Here we turn back from our own speculations to those of Las Casas and come first to a section that considers whether the Antipodes are inhabited—whether the other side of a spherical world can be supposed to have people upon it who would look to us like flies on a ceiling if our globe were transparent and we could see that far. Then he returns to the habitability of the zones, and we proceed with our translation, coming presently to some of his most involved passages:

“The thing which some ancient writers have thrown doubt upon was the [habitability of the region near the] equinoctial line, which they called torrid, as appeared in the chapter before this. The mistake and error of those writers is now well determined, for many of us have been below that equinoctial line, and have seen in certain parts the mildest and pleasantest regions, and in others so much snow that one can hardly live there, and others with much heat but not so much as to render them uninhabitable. . . .

“Certain it is that some affirm that the regions subject to the poles not only are uninhabitable because of the immense cold, but that also in those regions no living thing can exist. They prove it by reason and experience: the reason, according to them, is that, according to The Philosopher [i.e., Aristotle], *Physics* 2, the sun engenders the life of things which have life, with other particular and direct causes, so that if there were no sun nothing could be generated nor live; likewise, according to them, if the sun exerts no influence, and certain it is that the sun cannot exert any influence in such regions, since it is too far from the equinoctial and the entire width of the zodiac, which is the circle containing the twelve constellations and which the philosophers call the oblique circle where the sun goes and where its rays exert an influence. Therefore nothing in such regions can have life; therefore they are uninhabitable. By experience also they [the philosophers] pretend to be able to prove it, because if on this side of the Orkneys, which are thirty according to Ptolemy and very far west, and in the island of Thule, the rivers are frozen as well as the sea down to the deepest depths, as the same Ptolemy and all the others say, and which are situated at 60° [N. Lat.] what will happen to the land which is at 90°, which is near to the

pole? Of course it must be extremely cold and consequently uninhabitable.

“The foregoing is the way those argue who say that the lands below the poles of the heavens are uninhabitable.

“This reasoning seems to contain a certain appearance of truth. But one can say [in reply] that in spite of the distance from the poles, which the sun has in the zodiac, the lands below the poles have day, since even there the day lasts six months in the year so that it is not always night. Some virtue of the sun and some of its influence reach those regions, although its rays may be weak and debilitated. Likewise the virtue of the sun’s rays and of the stars, even if this be weak and debilitated, still multiplies itself in some way, through its reflection in the water, on the one hand because the water is smooth, shiny or polished, and returns what reaches it of the power of the sun and stars, and this is the cause of some heat; on the other hand, the reason lies in the natural coldness of the water, which is wounded by the said power of the sun and therefore multiplies to some extent the heat, and this is enough to make it possible that in these regions some living things may exist, especially if [we admit] the animals that may be there are perhaps large and fleshy so that they are not penetrated so easily by the cold.

“For this reason the said regions are not uninhabitable from all points of view, although they may not be inhabited everywhere and those who may live there may do so with hardship and pain.”

Here follows a long discussion of ancient literature bearing on

the Hyperboreans and their country—the sort of literature and indeed mainly the same authorities which we deal with under that head in our chapters on Pytheas and on the temperatures of Arctic summers. Accordingly, we omit this part of the Las Casas discussion of the views of Columbus; remarking, however, that we have seen already in our Churchill translation of the Iceland section of the *Historie* that Columbus is said to have been in the habit of speculating on the classic literature about the Hyperboreans.

“The second cause or natural reason through which one might suppose that there was habitable and inhabited land towards the west, stretching towards the south, is because it is a general and natural law, according to the physicians, that the life of human beings and their health depend on humidity and a tempered heat equally distributed. And finally, the more temperate a place or part of the world, and the nearer such places should be to the temperate zone, or remote from it, the better or more favorable, or the contrary, will conditions of life be.

“Consequently we may believe that those parts or regions are habitable and more or less inhabited, since, according to Aristotle in his *De causis proprietatum elementorum*: *Radix habitationis est aequalitas et temperamentum* (the root of habitability is equability and moderation); because, since the ocean had not been explored towards the west and south, and since for an infallible natural reason one knew that the more one should approach the equinoctial line the greater are the temperateness and moderation to be found, since, because the days and nights are the same, all that is heated by the sun during the day is moderated and cooled by the humidity of the



night. And thus respectively the regions which give off something of the qualities of those situated below the equinoctial line, to which belong all the regions of the first climate until their end, which extends more than 115 leagues, coming from the south pole towards the north, with parts of the second clime, it follows that Christopher Columbus could easily persuade himself that there were lands and population in the Ocean Sea towards the west extending towards the south.”

Follows now a section of miscellaneous topics and confused rhetoric which we omit as not pertinent. A sample of the things there discussed is the reasoning that an island, though really big, may seem small in a large sea like the Atlantic; while another, though really small, may seem comparatively big in a small sea like the Mediterranean. This apparently is to bring out that some of the discoveries of Columbus in the West, though little in comparison with the land Spaniards chiefly value, South America, are nevertheless hardly to be despised. Then he continues.

“... St. Anselm [early twelfth century] says in *De Imagine Mundi*, Book I, Chapter 20, that the Ocean Sea contained an island full of freshness, fertility and mild climate, which was more excellent than others, which is called *Perdita*, and which was sometimes found by chance, and which at other times when people went on purpose to find it and investigate it, they did not see. He says: ‘There is a certain island called *Perdita*, which by far excels all others for its pleasantness in all things, unknown to man, found sometimes by accident, later sought and not found and therefore called *Perdita*.’

“Thus after having quoted these authorities, and their reasons

as related above, it will appear most clearly that a man of so much learning and wisdom and so experienced in matters of the sea, who was chosen besides by God to accomplish such distinguished deeds as Christopher Columbus, could with reason and discernment persuade and bring himself to search for favor and aid, affirming the certainty of his discovery. And this will appear still more evident from what we shall bring to bear below.”

That argument we do not follow, however, for it has no more than a remote bearing upon our main problem, of whether Columbus visited Iceland, or upon our chief collateral interest, the ideas which he may have received, directly or indirectly, from the Icelanders.

Of an argument bearing upon Iceland that cuts both ways Las Casas gives us a discussion.

Some of those who do not believe that Columbus visited Iceland, or that he secured Icelandic information whether through Bristol merchants or the Vatican and its affiliated scholars, make a great point of how the mystical nature of Columbus may have seized upon the idea of Ultima Thule partly in relation to what he came to look upon as a divine prophecy applicable to himself, written according to God’s design by a heathen.

Columbus, we all agree, was familiar with Iceland as it appeared on the maps under the name of Thule—no one could be without that knowledge who in the fifteenth century had a concern for navigation and cartography, as Columbus obviously did. He was familiar, too, with Thule, or Ultima

Thule, as a figure of speech, the name for the last land of earth.

These ideas he evidently combined, applying both to himself. He went to Iceland, says one school; he pretended to have gone to Iceland, says another. Both agree that from the conception of Thule he developed one more of the numerous arguments which he used in the later part of his career to portray himself as chosen by God to extend the boundaries of the known world and the opportunities of the Church for the conversion of the heathen.

We quote, with some abridgment as indicated by dots, sections from Chapter X of *Las Casas*:

“Thus . . . the Lord seems to have willed that, as the discovery of this new Indian world was one of his great and merciful and not least just works, [it should be] for the good of those predestined by him, as well as for the judgment and punishment of those damned and to be damned, [and] he decided to make Seneca, who was a gentile and an infidel . . . prophesy and state very clearly nearly fourteen hundred and twenty years ago that this world was to be discovered. In the . . . tragedy *Medea* he says . . . :

*“Venient annis saecula seris,  
quibus Oceanus vincula rerum  
laxet, et ingens pateat tellus,  
Tiphisque novos detegat orbes,  
nec sit terrarum ultima Tihle.*

“In order that these verses may be understood by those who have not read much history, two things must be kept in mind:

first, that in antiquity the island of Thule, which is in the ocean on this side [i.e., west] of Norway, between the North and West, as we have discussed to some extent above in Chapter III, was held to be the last of all lands known at that time, as is evident from the testimony of Ptolemy, Book II, Chapter III; Strabo, Book III . . .; Pliny, Book II, Chapter LXXVII; Solinus, Chapter XXV; Pomponius Mela, Book III, Chapter VI; St. Isidore, Book XIV, Chapter VI of the *Etymologiae*; and Boethius, *De Consolatione*, Book III, met. V, . . .

“The second is that Tiphis was the first to build a ship for sailing, and that he was the first to invent apparatus for navigating, especially the rudder and the art of steering, taking, they say, as a model the tails of the kites, by which . . . they steer themselves . . . Thus nature taught through the birds of the air what men had to do in the water to steer themselves.

“It is thus to be supposed, say the verses of Seneca: ‘In future and remote years there shall come ages or times in which the Ocean Sea will loosen its bonds so that the great new land will appear; and the mariner, inventor of new things, shall discover new worlds, so that henceforth Thule shall not be considered as the last of all lands.’ How could Seneca speak much more clearly of the discovery of these Indies? To this he adds: ‘Tiphis will discover new worlds,’ by which he gives to understand automatically and unequivocally the dignity and all-embracing wisdom and grace that God was to bestow upon Christopher Columbus for that purpose, as if he should say that the excellent and distinguished mariner, and no other, inventor of signal and admirable innovations in matters of navigation, like that Tiphis, should discover new worlds, etc. He certainly was an excellent mariner, inventor of new and great things,

since he was the only one in this field in our times, and him alone God elected and no other to discover these new lands and give such a profoundly clear knowledge to the world . . .

“From all we have said it appears very clear that Christopher Columbus not only may have held probable the discovery of these worlds, but that he had quite certain and indubitable confidence of their existence.”

We have now quoted, with remarks chiefly our own, the main documents in the Iceland controversy, the *Historie* of Ferdinand Columbus, son of the explorer; and the *Historia* of Bartolomé de Las Casas, Bishop of Chiapas, admirer of Christopher Columbus, friend of his son the biographer, the only person definitely known (by his own testimony) to have had in his possession the Spanish original of the *Historie*.

We next desire to give at least a sample of the general comments upon these documents by scholars. We select a Spaniard, for it will turn out as we proceed that the disputants are frequently nationalistic if not race-conscious on the Iceland question, and that none of those who have been most effective against the Iceland story, or in its favor, have been of Spanish nationality.

The Spanish (Latin American) student of Columbian problems whom we select, Luis Ulloa, is more interested in the nationality of Columbus than in anything else and has no particular concern for the Iceland problem. This suits us, for we are for the time being occupied not so much with the

special question of the reliability of the *Historie*, and the *Historia*, with regard to Iceland as with the general worth of these books as sources on Columbus.

Spanish motivation, as we have outlined it, was not at first chiefly nationalistic in the sense of wanting to prove Columbus of Spanish blood. It was (from 1492 through the life of the Admiral, and for some time thereafter) nationalistic in the sense of working to suppress, with the help of the Church, the knowledge that the Vatican, and therefore more or less the Church throughout the whole of Europe, had been in touch with countries west of the Atlantic for a number of centuries. The worst thing in that connection was to start an argument; next worst, the making of a reply. Silence was the thing, or at most a contemptuous or a good-humored and tolerant smile at an absurdity. There is, accordingly, scarce a whisper for a long time with regard to Iceland.

What the Spaniards could and did dispute on was questions that related to Iberian priorities, as between themselves and Portugal. Then, as Columbus grew more and more a legendary figure, there were the attempts of Spaniards to steal him from Italy, of Italians to steal him from Spain, of the Portuguese to steal him from both, of both to steal him from the Portuguese, and so on nearly without limit—there have been contenders for native-land distinction from as far northeast as Poland, the well known Scolvus controversy.

Then there have been, as we said, the attempts to prove Columbus a Spanish Jew, an Italian Jew, a Portuguese Jew; and, of course, to demonstrate that he was not a Jew at all. A recent triumph of compromise we owe to Madariaga in the

1940 biography which makes him a Spaniard, an Italian, and a Jew turned Christian all in one, through having him derive from a family of Spanish Jews who had been resident some time in Italy.

However, we desire, as said, to quote a Spaniard with regard to the general reliability of the two chief Columbian documents—the only ones that contained the Iceland passage, the *Historie* and the *Historia*. We translate from pp. 209 ff. of the Paris, 1927, book *Christophe Colomb* written by the Peruvian Spaniard Luis Ulloa:

“There exists only one book that pretends to be, or is offered as being, a life of the Admiral written by someone who knew him and was related to him. This is of course the *Historie* . . . which is attributed to the son of Don Christopher, Don Ferdinand Columbus. Another book, also attributed to a contemporary, dedicates a portion of its thesis to the discoverer of America, or rather to the discovery itself; but for the period before the discovery, which is what interests us most in the life of Columbus, this book does nothing but copy with little variation what the *Historie* reports. I speak of the *Historia de las Indias* of Fra Bartolomé de las Casas.

“Certainly there are some other authors a little later than Columbus, among them the Genoese Giustianini, the Spaniard Oviedo, and Interiano, also a Genoese, who without paying special attention to the biography of the Admiral, do give some information about his origin. But the statements often conflict and are so little in accord with what we know that they cannot serve as anything but subsidiary guides, and that only on certain occasions.

“To what extent, then, can one believe the *Historie*, and to what extent can it serve as a guide in the investigations relative to the place of birth and the early life of the discoverer of the New World?

“As early as the eighteenth century the renowned Spanish scholar, Gonzales de Barcia, called attention to the fact that the original Castilian version, from which the Italian text of the *Historie* is said to have been translated, has not turned up; and that there is no indication of its existence. Barcia adds that he detects some differences between the two Italian editions.

“However, all the historians and critics believed in the *Historie* until about a half a century ago when HARRISSE, the great North American bibliographer, who devoted his entire life to Columbus studies, accused this book, upon reasoned grounds, of being to a great extent, or perhaps in its entirety, adulterated by literary forgeries—adulterated, as he seems to think, by the translator, Alonso de Ulloa.

“In any case, HARRISSE believes, this adulteration does not emanate from Don Ferdinand Columbus himself, but might perhaps be attributed to an untrustworthy transcription by a friend of Don Ferdinand, of which there seem to be traces in the *Biblioteca Colombina* of Seville.

“The HARRISSE reasoning is formidable: the *Historie* is full of contradictions, falsehoods, doubtful accounts, evident anachronisms, none of which could come from the son of Don Christopher. HARRISSE makes a detailed inventory, proving the book full of errors.



“Many of the Harrisse charges raised lively protest; some of them met with approval.

“However, the appearance of the book of Father Las Casas, published shortly after the work of Harrisse, seemed to give victory to the defenders of the *Historie*. For Las Casas had paraphrased or copied what was said in the *Historie*; and as this was published in 1571, while Father Las Casas finished his work in 1562, there were left no doubts: Las Casas, friend of Columbus, had had in his hands the original of the book of Ferdinand. That book was consequently authentic.

“Then the critics of the *Historie* rectified their position. Now, instead of attacking the translator alone, or a possible adulterator of the primitive text, they attacked also Ferdinand himself, who was accused of having falsified the biography of his father to glorify him. They even went further; they said that since Ferdinand had written with documents under his eyes which came from his father, the latter must be the chief author and instigator of the falsification of his own biography.

“It hardly needs saying that most of these accusations came, and still come, from the tenacious ‘Italianists,’ and most especially from the ‘Genovists.’ And that is logical, as there is no way to reconcile the biography of the Admiral with that of the wool-weaver except to make of Columbus an imposter, a thief of glory. Among those who support that thesis one finds, in the front rank, Vignaud. . . .”

We do not follow Luis Ulloa further, since his main concern is to prove Columbus a Spaniard (Catalan), a thing not germane to our problem. We proceed to an interpretation of the Iceland

material by distinguished scholars who represent the two main views—that Columbus did not go to Iceland and that he did go there.

### **COLUMBUS DID NOT GO TO ICELAND**

The 1939 pronouncement of the American historian Nowell, which we cited, that no one would hereafter seriously consider as possibly true certain Columbus stories, among them the “mythical voyage to Iceland,” was based on a wide survey of the Columbus literature. With reference to the Iceland question, however, he rested chiefly upon the Italian historian Alberto Magnaghi, who in turn rests chiefly on Vignaud and Ruge. We shall quote Vignaud and Magnaghi.

They suffice, in our opinion, because each quotes or refers to the chief authorities who have preceded them in the discussion of the Iceland story and who have partly or wholly agreed with them. We must quote both, although they cover the same ground, because while agreeing that the story of the Iceland voyage is a baseless fabrication they nevertheless represent different schools. Vignaud, while proving the story is a lie, is perhaps even more concerned with proving Columbus a liar. The general trend of his work is to the effect that no statement made by Columbus is worth paying much attention to unless it is supported by independent evidence. He does not express the view, but more or less implies it, that if Columbus said a thing it was probably not so. With Magnaghi it is reverse English. To him the belief that the Iceland story is false carries the implication that it must have had a source other than Columbus. According to Professor Magnaghi it was about as

difficult for Columbus to tell a lie as it was for Washington according to Parson Weems.

We present first the thesis that the Iceland story is a fabrication and that the fabricator was Columbus, doing this through paraphrase and translation of Henry Vignaud, depending chiefly upon his *Études Critiques sur la vie de Colomb . . .*, Paris, 1905.

By combining what is said in the *Études* with the discussion of the same topic in another Vignaud book, *Le Vrai Christoph Colomb*, we find he accepts the view that in 1476 Columbus was on one of four Genoese ships bound for England. When these were attacked during August by a French admiral, Casanova, “called Colombo,” Columbus escaped to Lisbon where he thus arrived by an accident and not for the purpose of developing his cosmographical conceptions, as Columbus later pretended had been the case. Two of these ships were commanded by Genoese sailors, Spinola and Di Negro, “with whom we know that Columbus was intimately linked, since some members of their family figure in his will.”

Says Vignaud: “If we compare these different clues with those given by Columbus himself ‘that he went to England, which is on the road to the North,’ and that in February 1477 he found himself a hundred leagues beyond Thule, one may easily come to the conclusion that, if he was telling the truth, it was from Lisbon that he went to England, that the voyage took place at the end of the year 1476, and that he without doubt made it on one of the Genoese ships with which he arrived in Portugal . . . whose destination was England, and which left Lisbon in December 1476.”

Vignaud says we don't know where in England Columbus landed; but that since he speaks elsewhere of having been in Galway in Ireland, and speaks of Bristol commerce, we may suppose he went to those places among others. He gives a note which says that Muñoz (*Historia del Nuevo Mundo*, Madrid, 1793) thinks the correct date for the Iceland voyage was 1467; says that John Barrow (*Chronological History of Voyages into the Arctic Regions*, London, 1818) accepts this date and that it is given in English translations by Churchill and in Kerr. These things we have checked, finding Vignaud correct.

Some pages later Vignaud goes on: "Columbus does not stop at saying that he went to Thule, he assures us that he sailed a hundred leagues beyond it, a thing which, according to his own indications, should have taken him to about the 78th parallel. The least that one is able to say about such an allegation is that it is highly exaggerated. If Columbus had done what he said he did, he would have gone well beyond Jan Mayen Island and reached those regions which have never been seen except by the great modern explorers at the cost of incredible hardships. Given the circumstances reported and the time of the year at which the voyage is supposed to have taken place, it is absolutely impossible.

"We do not know, moreover, any of the details of this extraordinary voyage. All that Columbus says about it in his note is that he made two observations which it is necessary to recount. One is that when he was in the regions of which he speaks, that is to say in the winter, the sea was not frozen, a curious observation which states a condition opposed to the usual nature of things. However, some believe that by this very statement the accuracy of the story is demonstrated, for it has

been shown to be supported by the evidence of ancient Icelandic documents.”

The alleged demonstration of accuracy to which Vignaud refers is that a passage has been found in an Icelandic annal which says that the winter 1476-77 was exceptionally mild and that no sea ice had been seen that winter on the north coast of Iceland. We shall note later that this argument has not swayed Icelandic participants in the Columbus dispute, for the two reasons that the pack ice does not come down on the north coast of Iceland by midwinter more than once every two or three years and that, in any case, a man who is on shore, as the annalist is supposed to have been, would not be able to testify to an ice-free ocean for more than a few miles from shore.

Vignaud, however, does not content himself with this explanation but goes into a discussion of Icelandic calendars which seems beside the point—is beside it, for battle has seldom been joined by the opposing sides on a calendar issue and never with significant result of weakening or strengthening either side.

Vignaud goes on to tell us:

“The other observation [of the Columbus story] is that the great tides in Iceland sometimes rose to 26 braces, which is impossible, even if we suppose that the passage should read ‘feet’ instead of braces, as has been suggested.”

In pages 410-12 of the *Études Critiques* Vignaud gives his main reasons for doubting that Columbus made this voyage. He feels that “The details which are reported concerning this expedition are such, in effect, that one asks oneself if this is not

just another one of those lying exaggerations to which Columbus was unhappily addicted.” Then he gives arguments for that view:

“If Columbus had really been in Iceland, and beyond, as he says, the note which he has left us on the subject would be very different. The first indication [of veracity] which we should have found in it would be the true name of the island. One does not go to a country for business, fishing, or whatever, without becoming acquainted with the customary name of the country, the one by which the inhabitants themselves call it, the one which all the English merchants and fishermen who were going there in such great number for the needs of their commerce or industry were acquainted with. This name Columbus, evidently, does not know since he does not give it, although by his own account he embarked from an English port where everybody was informed in this respect.

“It is also evident that the people with whom Columbus might have put himself in touch while he was in Iceland and who might have told him about the voyages to Vinland, would not have said that their island was called Thule. There is in this an indirect proof that Columbus is speaking of this famous island from some treatise on cosmography of the time, or from some map, perhaps the *Prima Europae Tabulae* of Ptolemy of 1478 which formed part of the *Colombina*, and not from his personal experience.



Ptolemy's farthest North and West, after the world map in Nordenskiöld's *Facsimile Atlas*, based on editions of Ptolemy published at Rome, 1478-1490.

“Another observation confirms this. If Columbus had landed at some point on the coast of Iceland, or even had merely approached it sufficiently near to judge the height of the tides, he would not have said that they reached twice a day a height of 25 or 26 braces, as this is an impossibility. Here again he speaks only from hearsay, or from some note which he has borrowed unintelligently from some work where there is found mention of such a thing.

“If Columbus had been at 5 degrees further north than Iceland he wouldn't have written that in that region the sea was free of ice, as, even if it is true that in 1477 the winter was extremely mild in Iceland, as some ancient documents state, it does not follow that at a latitude further north by five degrees there would not be ice. The exceptional warmth of the temperature in that season could not have prevented the breaking up of the ice at the Pole and the formation of floe ice, the descent of which, for that very reason, would be precipitated all the more.

“These three remarks suffice, it would seem, to justify the skepticism of those, who, with Ruge, reject as among the fabricated assertions of Columbus everything he tells us about his presence in the Polar seas in February 1477.”

Vignaud thinks, then, that although Columbus was an egregious liar, as the argument of the whole book is meant to prove, he would not have told about Iceland, if he had ever



been there, the particular lies which we find. If he had talked with Icelanders they would not have spoken of their land as Thule, and consequently he would not later have written a note about it under that name. If he had seen Iceland tides he would not have described them as high. If he had tried to sail north beyond Iceland he would have known the sea ice is never far from shore in winter.

The Vignaud conclusion is: The Iceland story is a baseless fabrication; the fabricator was Columbus.

The wobbly claims of Ferdinand that the Admiral had sailed to and beyond Iceland were finally destroyed, according to those who felt that way already, by Professor Alberto Magnaghi. The fateful blow was struck through a section on Iceland in the Professor's "*I presunti errori che vengono attribuiti a Colombo nella determinazione delle latitudini*," published in *Bolletino della Reale Societa Geografica Italiana* in 1928.

Like Vignaud, Magnaghi proves that no reasonable person, when suitably instructed, would take any stock at all in the Iceland yarn. But unlike Vignaud he is not trying to prove Columbus a liar. Columbus, then, was not the author but the victim of the tall tales.

Magnaghi hates to think badly of Ferdinand who, after all, was Italian like Columbus; he does not want father or son to remain under the burden of accusations against them which has resulted from the ignorance, misunderstanding and malice of "foreigners"—foreigners here being non-Italians. It is possible though unlikely that the Iceland story was pinned on the

Columbuses, father and son, by some misguided friend who thought he could enhance the reputation of the great discoverer by telling a yarn that was preposterous although this possible booster did not know it. Or perhaps the intention was villainous from the start—to place in the mouths of the Columbuses stories which no one could believe, as a result of which both of them, or the father at least, would become objects of ridicule.

By a combination of paraphrase and quotation, as we did in the case of Vignaud, but chiefly through paraphrase, we now present the argument of Professor Magnaghi:

Near the beginning of his paper Magnaghi refers to “the obstinate and furious efforts of Vignaud” to show that the very documents which prove the glory of Columbus were purposely falsified by Columbus. Why has nobody given the documents real study? If we do, we may find that the things which seem to be unfavorable to Columbus, “are not to be traced back to him personally,” but rather to others who for a variety of reasons invented or changed the “facts.”

A gross error frequently attributed to Columbus is placing the southern coast of Iceland at 73° N. Lat. instead of 63°. This, the most flagrant of all the errors attributed to him, appears in Chapter III of the *Historia* of Las Casas and in Chapter IV of the *Historie* of Ferdinand Columbus, in which latter the son of Columbus gathers together all facts and circumstances of which he knew to show that the Admiral had given proof of extraordinary experience in the art of navigation long before undertaking his transatlantic voyage (of 1492).

The story of the voyage to Iceland, allegedly undertaken by Columbus in 1477, “is wrong from beginning to end,” says Magnaghi. Vignaud blindly accepts as rightly attributable to Columbus the authorship of this tale because it gives him a chance to make Columbus seem ignorant of the most elementary principles; and, so as not to cast doubt on the sincerity of Ferdinand, he also accepts [as stemming from the Admiral] the yarn of a Columbus voyage to Tunis and all the other things referred to in Chapter IV of the *Historie*. Vignaud does this to show Columbus “guilty of flagrant falsehood.” There is no doubt, of course, that all these accounts are contrary to the truth; but “COLUMBUS did not invent them. He did not invent anything at all, and it was not HE who betrayed the truth.”

Columbus did insert occasionally in his letters, and in the accounts of his voyages, some notes (digressions) which we have reason to believe are in accord with fact. There were, however, others than Columbus who also made insertions, and who altered the few digressions of Columbus himself. These were people who had a special interest, or found it opportune to do so: “In other words, his descendants!”

A short time after the death of the Admiral the famous trial of El Fisco started, and lasted several years. During this trial the heirs of Columbus did everything within their power to obtain special benefits from the Spanish crown; while others, the detractors of Columbus, maliciously gathered and dumped into the evidence all they could of derogatory opinions concerning the authenticity of the discovery and the merits of the great Admiral. It is obvious to Magnaghi that Ferdinand Columbus tried to oppose these attacks upon the glory of his

father by every means at his disposal, searching among the papers of his father to discover things showing his thorough preparation, the originality of the project and the merit of the enterprise.

There are certain things in the first chapters of the *Historie*, and especially in Chapter IV, which can be traced back to genuine letters and notes of Columbus; most of them, however, and just those which give us the impression of being exaggerated, contradictory or false, do not stem from any known authentic documents. Whom should we blame for these alterations? Was it, perhaps, the degenerate nephew Don Luis who altered the original manuscript, which later reached Las Casas in such form that he was deceived into believing all of it the work of Ferdinand?

Magnaghi thinks that even the beginning of the Chapter IV is an interpolation: "The Admiral having knowledge of the above-mentioned sciences (those he studied at the University of Pavia!), began to take an interest in the sea and to undertake voyages to the East and West; of these and of many other things of that early period, I have not complete notice; since when he was dying I did not, in view of my filial consideration, want to ask about such matters; and, to tell the truth, when I was young I took little interest in serious affairs." Magnaghi comments: "Columbus died when Ferdinand was eighteen years old (he was born in 1488); he was fourteen when the Admiral took him along on his 4th voyage (1502-1504). That is just the age when youngsters are most curious, and his *filial consideration* is supposed to have prevented him from getting information about previous voyages! Even supposing this were so, why did he not ask his older

brother Diego, or his uncle Bartolomé?”

According to Magnaghi the stories of alleged Columbus enterprises to Tunis and to Iceland are full of errors and strange unlikely circumstances that cannot be the inventions of Ferdinand; it is not believable that such a scholarly man, such an expert cosmographer, himself conversant with maritime problems because of the voyages he had undertaken, would have attributed to his father yarns that would make him seem a liar and a braggart. That “vain and degenerate” descendant of the Admiral, Don Luis, must have smuggled these things into the Ferdinand manuscript. It is possible that to a mind like his such claims may have seemed likely to support and exalt the glory of the great navigator; but “in reality they were a disastrous defamation of the discoverer of America.”

Don Luis had a chance to pervert the manuscript; for at his death (1539) Ferdinand bequeathed all his letters and rich library to his nephew. Don Luis, not caring much for these treasures, soon abandoned them. In 1552 they came into possession of the Cathedral of Seville where they are known as the Biblioteca Colombina. In 1565 Don Luis was convicted of bigamy and exiled to Orano where he died in 1572.

Magnaghi says the passage about the voyage to Iceland is so fantastic that there is no critic who has not spent considerable time upon it. Even those who are most benevolent, and who do not doubt the episode as a whole, have had to confess that they were somewhat puzzled how to defend Columbus on the score of being such a poor observer.

Much has been written in the endeavor to tone down the

passage, to make it seem less incredible; but in that connection no one has dared to question the good faith of Ferdinand.

It has seemed incredible to everybody that Columbus would misplace the latitude of the southern coast of Iceland by  $10^{\circ}$ , as he is made to do in the questioned passage, but still they end up by saying that like errors were possible in his day. Harisse, for instance, first says that if Columbus knew no better than to make such mistakes, he would never have reached America, but later the same Harisse feels he has to accept the story without reservation, because d'Azevac had proved that errors of that kind were very possible, and especially because Peragallo had pointed out that the questioned passage was also to be found without change in the *Historia* of Fray Bartolomé de las Casas, so that it could not have been invented expressly for the edition of the *Historie* of Ferdinand, published in Venice in 1571. (Here it must be admitted that Las Casas copied, most ingeniously, the text of Ferdinand after Don Luis had made his interpolations.)

Continuing his piling up of evidence, Magnaghi points out that Ruge alone never vacillated in regarding the voyage as a fairy tale. Although Finnur Magnússon succeeded with patient research in showing that in March, 1477, the northern coast of Iceland was free of ice, "another Dane," Thoroddsen, objected that although it is very possible that even in full winter Iceland would be ice-free on its northern coast this would not be true for more than a few miles from the coast.

Ruge observes that saying Columbus went 100 leagues farther to the North ( $14\frac{2}{3}$  leagues for each degree) amounts to claiming he reached  $78^{\circ}$  N. Lat. He says, too, that when

Columbus elsewhere speaks of his voyages in the Atlantic he mentions England, not Tile, as the extreme North. [Vignaud, however, translates that passage not to the effect that England was the extreme north but that it was on the road to the north.]

De Lollis supplements this statement of Ruge by saying that if Columbus really had been in Iceland he certainly would have found there very much alive the fame of the Norsemen, and therefore he would have chosen as a point of departure for his transatlantic voyage England instead of Spain.

Be that as it may, in spite of all these justified attacks upon the story the belief that Columbus really was in Iceland is still [1928] widely held, and the majority of authors still believe that the account was written by Columbus himself. Before reaching unfounded conclusions, as others have done, it would be better if we go somewhat more closely into the confusion resulting from the wonderful yarn.

Magnaghi points out that the difficulty about reaching  $73^{\circ}$  in February on an ice-free sea has been recognized; the 100 leagues *beyond* Tile, however, correspond to  $7^{\circ}$  of latitude, without taking into account the width of Iceland. Columbus would, therefore, have reached about  $80^{\circ}$ . Columbus is made to say that Iceland is as large as England. Together with Scotland, England is represented as oblong on all the charts and maps of the time, extending from S. to N. about  $9^{\circ}$ . But let us suppose that Columbus had seen England in a more horizontal position, and that he believed its width to be only, let us say,  $5^{\circ}$ . He says he went 100 leagues beyond Iceland. Then  $73^{\circ}$  N. Lat. for the southern coast of Iceland, plus  $5^{\circ}$  for its width, plus  $7^{\circ}$  for the 100 leagues, would give a latitude of

85°. Is it possible that at such a latitude he should have found the ocean free of ice in February?

Still more fantastic, according to Magnaghi, is the reported height of tide, which Ferdinand Columbus gives at 26 ells [La Casas gives 25 ells], equivalent to 17 meters (approximately 56 feet). We know, however, that in the Arctic the tide is not large, and that its mean is from 3 to 6 feet. It remains to point out that at that latitude in February we are in the middle of the polar night. Columbus, therefore, is supposed to have chosen just the most favorable season for his voyage!

By assigning such a high latitude to the southern coast of Iceland, Columbus departs from any other representation found on the maps of his time. With the exception of Diego Ribero (1529) who places the island between 66° and 70° and the Ptolemy edition of Bernardino Silvani (1511) where Iceland lies between 67° and 71°, all maps, Magnaghi claims, place Iceland at latitudes which are very near the truth, that is to say, between 63° 30' and the Arctic Circle.

Magnaghi asks whether it is admissible to suppose that Ferdinand Columbus, who in 1524 was directing the work of the cosmographers in the *Junta* of Badajoz, and who in 1529 was placed by Charles V in charge of constructing a new official map, should have attributed to his father such gross errors, fatuously believing them to show his nautical prowess. If we suppose that Columbus made the Iceland voyage in his youth, and that because of his youth he believed that southern Iceland was at a latitude of 73°, then his son would have had the good sense to omit that passage from his book.



For all these reasons, it is not sane to persist in ascribing to Columbus the *Historie* account of an Iceland voyage.

In conclusion, says Magnaghi, attributing all these errors to Columbus has no foundation whatsoever. Some of them were attributed to him because of a wrong reading or a strange lack of comprehension of certain documents; others because it was not taken into account that Columbus was obliged for certain reasons to let certain scientific errors go, as was customary in his time; and finally it was not realized that some of the documents ascribed to Columbus might be apocryphal, containing falsifications which were introduced into the original text for a variety of reasons.

Thus Magnaghi, although more elaborate than Vignaud (at least in the parts we have quoted), agrees with Vignaud on the falsity of the Iceland story, and agrees for the same or very similar reasons. He disagrees with Vignaud solely upon the authorship of the falsehoods—we must not suspect Christopher Columbus; it is not reasonable to suspect Ferdinand Columbus; likely the falsifier was “the degenerate nephew,” Don Luis. Las Casas was tricked into supporting the yarn through having worked from a (Spanish) copy of the *Historie* which, without his suspecting it, contained the fraudulently interpolated Don Luis absurdity about a Far North voyage.

### **COLUMBUS WENT TO ICELAND**

An example of what might be named the conservative wing of those who believe that Columbus went to Iceland is the Norwegian philologist and historian Gustav Storm.

On March 15, 1893, the four hundredth anniversary of the return of Columbus to Palos, Storm delivered before the Geographical Society in Kristiania, Norway, an address which was part of their commemoration exercises. He said that, as he was publishing a book on Columbus, he did not want to cover the whole subject, for danger of repetition, but would instead take a small subdivision and develop it more at length than had been possible in the book. He would, then, speak on “Columbus in Iceland and the Discoveries of our Forefathers in the Northwestern Atlantic.” The address is published on pp. 67-85 of *Det Norske Geografiske Selskabs Arbog*, Vol. IV, 1892-93, Kristiania, 1893. Some of the points made by Storm are:

He disposes of HARRISSE's contention that the life of Columbus attributed to Ferdinand was written by someone else and for that reason suspect, by pointing out that LAS CASAS, twenty years before the allegedly fraudulent publication, used a manuscript of what he said was Ferdinand's life of his father. Storm does not think it conceivable that LAS CASAS could have been mistaken, and thinks it proved that the manuscript used by LAS CASAS was essentially the same as that upon which the publication was based, for some at least of the LAS CASAS quotations are found verbatim in the published work. In other cases the paraphrase is as good as you expect a paraphrase to be.

Storm says that Columbus studied cartography in his youth and that when mature he took part in a Genoese voyage in the Mediterranean, including the Near East (Chios), and “following that he apparently sailed in a Genoese vessel to England before he went to Portugal. In his diary kept on his

famous journey across the ocean he speaks of his former voyages in the following order: first the Levant, then the northern or British voyage, and following that the voyage to Guinea.”

After discussing the Columbus and Toscanelli problem, with which we have small concern, Storm passes on to the arguments of Columbus against the learned who believed that the tropics were uninhabitable because of heat and that the far north was uninhabitable because of cold and because the sea was frozen just beyond Thule, which Thule was placed at a degree and a half farther north than the north tip of Britain. In reply Columbus said that from his own experience he knew both contentions were false. He had been at La Mina on the equator and found this habitable. He had been to the north beyond Thule and found the sea unfrozen up to 73° N. Lat. even in midwinter—which would lead to the presumption that lands in that sort of climate would be habitable. Storm points out that La Mina is 5° farther north than Columbus said, and dwells on its being the rule that everybody overestimated distances, whether in degrees or in miles, and that Columbus was particularly afflicted with this tendency—Storm gives many examples of overestimates by Columbus.

We translate back from the Norwegian Storm’s translation of the passage on Thule:

“I sailed in the year 1477 in the month of February 100 leagues beyond the island Thule, the south side of which is at 73° north from the equator and not at 63° as has been said; and it is not within the line which is the boundary of the west, as Ptolemy said, but much farther west than that. And to this

island, which is the size of England, the English go with their wares, especially the people of Bristol; and at the time when I was there the sea was not frozen, but there was so mighty a tide that in certain places it rose twice a day 25 fathoms and sank twice to the same extent.’ [From the “twice a day” and the “25” we see Storm translates from Las Casas and not from Ferdinand.]

“Upon this point has been added a gloss by the son Ferdinand: ‘The truth is that Ptolemy’s Thule lies where he said and that moderns call this Frislanda.’ Ferdinand Columbus, who himself was an accomplished geographer, has desired, then, to correct his father’s statement on latitude, for that Thule lies where Ptolemy says means that its south coast is at 63°, not at 73°. Ferdinand informs us that this Thule is the one which the Spanish map-makers of the 16th century called Frislanda, which was Iceland. In this Ferdinand was certainly correct, even though the remarks of Columbus on this Thule do not quite fit Iceland. Iceland does not lie at 73° N. Lat., nor does it lie west of the Ferro meridian. Iceland is not as big as England and the tides do not fluctuate as much as Columbus says. But the remark that the English, particularly those of Bristol, are in the habit of visiting this large island shows that he is talking about Iceland, for it was just in the fifteenth century that the English, and especially those from Bristol, cultivated the trade in Iceland as well as the fishery along its coast, where they even maintained themselves throughout the winter either on shore or on the sea. Exactly from the year 1476 we have a complaint from Bergen [Norway] that the English from Bristol and Hull have taken fish from a Bergen trader who was trafficking in Iceland; unfortunately the letter does not mention where in Iceland these particular Bristol men were. Evidently

Columbus sailed with an English ship from Bristol and took part in the fishery along the coast during the following winter, in which connection his ship sailed far beyond, north or east from, Iceland.

“To understand how it came about that Columbus could give us such inaccurate figures or such exaggerated ones, we must remember his state of intellectual development in 1477 and the great progress of that development later. It was only some years after 1477, during his residence in Portugal, that Columbus learned the use of nautical instruments (the quadrant); neither the Italians nor the English would have known its use at this stage. We may then be sure that during the stay in Iceland Columbus cannot have made any observation for height of the sun. All he could do was to make guesses according to his estimate of the sailing distance [i.e., dead reckoning]. It was also later in Portugal that he learned from Ptolemy’s geography . . . that England reached north almost to 62° N. Lat.”

The argument is that Columbus assumed Ptolemy was right, but Ptolemy really exaggerated latitudes by four or five degrees.

“Columbus learned further [in Portugal] that the most northerly known island, Thule, was considered to lie about a degree farther north than Scotland, therefore at 63°, and that it was supposed to be at 33° E. Longitude. When he sailed with the English ship from Bristol through the Irish Sea and along the north coast of Ireland (which he reckoned at 61° N. Lat.) and had traveled thence across the ocean for many days to the northwest to reach the distant island where the English had

their trade, then he must have reckoned that he had sailed 180 leagues, or twelve degrees, and by adding this to the latitude of the Irish north coast ( $61^{\circ}$ ) he arrived at the sum  $73^{\circ}$ .”

Here Storm develops again the tendency of Columbus to overestimate. His exaggerations are usually by one-third or one-quarter. Therefore Storm thinks that Columbus's 180 leagues to Iceland were really 120, which would be the right distance between Ireland and Iceland (actually from  $55^{\circ}$  N. Lat. to  $63^{\circ} 20'$ ). In the same way Columbus would have exaggerated his westing. “Neither Columbus nor his contemporaries were in a position to determine geographic longitude; they just had to guess it,” (i.e., use dead reckoning). That is how Columbus got the idea that Iceland was west of the Ferro meridian. Really on the charts which Columbus had in mind the east coast of Iceland is four degrees east of the zero meridian and its west coast six degrees west of it.

Storm draws on his own experience to excuse Columbus for the high tides. Storm was used to a wide range of tides, yet he was astonished in Iceland when at one time of day he looked at a broad expanse of sea and then waited a few hours to gallop on horseback across what had been a wide body of water. Columbus, says Storm, was a product of the Mediterranean, where tides are practically unknown. He would, therefore, have had more of a tendency than a Norwegian like Storm to be amazed at the tidal behavior. The rise and fall may not actually be more than ten or twelve feet but you get a tremendous impression if you do not erect a staff for the measurement or if you have not the advantage of a steep cliff and are measuring on the basis of your impression of a given fjord at high and

low tide.

“Columbus says that he sailed 100 leagues beyond the land. It is not possible to discover whether Columbus sailed north along the west coast or the east coast of Iceland; but in either case 100 leagues, five or six degrees of latitude, is surely an exaggeration. But, remember, Columbus on his famous discovery voyage estimated on numerous days that they had sailed 50 or 60 miles per day; he may have overestimated similarly on his Iceland voyage; no doubt by 100 leagues he means a sail of two days, whereupon we are surely within our rights if we reduce his league estimate by half.”

Storm then discusses ice conditions around Iceland. He believes that Columbus made the northward voyage in a specially good year. From the fact that Columbus says nothing about ice ever being in Iceland, Storm feels that he was generalizing from the limited observation of one season and that he had not conversed with the Icelanders on this subject, for they would certainly have told him that in numerous years the ice does come down upon the coast. Here Storm quotes Thoroddsen from *Ymer* of 1884 for ice behaviors during 84 winters, between 1800 and 1883. Twenty of these winters no ice at all came down anywhere on Iceland, in twenty-one winters it appeared first in January, in twelve it came in February, in eighteen it came in March, in seven it came in April, and in four it arrived in May, and there were even two years when ice, previously absent, did arrive in June. Storm then refers to the report that the winter 1476-77 was extraordinarily mild in Iceland, which would argue that the sea ice was at a great distance.

Columbus was passionately involved later in contending that both tropic and polar regions were habitable. It was then he thought back to his experience at La Mina and beyond Iceland. For emphasis, or else because he really believed it, he put La Mina on the equator and pronounced triumphantly that nevertheless he was able to testify personally that the place was habitable. With similar triumph he referred to his own experience beyond Iceland, generalizing with as much confidence there as he did at La Mina.

Some of the exaggerated Columbus statements are: He said Iceland is as large as England, but it is two-thirds the size; that Cuba is as big as Great Britain, but it is half the size; that Haiti is as big as the Iberian Peninsula, but it is one-sixth the size. “These things I mention, not to impeach the veracity of Columbus, but to show that neither he nor his contemporaries had the necessary means to arrive at reasonably correct estimates of area.”

“One can well understand that Columbus [on the basis of his own experience] got the idea that he could sail right to the North Pole. Columbus is the first not only to say this but to make definite plans to carry it out. There is no doubt that he put in writing a program in this direction, which he deposited in a monastery in the town of Mejorada just before he started on his third voyage (1498). In a letter of the year 1500 he says that he is still hoping to carry out this plan. It is easy to see that he got the idea from his Icelandic voyage. He had himself found the northern Atlantic free of ice even in midwinter, and he believed that in 1477 he had been a long way on the road [to the Pole], even up to 80° N. Latitude.”



Storm gets the idea that Columbus thought he had been up to 80° by assuming that Columbus thought he had determined that Iceland had its south coast at 73° N. Then, if he sailed past Iceland and 100 leagues beyond it, he would have been covering at least seven more degrees.

In connection with the idea that Columbus would have known about the behavior of ice if he had conversed with Icelanders, Storm says: “An Italian like Columbus would hardly be able to make himself understood among the Icelanders unless through Latin. Then one would have to believe he could speak Latin at this stage—we do know that at a later period he was able to read it. Then he might have conversed with an Icelandic clergyman, but about this we know nothing, absolutely nothing.”

We omit from this survey of the Storm article whatever seems wholly non-Icelandic, like the things about Toscanelli. We omit, too, as not belonging to our subject what he says about the discoveries of the Icelanders in Greenland and on the North American mainland during the five centuries before Columbus. We barely mention that he has a long discourse on what Columbus may have known before the Palos voyage concerning lands (other than Iceland) west of the Atlantic—from European maps then available, from European knowledge of what the Icelanders knew, and so on. Then we quote Storm’s conclusions:

“The geographic ideas which Columbus brought back with him from northern Europe to Portugal may thus have been a fruitful soil for the impulses which later developed in him. In the northern Atlantic he had learned to know the

open sea and had, besides, seen large islands out in that sea about which the old geography had nothing to say. Finally he believed that he had discovered an open seaway to the North Pole. In short, he had not merely gained experience in sailing upon the high seas, which as yet was a strange thing to the Italians and even to the Portuguese on the African coast, but also his geographical horizon had been broadened and he had learned from experience that modern seamanship was competent to carry one beyond the boundary lines laid down by the ancients.”

Storm, accordingly, disagrees with Vignaud on practically all points except that he and Vignaud consider the Iceland story derived from Columbus himself. Specifically, he agrees with the note attributed to Ferdinand that *Frislanda* (or some spelling variant) was in the time of Columbus a usual name for Iceland, identified as the Thule of Ptolemy; and he agrees that Ferdinand is the author of the *Frislanda* gloss. He disagrees with Vignaud and Magnaghi that Columbus would have referred to Iceland as Iceland if he had ever been there, which disagreement he expresses by saying that if Columbus talked with anyone in Iceland it would have been with a clergyman and in Latin—whereupon the only name for Iceland that would reasonably be used between the local scholar and the visiting scholar would be from the language which they had in common, Latin, in which language Iceland was always called Thule, Tile, etc., during the Columbus period, as it had been for many centuries before (cf. our discussion of this problem in the chapter on Pytheas).

Storm disagrees about the Columbus statement on the tides being absurd; thinks it but a natural exaggeration. He disagrees

about Columbus necessarily meeting ice immediately north of Iceland, although he thinks that 300 miles is an overstatement—a reasonable overstatement and in character for Columbus who, according to Storm and indeed according to most of the commentators, was in the habit of overestimating distances.

Thus Storm thinks that Columbus went to Iceland and that his account, so far as it goes, is about as accurate as many other stories by Columbus which are universally accepted as having been written by him concerning places where he had been.

We introduced Storm as a conservative believer in the Iceland story, meaning thereby that he explains as reasonable or extenuates what have been considered gratuitous fabrications by critics of the Vignaud and Magnaghi schools. In a corresponding sense Charcot is a radical, particularly in that he accepts as true, both in descriptive words and in mileage, the very statement which the Vignaud and Magnaghi schools use as a fulcrum in their attack, the assertion that Columbus sailed 300 or even more miles north from Iceland in February without seeing ice.

Jean Charcot, the most famous of all French polar explorers of either the nineteenth or twentieth century, gained his popular acclaim chiefly through a voyage to the Antarctic. But his international and high scholarly reputation was based even more securely upon a dozen voyages which he made into the sea north of Iceland. He was the author of voluminous and learned works which, although mainly in the natural sciences, made frequent, well-considered and well-documented excursions into a number of other fields, among them history,

particularly the history of exploration.

Charcot, his friends tell, used to wax indignant that praise and blame are meted out to explorers and navigators by people who are not explorers nor even geographers and not sailors nor even versed in the theory and history of navigation. A remark in this trend, mild in comparison with what are said to have been his spoken views, fits into our discussion through being a criticism of Henry Vignaud, perhaps most effective of all those critics who have attacked the reputation of Columbus, particularly his veracity. In *Christophe Colomb vu par un Marin*, Paris, 1928, Jean Charcot says on page 57:

“Let us point out in passing that H. Vignaud informs us on page 115 of his book [*Le vrai Christophe Colomb et la légende*] that ‘all three (caravels) had three masts and *square lateen sails*’! We confess we do not understand: for *lateen sails*, since there have been ships on water, is an expression used to designate sails which *are not square sails*. [Webster’s dictionary says lateen sails are triangular.] This expression is, then, nonsense of the same order as *a curved straight line*, *a flat sphere*, or *a square circle*. This explains the weakness of the author’s criticism in the field of the maritime knowledge of Columbus, and we shall remark upon still other similar examples. This does not increase our respect for the erudition of H. Vignaud. To judge a sailor, one ought to be a little conversant with things of the sea. . . . This nonsense has been repeated without citing H. Vignaud in *La véridique aventure de Christophe Colomb*, by Marius André. Editors Plon and Nourrit, Paris, page 109, line 31.”

Some pages earlier in the same book Charcot discusses the

Iceland problem. We quote:

“Christopher Columbus earned his living by selling illustrated books, making globes and designing charts. He also sailed the seas, and in February 1477 went to Iceland, and then to Guinea and Madeira. Many scholars agree with the contention of H. Vignaud who disputes the Iceland voyage, admitting at most that our Genoese went to the Faroes. But there is the significant point about ‘a country covered with snow and

<sup>[2]</sup> ice’ (a description) which corresponds [in winter] to Iceland, and not in the least to the Faroes, where there is *never* any ice, either on the mountains or the sea, and where the snow lasts no longer than with us [in France]. Columbus said that he sailed 100 leagues north of Friesland (Iceland), and here has been found the most telling argument for maintaining the contrary [i.e., that he never went to Iceland], for, it is said, if Iceland were in question, his ship would have been prevented by ice from making that much distance towards the North, especially at that time of the year. Well, now 100 leagues of Columbus is equivalent actually to about 320 nautical miles, and it is a matter of elementary knowledge among sailors and geographers that during certain years in February, and perhaps moreover in any February when there has not been a special break-up of the ice (*débâcle*), it is quite likely that the sea would be free at 320 miles and more from Iceland.

## PLATE XI



Map of the North Atlantic from Lt.-Colonel Langlois' *La Découverte de l'Amérique par les Normands vers l'An 1000* (Paris, 1924), Société d'Éditions Géographiques, Maritimes et Coloniales, p. 119. The purpose of this authority's map and adjacent text is to throw the light of geography upon certain obscure historical problems, one of them why the charts of mediaeval Europe showed in the North Atlantic so many islands that cannot now be discovered. One explanation, according to the Colonel, is found in the difficulty of penetrating that ice which his map shows infesting the northern

sea; and then the ice may look so much like land that it is hard to differentiate—hence the mediaeval islands.

“In 1882 during the entire winter of the Austrians of the ‘Pola’ expedition on Jan Mayen Island, which is situated at that distance, no ice was seen on the south side of this Arctic land, and, since 1923 the year when the Norwegians established a meteorological post there, the same has been the case.

“Therefore, there is no reason whatever to deny this Iceland voyage; but, on the contrary, we are compelled to agree with the well-documented argument of the Norwegian Professor G. Storm that Columbus visited this island in 1477.

“It is most probable that his purpose was to reach Greenland whose east coast was at that time [believed to be] colonized, or perhaps to seek or visit another land such as the island actually known under the name of Jan Mayen. It is likely that on this voyage Columbus was seduced by the lure of the Arctic regions; in a letter written to Doña Juana de la Torre he speaks of a project which he had elaborated, and had not abandoned, to undertake the discovery of the North Pole.”

We do not know what Charcot thought about the absurdity, or the reverse, of the Columbus statement about tides in Iceland, for we have not found a comment by him on this point. Storm, commenting on the basis of his own experience in Iceland, feels that when a Norwegian like himself was so tremendously impressed with the rush of a tide into a certain Icelandic fjord it would not have been strange if

Columbus, whose ideas of the sea previous to 1477 were mainly formed upon a Mediterranean experience, had been still more impressed. Accordingly, he considers that although incorrect as a measurement the statement is reasonable as a casual impression.

Storm had not been in the sea to the north of Ireland, but Charcot had made a dozen voyages there. On the basis of that experience he felt at least as disposed to be generous about the midwinter voyage as Storm did about the tides—even better disposed, for Storm rather condones than supports the tidal pronouncement. Charcot backs up as completely reasonable the account of a midwinter voyage 300 or 400 miles north or northerly from northeastern Iceland.

Charcot is, then, in agreement with Storm except where he goes farther. Storm is willing to believe that Columbus thought he went the distance he says beyond Iceland. Charcot does not see any reason to reduce the Columbus distance estimate, for he is not in agreement with Storm in thinking that ice is usually found at no great distance beyond Iceland in winter.

Here we might interpret Charcot to mean that he would agree with Storm as to the distance at which ice was likely to be found if Columbus sailed north from the northwestern corner of Iceland. But Storm and Charcot are in agreement that we cannot tell whether Columbus meant to claim having sailed north from the northwestern corner or from the northeastern. It was doubtless only with reference to a departure from the northeast that Charcot believed it normal to go in midwinter the distance given and in the direction implied by Columbus without sighting ice.



Charcot refers to the establishment of a meteorological station by the Norwegians on Jan Mayen Island, about 300 miles farther north than the north coast of Iceland, in 1923. The year is technically correct, if by Norwegians you mean the Government of Norway. But the station was, in fact, established as a private venture in 1921 by an American of Norwegian descent, Hagbard Ekerold, now of Arlington, California.

In order to extend the Charcot statement two years back we have written Mr. Ekerold and he has replied by a letter from which we extract the pertinent section:

“In order to reconsider Christopher Columbus’ veracity as to ice conditions between Jan Mayen and Iceland, all I can do is dig out my 1921-22 notebooks covering the period of my overwintering on Jan Mayen.

“I find in my notes reference again and again, to ‘mild weather.’ Through the whole winter I myself took the 2 A.M. observations. On Sunday, January 29, 1922, I wrote:

“‘Mild weather. Few people would believe that one can, here on Jan Mayen, go straight out of bed clad only in a night shirt, with bare feet in wooden clogs, and walk to the observation shelter (about 50 yards from the Station) to jot down the night observations, but that is what I have been doing this whole month.’

“Repeatedly I use the phrase ‘it’s raining,’ and only occasionally find notes about freezing temperature. On January 31st, I wrote:

“‘The temperature has hovered above the freezing point almost the whole month. On February 3rd: “Fog, rain, mixed with snow.” Feb. 4—“7° C.” Feb. 25: “a howling blizzard.” Same on March 19. March 22: “Snow melting.” “‘Sunday—April 2: *Today we saw drift ice for the first time. It came south past the N.E. end of the Island. . . .*’

“From this it would seem very probable that Columbus might have been as far as Jan Mayen (from Iceland) without seeing any ice *in February.*”

We cannot say decisively even today how far one might sail north from northeastern Iceland, or in a course from Iceland to Jan Mayen and continuing in the same direction, without sighting ice in February. The nearest thing to an available report is in the press dispatches of 1939-40 about the rendezvous between the southward drifting *Sedov*, which had been beset in and moving with the Arctic pack for three years, and the icebreaker *Stalin* which came from Murmansk.

On December 22 the *Stalin* had already passed Cape South, Spitsbergen, which is about 700 miles north of the Arctic Circle, and therefore about the same mileage farther north than the north coast of Iceland. We are told that early the day after passing the cape the ship was “steaming full speed ahead to the north, steering a course straight for the heroic icebreaker *Sedov.*” No ship steams full speed unless there is either no ice or a negligible amount. It would seem, then, that Columbus might have gone twice as far beyond Iceland as he claimed to have done without meeting ice; for it is not necessarily true that the edge of the pack would be farther south in February than it is in December—it might be so in one year without

being so the next.

But perhaps we are making Ruge, Vignaud, Magnaghi and their schools seem more inexcusably ignorant than they really were about conditions in the sea north of Iceland. Certainly they were ignorant, but they have a lot of pretty good excuses.

For one thing, most of Europe was still when they wrote under the domination of the ancient Greek belief, which we discuss in our Pytheas chapter and again in our chapter on the temperatures of Arctic summers, that “the eternally frozen North” began just a little beyond Iceland. They should have known better, of course, from the great northern sailing days, following Henry Hudson’s voyage of 1607, when Spitsbergen was a center of the “fish oil” industry; but we find on examination that the memories of European scientists have tended to be as short with regard to the facts gathered by modern sailors as they were long with regard to the theories spun by the ancient cosmographers.

Then there were Icelandic writers on whom the Columbian scholars of other countries depended. During the nineteenth century these knew little of the sea north of their country from their own sailors, who had not been working much to the north in recent times. Iceland’s great age of seafaring had been the ninth to thirteenth centuries, when they explored much of Greenland and discovered land to the north of Iceland. Iceland’s forgetfulness of what those discoverers reported was as complete as that of Europe, which will appear from the case of Thorvald Thoroddsen, whom Vignaud and others are fond of quoting—and of calling “a Dane!”

From Iceland you could scarcely have selected a witness better accredited than Thoroddsen, for he was not merely the foremost authority upon the geology of the country but also upon its geography and even its climate—witness his many books in various languages, among them *Árferdi á Íslandi í Thúsund Ár*, “The Climate of Iceland through a Thousand Years.” He was also a chronicler of the history of Icelandic discovery, and speculated on the prehistory of his native land, including the question whether Pytheas had reached Iceland. His fame was truly international—for instance, he received the jealously guarded Daly medal of the American Geographical Society of New York in 1906.

We cite Thoroddsen more at length than otherwise because we want to bring out not merely how reasonable it was that the Vignaud group should accept his testimony on the sea north of Iceland but also because we want to continue emphasizing what is, perhaps, the main theme of this volume, the strong hold of classic theory upon the minds of our contemporaries—in Reykjavik not less than in Paris or New York.

We repeat for emphasis and amplify, before quoting this Icelandic scholar, the passing remark of Charcot that one of the International Polar Year Expeditions of 1882-83, the Austrian, had spent a winter on Jan Mayen Island and had reported the same ice-freeness of the waters north of Iceland during February that was described in the *Historie* of Ferdinand Columbus for 1477 and has been redescribed for every year since 1921 by Ekerold and by the official staff of scientists that have represented Norway on Jan Mayen.

As we read the Thoroddsen discussion of whether Columbus reached Iceland we must keep in mind both the things which make it harder to understand, the ones we have mentioned already, and those which make it easier to understand.

The hardest thing to grasp is the similarity of Icelandic to European reasoning about the sea to the north of Iceland. We may not feel like excusing any Columbus scholar who wrote of the debated Iceland passage in Ferdinand Columbus after 1883 without consulting the Austrian reports; we certainly feel less like excusing, or less able to excuse, the Icelandic Thoroddsen. Yet here we find him, a distinguished climatologist and geographer, writing of the waters between his own country and Jan Mayen nearly a decade after the report from the Austrian expedition, and writing as if he had never heard of the report, preliminary summaries of which appeared immediately after the return of the party to the continent of Europe, although the full reports did not come out till 1886.

It is not conceivable that Thoroddsen can have remained without knowledge of the Austrian results; nor is it conceivable that he disbelieved the report. Although he had seen the findings he just could not, or at least did not, assimilate them.

Among the things which make it easier to understand such differences of opinion as there are between Storm and Thoroddsen is that Thoroddsen, before publishing his 1892 volume, had read (as we see by a footnote) Sophus Ruge's 1892 attack on the Columbus story; but evidently, and naturally, he had not had a chance to read the paper Storm was working on for 1893 publication; he had apparently seen only

the comments by Storm which were published in 1887, before he had gone so fully into the question.

Apart from the above, there is a direct interest for Columbus scholars in reading Thoroddsen; for, although he was naive about the sea to the north, he was soaked in the literary and historical traditions of his country. Note, for instance, that he does not even mention the point which Vignaud thought so important, that Columbus spoke of Iceland as Thule. That is natural, for Thoroddsen's own published historical studies of Iceland bring out his having been well aware that Iceland was regularly called Thule by the learned men both of his own country and of Europe before and during the time of Columbus. It would not have struck Thoroddsen as reasonable that an Italian visitor would converse with Icelanders through a tongue other than Latin, or that a name for the country other than Thule would be an element of such a conversation.

We use our own translation, quoting from *Landfraedissaga Islands*, Reykjavik, 1892, pages 119-124. All but one of the numerous footnotes are omitted.

“English ships kept coming and going yearly between the countries [Iceland and England]. It is said that Christopher Columbus visited Iceland in an English ship from Bristol the year 1477. In a life of Columbus which is attributed to his son Ferdinand is found the account of the voyage to Thule and it is said to be as he wrote it; it runs: ‘I sailed the year 1477 in the month of February more than 100 miles (*leghe*) beyond the island Tile; its southern tip is at 73° from the equator and not at 63° as some have supposed; it does not lie within the line which, according to Ptolemy, marks off the west, but lies

much farther west than that. To this island, which is equal in size to England, the English come with their wares, especially from Bristol. At the time I went there the sea was not frozen; the sea rises there in some places 26 fathoms (*braccia*) and then falls as much.'

"This account is remarkable in many ways. Columbus says he sailed beyond Tile, which must be Iceland, 100 miles to the north in the month of February (!); according to that he must have gone far north into the sea along the coast of Greenland to Franz Josef Fjord or else nearly up to Spitsbergen, and that in midwinter. Columbus moves Iceland north to the 73rd degree of latitude; but, as everyone knows, it actually lies between  $63\frac{1}{2}^{\circ}$  and  $66\frac{1}{2}^{\circ}$ . The asserted height of flood tide on the coast of Iceland is absurd; apparently the story is modelled on the ancient account of Pytheas.

"Still, even though the story is absurdly scrambled, it may well be that Columbus visited Iceland although, properly speaking, this is not at all proved by the account itself; it may be that he

[\[3\]](#)

was in some harbor of the country or that he came ashore; the document says merely that he sailed a hundred miles beyond Tile (*oltra Tile isola*); then it would seem not improbable that Columbus was either on a fishing voyage, as Gustav Storm conjectures, or that he was gale-driven in an English ship north to Iceland and north beyond Iceland; the time (February) would seem to indicate this, for it is very strange that the English would come of their free will to Iceland in the month of February, whether to trade or to fish; this journey would have had to be a very special kind of voyage, for the reiterated complaints of the Icelanders about

Englishmen wintering there during the fifteenth and sixteenth centuries show that the merchants were not accustomed to any great deal of moving around during the winter.

“Much has been written and spoken about whether Columbus received in Iceland information about the journeys of the Icelanders to Wineland the Good. Finnur Magnússon [Icelandic historian and philologist, 1781-1847] appears to have been the first to write about this and he built lofty air castles upon what is said about a journey of Columbus to Tile. Of course Columbus *may* have learned something about the journeys of Icelanders to Greenland and to Vinland, but we have no *certainty* that this happened. According to present opinion, everything seems to be against the view and little or nothing for its support.

“To begin with, there is no proof that Columbus ever landed in Iceland, and that of itself should be enough to make people wary of building much on this foundation. Finnur Magnússon believes that perhaps Columbus visited Hvalfjord; that same year Bishop Magnus Eyjolfsson came there on a visitation; so Magnússon supposes that it may well be that he and Columbus conversed together and that the bishop told Columbus about the voyages of the Icelanders.

“All these suppositions are built on the paragraph about the journey to Tile, of which we have given a translation; it is seen at once what support there is for them when we do not even know whether Columbus came into any Icelandic harbor, or if he went ashore in whatever harbor it may have been; moreover, it is not certain whether the bishop himself knew about the Vinland journeys, although he had of course been an



abbot at Helgafell; even so, it would not be certain whether they met even if both of them were in Hvalfjord at the same time, which again is doubtful.

“Then it would have been remarkable if Columbus had begun to question a bishop away up in Iceland about a road to the Indies, for his mind was on nothing but India and he died in the belief that he had reached India; in order to explain his being curious on this point [lands to the west other than India] we would have to suppose that he had previously known something about the journeys of the Icelanders to Vinland. In the unlikely event that Columbus had heard of the journeys of the Icelanders, this clearly had no influence upon the course he took; for he eventually sailed from Spain south and west into the ocean.”

Thoroddsen was, seemingly, unaware of a contention developed by a group of scholars, of whom Vignaud is an example, that until during or after his voyage from Palos in 1492 Columbus never said a word to anyone about having a plan for reaching India. It is a supplementary contention of this school that while there is no independent evidence to show Columbus spoke of a plan for reaching India prior to 1492 there is a great deal of evidence from many sources to show that he did speak of a plan to reach islands or countries west of the Atlantic, such islands or countries clearly having at that time in the mind of Columbus no connection with India except that they would naturally lie in such a direction that beyond them somewhere had to be India (since Columbus, by universal agreement, thought of the earth as spherical).

It is, of course, not strange that Thoroddsen, who was far from

specializing in Columbian disputes, either knew not or had dismissed the contention that the India plans had never been advanced by Columbus until during or after 1492. For the main writings of the school who believe this have been published since 1892, the date of Thoroddsen's first volume in the Geography of Iceland series, from which we have translated. For instance, Vignaud's three-volume *Histoire Critique de la Grande Enterprise de Christophe Colomb*, was published in Paris during the years 1905-1911; *The Columbian Tradition on the Discovery of America . . .*, was Oxford, 1920, and *Le Vrai Christoph Colomb et la Légende*, was Paris, 1921.

We find, then, the following agreements and disagreements when we compare Thoroddsen the Iclander, Storm the Norwegian, Magnaghi the Italian, Charcot the Frenchman, and Vignaud the American.

Thoroddsen agrees with Magnaghi and Vignaud, and therefore with Ruge, that the tide part of the Columbus story is absurd. He is of the general opinion, in agreement with Vignaud but not with Magnaghi, that Columbus was untruthful; he agrees with Magnaghi, in a footnote which we did not quote, that a liar who was not Columbus or Ferdinand smuggled a lot of things into Ferdinand's *Historie*.

Thoroddsen is in agreement with Vignaud and Magnaghi that the story of a 300-mile voyage north beyond Iceland is absurd; and is therefore in flat disagreement on this point with Charcot (which includes being in disagreement with the Austrian International Polar Year Expedition of 1882-83 and, of course, is disagreement with Ekerold and the rest of the Norwegian observers on Jan Mayen since 1921).

By implication Thoroddsen would be in agreement with Storm that Columbus might have gone a little way beyond Iceland without seeing ice, but the general trend of his discussion makes it doubtful that he would have permitted anything like the 150 miles or so that Storm permits.

It is obvious from the historical writings of Thoroddsen that, if he knew about it, he was contemptuous of the Vignaud type of argument that an Italian of the fifteenth century can be shown not to have visited Iceland by showing that he wrote of it as Thule—particularly in view of Ferdinand’s saying he based his paragraph on a note (by implication, a lengthy note) written by his father, for it is well known that Columbus made a good many such notes in Latin. In that language, as said, Iceland was constantly being discussed or referred to during the fifteenth century as Thule (Tile)—for instance, in the atlases Columbus is supposed to have used.

We mention here what we shall discuss later, that Juan de la Cosa, fellow-traveler with Columbus to the West Indies, shows on his map of around 1500 an island named Tile, and has it in approximately the position given for an island of the same name by the disputed passage of the *Historie*.

The general conclusions of Thoroddsen are that Columbus may have been in Iceland but that it cannot be proved, and that if he was in Iceland he may have heard of North America but that this cannot be demonstrated either.

A subdivision not yet discussed of those who believe that Columbus went to and beyond Iceland is made up of scholars who think that “beyond” did not mean north, but west. These

are usually writers who give no argument to support their belief; or else they state or imply that in February no one could sail far north beyond Iceland and that therefore “beyond” must mean west.

The implied reasoning of this small group is: Columbus was the real author of the statement that he had gone a hundred leagues beyond Iceland; Columbus was truthful; it is not possible to sail a hundred leagues beyond Iceland in February, if “beyond” means north; it is possible if “beyond” means west. Therefore “beyond” does mean west. The solution is arrived at either in a mood of triumph or of nonchalance—you cry “Eureka!” or you light a Murad.

But the triumph or nonchalance is possible to maintain only so long as you can ignore what are of late the veriest commonplaces of the geography and oceanography of the Iceland-Greenland region.

However, we let this group speak for itself through one of its most famous members, that Spanish biographer of Columbus, Madariaga, whom we have quoted already as being sure, and as not understanding how anybody could not be sure, that Columbus made the Iceland voyage.

We are quoting Madariaga in part also for a second purpose, as an adherent to the view, which we indicated in the last several paragraphs of our quotation from Las Casas, that Columbus had a relation to Thule which was part of his concept that he was chosen of God as an instrument to broaden man’s dominion over the earth and that there were prophecies from remote times which forecast this destiny.

We cite, then, for our dual purpose pages 80 and 81 of the New York, 1940, *Christopher Columbus*. We might save a little space and a minute of the reader's time by omitting the Latin verse and its translation, since they are in effect repetitions from Las Casas; but that, we feel, would break the continuity of Madariaga's presentation which, in any case, is not identical with that of Las Casas.

“When young Colombo lands in Portugal, in 1476, at the very foot of that Rock of Sagres where Prince Henry had perched his nest of sea-birds of prey, we witness, to use a telling Spanish expression, the meeting of Hunger and Appetite. Colón's hunger for high endeavour meets the land longing for discovery. Barros was to say of him later on that he was ‘a skilled man, eloquent and a good Latin scholar, and very glorious in his affairs.’ It is therefore fair to assume, and so have we assumed already on other grounds, that in 1476, at twenty-five years of age, his Latin was already fairly good, and that, therefore, keen as he was to learn and read, he had read many a classic. There is good reason for thinking that either before his arrival in Portugal or soon after, within the year 1476, he had read the *Medea* of Seneca, for his mind, probably already full of his own star, saw a world of his own dreaming in a few lines of this tragedy of the Spanish-Latin poet, and he acted accordingly soon after. In Act II of this somewhat grim tragedy there occurs the following passage:

“*venient annis*

*Saecula seris quibus oceanus*

*Vincula rerum laxet: et ingens*

*Pateat tellus: Tiphysque novos*

*Detegat orbis: nec sit terris*

## *Ultima Thyle.*”

Though somewhat free and explanatory, Colón’s own translation, to be found in his Book of Prophecies, is correct:

“‘There will come a time in the long years of the world when the ocean sea will loosen the shackles that bind things together and a great part of the earth will be opened up and a new sailor such as the one who was Jason’s guide, whose name was Thyphis, shall discover a new world, and then shall Thule be no longer the last of lands.’

“This passage of the Spanish-Roman poet struck him deeply. The prophetic sense, a tendency to find a hint of things to come in all he read, was one of his most marked features. Are we to wonder, then, that in February 1477 Colón was in Thule, and even one hundred leagues beyond ‘the last of the lands’? All we know of his character suggests that Colón went there already smitten with this inner belief in his destiny, which was the real root of his indomitable strength. Why Thule? This voyage, on any other basis, is so devoid of meaning that his more matter-of-fact biographers simply deny that it ever took place. And yet Colon himself says he went there. ‘In some notes he made,’ says Las Casas, ‘to show how all the five zones were inhabitable, proving it on the experience of his navigations, he says: “In the month of February 1477 I sailed beyond the Island of Tile one hundred leagues, and its southern part is 73° north of the equinoctial and not 63° as some say, and it lies not within the line which contains the Occident, as Ptolemy says, but much further West, and to this Island, which is as big as England, the English go with goods, especially those of Bristol, and at the time I went the

sea was not frozen, though there were great tides, so much that in some parts it rose and fell 25 braces twice a day.’”

“The geographical errors of this text, far from telling against Colón’s veracity, speak in its favour, for if, as some of his modern critics claim, he had boasted of this visit on the strength of a mere perusal of sea-charts or maps, one has to deprive him of intelligence as well as of honesty, since he would thus have ventured to correct from his study in Portugal figures admitted by cosmographers and inscribed in maps. The objection is childish. He *did* go there. The proof is that he made bold to correct what others wrote about it before, whether competent to do it or not matters nothing for the argument.

“He went there because it was still Ultima Thule—not for long—and because he felt that the time had come when it should cease to be so. He went there to see for himself what Thule was like, and one hundred leagues beyond—of course, West.”

We see, then, that by implication Madariaga disagrees as strongly as possible with Vignaud who thought that if Columbus had been to Iceland he would not thereafter have talked of it as Thule. We gave our own view, that Columbus called Iceland Thule because it was called that on the usual maps of the day, because Thule was the usual name for Iceland among scholars of the time, and because a conversation in Iceland between him and an Icelander would almost necessarily have been in Latin, a tongue in which the customary word for Iceland was Thule. Now Madariaga emphasizes, what indeed Las Casas implies, that to Columbus Iceland was Thule not merely for the reasons we have given

but also because of the figurative meaning of the word, this in relation to his belief that he had been called upon to herald the new time when Thule should no longer be the farthest of the lands. The case for the Iceland voyage, then, has been strengthened by Madariaga through emphasis upon a clarification of Las Casas.

At least to the modern geographer it will seem rather a pity that when Madariaga had contributed to strengthening an already strong case for Columbus having been in Iceland, he had to weaken it by making him go “beyond” it in a westerly rather than a northerly direction.

The first difficulty is with the distance from Iceland to the next land west of it, Greenland. The strait between Iceland and the Blosseville coast is about 165 miles wide. From the northwest corner of Iceland straight west it is around 260 miles across. The distance west to Greenland from what has always been regarded, in mediaeval and modern times, as the west tip of Iceland, Snaefellsnes, is 330. (It may seem to you on the map as if this peninsula were not inevitably looked upon as the west tip, but you cannot feel otherwise if you have been there; for near its tip is the magnificent Snaefellsjökull, one of the most spectacular mountains in the world, certainly conspicuous beyond anything that can be seen coasting the lands said to have been visited by Columbus before 1477.)

The second difficulty for Madariaga is with the ice. When you think in classic terms you feel it natural that you reach sea ice quicker by going north from Iceland than west. This is seemingly the pit into which Madariaga fell. We have already made it clear by quotations from Charcot, Ekerold and the rest,



that it would be next thing to a miracle if Columbus did meet ice in February within a hundred leagues north from the northeastern corner of Iceland. It would be an actual miracle if he did not meet it going a hundred leagues west from northwestern Iceland, for by that time he would be in the interior of Greenland. He would be far within the customary bounds of the southflowing Greenland ice if he had gone 320 miles west from Snaefellsnes.

An objection to the Columbus story that has been made by several writers whom we have not quoted, and which we have quoted from Magnaghi, is that in February the sea to the north of Iceland is, as Magnaghi puts it, “in the middle of the Arctic night.”

Apart from pointing out that the middle of an Arctic winter comes in December and not in February, the modern geographer complains about statements like Magnaghi’s that they are on the basis of mediaeval cosmographic theory, not modern knowledge. To begin with, you could read a book outdoors on Jan Mayen Island December 22 for something like two hours at noon, if the day was clear. By February 22 there is more daylight each twenty-four hours, more light by which you can read a book out of doors, than there is on December 22 in London.

In order to go beyond Iceland in February, Columbus may have been sailing from England to Iceland in January. The nights of early January would have been longer than those of mid-February at Jan Mayen. Every December night in London is longer than the night of February 22 at Jan Mayen—again defining light as a sailor would by the test of whether there was

enough of it for him to do his work by its unaided help.

It is of course a mere chance, but still worth comment, that the two most notable voyages which mention both Iceland and a month of the year mention February. For Dicuil tells us that the monks who gave him the information about Iceland which he uses in the *De Mensura Orbis Terrae* sailed from Ireland toward Iceland in the first week of February, 795 A.D., and Columbus tells, or at least the *Historie* says he tells us, that he made his voyage north from Iceland in February, 1477.

And why not February? The ice that might be feared was neither met with nor seemingly even feared, whether by the Irish monks or by Columbus. The darkness of February, north or south of Iceland, is not to be feared by those who fear not the nights of December when plying the North Sea between Scotland and Norway; and that was routine both in the time of Dicuil and of Columbus.

Our study, based on the men we have listed, has been thus far, excepting a few *ex cathedra* pronouncements, a battle of printed authorities. We have quoted them at lengths partly determined by the inaccessibility of the material—because it is in the language of a small country or in a rare book. We now use some material at considerable length because it is our privilege to be the first to print it.

Eloise McCaskill (Mrs. Alexander Popini), specialist in mediaeval European literature and therefore in mediaeval Latin, has recently found her bent changing towards history, partly through research as joint editor of the London 1938 edition of *The Three Voyages of Martin Frobisher*. That study

naturally brought her in touch with Columbus, for it covered the relation between lands east and west of the North Atlantic from Pytheas through the time of the Irish in Iceland and down through the Norse period and the history of the Greenland colony—in fact through that unbroken transatlantic relation from Dicuil in 795 to Frobisher in 1576 for which we have literary and archaeological documentation.

An unpublished but considerably advanced study of certain Columbus problems by Miss McCaskill considers two points heretofore not covered by our discussion—the light upon the Iceland voyage which we may get from a retranslation and analysis of the *Historie* and *Historia* passages themselves and from an examination of the map of the Iceland region drawn by Juan de la Cosa, shipmate of Columbus.

In retranslating, interpreting and emending the *Historie* passage Miss McCaskill is by no means the first, although we have in our presentation so far used none of the emended versions, sticking to literal and, one might say, unimaginative translations.

One of the best treatments along a line where Miss McCaskill has gone farther is by the American historian, John Fiske, in his *The Discovery of America*, Boston, 1892. In conformity with our practice not to quote isolated sentences, we use consecutive material from Volume I, pages 381-384. The emendations in square brackets are by us, those in parentheses are by Fiske.

“About this time [1474-1480] Columbus was writing a treatise on ‘the five habitable zones,’ intended to refute the old notions

about regions so fiery or so frozen as to be inaccessible to man. As this book is lost we know little or nothing of its views and speculations, but it appears that in writing it Columbus utilized sundry observations made by himself in long voyages into the torrid and arctic zones. He spent some time at the fortress of San Jorge de la Mina, on the Gold Coast, and made a study of that equinoctial climate. This could not have been earlier than 1482, the year in which the fortress was built. Five years before this he seems to have gone far in the opposite direction. In a fragment of a letter or diary, preserved by his son and by Las Casas, he says:—‘In the month of February, 1477, I sailed a hundred leagues beyond the island of Thule, (to ?) an island of which the south part is in latitude  $73^{\circ}$ , not  $63^{\circ}$ , as some say; and it (i.e., Thule) does not lie within Ptolemy’s western boundary, but much farther west. And to this island, which is as big as England, the English go with their wares, especially from Bristol. When I was there the sea was not frozen. In some places the tide rose and fell twenty-six fathoms. It is true that the Thule mentioned by Ptolemy lies where he says it does, and this by the moderns is called Frislanda.’

“Taken as it stands this passage is so bewildering that we can hardly suppose it to have come in just this shape from the pen of Columbus. It looks as if it had been abridged from some diary of his by some person unfamiliar with the Arctic seas; and I have ventured to insert in brackets a little preposition which may perhaps help to straighten out the meaning. By Thule Columbus doubtless means Iceland, which lies between latitudes  $64^{\circ}$  and  $67^{\circ}$  [more nearly  $63\frac{1}{2}^{\circ}$  and  $66\frac{1}{2}^{\circ}$ ], and it looks as if he meant to say that he ran beyond it as far as the little island, just a hundred leagues from Iceland and in latitude  $71^{\circ}$ , since discovered by Jan Mayen in 1611. The rest

of the paragraph is more intelligible. It is true that Iceland lies thirty degrees farther west than Ptolemy placed Thule; and that for a century before the discovery of the Newfoundland fisheries the English did much fishing in the waters about Iceland, and carried wares thither, especially from Bristol. There can be no doubt that by Frislanda Columbus means the Faeroe Islands, which do lie in the latitude though not in the longitude mentioned by Ptolemy. As for the voyage into the Jan Mayen waters in February, it would be dangerous but by no means impossible. In another letter Columbus mentions visiting England, apparently in connection with this voyage, and it is highly probable that he went in an English ship from Bristol.

“The object of Columbus in making these long voyages to the equator and into the polar circle was, as he tells us, to gather observations upon climate.”

Fiske then believes that Christopher Columbus meant to be talking about three Thules and not one. The Thule at the correct latitudes shown by the Ptolemy maps of the day is the Faroes [says Fiske—others would have it the Shetlands]; the Thule as large as England visited by Bristol ships is Iceland; the Thule at 73° N. Lat., a hundred Spanish leagues beyond the second Thule, is Jan Mayen Island.

Another sample of those who believe the *Historie* passage confused rather than false, and therefore needing interpretation and not refutation, is John Boyd Thacher. We take his explanation from Volume I, page 392, of his three-volume *Christopher Columbus*, New York, 1903:

“After all is said and done and written, we must fall back on conjecture, a mental attitude in which students as well as readers of history often find themselves. We may, then, conjecture that Columbus is trying to say, through the medium of Ferdinand, his son, or Ulloa, who translated the latter’s book relating to his father, something like this:

“I navigated in the month of February in the year 1477 very far to the north, to an island 100 leagues beyond Iceland, which Iceland I take to be Ptolemy’s Thule. This northernmost island is therefore the extremity of the habitable globe so far as I know it and is therefore to be known as the *Ultima Thule*: the island to which I went has its southerly coast in latitude 73°, while Ptolemy makes the southerly coast of his territorial extremity to be only 63°: my *Ultima Thule* is also very much farther to the westward than that of Ptolemy: the Iceland of which I was speaking is as large an island as England, and by the way, speaking of England I may say that the English, and particularly the people of Bristol, go there to trade their merchandise: when I was there the sea was not frozen and there was such a tide that in some places it rose 26 fathoms.”

From this passage as emended Thacher omits the last sentence of the *Historie* passage, which is: “And it is very true that the Thule of which Ptolemy makes mention lies where he says; and this by moderns is called Frislanda.” He explains the omission on page 391. Commentators on the *Historie* have been puzzled, he says, as to whether this sentence is intended as a further quotation from the notes of Christopher Columbus or whether it is an emendation by Ferdinand or by Ulloa. The passage should not have troubled them. “If they [the

commentators] had quoted from Las Casas instead of from Ferdinand they would have seen that the Bishop of Chiapas, who had before him not only Ferdinand's manuscript but the original memorandum or annotation of Columbus himself, makes the note end with the passage as to the tides. The passage coming next [the one about Ptolemy's Thule] he quotes as his own ideas on the subject or as Ferdinand's, but certainly not as an expression of the Admiral's."

Thacher's emendation, then, differs in that he has two Thules in place of Fiske's three. This carries with it that Thacher finds no implied reference in the *Historie* passage to the Faroes and to their being Frislanda. In this relation we note that Storm and Hermannsson, each in his own day a leader in the study of the history and cartography of Iceland, agree with Fiske that in the fifteenth century Frislanda was commonly on the maps a name for Iceland.

As a necessary beginning of her study, Miss McCaskill made her own translation of the *Historie* passage, working from the first edition of the *Historie*, Venice, 1571. Here the punctuation may or may not approximate Ferdinand's original Spanish manuscript from which Alfonso Ulloa made his translation.

The Ulloa rendering into Italian is in Chapter IV on leaf 8:

*"Et medesimamente in una memoria, o annotatione, ch'ei fece, dimostrando, che tutte le cinque Zone sono habitabili, & provandolo con l'isperientia delle navigationi, dice: Jo navigai l'anno MCCCCLXXVII nel mese di Febraio oltra Tile isola cento leghe, la cui parte Australe è lontana dall' Equinottiale*

*settantatrè gradi, & non sessantatrè, como alcuni vogliono: ne giace dentro della linea, che include l'Occidente di Tolomeo, ma è molto più Occidentale. Et a quest' isola, che è tanto grande come l'Inghilterra, vanno gl'Inglesi con le loro mercatantie, specialmente quelli di Bristol. Et al tempo, che io vi andai, non era congelato il mare, quantunque vi fossero sì grosse maree, che in alcuni luoghi ascendeva ventisei braccia, & discendeva altrettanti in altezza. È bene il vero, che Tile, quella, di cui Tolomeo fa mentione, giace dove egli dice; & questa da' moderni è chiamata Frislanda."*

The McCaskill translation from the above runs:

“And likewise, in a memorandum, or note, which he made, demonstrating that all five Zones are habitable, and proving this by the experience of his navigation, he says:

“I sailed in the year 1477 in the month of February beyond Tile Island a hundred leagues, the southern part of which is distant from the Equator seventy-three degrees, and not sixty-three as some have it; nor does it lie within that line which includes Ptolemy's West, but is much farther West. And to this island, which is about the size of England, the English go with their merchandise, especially those from Bristol. And at the time that I went there the sea was not frozen, but there were such huge waves (swollen seas, heavy seas) that in some places they rose to twenty-six ells (*braccia*) and descended as much. It is quite true that that Tile of which Ptolemy makes mention lies where he says; and this [other] one is called by the moderns Frislanda.”

From this rendering, and from a comparative study of what we



might call the Fiske and Thacher groups of commentators, Miss McCaskill found herself more inclined to the Fiske view—that the notes which Ferdinand pieced together, and interpreted, had originally been meant to refer to three Thules.

There was, of course, historical and cartographical basis for at least two Thules; we dealt with that, to some extent, in our chapter on Pytheas. From Tacitus in the first century to Müllenhoff in the nineteenth there were influential writers, though a minority, who maintained that Thule was one of the Shetlands; and, of course, the Shetland latitude differs immaterially from that of the Faroes, in view of how inexact latitude determination was anyway in those days. So the Shetlands, or Faroes, were to Columbus Thule I. Then, again as we have said in the Pythean chapter, a majority of fifteenth century writers considered Iceland Thule, whereupon we have Thule II. Finally, if there was discovery of Jan Mayen, as Fiske thinks, or of the east coast of Greenland north from Iceland, as Storm suggests, then Columbus would have there Thule III.

In feeling that three islands are being discussed in the *Historie* passage Miss McCaskill takes what is a minority view, if we count noses among the writers. It is not original with her to translate *braccia* as ells, but it is strange that so many have rendered the words by fathom, when *braccio* seems to have the ordinary dictionary meaning of ell.

Magnaghi has gone into the various ells (*braccia*) and has found a mean value of about 26 inches (65 cm.). That leaves the tide still extraordinarily high, something over fifty feet. We need for such estimates the generosity of a Storm who, as we

quoted him, was willing to concede that an Italian might have made a very high estimate for an Iceland tide, when even a Norwegian like Storm had been startled by what seemed to him colossal tides there.

One thing in the McCaskill translation is, so far as we know, unique. She renders the expression *grosse maree* not as *high tides* but as *huge waves, heavy seas, high seas*. This would be as when we use “seas” for “waves” in such expressions as “the seas were running high” or “the seas were heavy.”

If the dictionary authority were equal for *tides* and for *waves*, it might seem that the wave meaning should be preferred.

For Columbus, as nearly or quite all commentators agree, was in his notes giving facts, or making allegations, to strengthen his contention that the Arctic was not uninhabitable because of cold. This was in opposition to the authorities, who had been saying, from Greek times, that the sea north of the Arctic Circle was thick, squid-like, sluggish, congealed, frozen, hard, and the rest. It moved not at all; or it moved sluggishly—“like a sea lung” was the phrase, and to an Italian a sea lung is a squid.

Where did this stiffness or sluggishness of the sea begin? In the south of Europe, as we show in our chapter on Arctic summers, followers of Strabo had been saying for more than a thousand years, at least as late as the fourteenth century, that the sea was congealed even south of Iceland. Few Mediterranean scholars in the youth of Columbus believed one could go at all beyond Iceland without meeting a stiffened sea. Indeed, the main reason that Pytheas had been considered a

charlatan from the second century B.C. to the fifteenth after Christ, to the very time of Columbus, was that he claimed to have gone a day's sail north from Iceland and to have found only then the edge of the pack—which edge, by varying estimates of the length of a day's sail, should by his account be from fifty to a hundred English miles beyond Iceland.

The learned world of 1477 was in substantial agreement, then, that at most a day's sail beyond Thule, at most a hundred English miles, the sea did not move before the wind in wave action because it was frozen; alternatively it moved like a jelly because it was like a sea lung.

But in 1477, by the *Historie* and *Historia* accounts, Columbus made a discovery to upset the learned. He had sailed beyond Thule not a mere 100 English miles but actually three times that far, 100 Spanish leagues, much farther than claimed by anybody even for Pytheas, and he had not found the sea frozen and hard; he had not even found it squid-like and sluggish.

In that situation, and when he was arguing the habitability of the Arctic, why would Columbus digress about tides in the fjords of Iceland? Why not stick to describing that sea which he claimed to have seen unfrozen far beyond Iceland? What was more natural than for him to say on his favorite theme, the habitability of the five zones, that he had been all of ten degrees within the Arctic, nearly 700 English miles, and that even there and even in February, the coldest month of the year, the sea was not merely liquid but was so free from “sea lung” quality, or any sluggishness, that it ran in gigantic waves, some of them, by his estimate, at least fifty feet from trough to crest?

By our modern knowledge waves of that kind are to be expected a hundred Spanish leagues north of Iceland. For it is now agreed that some of the most violent gales of the North Atlantic—perhaps not quite equal to the hurricanes that are met on the Columbus route from Spain to the West Indies, but still terrific—will descend on the Jan Mayen sea every now and then. They come in any month of the year; therefore in some Februarys.

It may be said that even these waves are not fifty feet high. People differ a lot about waves. Some that go to sea make a specialty of being conservative and will ridicule a fifty-foot distance from trough to crest. Others, and those more of the Columbus temperament as it is usually portrayed, are likely to converse about fifty, sixty and even seventy-foot waves. The facts may lie in between, and perhaps not far from twenty-five or twenty-six *braccia* if we give them the Magnaghi value of sixty-five centimeters.

We have consulted on the height of waves at sea Dr. Vaughan Cornish who has specialized in waves of sand, of snow and of water, and who published in 1934, Cambridge and New York, the book *Ocean Waves and Kindred Geophysical Phenomena*. Describing a gale of midwinter, he says on pp. 3-4:

“At 8 A.M. as I stood upon the promenade deck, with an eye-height 27 feet above the water-line, each passing wave was well above the horizon. From the look of the sea I judged the waves to be as high as any which I had seen on previous voyages, that is to say, 40 feet from trough to crest. They were remarkably uniform in height and were much steeper in front than at the back, thus differing from the almost

symmetrical swell of the preceding day. The velocity of the wind at this time, according to the seamen's estimate, was 52 miles per hour, somewhat greater than the 'Strong Gale,' expressed by the number 9 on Admiral Beaufort's scale of force."

Since the Beaufort scale does not stop at nine, but goes as high as twelve, it is obvious that waves could be higher than forty feet, assuming the Cornish measurement of his waves in a fifty-mile gale to be accurate.

There are signs that the wave measurements of Professor Cornish are inclined to be on the low side, in comparison with others. For instance, the *Scottish Geographical Magazine*, December, 1893, says of Dr. G. Schott, who had been cruising south of Africa: "As regards the height of waves, Dr. Schott is inclined to assign a comparatively low figure as the maximum limit. . . . He considers . . . waves higher than 60 feet can hardly occur, and that 50 feet must be a very exceptional height." This technical journal, then, feels that 60 feet as the maximum height of a wave is probably an underestimate. If that be so, the 25 *brazas* of Las Casas, 54 feet, or the 26 *braccia* of Ferdinand Columbus, 56 feet, do not even show an exaggerated wave height, let alone an absurd one.

Besides, as we have said, there are few things about which one is more likely to be impressionistic than the height of a wave. What Cornish, professional student of wave action, puts at forty feet, what Schott, another professional puts at sixty, might well have been described as seventy or eighty by a youngster from the Mediterranean, even though he had made already a few voyages in the Atlantic.

But it need not perhaps be agreed that Columbus is talking about the sea a hundred leagues north of Iceland. The passage has, after all, been put together, most commentators agree, from several notes or at least from more than one note, the fragments interpreted and adjusted by the son of Columbus. The passage speaks of the size of Iceland and says that the English from Bristol come there. Perhaps, then, Columbus is talking about the sea right against the shore of Iceland. Perhaps it may be argued, further, that a gigantic rise and fall of tide would have appeared to Columbus a convincing argument against the ocean being sluggish, squid-like or stiff, as convincing as the height of rolling seas in the free ocean remote from land.

There is the Vignaud school, who want Columbus not merely to be a liar but to be ignorant on practically every question. They would gleefully concede he was so ignorant that he did not realize that ice on the sea cannot possibly interfere materially with the rise and fall of tides; since ice, like cream, floats.

When tides rise in bays that are frozen, the observer does not see except with his mind's eye the behavior of liquid water. All his vision reaches is the surface covering over the liquid water, which is the snow-whitened ice. It is the ice which he observes to rise and fall with the tide. That the liquid water is rising beneath is a mere inference from the noted behavior of the ice.

We do not know (this being an editorial "we") what the cosmographers of the fifteenth century believed on tides being influenced, or not, by an ice covering of the sea; but seemingly they "always" believed that if there were ice on the sea it

would not move in wave action, or would move sluggishly. It is an especial pleasure in a book such as we are writing, which keeps knocking these philosophers, to say a word in their favor. We can do that here. They were a long way from being wrong when they said that an icy sea would be nearly or quite free of waves.

There does not have to be a great deal of ice at sea to reduce waves which are produced by a gale practically down to what you expect on a stormy day on the ponds in Central Park, New York City. For it is a common experience with navigators when they are among “sailing ice” (ice that does not seriously interfere with the progress of a ship under a spread of sail) that with wind of thirty and forty miles an hour the waves on open stretches between the floes no more than lap the side of a ship—they do not materially interfere with the lowering and manning of a boat, for instance. This will be true even when, as viewed from an airplane, no more than one-quarter of the ocean surface in the vicinity is covered by floes—provided, of course, that they are substantial ice, such as found where an oldish pack spreads out.

It follows from this behavior of an icy sea that if you are in a sailing ship near the edge of a pack and a gale comes that blows off the pack towards you, then you will do one of two things: If you have a stout ship and are a good sailor, as familiar with icy as with ice-free seas, you will work your way as best you can, and as quickly, well into the pack. The other thing you may do, and will if you are less experienced with ice or if you have small confidence in your ship, is heave to. Even so, you will try first working up close to the edge of the pack, for there the waves are least.

You might or might not do the same, depending on the strength of your ship, if the gale were from the open sea against the ice. If you did move in among the ice you would find the white caps disappearing but the swell still continuing as you enter the scattering fringe of the pack. Proceeding, the swell would gradually subside; but there would be considerable buffeting by floes.

Five or ten miles within the pack the gale-produced swell would be only a gentle heave. If twenty or thirty miles within the pack you would need instrumental help, such as that of a bowl of quicksilver, to prove that there still was a swell.

When you are on heavy ice a hundred or two hundred miles from shore during an Arctic winter it would take an instrument of the nature and delicacy of a seismograph to demonstrate a swell; and then you could argue whether the instrument was showing a storm-made swell or a movement of a different origin.

We illustrate these points, or at least those that apply to the first ten miles or so, by quoting the famous Norwegian explorer Fridtjof Nansen for a gale which was blowing from the open sea against the pack.

We cannot tell exactly the place where Nansen met the gale he describes; for he is writing in 1890 primarily of a voyage just completed, but is reminiscing about his first encounter with the ice several years before. He was somewhere in the region which Columbus, according to Ferdinand, visited in 1477; but a month later in the season. What Nansen says of the location is: "Never shall I forget the first time I entered these regions. It



was on a dark night in March 1882 when we, on board a Norwegian sealer, met the first floes in the neighbourhood of Jan Mayen . . .”

From our knowledge of the behavior of the pack gained in that district since 1882, we gather that the ice would not have been encountered unless the ship had been well past Jan Mayen on its way from Norway toward Greenland. They might have been fifty miles, or even a hundred, west of the Jan Mayen meridian. We use the London, 1890, edition of *The First Crossing of Greenland*, quoting from [pages 150-52] of Volume I:

“We shortened sail, and for a day or two cruised along the edge of the ice. Then one evening it blew up for a storm, and, as we were tired of the sea, we resolved to push into the ice and ride out its fury there. So we stood straight ahead, but before we reached the margin of the ice the storm fell upon us. Sail was still further shortened, till we had but the topsails left, but we still rushed inwards before the wind. The ship charged the ice, was thrown from floe to floe, but on she pushed, taking her own course in the darkness. The swell grew heavier and heavier, and made things worse than ever. The floes reared on end and fell upon each other; all around us was seething and noise; the wind whistled in the rigging, and not a word was to be heard save the captain’s calm but vigorous orders, which prevailed over the roaring of the sea.

“Precisely and silently were they obeyed by the pale men, who were all on deck, as none dared risk his life by staying below, now that the ship was straining in every joint. We bored steadily inwards into the darkness. It was no use trying to guide the vessel here; she had to be left to herself, like the

horses on the mountains at home. The water seethed and roared round our bows; the floes were rolled over, split in pieces, were forced under or thrust aside, nothing holding its own against us. Then one looms ahead, huge and white, and threatens to carry away the davits and rigging on one side. Hastily the boat which hangs in the davits is swung in on to the deck, the helm is put down, and we glide by uninjured. Then comes a big sea on our quarter, breaking as it nears us, and as it strikes us heavily we hear a crash and the whistling of splinters about our ears, while the port is thrown across the deck, a floe having broken the bulwarks on the weather-side. The ship heels over, we hear another crash, and the bulwarks are broken in several places on the lee-side too.

“But as we get further into the ice it grows calmer. The sea loses its force, the noise is deadened, though the storm tears over us with more fury than ever. The wind whistles and shrieks in the rigging, and we can scarcely keep our footing on the deck. The storm seems to rage because it cannot roll at its will in the open sea; but here at last we can ride at our ease.”

Thus Nansen describes his first experience with a maneuver for safety which Norwegian sealers, and all those of experience, commonly use when a gale they dread or dislike strikes them in open water near the edge of the pack. It was a pretty rough experience for him because it was an onto-the-pack gale. Had it been an off-pack storm it would have been a case of fore and aft sails, tacking into the wind and working gradually in among the floes. There would have been, then, no such pounding of the ice and by the ice as Nansen describes.

So it is one of the most striking differences between tide action

and wave action that tides are little hampered by an ice covering of the sea but that waves are profoundly handicapped if not wholly prevented. Unless, then, Columbus was as limited in reasoning faculty as in knowledge (unless, in fact, he was a Vignaud Columbus), he would have known, through blending cosmographic belief with a little common sense, that he was proving nothing about the ice-freeness of a sea by telling of a rise and fall of tide; but that he was proving a great deal by describing a movement of waves as free at 73° N. Lat. as it is in the Bay of Biscay.

So we come back to the same argument, that Columbus, in his attempt to hammer down the old conception that the Far North is uninhabitable because of the cold, would be more inclined to tell about wave behavior on the shores of Iceland than about tide behavior. (This is apart from the fact that the bays of Iceland do not freeze over in any case. Reykjavik, for instance, is more like Philadelphia or Baltimore in the probability of ice in winter than like New York; while few harbors in Iceland are as cold as Boston and none as cold as Portland, Maine.)

Perhaps it was the waves coming in from the sea that Columbus intended to comment upon in his note of twenty-six (or, as Las Casas gives it, twenty-five) *braccia*. The actual wave certainly reaches that high against many an Iceland cliff in many a gale, the spray of course rising still higher. Breakers roll in upon Iceland coasts that would seem terrifying to a Mediterranean sailor—though no higher than breakers Columbus may have seen upon Iberian coasts.

It is true, agreed upon and therefore not to be argued, that *maree* in Italian and *mareas* in Spanish can mean tides.

Our question is whether the word can also mean seas in the sense of waves. We quote from the McCaskill discussion:

“We read in the usual translations of the *Historie* passage that the ‘tides’ or ‘seas’ near Iceland rise and fall 26 *braccia*. The word used by Columbus is *marea* (Italian and Spanish), and certainly has the meaning ‘tide.’ *Marea*, however, has also another meaning: it means *swollen sea*. Definitions for the word *marea* in certain Italian dictionaries are:

“*Vocabolario degli Accademici della Crusca*, Vol. IX, Firenze, 1905, p. 937 (This is the official Italian language dictionary): *Marea*, violent agitation of the sea. Tasson. Secch. rap. 10, 21. *Vide fuggirsi a frettoloso passo le ninfe dal furor de la marea*. Vill. G. 872 . . . *come gli portava la marea del fiotto, arrivo sano e salvo*.

“Bolza, Giov. Batt.: *Vocabulario genetico-etimologicco della lingua italiana*, Vienna, 1852: *Marea* (*mare gonfiato*), ‘swollen sea.’

“Cardinali, Francesco: *Dizionario della Lingua Italiana*, Vol. II, Naples, 1852: *Marea* (*mare crescente, gonfiato*); ‘rising, swollen sea.’

“Florio, Iohn: *A worlde of wordes*, London, 1598: *Marea*, a tyde, a full tyde, a full sea, etc.

“In Spanish dictionaries of the time we find the same meaning for the word *marea*. The official Spanish language dictionary gives also the meaning ‘soft wind blowing from the sea.’ So it is quite evident that this word *marea*, connoting in its etymology ‘sea,’ or ‘pertaining to the sea,’ did not mean only

‘tide,’ and that the meaning ‘tide’ is a later derivation.

“The expression *grosse maree* which Columbus uses, may, therefore, refer to the swollen or high seas which he encountered near Iceland or beyond. He expressly says that the sea was not frozen—in contradistinction to the authors of that day who stated that it was frozen; which means that in a storm the waves can have reached a considerable height. What he may have meant, therefore, by *maree*, was ‘high, swollen sea,’ waves which rose to an altitude of 26 (25) *braccia*.

“Columbus uses an expression that would be in the singular *grossa marea*. The adjective *grosso* in Italian is not generally used with reference to tides, but more often in connection with waves, or sea. Nor must we forget that Columbus did not say *where* he measured the *maree*. From the entire context it certainly appears that he did not measure them ashore, but that his statement refers to the open sea. One cannot measure, or estimate visually, a tide in the open sea.

“Columbus, in his undisputed writings, apparently never used the word *marea* as an equivalent of our *tide*. On different occasions when he is referring to tides, he speaks of *water growing and diminishing in size or quantity*, and does not employ the word *marea*: On his third voyage, for instance, after having reached the island of Trinidad (July 31, 1498), he makes several observations concerning the height of the tide at that particular point and on the velocity of the Atlantic sea current, flowing to the West, towards the mouth of the Orinoco. We read in Chapter LXXI of the *Historie*: ‘. . . nella Trinità cresceva l’acqua tre braccia, e quivi [Paria], ch’era più

all'Occidente XLV leghe, *non cresceva* che una: e là sempre all'in giù, o come dicono i marinari, di giusante, e di montante, andavano le correnti al Ponente; e quivi di giusante andava all'Oriente, e di montante all'Occidente . . . ' ('. . . at Trinidad the water increased three ells, and here [at Paria], which was 45 leagues more to the West, it did not increase beyond one ell; and there, whenever the waters went down, or, as the sailors say, at the ebb and flow, the currents went towards the West; and here, at the ebb they went to the East and at flood they went to the West . . .')

"We find a similar passage in [Chapter LXVII], where Columbus refers to the bank of the delta of the Orinoco: '. . . la corrente del mare era sì veloce verso l'Occidente che pareva un rapido fiume così il dì come la notte, e a tutte le ore, nonostante che *crescesse e scemasse* l'acqua per la spiaggia più di LX passi . . . ' ('. . . the sea current was so strong toward the West that during the day, as during the night, and at all times, it resembled a swift flowing river, although the water increased and diminished along the shore, more than LX paces . . .')

"Columbus's language is here quite different from that employed for his Iceland voyage when he speaks of *grosse maree*, that rose (*ascendeva*, not *cresceva*) and fell

[4]  
(*discendeva*, not *scemava*) 26 ells. He does not in the Iceland passage use any such technical terms for the ebb and flow of tides as he uses in other instances when he is definitely speaking of tides. The adjective, *grosso*, which he uses in the passage about the northern voyage, is certainly more suggestive, in Italian, of waves or seas than of tides.

“A further probability that Columbus was thinking of waves and not tides when he spoke of *grosse maree* comes from Italian maritime pictures of the fifteenth and sixteenth centuries. For when boats are shown lifted by waves there is frequently an attached legend which refers to waves as *maree*.

“But this beautiful reasoning is somewhat marred by the fact that Las Casas in his rendering of the Iceland passage says: ‘. . . The sea was not frozen, although there were very big (*grandisimas*) *mareas*, such that in some parts twice a day (*duas veces al dia*) they went up 25 *brazas* and descended as much again. . .’ It is clear, then, that Las Casas understood *mareas* to mean tides.

“Las Casas has stated that in his life of Columbus he was relying upon Ferdinand’s *Historie* and copying with his own modifications, or, as he says, literally but with some words of his own added (*‘todo . . . es a la letra, con algunas palabras añididas mias, de D. Hernando Colón . . .’*). Now all is certainly not ‘*a la letra*’ in the Iceland passage; as, for example, his changing of odd numbers to round numbers, 25 instead of 26 *brazas*. And ‘words of his own’ he has added and multiplied; for the verbose ‘Apostle of the Indies’ seldom used two words if he could find six. And he could frequently discover more than six. We cannot say, of course, whether the ‘twice a day’ is one of the good bishop’s multiplications of words. This phrase does not occur in the *Historie* of Ferdinand; but we have not the original of that, or of the documents upon which it was based. So just why the ‘twice a day’? Did Columbus specify that? Or was Las Casas being erudite?

“Ferdinand says, through Ulloa’s translation, that the *maree*

were big (*grosse*). Las Casas says that the *mareas* were superlatively big (*grandisimas*). This use of a superlative in place of Ferdinand's positive is likewise characteristic of him, and confirms his own statement that he has followed Ferdinand *except* for adding something of his own.

“It is not today good scholarship to change passages, or make interpolations, without so specifying at least in a footnote; but it was considered a duty by fifteenth and sixteenth century historians and other scholars to present to the reader the most enlightened interpretation, according to their own opinion or knowledge. With learned helpfulness they would add, subtract or change, modestly refraining from asking credit through saying, or intimating in any way, that the manuscript they were copying had been improved by them.”

From what we have quoted, and from like parts of the McCaskill discussion which we have not quoted, we arrive at the verdict that Las Casas has “improved” the Iceland passage. He has decided between the two possible meanings of *marea* (against the one for waves, in favor of the one for tides); then he has added, helpfully, a gloss, no doubt to make clear that Columbus knew what he was talking about, that the tides rise and fall twice daily.

This is another way of saying that the debate on whether *grosse maree* refers to high waves or high tides should be settled, if at all, on the basis of the *Historie* passage alone; for a clergyman would not have been any more competent four hundred years ago to decide the meaning of the word than our lexicographers of the past one hundred years who, without prejudice, have gone to the literature of the fifteenth century,



and of other centuries, to determine the several meanings of *marea*.

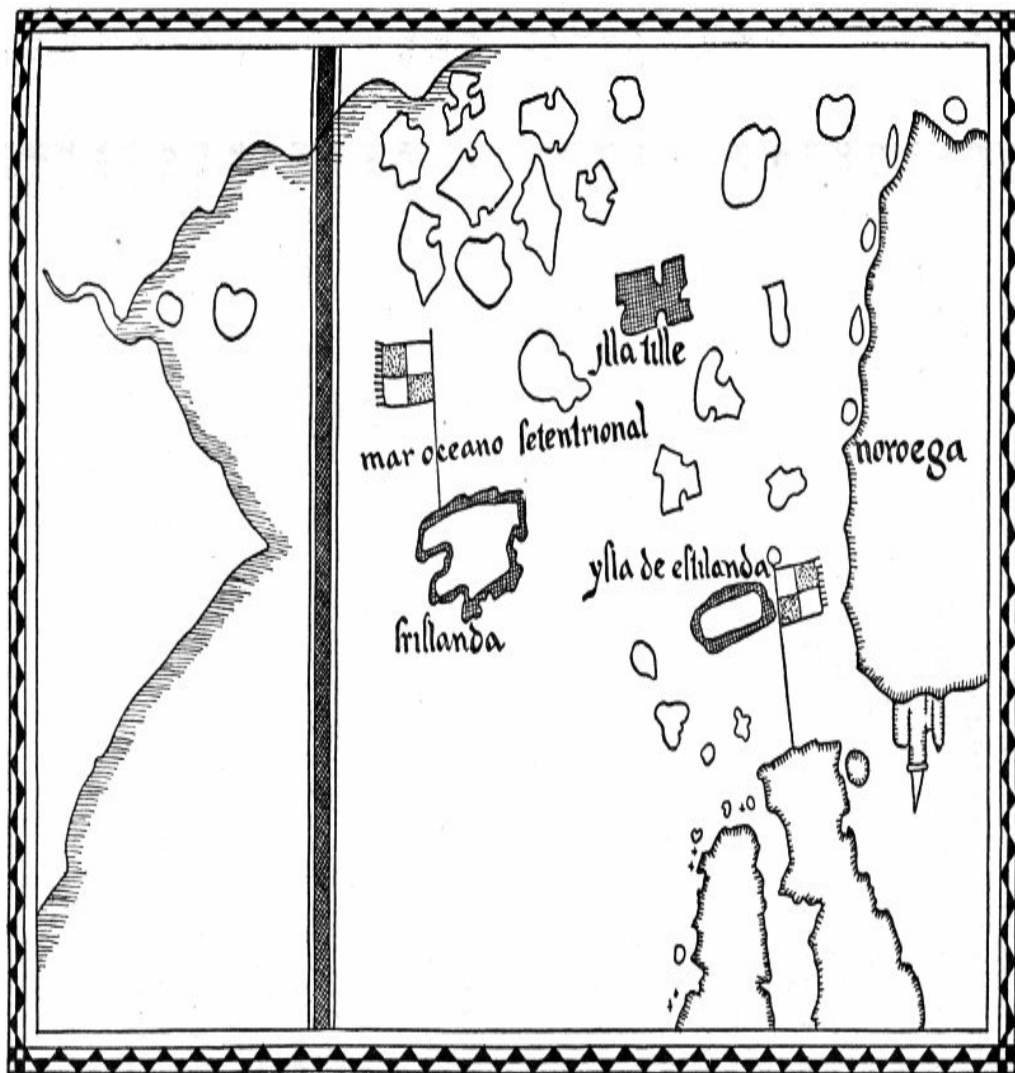
The balance ready to tip either way, Miss McCaskill turns for the deciding vote to cartography, discovering there some new points and carrying old lines of argument farther than has been done by writers with whom we are familiar.

“It is not at all difficult to see, in spite of the confusion of the *Historie* passage on Iceland, that reference is made to at least two Thules. One is of course Ptolemy’s, which ‘lies where he says.’ Another is Iceland, which is ‘called by the moderns Frisland.’ (*È bene il vero, che Tile, quella, di cui Tolomeo fa mentione, giace dove egli dice; & questa da’ moderni è chiamata Frislanda.*’)

“Now the Thule of the Ptolemaic maps with which Columbus may have been familiar lies most likely in the Shetland Islands and is placed at 63°, Ptolemy’s northern limit of habitable land. Columbus sailed, he said, to a Thule further north than 63°, in ice-free seas, and thus has proved that the northern zone is habitable, or at least navigable, as far as 73°.

“Did he mean to say that the southern coast of Iceland was at 73°, or did he mean to say, as Fiske, Thacher and others have suggested, that he sailed beyond Iceland (the latitude of which, in case you interpret the passage in that way, is not given) to an island at 73°? This would give us *three* Thules.

## PLATE XII



The North Atlantic according to Juan de la Cosa's world map dated 1500. (Certain shadings and decorations omitted.)

"If he really believed that the southern coast of Iceland was at  $73^{\circ}$ , one of the chief difficulties of interpretation is removed. Gustav Storm has pointed out that almost certainly he accepted the too high Ptolemaic latitudes for the British Isles. In them, it would seem, lay his point of departure on the

northern voyage, for he said of England elsewhere that it lay ‘on the route to the north.’ In such case he would have thought, when he reached Iceland, that in traveling approximately 100 leagues beyond ‘Ptolemy’s Thule,’ at 63° just north of Scotland, he had attained a latitude of 73°. This might well be the case if, as is practically certain, he was arriving at his distances by dead reckoning—his own or (more likely) that of the skipper of the ship on which he was passenger.

“All of this is mere speculation, based on literary sources. There is a document in the case that leads us not through the medium of words, but through a cartographer’s lines and measurements, back to the explanation suggested by Fiske and Thacher.

“This document is the world map of Juan de la Cosa, which has often been studied most carefully for what light it might throw upon the Columbus and Cabot voyages to America, but of which the only notice we have found in connection with a Columbus voyage to the Arctic is contained in the passage we now quote from Halldór Hermannsson’s *The Cartography of Iceland*, Ithaca, 1931, pp. 17-18.

“Professor Hermannsson is talking about the northern portion of the La Cosa map and about the map-maker. He writes:

“‘Juan de la Cosa of Basque origin was the owner and pilot of Columbus’ flagship *Santa Maria* on his first voyage of discovery, and accompanied him also on the second and third voyages as pilot and draughtsman respectively. He made a mappemonde in 1500 which now is preserved in the Hydrographical Department of Madrid. Being so closely and

so long connected with the great discoverer one might expect to find in his map some indication of information imparted to him by Columbus about regions with which La Cosa was not personally acquainted, but which Columbus, provided his visit to England and Iceland are authentic, knew something of from personal experience. The sea (*mar oceano setentrional*) northwest of the British Isles and west of Norway is covered with a great number of islands which in shape look more like enormous pieces of floating ice than anything else, and in this we can detect influences from various earlier cartographers. We find Ysla de Estilanda of the Catalan maps, practically in its original form with turreted buildings; northwest of it is Frislanda with a standard attached to it and somewhat in the shape of the Insula d'Ureslant of the Munich-Portuguese map; the eight islands furthest north are strongly reminiscent of the Islades islands of the Catalan maps in Florence and Modena, while Illa Tille in the midst of the archipelago is to some extent a novelty as to shape and position. If this is Columbus' contribution to the map as to this region, it can scarcely be said that his information was very important. Since the map is not graduated it cannot be seen whether the latitude of Tille agrees with that given by Columbus in the passage quoted above [i.e., the passage from the *Historie*].'

"Columbus' connection with this map, although it would appear to be obvious, is reinforced by the observation of F. Streicher, a recent expert on Columbus originals, that there is apparently a close connection between the picture on the map, of St. Christopher (or Columbus) wading through the sea with a staff in his hand and the Christ-child on his shoulders, and Columbus' use shortly after this date (1500) of the signature

XroFerens in preference to his baptismal name Christophorus.

[5]

“Columbus and de la Cosa were both students of maps, makers of maps. They were both discoverers and explorers of new lands. Few things could be more unlikely than their having made three voyages together between the (to them) old lands of Europe and the new lands of tropical America, cruising also around the American tropics, without discussing such voyages as Columbus had previously made to regions little known or unknown to Mediterranean cartographers. Such a voyage to parts unknown, at least according to the claims of Ferdinand Columbus and of Las Casas, had been made by Christopher Columbus, to and beyond Iceland.

“The region to and beyond Iceland is included in the de la Cosa map. Can we then doubt that on that map we find Columbus himself testifying through the medium of his pilot and cartographer?

“If we fit the testimony of the map to the garbled passage of the *Historie*, certain conclusions appear that may be of the highest importance. They may rehabilitate Christopher Columbus as a truthful reporter and his son Ferdinand as an accurate chronicler. They may establish Columbus, through the *Historie* and the *Historia*, as an Arctic explorer.

“Columbus navigated, he is said to have said, 100 leagues beyond Ptolemy’s Thule, ‘called by moderns Frislanda.’

“Supposing that this is what he did, or even only said he did, let us see if the supposition fits the de la Cosa map. It does. His

island of Thule (Tille) is placed on the map in a northeasterly direction from Iceland. [Jan Mayen is actually almost north from eastern Iceland—just a little east of north.]

“‘La Cosa’s map,’ says Nansen, ‘is drawn as an equidistant compass chart, and we can therefore make ourselves a scale of miles by using the distance between the Equator and the Tropic.’

“This Nansen has done in order to reinforce his view of the Cabot problem. He remarks that ‘For determining the question, what part of North America it was that Cabot discovered, it appears to me that there is no trustworthy document but La Cosa’s map of the world of 1500.’ The same certainly holds true for the reported Columbus voyage north from Iceland.

“Using the scale, we find that the distance from the Frislanda of the map (Iceland) to the Illa Tille *is just about the distance Columbus said he sailed.*

“One noteworthy feature of the de la Cosa map, besides the novelty of the location of the Illa Tille, is the comparatively correct position of Iceland itself. In spite of the wide circulation of knowledge about Iceland in the middle ages, at least in ecclesiastical (i.e., papal), nautical and ‘sporting’ (i.e., falconry) circles, the mediaeval cartographers give little indication of any real knowledge about the location of the country. We may safely say that the de la Cosa map is more nearly correct on this score than any before and than many, many others for many years thereafter.

“We find Columbus’ own statement, then, as reported by his

son, supported by the testimony of de la Cosa's map, in the construction of which we have every right to believe that the cartographer had the benefit of information imparted to him by Columbus, based on his personal experience. The map implies that Columbus (or at least somebody) has sailed 100 leagues *northeast* of Iceland (Frislanda) to a Thule more remote than the land hitherto regarded as the Ultima Thule (Ptolemy's Thule) at 63° N. Lat., this new Thule being nearer 73° N. Lat.

"In distance, in sailing conditions during midwinter, Jan Mayen does fit both the Columbus story and the de la Cosa map. This would argue for better correlation of nautical and cartographical evidence with the other known evidence.

"Jan Mayen Island actually lies at 71° N., 8° W., but all will agree that two latitude degrees is not a great discrepancy for Columbus and for his time. Then did Columbus intend, in round numbers of 73°, to say that this was the remotest land which had yet been reached in ice-free seas?"

We interrupt Miss McCaskill's presentation here to remark, harking back to Las Casas, Madariaga and the prophecy of Seneca, that Columbus may well have felt himself already in 1477 to have fulfilled the prophecy that Thule (Iceland) was no longer the last of the lands. He had found another a hundred Spanish leagues farther away.

Though a small island, Jan Mayen is conspicuous because of its towering mountain, higher than any in Europe north of the Alps and looking higher than Alpine peaks because none of them rise as far above their surrounding country.

Or it could be, as has been suggested by several, that the land beyond Iceland, required by the analysis of the *Historie* passage favored by Thacher and Fiske, may have been the Scoresby region of Greenland, straight north from the northwestern corner of Iceland. A difficulty about that, however, is the Columbus statement that he saw no ice in the ocean. That *could* have happened, for Charcot has reported one season, but only one of his dozen or more, when there was for a period of several days, if not weeks, no ice at all in the sea between Greenland and Iceland along the northern Blosseville coast, just south of Scoresby Sound. That condition, by the way, is never known to have happened farther south along Greenland; as, for instance, west of (abreast of) Snaefellsnes.

We return to the McCaskill presentation where she discusses three Illa Tille features of the de la Cosa map, only two of which are approximately correct for Jan Mayen. His Illa Tille has a wasp waist and is to that extent of the right shape; it is approximately in the right location (direction and distance from Iceland, as well as latitude). But, although much smaller, it is still, she feels, too large in proportion to Iceland. On this we comment:

While Jan Mayen is a small island, only some thirty-four miles in length by nine in its greatest width, it is, as implied above, one of the most striking lands of the world when seen by an approaching navigator; for it contains a higher mountain than any in Europe north of the Alps—Beerenberg, 7,680 feet high by the 1938 determination of the British expedition led by Alexander King. No other mountain that Columbus had a chance to see (unless, indeed, he sighted Greenland) rises that much higher than where you stand when you see it—



therefore none looks as high, not even the most spectacular mountain of Iceland.

Such a land, especially if only approached from one side to a distance of several miles, or if passed at a distance, will give an impression of greater size than actual, and will at any rate make a powerful mental impression upon those who see it, one that may lead to an exaggerated size when it is sketched on a map.

There are two main parts to the island, with a narrow isthmus that is comparatively low.

It is well known in the history of exploration that the first maps of a coastline frequently indicate as capes, promontories and even peninsulas what eventually turn out to be mountains or great hills not necessarily near the shore; while reciprocally the chart shows bights, bays and deep inlets where really are low parts of the coast. A case is M'Clure's mapping of the west coast of Banks Island from the *Investigator*. Standing northward a few miles off shore, he at times indicated as bays what are really promontories and as promontories what are really bays; for he judged by what he saw and did not see. It might be, then, that sailors not close in shore would nevertheless sketch Jan Mayen Island to approximately the shape it has; for it happens that the land curves in where it is low.

In any case, the Illa Tille of the de la Cosa map has a wasp waist and is thus shaped like the real Jan Mayen. This could have resulted either from such distance sketching as we just outlined or else from de la Cosa's informant having actually

gone ashore and climbed up a mountain so as to get a view of the isthmus.

We quote again:

“While it is true that this new Thule is placed in an archipelago of the usual ‘scattered islands’ (ice-floes) which appear on the maps of the North of this time, it is noteworthy that *only those bear names on the map which Columbus said he had visited: Frislanda (Iceland) and Illa Tille (which conforms to the position of Jan Mayen Island).*”

Miss McCaskill believes, then, that on the de la Cosa map Illa Tille is Jan Mayen. She feels that in view of the association of de la Cosa with Columbus, on two voyages to America as pilot and on one as draftsman or cartographer, in view of Columbus at least fancying himself as a cartographer, and in view of the correspondence of Iceland and Jan Mayen positions to the 63 and 73-degree Thules of Columbus (Fiske’s Thule II and Thule III), we are justified in arriving at several high probabilities:

De la Cosa received information about Iceland, Jan Mayen and their positional relation from Columbus.

Columbus acquired the information which he gave de la Cosa on a voyage to and beyond Iceland.

That Jan Mayen is wasp-waisted on the de la Cosa map, as in reality, far outweighs as an argument the objection that if Columbus had been there he would not have reported this island as large in comparison with Iceland as the map shows.

We have here, then, a believer in the substantial although

partly scrambled accuracy of the passage in the *Historie* that tells of a voyage to and beyond Iceland. The differences between Las Casas and Ferdinand are considered due to a scholarly custom of the fifteenth and sixteenth century of “improving” manuscripts that were being copied. The 73° latitude for one of the Thules may be explained with plausibility, so far as the literary sources go, either by the reasoning of Storm or of Fiske. There is no validity in the objection that it is impossible to sail 100 Spanish leagues beyond Iceland in February without sighting ice, for the reverse has been found to be true.

If *marea* means tide, then the twenty-five or twenty-six *braccia* are an exaggeration and not a fabrication; the argument of Storm applying, that if a Norwegian was astounded by the tides of Iceland it is likely that an Italian would be still more impressed. But, in any case, *grosse maree* is linguistically better translated as high seas than as high tides; also that translation fits better into the usual Columbus line of argument about the Arctic being habitable.

There remains to be mentioned, so far as we realize, only one class of evidence not considered. This has been an attempt by the skeptics to show that Columbus was elsewhere the winter 1476-77 and could not, therefore, have been in Iceland; and, conversely, an attempt by the believers to show that there are a number of things pointing to Columbus having been at least in England and probably farther north that winter. We have not felt able to go into this question of *alibi*; and hope those not already committed to one side or the other of the Columbus-in-Iceland debate will be ready to join us in assuming that the battle of the alibis is a draw and to join us in trying to

summarize the rest of the evidence as basis for a decision.

### SUMMARY

We recall first the motives that have been suggested on both sides of the controversy.

The kingdom of Spain, and the Spanish Pope Alexander Borgia, desired to establish as many “rights” as possible for Spain to countries west of the Atlantic. But the existence of lands beyond the Atlantic had, unfortunately, been known to Europe for some 500 years. Demonstrably Greenland was known to Italian and Saracen falconers, therefore to the falconers of Europe and beyond. The Church collected tithes from Greenland, administering it as a bishopric through the Archbishopric of Hamburg, Germany, and later of Nidaros, Norway; so that Greenland was particularly well known to the clergy.

Part of the knowledge about Greenland would be that the Greenlanders had attempted to colonize lands farther west and south; and that when the colonizing failed they continued to go to the American mainland for timber at least down to the century just before Columbus.

Those who knew about Greenland almost necessarily knew about Iceland, and about the intimate connection between the two countries. It was widely known, therefore, that the Icelanders were or had been in touch not merely with Greenland but also with the lands southwest of Greenland. Therefore, in order to prove that Columbus, apart from

speculation on cosmographic principles, had no knowledge of countries beyond the Atlantic, it was necessary either that no question should arise about his having visited Iceland or that the allegation be disproved when made.

When Spain had been long in control beyond the seas a territorial motive for hiding or combatting the visit to Iceland would disappear. By that time, however, Columbus was growing into a world figure and motives of national pride became applicable. He would not seem quite so great a discoverer if it could be shown that, like Hudson, he navigated the Western Ocean by Icelandic sailing directions—or by his own logical southward extension of directions which the Icelanders had that applied, let us say, only as far south as New England.

Accordingly, trying to prove that Columbus had visited Iceland in 1477 was during the lifetime of his son, the first third of the sixteenth century, and perhaps for some time thereafter, an attack upon the territorial claims of Spain. Later it was looked upon as an attack upon the glory of Spain—or upon the glory of Italy, Portugal, the Jews, or whatever land or people in southern Europe were claiming the Admiral as one of themselves.

“But,” say the Latins, “the people of northern Europe have corresponding motives for trying to steal from us the glory of Columbus.” There is truth in that. Perhaps the Scandinavians did not realize what was going on during the first century or two; but it may at least be argued that during the eighteenth, nineteenth and twentieth centuries they have been aware of the steadily increasing reputation of Columbus. They have been

jealous of it; they have been trying to pretend that the real discoverers of the New World were not Latins but those people of largely Norwegian though partly Irish blood who, after settling Iceland and Greenland, attempted to colonize the forested lands around and south of the Gulf of St. Lawrence. It may be claimed that, not satisfied with a direct attempt to build up an undeserved credit for men of their nationality, the Scandinavians, and north Europeans generally (and whoever has claimed the reality of the Iceland voyage of 1477) have been trying to elevate themselves by pulling down that incarnation of Latin achievement, Christopher Columbus.

We must remember, then, in weighing the evidence, that each side has been accused by the other of having powerful motives, the one for setting Columbus on a pedestal, the other for pulling him down.

Back of the fundamental dispute as to whether Columbus visited Iceland is the one about how it happened that the *Historie* says he went there. To those who believe the story the answer is that a book on the life of Columbus naturally tells what he did; and that one of the things he did was to go to Iceland and beyond. To those who disbelieve the story there seem two main possibilities. One faction contends that injudicious friends of the Admiral were trying to build up for him after his death a career as a navigator that would be impressive and that would materially antecede the Palos voyage. They hit upon, of all things, the story that he had gone to and beyond Iceland, and this they smuggled into the *Historie* manuscript. The second faction agrees that the story must be an interpolation, but they believe it was foisted upon Columbus by a clever enemy who realized that if he

succeeded in putting into the Admiral's mouth such absurdities as fifty-foot tides in Iceland and a sea beyond that was unfrozen during winter for 100 leagues, then their victim would appear not merely a liar but also a vain braggart.

With these alleged motives all carefully in mind we approach a summary of the facts and theories of the case.

The first position taken by foes of the *Historie* narrative was to assume that no attack was needed—that the story was absurd on its face. It contained, they said, three major untruths: that Iceland was ten degrees, or 700 miles, farther north than it is; that the tides were several times higher than they are; and that a sea beyond Iceland, which is in reality frozen during midwinter, had been navigated for 300 miles without sighting ice.

The replies of the believers to the absurdity charges are:

If only one Thule is being discussed then the supposition that the south coast of Iceland is at  $73^{\circ}$  becomes a reasonable error, allowing that Columbus was sailing by one of the usual maps of his time which had the north ends of both Ireland and Scotland much farther north than they are. Having once assumed, reasonably though mistakenly, that the British Isles were rightly charted, both as to latitude and longitude, Columbus estimated by dead reckoning how far he sailed to the north and to the west, coming to the conclusion, and again mistakenly but reasonably, that he had attained  $73^{\circ}$ . This line of reasoning is typified by Storm, whom we have quoted.

If the paragraph discusses two Thules, a reasoning similar to

that of Storm applies for one of them; the second is ten degrees farther north and would be Jan Mayen Island, the first Thule then being Iceland. Thereupon Columbus is substantially correct in his latitudes—having claimed that one Thule has a coast at  $63^{\circ}$ , which is within a half degree of right for Iceland; the other being at  $73^{\circ}$ . This latter is nearly two degrees wrong for Jan Mayen, but that is a discrepancy in latitude usual during the fifteenth century. The type for this reasoning is Thacher, quoted *ante*.

Fiske, as we cited him, is typical for reasoning of a third sort. He believes that the *Historie* passage discusses three Thules. The first is either the Shetlands or Faroes, which groups are, from a fifteenth century point of view, at near enough the same latitude. The second is Iceland, described with substantial correctness in the *Historie* passage as a large country frequented by English vessels, particularly from Bristol. The third, at approximately the correct latitude, is Jan Mayen.

These three subdivisions of a scholarly group all contend that in general the passage is either correct or as nearly correct as usual for sailor reports of the fifteenth century. A further qualification makes the passage as nearly correct for Iceland and Jan Mayen as are many passages known to have been written by Columbus about places where he is known to have been—without being exactly correct, the *Historie* passage meets the usual Columbus standard of reports on new lands visited.

Against the charge that the height of tide is an absurdity there has been defense of two kinds.



Typical for one defense is Thoroddsen who, although skeptical that Columbus visited Iceland, is willing to concede that the Iceland passage in the *Historie* may fairly be allowed to pass on the supposition that although some other parts were derived from observation the reference to tides was no doubt borrowed from Pytheas—it being well known that returning travelers will frequently make up a statement alleged to be wholly a result of what they have seen, although it is in fact only partly a result of observation, the rest consisting of things which the narrator believes to be true because someone told him, or because he read it somewhere.

A second form of defense is like that of Storm who tells us that he himself, a Norwegian used to high tides, has been startled by the inrush of tides in Iceland and might have exaggerated them himself considerably, though perhaps not as much as Columbus did. Storm feels that Columbus, an Italian, should not be too much scolded. The high Iceland tide is to Storm neither invented nor borrowed but merely exaggerated, pardonably.

These are old forms of defense, Thoroddsen and Storm each representing a group. Now comes, in the unpublished manuscript we quote, a tide solution which, so far as we know, has been offered by Miss McCaskill only. She approaches the problem from four angles. What is, linguistically, the most probable translation for *marea*, a word recognized as having several meanings? Second, linguistics apart, what is the most likely translation of *marea* in view of the context? Third, what is the likeliest translation of *marea* in view of what we know about the interests of Columbus—what things he was likeliest to write about, to emphasize? Fourth, what expression does

Columbus himself ordinarily use for tides in writings which no one disputes are his?

In the detailed reasoning which we have summarized the reply on the first three counts is that the likely translation of *grosse maree* is not “high tides” but “huge waves”—Columbus was trying to tell us in the Iceland passage not that the tides in the fjords were high but that in a storm the waves of the open sea ran high because, instead of being stiff or sluggish, as the cosmographers believed, the Icelandic was in reality as liquid as any other sea, and even moved in waves which he estimated at fifty or sixty feet. On the fourth count the verdict is that when Columbus, in undisputed passages, speaks of tides he always uses terms other than *maree*. Why should we, then, think that in this one passage he meant tides when he used the expression *grosse maree*?

According to the disbelievers, the glaring absurdity of the *Historie* passage was the allegation that Columbus had sailed in February 300 miles north from Iceland without seeing ice. To this the reply now is that if he sailed north from the northeast corner of Iceland he would not find ice in a usual February. For north from the northwest corner of Iceland the reply is that of Storm—if we allow Columbus to exaggerate his sailing distances on the 1477 voyage in about the way he exaggerated them on his well known American voyages, then we might cut his estimated 300 miles to a real 150, within which distance he would not necessarily meet ice in February.

However, there may not seem much need for calling upon the generosity of the Storm argument—the cutting of 300 miles down to half that distance—since the probabilities favor a

voyage north along the east coast of Iceland rather than the west coast. The chief of these probabilities are three. The Bristol merchants had been cultivating Iceland so long that they would have known from experience that they might encounter ice going north from the northwest corner but would not from the northeast corner; absence of ice the first 300 miles is almost necessary if departure is from the northeast corner, while it is no more than a possibility from the northwest corner; only from the northeast corner will you discover an island approximately at the latitude given which is wasp-waisted like the island we find there on the map of de la Cosa, companion of Columbus.

It would seem, then, that the Iceland passage of the *Historie*, when well translated and reasonably interpreted, is not more inaccurate than is to be expected from a truthful but somewhat impressionistic sailor who had with him, or studied later, the common maps of the late fifteenth century and who in middle life was arguing from the experience of his youth what Ferdinand Columbus says the Admiral was arguing, the habitability of the Arctic. Columbus was not being untruthful, though he was perhaps giving his side of the argument the benefit of the doubt, when he estimated at fifty or sixty feet waves that may not have been more than forty or fifty, and at  $73^{\circ}$  a latitude that in reality was  $71^{\circ}$ —the higher figure giving him an ice-free ocean 450 miles north of the Arctic Circle to strengthen his argument, instead of one only 300 miles north of it.

As said, the reasoning of the chief opponents has been that since the 300-mile February sail beyond Iceland was a lie we were justified in being more suspicious than otherwise of the

rest of the passage. This argument would seem to have turned into a boomerang. For if it was permissible for opponents to weaken the rest of the story by getting us to label as an impossibility the tale of an iceless sea beyond Iceland, then it would appear that the other side is no less justified now in arguing that we should be more lenient with the tides and the latitudes when it has been shown that a description of the sea 300 miles beyond Iceland as free from ice in midwinter is correct, either for every year or for most years.

It has been said against the *Historie* passage that if Columbus had been in Iceland he would have given to his friend and cartographer, Juan de la Cosa, information about Iceland and the region beyond which would have enabled de la Cosa to add to our knowledge through his 1500 map. This has been followed up by the statement that the map does not add to our knowledge. The reply to this can now be that he does add to the knowledge current around 1500; for he represents in approximately the right latitude and longitude for Jan Mayen an island which is shaped like Jan Mayen and to which he attaches the name Tile (Tille), the name used by Columbus for an island which the *Historie* says he found.

That de la Cosa must have had more to go on when he made his map than Ferdinand did when he wrote the *Historie*, has at least one support—that de la Cosa represents Jan Mayen as dumbbell-shaped, or wasp-waisted, which is a characteristic of that island not mentioned by the *Historie* passage.

Upon such main considerations as we have summarized the critics have been handing down their verdicts. We give under

three heads a list of the authors we have examined. In the first group we place those who believe that the story of the Iceland voyage was fabricated by Christopher Columbus, by Ferdinand Columbus or by some unknown. This group holds that the story is untrue. They feel on the average that while it might be possible to explain away the latitudes as honest mistakes and the tides as an exaggeration, you just cannot explain away the February voyage 300 leagues beyond Iceland; since making that voyage in midwinter without seeing ice is, they say, an impossibility so preposterous that generosity of interpretation cannot be applied without stultifying oneself. Of this group we list the following:

<i>Author</i>	<i>Nationality</i>	<i>Date of Publication</i>
André, Marius	French	1928
Goodrich, Aaron	American	1874
Magnaghi, Alberto	Italian	1928
Nowell, Charles E.	American	1939
Thoroddsen, Thorvaldur	Icelandic	1892
Ruge, Sophus	German	1902
Vignaud, Henry	French- American	1905
Winsor, Justin	American	1892

There is a middle and miscellaneous group, the fence-sitters. Some of them do not want to give a clear verdict on whether Columbus made the Iceland voyage. The rest think that he may have gone to Iceland but did not go beyond, and that the

*Historie* passage therefore contains at least one falsification, that of the February voyage to 73° N. Of these we have read:

<i><b>Author</b></i>	<i><b>Nationality</b></i>	<i><b>Date of Publication</b></i>
Beazley, C. Raymond	British	1929
de Lollis, Cesare	Italian	1898
Harrisse, Henry	French-American	1897 <a href="#">[6]</a>
Hermannsson, Halldór	Icelandic-American	1936
Jane, Cecil	British	1930 <a href="#">[7]</a>
MacKie, Charles Paul	American	1891
Revelli, Paolo	Italian	1937
Young, Filson	British	1906

The third group have it that, either probably or certainly, Columbus made the voyage to Iceland and a considerable distance beyond. Some feel he may have overestimated his February northing as he is known to have done with many other sailing distances. Our list of believers is:

<i><b>Author</b></i>	<i><b>Nationality</b></i>	<i><b>Date of Publication</b></i>
Anderson, Rasmus B.	Norwegian-American	1874
Asher, G. M.	British	1860
Belknap, Jeremy	American	1792

Bonnefoux, P. M. J., Baron de	French	1856
Burton, Sir Richard Francis	British	1875
Caddeo, Rinaldo	Italian	1930
Charcot, Jean B.	French	1928
Clarke, Richard H.	American	1893
Coudert, Frederic C.	American	1893
De Costa, Rev. B. F.	American	1872
De Hevesy, André	French	1928
De Roo, P.	American	1900
Donworth, Albert B.	American	1939
Fiske, John	American	1898
Hale, Edward Everett	American	1891
Helps, Arthur	British	1869
Irving, Washington	American	1831
de La Roncière, Charles	French	1938
Madariaga, Salvador de	Spanish	1939
Magnusson, Finnur	Icelandic	1833
Markham, Clements R.	British	1892
Murray, Sir John	British	1893
Pessagno, G.	Italian	1926
Salvagnini, A.	Italian	1894
Saunders, Frederick	American	1892
Spotorno, G. B.	Italian	1823
Storm, Gustav	Norwegian	1893
Thacher, John Boyd	American	1893

It may appear to the reader that the believers in the essential, although somewhat confused, truth of the *Historie* passage have had the best of the argument. That feeling may seem confirmed by noting that, at least among the writers whom we have examined, there is a heavy majority in favor. There may be an inclination, then, to give a verdict of acquittal. The findings of the jury may read that Columbus probably went to Iceland, that whoever wrote the *Historie* was sticking to the truth the best he knew how, and that actually he was in the main correct.

We can turn, then, to such a book as Salvador de Madariaga's 1940 biography *Christopher Columbus* with a sense that he is stating not merely the right but also what surely must be the generally accepted conclusion when he says in Chapter VIII, "The Lure of the Western Sea," that ". . . in February 1477 Colón was in Thule, and even one hundred leagues beyond 'the last of the lands.'" Madariaga quotes the passage on the voyage to Iceland, admits that it contains some inaccuracies, and concludes: "The geographical errors of this text, far from telling against Colón's veracity, speak in its favour . . ."

In a footnote Madariaga pays his respects to those who doubt. He says: "The chief denier of the voyage to Thule is, of course, Vignaud. For Vignaud, the life of Colón is quite easy. Everything that does not suit his view of Colón is false."

If the findings of Madariaga have agreed with our own it will be with surprise, although possibly with later admiration, that we read the contrary verdict of the historians. For, after all,



who are we to doubt them, professional weighers of evidence that they are, trained scrutinizers of documents, shrewd judges of what is in their field evidence.

That the historians, at least those whom the rest of their craft admire, are opposed to any Columbus voyage to and beyond Iceland, we may safely conclude from an article by one of them, Dr. Charles E. Nowell, "The Columbus Question," which was published in the *American Historical Review* for July, 1939. Judicially calm, Dr. Nowell refuses to be impressed by sneers at Vignaud, like those of Madariaga who, after all, is rather a diplomat and creative writer than a historian. He does not even look in the direction of those who feel they have disproved the arguments of Ruge and Magnaghi. He dismisses by implication (and who would not?) the possibility that Iceland's geographers and climatologists, like Thoroddsen, would know less in the nineteenth century about ice in the sea north of Iceland than Columbus did in the fifteenth. In fact, none of the arguments in support of Columbus have impressed Dr. Nowell, or at least no appreciable number of them; for in a presentation buttressed by footnotes that show a canvass of literature in several languages, he groups the Iceland voyage with a bunch of cherry tree anecdotes that have gathered about the youth of Columbus:

"The failure of all efforts to expatriate Columbus re-establishes the conclusions reached long ago by Henry Vignaud concerning his early life and career. It is unlikely that these will ever again be seriously questioned. Several of the traditional occurrences associated with the youthful Columbus are now known to have been utterly impossible. These include the mythical voyage to Iceland . . ."

For the historian, then, the question is settled. The “mythical voyage to Iceland” is one of several Parson Weems fables “now known to have been utterly impossible.”

According to this there must have been something wrong with our presentation, which has arrived at results on the whole favoring the voyage. Seemingly, we have not been true historians in our method, which was to let the proponents of every view speak each his own piece, confronting each in his turn with the rebuttal evidence, the best of it we could find. Perhaps we have misunderstood or misinterpreted; but of that the reader can usually be his own judge—because of our method, that of presenting both the alleged facts and the supporting argument either in the words of leading contenders or through a paraphrase.

Or perhaps, not being historians, we have been giving undue weight to non-historical arguments—have been sort of employing non-union labor when we called in outsiders, like Charcot. Still we don’t quite see that; for if it is permissible for the historians to call in a geographer and climatologist like Thoroddsen to prove the absurdity of a 300-mile voyage beyond Iceland in February, why is it not then equally permissible for us to call in a geographer and oceanographer like Charcot for rebuttal testimony?

Or is it perhaps that whether you can sail 300 miles beyond Iceland in February has now become academic, although it was at one time crucial? Maybe the true historical logic is that when Columbus had once been proved a liar, by the then-agreed-upon absurdity of the Iceland story, it was thereafter necessary not to pay any attention to the said Iceland story,

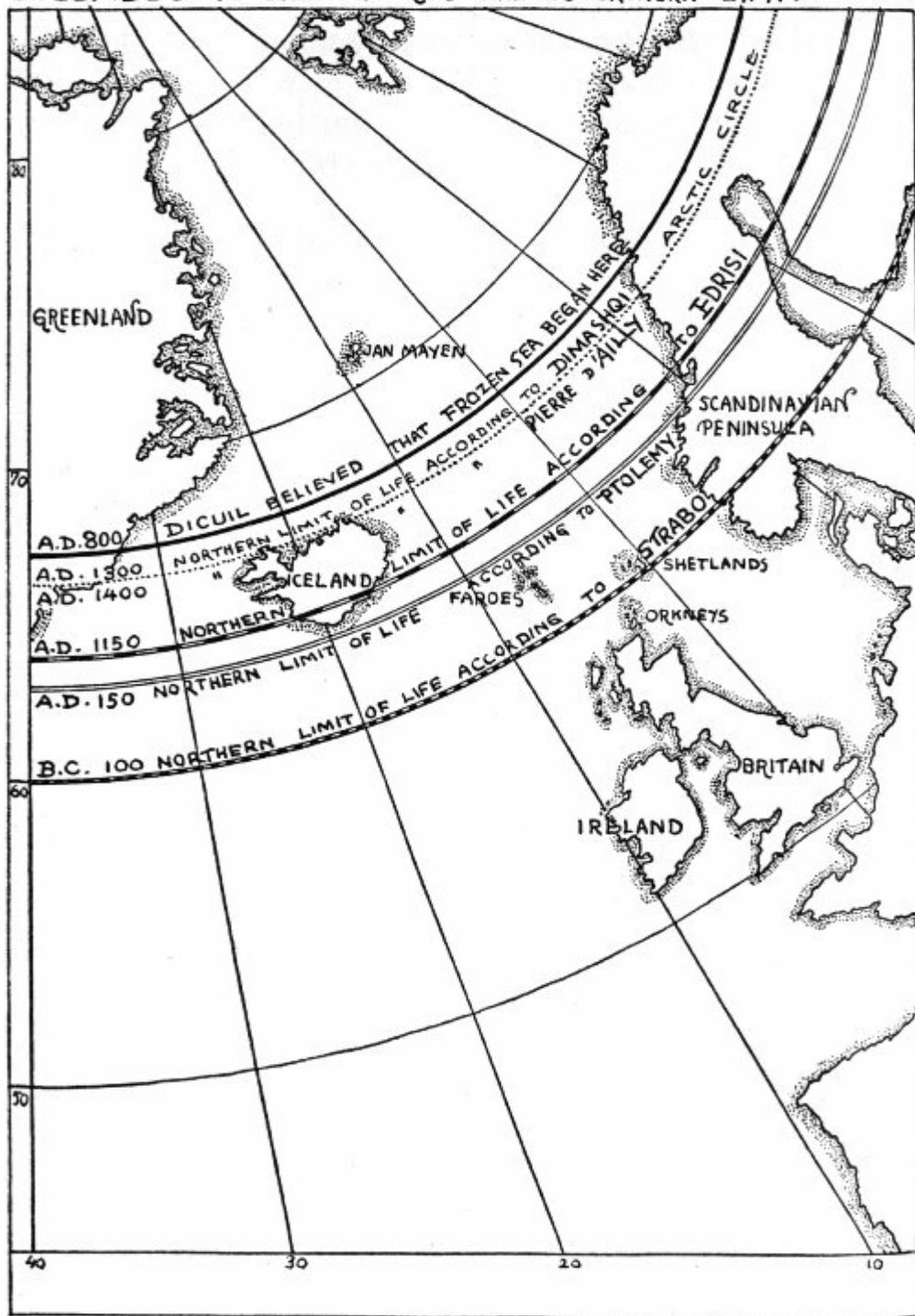
even after its non-absurdity has been shown, because it was now but a tale told by a branded liar and therefore doubtless a fiction even though in itself not absurd.

In short, we were likely quite wrong in falling for the arguments of those who, it seemed to us, had discovered a lot of flaws in the Vignaud and Magnaghi type of presentation. For it appears to be with them and their school that the historians now agree.

The historians probably know their onions. Or do they?

### **PLATE XIII**

# COLUMBUS BELIEVED THAT LIFE HAD NO NORTHERN LIMIT . . .



# COLUMBUS BELIEVED THAT LIFE HAD NO NORTHERN LIMIT . . . .

The northern limit of life and of habitability according to  
certain geographers.

## WERE PYTHEAS AND COLUMBUS RIGHT ABOUT ARCTIC CLIMATE?

Conspicuous among northern mysteries still unsolved is the problem of whether there is in the Arctic a proper summer—a season, or a period of a considerable number of days, which would strike the average New Yorker as warm.

In our section on Pytheas in this book we have shown that the debate on whether there is heat in the Arctic goes at least as far back as the fourth century B.C. when the Massilian explorer returned from a northern voyage telling of warm summers, with resulting disbelief so violent that the name Pytheas brought to mind throughout Greek, Roman and mediaeval times the same ideas that come to our minds when we hear the names of Munchausen or Ananias.

Through the twenty-two centuries which separate the time of Pytheas from our own, there has been a running fight between those who reported summers of considerable heat from the Arctic and those who disbelieved these reports on the ground that they were incompatible with the known laws of geography and climate.

There have been vicissitudes in this struggle, as in most struggles; for every now and then a traveler has returned from the North who has agreed with the cosmographers, and with their spiritual descendants, the modern orthodox climatologists, that proper summers do not exist in the Arctic and that reports to such effect are invention, exaggeration,

faulty observation or, at the best, an improperly interpreted psychological or physiological reaction to a season which is warm merely in comparison with the intense and long-continued chill of a previous Arctic winter.

On occasion, too, a scientist has been won over to the side of the travelers, has accepted a warm northern summer of considerable length as a fact, and has made defense of his belief in the tales of the travelers on lines which to him appeared reasonable.

There have been, too, fairly long periods when belief in a warm and even hot northern summer gained numerous adherents outside the ranks of the explorers. The most notable of these, perhaps, was the Elizabethan age of Britain, and the time immediately following, that early period of the search for the northern passage to the Indies when royalty, legislators and even capitalists swung to the extreme of a faith in a warm north, with longer summers than had perhaps ever been reported by a traveler. In this stage pretended travelers, the writers of imaginary voyages, found ready belief when they described a Far North that in some cases resembled the warm northern country of the Hyperboreans in which the Greek peasantry had believed even before the days of Pytheas—from Hesiod's time, at least, 700 B.C.

That the problem of whether there are hot summers beyond the Arctic is still unsolved we show presently by quoting, on one side, two prominent and respected geographers and climatologists of our time, and on the other two sample reports of modern travelers. Meantime we define what is meant by "the Arctic."

There are canny geographers who maintain the ancient cosmographic view that there never is warmth in the Arctic but who (perhaps because of a lingering suspicion that their case is not wholly sound) define the Arctic as a region in the north where there are no warm summers. With such a definition you cannot go wrong; for all that these pundits need to say, in reply to the reporters of northern heat, is that if the traveler is able to prove that the district he visited was really hot, then he has merely shown that he was not in the Arctic!—not in the Arctic, as they define it. Trying to show that the Arctic is hot is, then, like that other manifest impossibility, proving that a Christian is a bad man. You first define a Christian as a good man; then, if somebody charges that a deacon of the church broke a statute, or a moral law, the sufficient reply is: “If he did that, he was not a Christian.”

There are many rational and non-defensive ways of limiting, in a discussion, what it is you mean by the Arctic.

Most people mean by “Arctic” the territory north of the Arctic Circle; but since even this majority normally considers that the Gulf Stream creates a special condition in a known region of considerable area, we shall speak of as Arctic only those territories which are north of the Arctic Circle and beyond intimate contact with the Gulf Stream.

We do not have to make a similar exception for the Japan Current on the Pacific side; for this, according to general belief, sends a negligible quantity of warm water north into the Arctic—only a small amount into Bering Sea and, in turn, a small subdivision of that small quantity through Bering Strait into the Arctic Sea. Still, to be on the safe side, we shall not be



talking about any islands in Bering Sea as Arctic. On the Atlantic side, we shall not be talking about Iceland, northern Norway, northern Sweden or extreme northern Finland; nor, indeed, about that section of northern European Russia which has an open sea before it in winter, acknowledgedly a result of foray by currents affiliated with the Gulf Stream.

What we talk about as Arctic, then, is Alaska north of the Arctic Circle, Canada north of the Circle, and Siberia north of it. The single exception to this rule is where we discuss Pytheas and those who discussed him—this exception because he went north before the cosmographers and geographers had gone off on their present tangent to admit that there are warm summers where warm ocean currents run, while denying summer warmth to districts not pronouncedly modified in climate by warm sea currents.

The first of our specimen statements to show that travelers of our day still describe the Arctic as hot in summer is from Commander John C. Cantwell, now of Sausalito, California. In 1885 he was Third Lieutenant on the U.S. Revenue Steamer *Corwin*. His “A Narrative Account of the Exploration of the Kowak River, Alaska, Under the Direction of Capt. Michael A. Healy,” published by the U.S. Government in 1887, tells of a journey up a stream that has its mouth just north of the Arctic Circle, its whole course well to the north of the Circle. We take from pages 32-35 of this publication three entries to show what the temperature was and how Lieutenant Cantwell felt about it and about some of its results:

July 15: “The temperature of the air increased as we advanced until the thermometer registered as high as ninety-six degrees

in the shade and seldom fell below eighty-eight degrees during the day, . . .

“On July 16 we passed the Ung-ee-let-ar-geeak River of the natives, . . .

“The weather continued fair and intensely hot. The mosquitoes were simply terrific, and our lives were a burden to us altogether until we emerged from the low country and reached a portion of the river inclosed by high bluff banks.

“With the thermometer standing steadily at ninety-four degrees in the shade, and with no time to rest, one could ring the changes on a popular song and sing ‘an *explorer*’s lot is not a happy one’ . . .”

The year in which Lieutenant Cantwell’s report was published by the Treasury Department of the U.S. Government, Robert DeCourcy Ward, destined to be recognized as one of the foremost climatologists of the United States, was a sophomore at Harvard. Many other statements of Arctic heat resembling those of Lieutenant Cantwell were published in books and journals before 1907 when Dr. Ward, then professor at Harvard, was writing his book, *Climate*. He must have read some of the heat yarns. Nevertheless he said concerning weather in the Arctic the things we are about to quote. We take them not from the first edition, 1908, but from the second, revised, edition of 1918:

“During the long summer days the temperature rises well above the winter mean, and under favourable conditions certain phenomena, such as the diurnal variation in wind

velocity, for example, give evidence of the diurnal control. But the irregular cyclonic weather changes continue, in a modified form. There is no really warm season. Snow still falls. The summer is essentially only a modified winter.”

There was a marked recrudescence of traveler reports of Arctic summer heat during the second, third and fourth decades of our century. In that period were being educated a number of scientists who now rank high in geography and climatology. Some of the most eminent of these still write concerning heat north of the Arctic Circle substantially in the terms used by Professor Ward in 1908 and 1918. We mean to quote a number of them towards the end of our chapter. Here we present Dr. Glenn T. Trewartha, Professor of Geography in the University of Wisconsin and quote from page 329 of his *Introduction to Weather and Climate*, New York and London, 1937, that “. . . the polar regions are wanting in a period of warmth.”

In this introductory part of our discussion we are trying to establish merely that there still is basic disagreement between at least a good many respected books on climatology on one side and a good many widely read books of travel upon the other as to whether periods of warmth are found within the Arctic Circle which are long enough and hot enough to be recognized as summer. Professor Trewartha is an example of those who admit that there may be an occasional hot day but who feel it a misrepresentation to claim that there are enough of these to make a warm period. He says that:

“Certain explorers to the contrary, the polar areas cannot be made to appear warm by noting that occasional days with temperatures over 80° have been experienced beyond the

Arctic Circle. ‘One swallow does not make a summer,’ . . .”

So the contention of at least this school of meteorologists is that while there may be sporadic warmth there cannot be any warm period within the Arctic. We have not been able to find in Professor Trewartha’s book an answer to how long is a period. We can find out, however, what span of days he considers not long enough to be a period by examining statements which he can scarce have failed to read—for surely the reports of the U.S. Weather Bureau, or at least summaries of them, are probable reading for an American meteorologist.

One place north of the Arctic Circle, a few miles north of it, for which there is a statement by the Weather Bureau, is Fort Yukon. “A Summary of the Climatological Data for Alaska, By Sections” issued over the name of P. C. Day, Meteorologist in Charge of Division, and covering data to 1921 inclusive, has objective statements taken from thermometers that were housed and read according to Weather Bureau standards. Before quoting them, however, we give a subjective impression of Fort Yukon heat in the words of a traveler.

We quote, then, W. H. Dall, who journeyed widely through Alaska in different years soon after the purchase of that territory by the United States, and who, through a long career as a scientist, was connected with the Smithsonian Institution. We use the Boston, 1870, edition of his *Alaska and Its Resources*. On page 437 he says:

“At Fort Yukon I have seen the thermometer at noon, not in the direct rays of the sun, standing at 112°, and I was informed, by the commander of the post, that several spirit thermometers,

graduated up to 120.0°, had burst under the scorching sun of the Arctic midsummer; which can only be thoroughly appreciated by one who has endured it.”

“The Geography and Geology of Alaska,” by Alfred H. Brooks (U.S. Geological Survey, 1906), has a section on climate by Cleveland Abbe, Jr., who comments on the above from Dall:

“This passage leads one to infer that the temperature at Fort Yukon has been known to reach 120° F., but the writer doubts if such an inference is justified by our knowledge of the facts concerning the exposure of the thermometers which are reported to have burst under the heat. Since the Weather Bureau has been sending standard instrument shelters into the Alaska interior and has been receiving records from registering instruments exposed in them, no such temperature for the air as 112° has ever been reported. That it grows very hot in this province no one may deny. Doctor Dall, in the same book (*loc. cit.*), has characterized the summer heat thus:

““In midsummer on the upper Yukon the only relief from the intense heat, under which the vegetation attains an almost tropical luxuriance, is the brief space during which the sun hovers over the northern horizon, and the voyageur in his canoe blesses the transient coolness of the midnight air.””

Among other things which relate to the summer temperature of Fort Yukon, the mentioned Weather Bureau summary by P. C. Day tells us that the highest temperature officially recorded at Fort Yukon is 100° F. in the shade, that the highest for March is 47°, for April 57°, for May 78°, for June 100°, for July 93°, for August 87°, for September 79° and for October 53°. The

average number of days per year at Fort Yukon that have a temperature above 70°, is forty-nine. The greatest number of days in any one year at Fort Yukon which had a temperature 70° or over is sixty-one.

Under “Frost Data” the summary tells us that the longest recorded growing season (time between last killing frost of spring and first killing frost of autumn) is 101 days, the shortest sixty-two days.

These facts, derivable from a Weather Bureau Summary, are, then, not a large enough flock of swallows to make a summer in the opinion of at least some of our more orthodox climatologists. After all, how could they be? The climatologist knows it is not possible that there should be any considerable warmth during an Arctic summer and he tells us why. Professor Trewartha does on his page 333:

“In spite of the long duration of sunshine in summer, temperatures remain low, the rays being too oblique to be genuinely effective. Moreover, much of the solar energy is reflected by the snow and ice or is consumed in melting the snow cover and evaporating the water, so that neither the land surface nor the air adjacent to it becomes warm.”

The grounds upon which climatologists like Trewartha reject travelers like Dall, are, but for refinement, the same as the grounds upon which geographers like Strabo rejected the yarns of travelers like Pytheas. According to the Greek theories of around 2000 years ago it was always cold in the Arctic because the Arctic was too far from the sun; according to modern climatologists of the no-summer school the explanation of the

same perpetual chill is not distance but a slanting of the sunbeams that compels them to pass a long way through the atmosphere and which also spreads a unit of them over a larger surface than in tropics or temperate zone.

Then, as we have seen in the Trewartha quotation, there is a second part to the explanation—that the sunbeams are light and not heat, and that much of the light is not converted into heat because it is reflected by the snow. The snow is there because it is never warm and it is never warm partly because the snow is there. It is one of those arguments which we call vicious circles if they lead to conclusions which we do not like.

It would seem, then, that if we read nothing but the works of travelers we would consider it well established that real summers go far beyond the Arctic Circle and, indeed, that they go wherever there is an extensive lowland, a lowland not swept by winds from a nearby sea or neighboring snow-clad mountains. From the temperature reports of explorers, and from an application to them of familiar natural laws, we would think it established that if the Polar Sea were replaced by lowland, joining North America with Asia, it would be as hot by the thermometer at the North Pole in July as it is a thousand miles upstream on the Amazon. If we read, on the other hand, nothing but geographers and climatologists of the Trewartha and Ward school, we would feel it to be established that there is no summer within the Arctic Circle unless produced by some such condition as a warm ocean current.

It is when we read alternatively the vivid tales of returned travelers and the systematic expositions of the climatologists that we realize the 2000-year problem is still with us. The

question of whether to side with Strabo or Pytheas confronts us today in whether to side with Trewartha or Dall.

The mystery is the more baffling in that there are many defections from both ranks—there are climatologists who side with the travelers, there are travelers who side with the climatologists. We shall present these in their order as our study comes down the ages from the fourth century B.C., when the Greek world met with a chorus of disbelief the claim of Pytheas that he had gone five hundred miles north from Scotland without seeing ice and without leaving behind him those conditions which the Mediterranean world recognized as summer.

A book with the title *Ultima Thule*, with its longest subdivision given to Pytheas, can afford to be brief in stating the Arctic summer heat issue between the geographers and the travelers as it stood around 325 B.C.

Greek philosophy knew that the earth was divided into five zones, a middle belt too near the sun and uninhabitable because of heat, two belts on either side habitable because they were about the right distance from the sun, and then two belts or patches at either end of the earth not habitable because too far from the sun. No living thing existed in the Burning Tropics nor did any living thing exist in the Frozen Arctic.

True, there was the peasant belief in Greece that it grew colder as you went north only to the Rhipaeian Mountains; beyond them was a land of constant warmth and of many qualities admired by the Greeks, a sort of earthly paradise, the Country



of the Hyperboreans. To the Greek philosophers, such tales were inconsistent with the nature of the world—mere folklore.

By a “traveler’s tale” was formerly meant what we mean now by a “fish story.” It was just such tales as those of Pytheas about warmth in the remote North that gave the words, a traveler’s tale, power to express contempt that was not alloyed except with ridicule.

### **TESTIMONY FROM ANCIENT AND MEDIAEVAL WRITERS**

On our problem of whether there is a warm summer in the Arctic we have said we would listen to witnesses from both sides only for about 2000 years; or, to be more precise, from 325 B.C. to A.D. 1940. For we consider that the dispute first began to be active when Pytheas returned from a real or pretended far northern voyage with reports which the learned world could not reconcile with what were to them known facts and established principles. The Mediterranean philosophers took, in effect, the position taken by the Scottish philosopher David Hume in the eighteenth century, that it is more sensible to believe a thousand witnesses have lied than to accept one miracle. Indeed, the Greeks had a trust in their philosophy which has seldom been equalled by religious faith in miracles; besides, they had only one and not a thousand witnesses to deal with—at least only one who had written a book on the remote North with which they were familiar. For, through circumstances discussed in our section on Pytheas, neither Greek nor Roman made a voyage to the region of the midnight sun during the late pagan and early Christian centuries.

If the scholars of Greece had taken seriously the folklore of their own people, there might have arisen centuries before Pytheas a debate on whether the remote north had a summer.

We have referred to the widespread Mediterranean folk belief in a gorgeous far northern paradise, the Land of the Hyperboreans. As we read these stories now they seem as if they might have been founded upon just such traveler tales as W. H. Dall's claim for Alaska which we have cited, that midsummer Arctic heat may produce a vegetation which in its luxuriance and rapidity of growth fits our conception of the tropical. Such yarns may have reached classic Greece, if there were then in what is now European Russia beyond the Arctic Circle barbarians of temperament and vocabulary similar to Dall's. For it is considered that ivory and furs came south, overland and by the various rivers, to the Black Sea and thence to Greece; with them may have come stories about the country from which the furs and ivory were derived or through which they had passed.

The Greek philosophers, then, might have taken the Hyperborean conception seriously enough to give it battle in defense of their systems of cosmography. The fact is that they did not take it that seriously.

It is an extensive and varied literature which shows what the philosophers, and the scholars who studied them, thought about Arctic summers during classic and mediaeval times. To quote them all, or a tenth of them, would be tedious, the more so because, at least on the problem which here concerns us, they usually copy each other—whether frankly by

name or through unacknowledged borrowing. An investigator who wants a mass of evidence can find a large part of what is available in the two quarto volumes of Fridtjof Nansen's *In Northern Mists*, New York and London, 1911. From that rich collection will be taken, unless otherwise stated, the samples we use in this section of our study.

Some clear pronouncements on Arctic temperatures are found in connection with a definition of the five zones. Nansen tells us, for instance, that Parmenides of Elea, around 460 B.C., “. . . divided the earth's sphere into five zones or belts, of which three were uninhabitable: the zone of heat, or the scorched belt round the equator, and the two zones of cold at the poles. Between the warmth and the cold there were on either side of the hot zone two temperate zones where men might live. This division was originally derived from the five zones of the heavens, where the Arctic Circle formed the boundary of the northern stars that are always visible, and the tropics that of the zone dominated by the sun. Pythagoras [active around 530 B.C.] seems to have been the first to transfer it to the globe, the centre of the universe.”

A notable study of the springs from which was derived the main stream of geographical belief through the first thirteen centuries of our era is the *Geographical Lore of the Time of the Crusades* by John Kirtland Wright, now Director of the American Geographical Society. After agreeing about Parmenides and Pythagoras, as just quoted, Wright goes on to say that Eratosthenes is believed to have been the first to determine “exactly upon the sphere the position of the fixed circles which mark the limits of each zone.” Then he goes on to a summary:

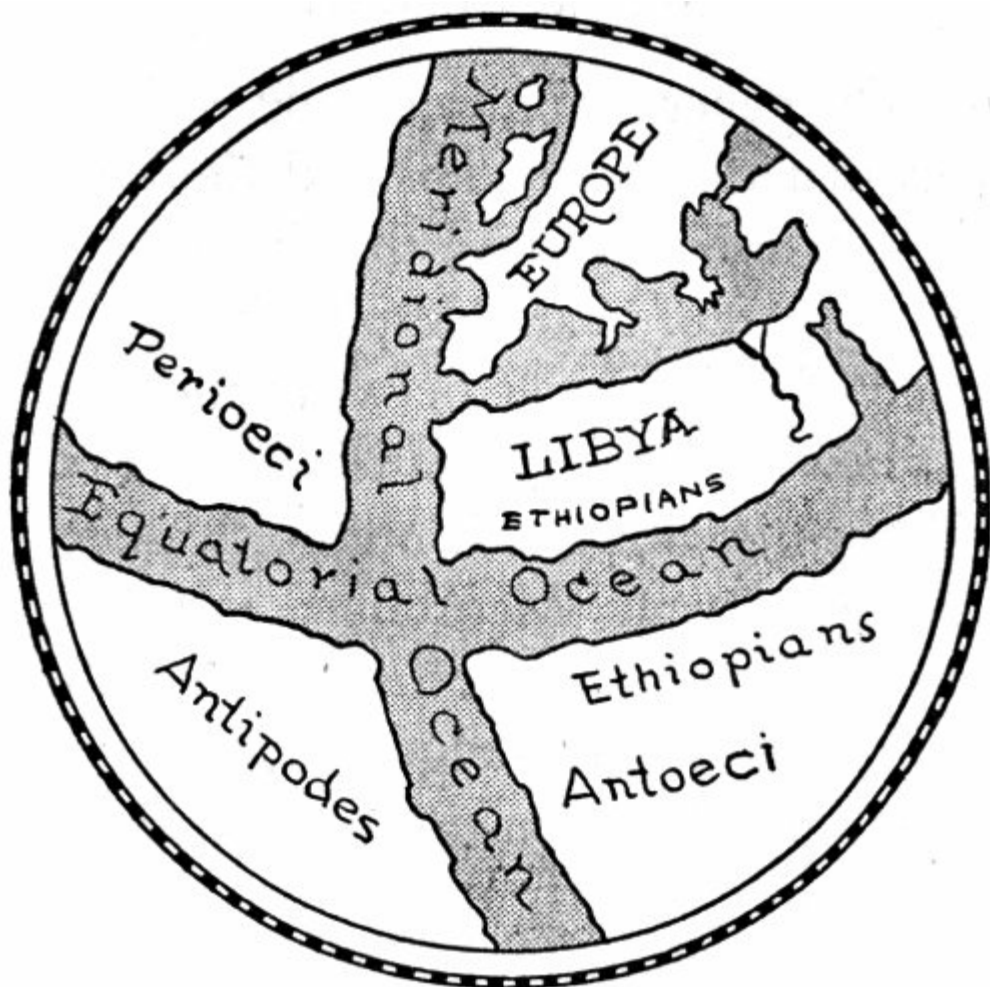
“Ancient geographers set the number of terrestrial zones at five, though they differed as to the character of the climates within them. The general opinion—one which was shared by Aristotle—was that the polar caps and the equatorial regions were incapable of sustaining life, the first on account of cold, the second on account of heat. Despite the fact that the notion of the existence of a fiery belt between the tropics was challenged by Polybius and Posidonius, who had heard reports from expeditions in these regions, this notion persisted in the writings of Martianus Capella, Macrobius, and many others and exerted an extremely restrictive effect on the subsequent development of geographical knowledge and enterprise.”

It is generally agreed that before Aristotle’s rise to dominant power after 1100 the two writers who had most influence upon mediaeval geographic thought in Europe were the fourth or fifth century Martianus Capella and the fifth century Macrobius. As Wright implies, these did not modify appreciably, because of any belief in traveler reports, the classic idea that three of the five zones were uninhabitable.

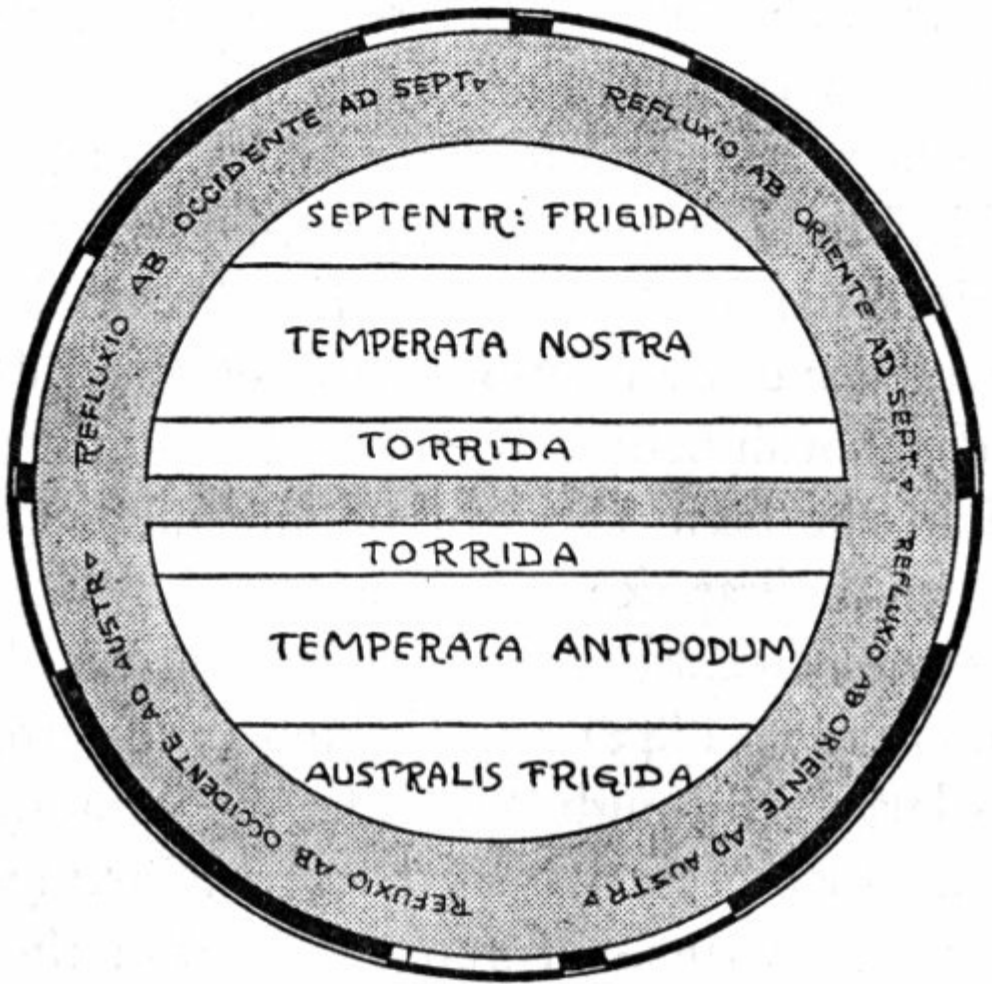
Nor was there a change in the twelfth century, when the writings of Aristotle came to such preeminence that they practically acquired the force of holy writ—his books might then almost as well have been supplements of the Bible, with the authority of Jehovah behind them, so firmly did they become entrenched in the basic thought of late mediaeval Christendom, their cosmographic sway not to be weakened until gradually in the fifteenth and sixteenth centuries by such men as Copernicus (1473-1543) and Galileo (1564-1642). In that sense it was largely through Aristotle, the contemporary

who did not know of Pytheas, that Pytheas remained until well into modern times the Ananias of geography. For the doctrine of Aristotle, and therefore of mediaeval scholarship, is correctly summarized by R. E. Dickinson and A. J. R. Howarth in their *The Making of Geography*, Oxford, 1933, where they say of him that:

## PLATE XIV



Conception of the globe, according to Crates of Mallus, *ca* 150 B.C. [after Kretschmer].



Conception of the zones, according to Macrobius, fifth century after Christ. From north to south are shown: (1) the northern frozen zone; (2) “our” temperate zone; (3) the torrid or burning zone; (4) the temperate zone of the Antipodes; (5) the southern frozen zone [after Kretschmer].

SEPTENTR: FRIGIDA  
 TEMPERATA NOSTRA  
 TORRIDA

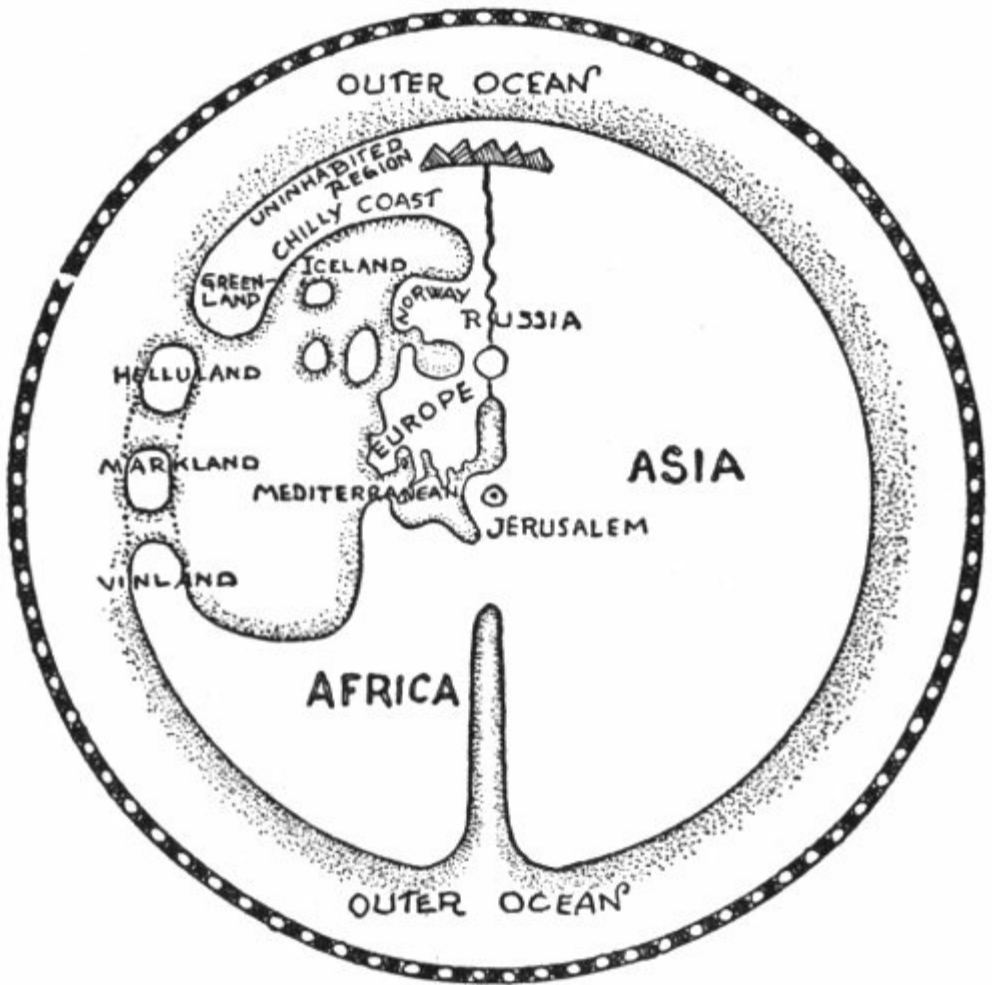
TORRIDA  
TEMPERATA ANTIPODUM  
AUTRALIS FRIGIDA

PLATE XV



Map of the world, according to Petrus Vesconte, 1320 [after Kretschmer].





Conception of the world in Iceland and Norway, 12-14 centuries, as deduced by Björnbo from Icelandic Sagas and various Icelandic-Norwegian sailing directions.

“He . . . postulated a southern temperate zone corresponding to the northern temperate zone in which lay his own inhabited world—for he supposed the cold and hot zones respectively north and south of that to be uninhabitable by reason of their temperatures.”

Perhaps we have been discussing the beliefs of the philosophers in a way to imply that these learned and speculative men influenced chiefly each other. That was not true; for they influenced poets, historians and other writers who had more direct access to the masses of the people. The classic doctrine is, for instance, clearly stated by Virgil (70-19 B.C.) in his *Georgics*:

“Five zones there are which gird the heaven, whereof one ever glows with the blazing sun and ever is parched with fire; and round it to right and left sweep the two outermost, stiff with blue ice and lowering with storms; while two between these and the central zone are granted by the bounty of the gods to suffering mortals. . . .”

Around the beginning of the Christian era Strabo, destined for much influence upon the geographic thinking of the Middle Ages, taught that the region too cold for life to exist began just north of the British Isles, therefore three or four hundred miles south of the Arctic Circle. For he said:

“I consider that the northern limit of the inhabited world is much farther south than where the summer tropic becomes the Arctic Circle. For modern scientific writers are not able to speak of any country north of Ierne (Ireland), which lies to the north of Britain and near thereto, and is the home of men who are complete savages and lead a miserable existence because of the cold; and therefore I consider the northern limit of our inhabited world is to be placed there.”<sup>[8]</sup>

Strabo wrote in Greek under the dominance of Rome. When the Latin tongue became the instrument of

geography there was no marked change in the cosmographic ideas, at least not in those which relate to the question of Arctic summers. For instance, Pliny wrote in the first century after Christ that “Far north in Scythia, beyond the Arimaspians, ‘we come to the “Ripaeae” Mountains and to the district which on account of the ever-falling snow, resembling feathers, is called Pterophorus. This part of the world is accursed by nature and shrouded in thick darkness; it produces nothing else but frost and is the chilly hiding-place of the north wind.’”

Pliny, like many we could cite from the early centuries of the Christian era, coupled with an adherence to the philosophical conception, such as we have just quoted, a willingness to mention as possibly or even probably true the folk conception of a northern paradise, or a modified form of that conception. The passage we have just quoted is, for instance, followed by Pliny’s statement that:

“‘. . . beyond the north wind dwells, if we are willing to believe it, a happy people, the Hyperboreans, who have long life and are famous for many marvels which border on the fabulous. There, it is said, are the pivots of the world, and the uttermost revolution of the constellations.’ . . . The climate is magnificent and without cold winds. As the sun shines for half the year, ‘the Hyperboreans sow in the morning, harvest at midday, gather the fruit from the trees at evening, and spend the night in caves. The existence of this people is not to be doubted, since so many authors tell us about them.’”

Around what we think of as the beginning of the Middle Ages we find the idea of a northern region uninhabitable because of the cold modified in the thinking of some of the scholars by a

conception the reverse of that which is common today—we now usually generalize in the direction that warmth is life, that cold is death, and that a warm climate is easier to endure, more favorable to life, than a cold one. The reverse is stated, for instance, by Orosius, a Spanish priest of the fifth century after Christ, who says that:

“Much more land remains uncultivated and unexplored in Africa because of the heat of the sun than in Europe because of the intensity of the cold, for certainly almost all animals and plants adapt themselves more readily and easily to great cold than to great heat. . . .”

We proceed now from strictly Mediterranean writers to writers of Mediterranean culture in northwestern Europe.

From our study of the Thule problem we saw that Iceland may have been known to the British Isles before 325 B.C., that Pytheas may have gone there, that Cormac was there in the sixth century. The Venerable Bede, English scholar who lived from about 672 to 735, mentions people of his own time who had been to Iceland. What they told him did not modify at all considerably, it would seem, his general cosmographic thinking, which in the main followed Greek cosmography as Latinized and popularized by Macrobius. To illustrate this we take a passage from *De Natura Rerum*, using a translation found in *Travel and Travellers of the Middle Ages* by Arthur Percival Newton, New York, 1930:

“The first [zone] is the northern, uninhabitable by reason of cold and whose stars never set for us. The second is the solstitial or summer zone, which is habitable and temperate;

the third the equinoctial covered by the burning orb of the sun, torrid and uninhabitable. The fourth zone is the brumal or winter zone (*brumalis*) on the lower side turned toward the southern pole, temperate and habitable. The fifth is the austral zone around the southern turning point (*verticem*), which is covered with land and is uninhabitable by reason of the cold.”

Our next writer on northern climate we have already quoted at considerable length in the chapter on Pytheas. This is the Irish monk Dicuil, who is responsible for the first unquestioned reference to Iceland as Thule, and who therefore wrote the first unquestioned account of any part of the New World, of any land west of the Atlantic.

We gather from a rather obscure passage in Dicuil’s *De Mensura Orbis Terrae* (p. 18 of the Parthey edition) that Dicuil adheres to the conception of a world uninhabitable at its middle because of heat and uninhabitable toward the north because of cold. But this is a strictly philosophic adherence (the contrary of which would have been strange indeed in a scholar of his time); for, in the passage quoted in our chapter on Pytheas, he calls liars those who describe as always cold a certain part of the Far North of which he has information from travelers.

It is hard to guess in the case of Dicuil, who quotes thirty or more writers, whether it was from them or from the Irish who had been in Iceland that he got the idea that: “. . . one day’s sail from it [Iceland] towards the north the sea was frozen.” For that is exactly what Pytheas said of Iceland—that he had gone a day’s sail north from Thule and found the edge of the pack ice. The writers of antiquity and those of the early and middle

Christian period ceaselessly quoted this statement of Pytheas, most of them to ridicule it but some to believe it or to think that it might be true. So it can have been one of these quotations that was here the authority and not Irish travelers.

Of course, Dicuil does say that it was the Irish who discovered the pack a day's sail north from Iceland; but nothing is more common in writings, or in our personal experience, than attributing to the man we are talking about statements we believe to be true—which we think he would have made if it had occurred to him to make them. It would not be contrary to practice for Dicuil to put into the mouths of his Irish informants the Pythean idea that the sea began to be frozen a day's sail north of Iceland.

As explained in detail when we were considering the problem of Thule, you would be likely to find in an average year, and whether in winter or summer, that a day's sail, anything between 50 and 100 miles, north from the northwest corner of Iceland would bring you to the edge of the Greenland pack. It is from the northeast corner of Iceland, as we bring out in our paper on Columbus, that you can sail northward in February the distance Columbus mentions, 300 miles, without seeing ice.

Although Dicuil tells nothing specific about the temperatures of summer, we infer legitimately from his omitting reference to snow on the ground, to ice in the sea, or to any of the usual results of a long and hard winter, that no temperatures were experienced by his Irish friends while they were in Iceland which differed strikingly from what they were used to in Ireland. That they sailed from Ireland in February to reach

Iceland and returned in July has been taken as a sign that the voyage was a commonplace and that there was nothing in the ocean climate which hindered average seamen of the British Isles of that period from making the voyage at any time of year.

When the Norsemen started going to Iceland, following 850, they brought back varied reports. The name “Land of Ice,” was given by a man who had spent the winter without seeing ice on the sea but who climbed a mountain in the spring and did see drift ice to the northwest. His observation was prelude to what is now a common report, that about one year in three strong northwesterly winds do bring ice down upon the northwestern coast.

The vast saga literature of Iceland, composed in the main during the eleventh and twelfth centuries, is available in thousands of pages to readers of English translations and in further thousands to those who can read the Icelandic itself. So far as relates to summer temperatures the sagas are, in effect, traveler tales, although written in the form of history and biography. It is an implication from them that the climate of Iceland in those times was about as the weather observation department of that government says it is today—with only one month that averages below freezing on the south coast, with only two or three averaging below freezing on the north coast, and with a summer climate resembling that of Puget Sound in the United States—excellent for grasses and for garden vegetables but not of a fierce enough heat for wheat and like crops.

Mediaeval scholarly descriptions of Iceland, to which we shall

come presently, tell of intense winter cold and, by implication, of summers devoid of warmth. These statements were not derived from the Icelanders themselves, who wrote the sagas and the rest of the Icelandic literature, but from the cosmographers of southern Europe and from scholars in the rest of Europe, commonly in the monasteries, who edited and “improved” the classic and early Church writers.

As said, the school of writers who inherited the Greek cosmographical views, and who desired to adhere to them, have long ago agreed upon an explanation of why Iceland does not fit their rule of perpetual cold north of the Arctic Circle—the Gulf Stream. But this does not explain to them the climate of Greenland, and especially not that of the Greenlandic west coast, which is remote from Gulf Stream and related influences, separated from them not only by the vast bulk and towering height of Greenland itself but also by the chill waters of the Greenland and Labrador currents. In Greenland, therefore, the tradition-minded geographers have remained in conflict with the purveyors of travel tables.

Except in degree, the case of Greenland is like that of Iceland in having a body of literature, the equivalent of traveler tales, which relates how western Greenland was explored by Europeans in 982-985, and thereafter colonized and developed into a republic with a parliament that functioned after about 990 and that accepted Christianity on behalf of the country in the summer 1000. The saga-type literature tells not only of this successful colonization but also concerning the attempted colonization of the North American mainland just to the southwest.



The generally accepted northern limit of travel by Erik the Red on the west coast of Greenland in the years 982-985 is Disko Island, about 220 miles north of the Arctic Circle. From this stretch Erik brought back a report which justified his naming the country Green Land. There were meadows; there were pastures suitable for cattle and sheep; the slopes and the flats were beautifully green against the background of rugged cliffs and high mountains. All of this would mean that there was in Greenland, at least to 200 miles beyond the Arctic Circle, a real summer.

As we are finding customary with mediaeval writers, the learned Adam of Bremen (died 1076), historian of the archbishopric of Hamburg, blended in his mind ideas from the classic writers with those from travelers. He tells that he secured at the court of Denmark information about Iceland, Greenland and Vinland (the last New England, unless it was the maritime provinces of Canada). About neither Iceland nor Greenland does he say that cold persists throughout the year, or that the territory is uninhabitable because of the climate. What information of this kind he gives is connected with Vinland.

If we have it in mind that Adam of Bremen understood the geography of northeastern America as we do today, then we would say that he is telling us, in the passage we are about to quote, that the Canadian islands west from Greenland and north from Labrador are uninhabitable because of the cold. But from certain parts of his long discussion about what he learned of Iceland, Greenland and Vinland when he was in Denmark it has been inferred that he thought of Greenland and Vinland as north from Norway. We use Nansen's translation:

“Moreover he [the King of the Danes] mentioned yet another island, which had been discovered by many in that ocean, and which is called ‘Winland,’ because vines grow there of themselves and give the noblest wine. And that there is abundance of unsown corn we have obtained certain knowledge, not by fabulous supposition, but from trustworthy information of the Danes. Beyond . . . this island, he said, no habitable land is found in this ocean, but all that is more distant is full of intolerable ice and immense mist. . . .”

During the Crusades vivid stories of real and alleged experiences in southern Europe and beyond the Mediterranean were brought to northern Europe where they had wide circulation, written and verbal. Like tales passed to southern Europe from the north in the great maelstroms and smaller eddies of the crusading movement; among these were picturesque accounts of how cold it was, and of what effects the cold might have, in the lands that bordered upon the summer-less Arctic. One of these border districts was Iceland.

Books then widely read, like the *De Imagine Mundi* of disputed authorship from about 1100, told that beyond Iceland the sea was frozen and that the cold was uninterrupted throughout the year. For illustrative purposes were used anecdotes such as the one we here quote from an interpolation into a twelfth or thirteenth century “improved” edition of the *Collectanea rerum memorabilium* of the third century cosmographer Solinus. Iceland is being described:

“These people also are good Christians, but in winter they dare not leave their underground holes on account of the terrible cold. For if they go out they are smitten by such terrible cold

that they lose their color like lepers and swell up, if by chance they blow their nose, it comes off and they throw it away.”

This reads as if it were a traveler’s tale; and of course it is, real or pretended. That such conditions do exist, if not in Iceland then at least in some properly Arctic countries, has been attested by recent travelers. The Book-of-the-Month Club, in 1932, chose for its members a volume that fell into their non-fiction category, *Thirty Years in the Golden North*, by Jan Welzl. The Club assured its members that here was a book upon which they might put general reliance, although they must, of course, remember that its author was not a technical scientist.

Henry Seidel Canby, member of the board that selected the book, discussed it in the *Saturday Review of Literature* for July 9, 1932. There we find that “this is a story worthy of Hakluyt’s Voyages. It is a narrative of life (not merely adventure) in regions as unknown to civilization as, say, Newfoundland was in the fifteen hundreds. . . .”

Canby feels that “. . . though it would be folly to attach scientific value to this story, there is a note of sincerity in it, an absence of the apparatus of fiction (though plenty of yarns) and above all an inherent improbability that any one (short of Defoe) could have invented such a mass of specific detail.”

After a discussion to the general effect that Welzl may not always be strictly accurate but that he means to be truthful, Canby sums up that the narrative of Jan Welzl “. . . is interesting, not because it is sensational here and there, but for its very interesting picture of a pioneer culture more self-

organized than that of the Indian traders whom Stewart Edward White writes about.”

With this traveler of the late nineteenth and early twentieth century thus vouched for by the Book-of-the-Month Club and by Professor Canby, we are justified in using him for comparison with mediaeval writers in forming an opinion of their reliability. As implied, we select Welzl rather than another because he tells of experiencing in the Arctic things which fall into one category with some of those commonly reported from the remote north in mediaeval and early modern times.

Welzl’s descriptions of how cold it may be in the Arctic, and of what effect the cold may have, are based in the main, we are told in his book, on his experiences in the New Siberia Islands. We take first an account which, on its face at least, strikingly resembles the Solinus interpolation—indicating, then, that while the mediaeval story may have been wrongly located geographically, it otherwise corresponds to the facts—such things perhaps do not occur in Iceland, but they do occur in other more northerly and colder lands.

On pages 295-297 of *Thirty Years in the Golden North* Welzl tells how in midwinter a Laplander named Pitt came visiting. When Pitt entered the house, Welzl realized that Pitt’s nose was frozen. The account goes on:

“‘Pitt, old man, your nose is done for.’

“He said: ‘It can’t be.’

“And I replied: ‘Yes, it is.’

“I made him sit down. Then he said that it was burning him again, and his face started twitching as before. I said to him:

““Pitt, do me a favour and catch hold of your nose and pull. . .  
,’

““All right then,’ he said. He caught hold of his nose, pulled at it, and there it was in his hands. . . .”

Naturally in such dreadful cold as described by Welzl from the New Siberia Islands, noses are not the only thing to freeze. Freezings are so commonplace that the people develop a routine practice. Welzl tells us:

“When the hand or the fingers are frostbitten, the patient has to bang the limb against the edge of a table and the frostbitten parts drop off. The strange thing is that, when the fingers are frostbitten, as a rule, at least the thumb and half the forefinger remain, so that the unfortunate patient can at least do light work. There are a large number of people like that up North.”

We see, then, from recent books like those of Welzl that mediaeval writers did not go beyond what has been attested in our day when they told about the startling and sometimes dreadful effects of the northern cold. We quote, still from page 294 of the *Golden North*:

“I once saw a man who was delayed in the cold, because his dogs got caught in the reins, and he had to release them. Meanwhile a blizzard came on, and before he could reach home, he was frostbitten up to the waist. He had enough presence of mind to lie down in the sledge and drag a heavy rug over himself, and in that way he just managed to save his

hands. His dogs took him to a Polar settler, whose dogs they had scented. The Polar settler came out and saw something moving under the rug, he pulled aside the rug and shouted:

““Good heavens, what’s this?”

“The man under the rug was half dead. He picked him up and took him in. His chest and waist were badly frostbitten, and both his legs had dropped off. But he happened to have plenty of money, and I believe they sent him to some institute in America.”<sup>[9]</sup>

This has been a rather lengthy digression on winter cold when our problem is summer heat. We feel it to be justified, however; for the case against Arctic summers being hot is materially and justifiably strengthened by the development of a clear understanding of how intense may be, and how destructive, the cold of the Arctic winter.

In the twelfth century, the Arab geographer Edrisi agreed with the Greek-Roman geographer Strabo of the first century B.C. that the uninhabited and uninhabitable region did not begin at <sup>[10]</sup>66½° N. Lat., the proper Arctic Circle, but farther south. Strabo placed the farthest life at just a little north of the British Isles or around 60° N. Lat., which would be about 400 miles south of the Circle; Edrisi placed it at 64° N. Lat. which is about 150 miles south of it. He said that all beyond was uninhabitable because of the cold and the snow; which, in the concepts of that time, would mean that there was no real summer.

Pronounced views on Arctic temperatures continued to be held by the Arabs, revivers of learning. These promulgators of Aristotle to mediaeval Europe naturally took the Aristotelian position that north of the north temperate zone it was impossible to live because of the cold. Quazwini (d. 1283) said of the Land of Rum (which Nansen considers was the Roman Empire, particularly the eastern empire and in a wider sense the countries of central Europe):

“Winter in Rum is an affliction, a punishment and a plague; during it the air becomes condensed and the ground petrified; it makes faces to fade, eyes to weep, noses to run and change color; it causes the skin to crack and kills many beasts. Its earth is like flashing bottles, its air like stinging wasps; its night rids the dog of his whimpering, the lion of his roar, the birds of their twittering and the water of its murmur, and the biting cold makes people long for the fires of Hell.”

But then the Arab view on how cold it is when it is cold may have resembled that of the classic Greeks who, according to Nansen, indicated the severity of the weather when you got up north into the vicinity of the Rhipaeian Mountains by saying it was so cold the people had to wear breeches.

Shirazi, Arab geographer of the late thirteenth century, tells that because of the cold the people of Thule, which may have meant Iceland or Norway, live in heated bathrooms (literally, live in warm baths) on account of the severe cold.

To our point, not by mere inference but directly, is the statement of Dimashqi (1256-1327):

“The habitable part of the earth extends as far as  $66\frac{5}{12}^{\circ}$ ; the regions beyond, up to  $90^{\circ}$ , are desert and uninhabited; no known animals are found there on account of the great quantity of snow and the thick darkness, and the too great distance from the sun.” [\[11\]](#)

There have been scattered statements throughout our presentation of Greek, Roman and early Christian views which indicate that in addition to what belief some of the cosmographers may have had in the strictly folklore idea (or modified traveler’s tale idea) of the Land of the Hyperboreans, there was also a philosophical or reasoned concept by which the Arctic had warmth sometimes, or always had it. One writer went so far as to conclude, upon theoretical grounds, that it was always hot in the Arctic—indeed so hot that the polar zone was lifeless for the same reason as the tropical, because of excessive heat.

Nansen appears to consider that with Hippocrates, 470-364 B.C., it was a philosophical rather than a traditional belief, although perhaps derived to some extent from information, that north of the Rhipaeen Mountains was a climate warmer than south of them. Eratosthenes, 276-194 B.C., ranked by some as one of the greatest thinkers that the Greek civilization produced, believed, according to one of the preserved fragments of his writings, that the Arctic was habitable to its very center.

Strabo, who himself believed the northern limit of habitability to be about 400 miles south of the Arctic Circle, nevertheless admitted that Eratosthenes favored Arctic



habitability and quoted him to that effect. Most scholars followed Strabo himself, but it remained widely known by the learned world throughout the Middle Ages that Eratosthenes thought there were hot summers in the Arctic.

In his *Geographical Lore*, Dr. J. K. Wright summarizes with regard to Arctic heat a work, *De vegetabilibus*, which during the Middle Ages was erroneously supposed to have been written by Aristotle. This book reasons that because the sun shines at the North Pole continuously for half the year, and is never more than twenty-three degrees below the horizon even in midwinter, there will be created—apparently towards the end of the six-month day—such terrific heat that neither plants nor animals can exist.

We step ahead of our chronology (for the topic is hardly worth a section of its own later) to note that in the nineteenth century there were distinguished geographers, among them A. Petermann, the famous editor of *Petermann's Mittheilungen*, who believed not only that there was great heat in the Arctic but that when you got beyond a certain parallel (placed by different members of the school between 78° and 82° N., or between 800 and 500 miles from the North Pole) it would begin to grow warmer than it was in the Arctic south of these parallels. This heat was to them a large part of the explanation of “the open polar sea,” which had adherents not merely among theoretical geographers but also among the travelers. A famous American explorer who took the doctrine seriously was Dr. I. I. Hayes, who actually supposed himself to have seen, from a point on the northwestern coast of Greenland, the evidence which justified his using the title *The Open Polar Sea* for a narrative of the expedition which he

commanded on the Schooner *United States*, and which spent in the Arctic the winter 1860-61. The book was published at New York in 1867.

From the thirteenth century we have a work *Konungs Skuggsjá* (*Speculum Regale*, *The King's Mirror*) which in dealing with Greenland attempts to weave ideas received from travelers into a general pattern derived from the cosmographers of Greece and Rome. In this book, preserved in Icelandic, Norwegian and Latin, we find the unknown writer now and then in partial contradiction with himself, appearing to believe on one page wholeheartedly what he no more than half believes on another. That is less strange with Greenland than almost any other country, for Greenland is a strange country.

So, for a better understanding of how *The King's Mirror* blends Mediterranean theory with reports of men who had lived in Greenland, we must keep steadily in mind that Greenland is peculiar among Arctic lands. It is the one country of the northern hemisphere which has a proper ice cap—there are glaciers in other mountainous northern lands; but only Greenland has that combination of high mountains and a heavy precipitation which make an ice cap possible. Surely 80 per cent of all the permanent snow and ice on land in the northern hemisphere is in Greenland.

From echo soundings made in recent years, and from knowledge we get through other means, there is now agreement that a coastal mountain range, not far from the sea, parallels both east and west coasts, and that the interior generally is low. These coastal ranges were high enough to gather snow on both their slopes. The snow from the western

slope of the western range made glaciers which flowed down the valleys to break off in the sea and drift away as bergs. Snow from the eastern slope of the eastern range did similarly. But the snow from the eastern slope of the western range and the western slope of the eastern spread inland till the streams met and built themselves up to form the Inland Ice. That ice is now a dome over Greenland (about 10,000 feet), a little higher near its middle than any except the loftiest peaks of the coastal mountains, so that the Inland Ice flows by gravitation through the gaps both westward and eastward. Greenland is, then, a turtle-backed minor continent, more than 1500 miles from north to south, and generally from 600 to 800 miles wide from east to west, covered with ice through more than 80 per cent of its area, perhaps as much as 84 per cent. But the remaining 16 per cent of this continental island is snow-covered only in winter, in the manner of a Dakota prairie. The largest sections which are grassy in summer are in the district first explored, so far as we know, by Erik the Red. In some places the snow-free belt is a hundred miles from the sea to the margin of the Inland Ice, so that when you pass along the coast by ship you may not be able to see ice, or will see it only as the people of Seattle do the icy slopes of Mt. Rainier.

This snow-free belt of the western coast is broad to only about 100 miles north of the Arctic Circle; but nearly if not quite as wide a stretch of land is snow-free during summer at the north tip of Greenland, some 1200 miles north of the Circle, only about 450 miles from the North Pole. We call this Peary Land because Admiral Peary discovered it in 1892 on a journey northeastward by sledge across the Inland Ice. He and those who have been there since join in reporting sedges, grasses and

other feed that supports herds of muskoxen. Flowers are numerous; among the insects reported are butterflies and bumblebees. Since heat is our quest, we draw from these things the inference that summers have warmth no matter how far north, so long as you are on a lowland of considerable area.

That there is very little snow-free land near the south tip of Greenland, but a good deal of it 1500 miles farther north at the north tip, brings out the fact that snow accumulation is mainly the result of precipitation and altitude. Lowland, no matter how far north it is, will always be free of snow in summer so long as the climate of our northern hemisphere remains what it has been the last thousand years and more.

Probably there has been only slight change in Greenland climate since the Icelandic colonization of Greenland following 985. You do, admittedly, find many references to authorities who have said that Greenland must have had a different climate in the time of Erik the Red and *The King's Mirror*; but the argument upon which these contentions are based have been made to look doubtful, to put it mildly, by Nansen's thoroughgoing examination of them in his "*Klima-Vekslinger i Historisk og postglacial Tid*" (Climatic Changes in Historical and Post-Glacial Times).

*The King's Mirror* is what its name implies, a book on what the well-instructed thirteenth century prince should know. It is in the form of a dialogue between Father and Son. We shall quote enough of the section about the climate of Greenland to indicate how this unknown scholar handled the conflict between the doctrine of a perpetual cold in the Far North and the reports of travelers who claimed that there was a real

summer even there.

On page 145 of the Laurence M. Larson, New York, 1917, edition of *The King's Mirror*, Son has been asking about the products of Greenland, a little puzzled how to reconcile the belief that it is always cold up there (or that, at any rate, it is very cold most of the time) with the information that Christian Europeans reside there in numbers, with a bishopric and churches. Father replies:

“You ask what the inhabitants live on in that country since they sow no grain; but men can live on other food than bread. It is reported that the pasturage is good and that there are large and fine farms in Greenland. The farmers raise cattle and sheep in large numbers and make butter and cheese in great quantities. The people subsist chiefly on these foods and on beef; but they also eat the flesh of various kinds of game, such as reindeer, whales, seals, and bears. That is what men live on in that country.

“*Son.* . . . Now since the land is constantly frozen over in both winter and summer, I wish to ask you to tell me exactly how the climate is in Greenland: whether there is any warmth or fair sunshine as in other lands, or if the weather is always unpleasant, . . .

“*Father.* . . . The men who have written best concerning the nature of the earth, following the guidance of Isidore and other learned men, state that there are certain zones on the heavens under which men cannot live. One is very hot and, because of the glowing heat which burns everything that comes beneath it, people cannot exist under this zone. . . . These writers have

also said concerning two other zones in the sky that under them too the land is uninhabitable; because, on account of their frigidity, it is no more comfortable to dwell under them than under the first mentioned where the heat is torrid. For there the cold has developed such a power that water casts aside its nature and turns into ice masses; in this way all those lands become ice-cold, and the seas, too, that lie under either of these two zones. From this I conclude that there are five zones in the heavens: two under which the earth is habitable, and three under which it is uninhabitable.

“. . . Now in my opinion it seems most probable that the hot zone extends from east to west in a curved ring like a flaming girdle around the entire sphere. On the other hand, it is quite probable that the cold zones lie on the outer edges of the world to the north and south: and in case I have thought this out correctly, it is not unlikely that Greenland lies under the frigid belt; . . .

“You asked whether the sun shines in Greenland and whether there ever happens to be fair weather there as in other countries; and you shall know of a truth that the land has beautiful sunshine and is said to have a rather pleasant climate. The sun’s course varies greatly, however; when winter is on, the night is almost continuous; but when it is summer, there is almost constant day. When the sun rises highest, it has abundant power to shine and give light, but very little to give warmth and heat; still, it has sufficient strength, where the ground is free from ice, to warm the soil so that the earth yields good and fragrant grass. Consequently, people may easily till the land where the frost leaves, but that is a very small part.”

Since *The King's Mirror* of the 1300's was available in Latin, common language of the European world, as well as in Icelandic and Norwegian, it is not strange that views of the Greenland climate similar to those of the *Mirror* are known to have been widespread in Europe.

That wide circulation of the *Mirror* helped to spread traveler reports of Greenland is a probability; that such reports were known beyond Iceland and the Scandinavian countries long before the composition of the *Mirror* is more striking, and a certainty. One of its proofs is in the *Topographia Hibernica* of Giraldus Cambrensis.

The ordinary dates for the writing of the *Mirror* are 1220-1240; the *Topographia* is from the 1180's. True enough, that work was written while Giraldus was in Ireland, and we have seen the close connection of that country in the twelfth century with Iceland and Greenland; but he had studied previously at the University of Paris and he traveled widely throughout France after writing the *Topographia*, including several stays in Rome. By word of mouth, and by the usual author practice of carrying his own books around with him, Giraldus will have disseminated his ideas wherever he went.

Nansen says of Giraldus that:

“His statements about Greenland are remarkable for their sober trustworthiness. He gives the first description of its inland ice:

““But since you asked whether the land is thawed or not, or whether it is covered with ice like the sea, you must know

that there are small portions of the land which are thawed, but all the rest is covered with ice, and the people do not know whether the country is large or small, . . .’

“This, as we see, is an extremely happy description of the mighty ice-sheet. He also describes the climate of the country, both the fine weather that often occurs in summer, and its usually inclement character, which causes so small a proportion of the country to be habitable.”

This paraphrase by Nansen, and his quotation from Giraldus, are enough to show that both the author of the twelfth century *Topographia* and of the thirteenth century *Mirror* had a balanced view of Greenland, which included both the topography and the climate—the latter no monotony of cold, but with a swing from long and cold winters to a summer warm enough for dairy farming.

That reports on Greenland derived from travelers circulated even beyond Europe we know in connection with the sport of falconry.

In a section of the *Mirror* which we do not quote it is said that Greenland has large numbers of the best falcons. Falconry was to Europe in the late Middle Ages what baseball is to America now. Every class participated, and there was a social gradation of the falcons corresponding to the ranks of church and state. Certain falcons were recognized as proper for kings, royal princes and cardinals; others for dukes, earls, archbishops and bishops, and so on down until you came to falcons so low, socially, that even a peasant might use them. A favorite of princes of church and state, and proper to their rank, was



the Greenland falcon.

A book on falconry is necessarily written in considerable part for sportsmen rather than for scholars. Wide, if not universal, knowledge of Greenland is, therefore, implied for instance by the Emperor Frederick II of Hohenstaufen when his “Art of Hunting with Birds” (*De Arte Venandi cum Avibus*), completed about 1244, remarks in connection with Iceland that it is an island which lies in the sea between Norway and Greenland. That statement has, indeed, a double implication—not merely that Greenland was well known but that it was better known than Iceland; and this may well have been true with the class to which the book was addressed, the falconers, among whom the birds of Greenland were coveted and admired.

With exceptions in both camps, it seems generally true that writers from the south of Europe held to the simple philosophical concept that north of a certain line it was always cold while writers from northwestern Europe felt the need of adapting and interpreting that conception. This is natural, for the southerners lived where the philosophy grew up and where it had its strongest hold; the northerners, as a group, were more exposed to the reports of travelers.

Most exposed of all to traveler reports from the Arctic were the Scandinavians. Their scholars, even those who lived in the south while writing their books, had met, perhaps in their youth, travelers who had been in Greenland, in Arctic Scandinavia, or in Arctic Russia. Like Dicuil who had conversed with people from Iceland, the author of *The King’s Mirror* received direct information from people who had been in Greenland. Claudius Clavus may himself have visited

Greenland. Almost for a certainty he had traveled a considerable distance north along the west coast of Norway.

Claudius, a Dane, was in Italy when he drew two maps which we still have and which show Greenland, in 1427 and in 1430. On these Greenland is as correct in position, size and shape as are the British Isles on the same maps. The British Isles he no doubt copied from other maps; Greenland he probably sketched from information received in Norway, likely in considerable part from Bergen merchants and sailors, for that city had a legal monopoly of the Greenland trade.

Claudius may have been familiar, too, with one or several of the Icelandic and Norwegian written sources from which the kind of knowledge about Greenland which he seems to have possessed was most readily available. He may have seen those Icelandic sailing directions which Henry Hudson used on his voyage to Greenland and which English language readers can most readily find in works on Henry Hudson or in Hakluyt. Claudius may have seen the Greenland description by Ivar Bardarson, *The King's Mirror* or the *Rímbegla*. It is less probable that he was familiar with the saga of Erik the Red and the various other Icelandic historical works which treat of Greenland. Then there was, of course, the general European knowledge of Greenland that was derived from trade and in particular from trade in eagles and hawks which was associated with the sport of falconry.

Whatever his sources, Claudius believed that the Arctic zone was not only habitable but actually then inhabited—which, of course, implies a belief in warm Arctic summers.

After speaking of a headland on the east coast of Greenland, some 300 miles north of the Circle in 71° N. Lat., Claudius says in the text which accompanies the “Nancy Copy” of his map:

“But from this headland an immense country extends eastward as far as Russia. And in its [i.e., the country’s] northern parts dwell the infidel Karelians [*Careli infideles*] whose territory [*regio*] extends to the north pole [*sub polo septentrionalis*] . . .”

Nansen feels that although the idea of the Arctic being habitable, and of people actually living pretty well all over it, was revolutionary from the classic point of view, there is not much originality in the statement if you compare it not with the classics of southern Europe but with what learning there was that was derived from the north of Europe. He points out that the *Historia Norwegiae* has inhabited land beyond the sea in the north, and so with the Icelandic sagas (composed between ninth and twelfth centuries, written down in eleventh and twelfth) and the Latin writings of Saxo Grammaticus (1150-1206). He refers to the Icelandic poem *Rímbeгла* (late thirteenth or early fourteenth century) which says:

“Some will understand this to mean that he [i.e., the poet] says that land lies under *leidarstjarna* [the pole-star], and that the shores there prevent the ring of the ocean from joining [i.e., around the disc of the earth]; with this certain ancient legends agree, which show that one can go, or that men have gone, on foot from Greenland to Norway.”

We have mentioned earlier that at least two classic writers, Polybius and Posidonius, discontinued the idea of the middle

zone of the earth being uninhabited, doing so on the ground that according to reports of travelers there actually were people living in those regions; we have cited a half dozen works, written in or available in Latin, which contradicted specifically the notion that the Arctic was uninhabited because of cold, most of these, however, contradicting themselves in that while they asserted habitation and habitability for portions of the Arctic that had previously been thought to be uninhabitable they still retained a belief in a more remote Arctic that was uninhabitable because of cold. Claudius Clavus does not hedge in that manner, so that he either had to be opposed by the scholars or ignored. Generally he seems to have been ignored by the writers of learned books. That his ideas nevertheless spread, from him direct or from other sources, we know.

So far as sources have yet been published, the southward limit of traveler's-tale information concerning Greenland is indicated by circumstances connected with one of the Crusades. In 1396 the son of the Duke of Burgundy was captured by the Saracens, who demanded in ransom twelve Greenland falcons. The demand was met, the captive was ransomed within two years. Now it is agreed that falcons were never produced in domestication, like pigeons, but were always captured in the wild; so we must conclude either that there were available in Europe at the time, among princes here and there, at least a dozen Greenland falcons which the Duke of Burgundy was able to secure; or else that a message was sent to Greenland, perhaps by a special ship, to secure for transport to the Mediterranean the required number of these American hawks.

Through extant letters of various popes from Innocent III in

1206 to Alexander VI in 1492 we know that the Vatican had a broad familiarity with the resources and exports of Greenland and with the navigation conditions there. The papal statements and inferences dovetail with what we know from the Icelandic sagas, from the records of Norway, and from the recent development of Greenland archaeology which, in conjunction with the rest of the sources, has given us a full and beyond doubt accurate picture of the lives of the Christians in their Arctic and sub-Arctic colony between the tenth and sixteenth centuries. All of this suggests the extent to which were known throughout Europe in this period the reports of travelers and of residents in Greenland which made claims about the summers there that resembled those made by *The King's Mirror*.

Christopher Columbus is going to be a large figure on our stage, as he frequently is where he appears. He believed in warm summers far north beyond the Arctic Circle and seemingly throughout the Arctic. We review briefly, then, the sources from which he may have developed his ideas.

A belief in warm Arctic summers can scarce have been derived by Columbus from his reading of the classics. Eratosthenes, of the second century, B.C., had believed in an Arctic warm through part of the year from what we would call natural causes—quite distinct from the folklore belief in the country of the Hyperboreans. To us he is a great figure in the history of science, but he was little known in the fifteenth century. Besides, the students of Columbus usually agree that he was familiar with only two works of cosmography, *Historia rerum ubique gestarum* of Aeneas Silvius, who was Pope Pius II, and *Imago Mundi* of Pierre d'Ailly, the first published in 1477, the second after 1480. Neither of these presents a

concept of warm summers in the Arctic resembling what we know to have become the view of Columbus.

But Columbus may have received ideas concerning warmth beyond the Circle from any number of commonplace sources. At Rome it was known by those concerned with the collection of tithes that the Greenlanders produced butter, wool and other such things with which they paid the collections of the Church—things which, of their nature, could be derived only from a land of warm summers. We know from letters which Columbus wrote that he took seriously the stories about the Hyperboreans, as he had seen them quoted from Pliny; he may have interpreted them in some such common-sense way as our saying that the stories, although in themselves fabulous, were no doubt grounded on facts, among them the fact that summers are warm in the Arctic.

Columbus is known to have associated a good deal with people who traded in Britain. The British, especially through sailors and fishermen of Bristol, were familiar with conditions in Iceland, and may have learned about the Greenland colony from the Icelanders. Recent archaeological work in Greenland shows, and so does the study of British trade records and of treaties between the British and Scandinavian kingdoms, that the English were in the habit of going up the west coast of Greenland in the period just before 1480.

And then it may be, as Columbus said or as others claimed for him, that he himself sailed in midwinter 300 miles north from Iceland without discovering any sign of ice. From that observation, even if it stood alone, it would not be strange for a man of the known Columbus temperament to reason that if

there was no ice that far north in midwinter it might well be fairly hot at least that far north during midsummer.

Then we know that there was in Italy in 1430, and perhaps much later, at least one man, Claudius Clavus, who maintained that the northern polar region was inhabitable. Columbus is said to have been born in Italy between 1446 and 1451. It is therefore not impossible, or even particularly unlikely, that he met some time during his career a man who had talked with Claudius Clavus, or one who had talked with another who had talked with Clavus.

It is not certain, although many have claimed it, that the maps and writings of Claudius Clavus, with which we are now familiar, were unfamiliar to the scholars of Italy and the rest of the Mediterranean countries during the early years of Columbus. However, it is in our chapter on whether Columbus visited Iceland that we more logically deal with such questions. Here we do not mean to go beyond pointing out that there are various reasonable channels of northern derivation for the Columbus view that the Arctic was not very like the picture drawn by the cosmographers. It remains to consider a probable southern derivation of his views on the North.

When Columbus appeared on the scene of European thought and action the doctrine of the five zones, particularly unshaken in the Mediterranean world for 2000 years, was beginning to crumble. For around the time of his birth there were drawing to a triumphant close a series of Portuguese voyages south along the west coast of Africa which had demonstrated that it is no hotter directly beneath the sun than it may be far

north of where the sun is ever vertical. (Indeed, we now believe that the highest temperatures of the earth are found in the Old World about 600 miles north of the Tropic of Cancer and in the New World about 900 miles north of it.)

Breaking down the conception of a zone that was burning because too near the sun was through analogy destructive to the complementary belief that the end zones of the earth were lifeless because too far from the sun. That logic apparently swayed Columbus more strongly than it did any of his known contemporaries, and it seems to have grown into one of the desires of his life to prove the habitability of all the five zones. That is how the case is usually stated by the commentators; but really his job was to prove the habitability of the Frozen Zones—for the Burning Zone had already been shown not to be burning and to be decidedly habitable.

But although it was not, in our view, necessary for Columbus to prove with regard to the tropics what had been proved already, it is usually considered that he had in mind the making of at least two voyages after returning from his fourth to America, the first of these south in connection with demonstrating the habitability of the tropics and the second north for proving that Arctic conditions are livable. The only record of this plan which we have from the hand of Columbus is in a letter which he wrote toward the end of the year 1500 to Doña Juana de la Torres. We quote the paragraph involved from *Select Letters of Christopher Columbus* as edited by R. H. Major for the Hakluyt Society's London edition of 1847:

“Already the road is opened to the gold and pearls, and it may surely be hoped that precious stones, spices, and a thousand



other things, will also be found. Would to God that it were as certain that I should suffer no greater wrongs than I have already experienced, as it is that I would, in the name of our Lord, again undertake my first voyage; and that I would undertake to go to Arabia Felix as far as Mecca, as I have said in the letter that I sent to their Highnesses by Antonio de Torres, in answer to the division of the sea and land between Spain and the Portuguese; and I would go afterwards to the North Pole, as I have said and given in writing to the monastery of the Mejorada.”

Many documents of Columbus have been lost, among them the plan for an Arctic voyage which he here says he gave in writing to the monastery of the Mejorada. Indeed, the letter itself from which we quote has also been lost. There are several copies of it, one or more of which do not contain the reference to a projected Arctic journey.

From later developments, when the idea of a northern seaway to the Indies became an obsession with Europe, we are led to think that what Columbus must have been planning was to find an alternative route to the Indies—he had discovered one by sailing west; he would discover another by sailing north. That inference is not supported by the tradition. He would have understood that necessarily he would reach China if he were successful in a northern voyage, but his purpose was rather to demonstrate that the deadliness of Arctic cold was as mythical as the deadliness of tropic heat. He wanted to overthrow completely the doctrine of the five zones and to conquer the Arctic as Prince Henry the Navigator had conquered the tropics. The tropic and polar regions would still be there; but the fear of them was to disappear and man was to have

dominion over the whole earth. To Columbus, who particularly in his later years was fanatically religious, it may well have been a chief goal to become the instrument for making good what he understood as a biblical prophecy, that man would eventually penetrate to and live in both the tropical and polar zones.

Some maintain that the plan of Columbus to dispel the terrors of the “Frozen North” was a product of reason and the imagination—that he merely deduced from the breakdown of ancient theory with regard to the middle of the earth a similar breakdown for the ends of the earth. However, if we believe his son Ferdinand, Columbus had personal experience to go on. What that experience was, or may have been, we discuss at length in the chapter “Did Columbus Visit Thule?” Here we condense and paraphrase:

According to Ferdinand Columbus his father, Christopher, in the year 1477, made a voyage to Iceland and 100 Spanish leagues beyond it, therefore some 300 miles beyond the Arctic Circle. Even at his farthest north, and even though the time was midwinter, he found no ice in the sea. This, to Ferdinand, was one of the reasons which led Christopher Columbus to the view that the Arctic zone was habitable.

Whether Columbus sailed beyond Iceland or not, it was as yet only to a few men of his type that the discovery of the livable and crossable nature of the tropics meant the probability that the Arctic would also be found livable and crossable. The learned world generally took the view that the doctrine of the five zones should be modified only with regard to the tropics—that the livable zones were three instead of two and that the

unlivable zones were two instead of three. They continued to maintain that the sun would have too little power beyond the Arctic Circle for removing snow from the land, for producing summer.

Indeed, as we have shown in the chapter on whether Columbus visited Iceland, his claim that he had gone 300 miles beyond it in midwinter *without discovering ice in the sea* was taken as proof of two things, that he was a liar and that he had never visited Iceland. For, said the orthodox, if he had been to and beyond Iceland he could scarcely have been such an outrageous liar as to misrepresent conditions the way he did.

With the circumnavigation of Magellan after 1519, and the gradual exploration of the southern and northern American Atlantic coasts, it became clear that Asia and its wealth were remote from Europe and that the way to the Indies, roundabout through the Strait of Magellan or by the Horn, was as long and difficult as the route which the Portuguese had discovered by way of the Cape of Good Hope. Trade and tradesmen were rising to power throughout Europe. There developed an attitude toward geography that was commercial if not mercenary, and it became an obsession of several nations, particularly of England, to discover a “near way to the Far East by the North.” They wanted the Polar Sea to be free of ice so that vessels could sail direct; and what they wanted to believe they readily believed. There was a swing in opinion, which among leaders approached unanimity, to the idea of Columbus that all five zones are habitable. The English made it into a slogan, a double statement one element of which was from seafaring—that there is no land uninhabitable and no sea innavigable.

With a keen mental vision for seeing things which were to their advantage, the Elizabethans turned to a reconstruction of the philosophical basis of the theory of climate. On this we might quote Sir Humphrey Gilbert, we might quote Sir Walter Raleigh; we do quote, as speaking well for his fellow countrymen, George Best, who was historian of the Frobisher voyages, a companion of Sir Martin on his second and third voyages.

Though it was Best's chief purpose to demonstrate the navigability and habitability of the Arctic he logically prepared the minds of his readers by an onslaught upon theories of the Burning Tropics. He dealt at length with the theoreticians who, because of their eminence and their plausibility, had been able to lead by the nose all of Christendom throughout mediaeval times and until the appearance of Henry, preventing the navigators and traders of those ages from voyaging to the south, which would have been simple and easy and would have led to great riches. He asks his readers, in effect, whether they are willing to be similarly prevented from using the Arctic, whether for its own resources or as a short road to China.

In demolishing the tropical argument, Best first shows by logic that it ought to be hotter on the tropic of cancer when the sun is vertical there than it is upon the equator when the sun is there vertical; for its rays can beat down upon the equator for no more than twelve hours a day while it beats vertically down on the tropic (late in June) for considerably more than twelve hours. Then, says Best, there is the reciprocal part of the argument, that the equator has twelve hours in which to cool off from a vertical sun while the June and July tropic has

considerably less than twelve hours for cooling. He emphasizes by repetition when he insists that because the sun delivers more heat to the tropic per solstice day and gives it less chance to cool off, it must follow that the tropic is hotter at its hottest than the equator is at its hottest.

The logical argument for moderate maximum heat at the equator and for greater maxima at the tropic of cancer is buttressed through many pages with examples, among them that travelers have reported from Morocco, where the tropic runs, more intense heat than from the immediate belt of the equator, and that, by reliable men who have visited both, Paris has been reported more excruciatingly hot in summer than the equator.

Best hammers it in again and again, by reason and by example, that it is a mistake to confine our attention to the truth that the sun delivers most heat in a given space when it is vertical—if you want to arrive at a correct result, he says, you must pay as much attention to how long the sun delivers heat as to the quantity it delivers in a given time. The reasoning leads to the conclusion that if the average amount of heat per hour delivered by the sun at the Arctic Circle is half of its average delivery at the equator, then the equator and the Arctic Circle ought to be equally hot when the sun shines twelve hours upon one and twenty-four hours upon the other.

For the polar regions we now give the Best reasoning with enough detail to show how he marshals his arguments and how he derives his conclusions:

“In the prouing of these colde regions habitable, I shall be

very shorte, because the same reasons serue for this purpose, which were alleaged before in the prouing the middle Zone to be temperate, especially seeing al heate & cold proceede from the Sunne, by the meanes eyther of the Angle his beames doeth make with the Horizon, or else by ye long or shorte continuance of the Suns presence aboue ground: so that if the Sunnes beames do beate perpendicularlye at righte Angles, then there is one cause of heate, and if the Sunne doe also long continue aboue the Horizon, then the heate thereby is much encreased by accesse of this other cause, and so groweth to a kind of extremitie. . . . But in such regions, ouer the which the Sun riseth lower (as in regions extended towards eyther pole) . . . the Sunne continueth longer, and maketh longer dayes, & causeth so much shorter and warmer nights, as retayning warme vapoures of the daye paste. . . . This benefite of the Sunnes long continuance and encrease of the day, doth augment so muche the more in colde regions, as they are nearer the poles, and ceaseth not encreasing, vntil it come directly vnder the point of the Pole Articke, . . . there foloweth to be a conuenient moderate and temperate heat, or else rather it is to be suspected, the heat there to be very great, both for continuance, & also . . . the vertue and strength of heat vnited in one encreaseth. . . .”

In saying about Arctic summer temperatures that “. . . it is to be suspected, the heat there to be very great, both for continuance, & . . . vertue,” Best published in 1578 a forecast of some of the traveler reports we mentioned in the introductory part of this chapter—for instance, what Dall said about the power (vertue) of the Fort Yukon Arctic heat and what the Weather Bureau claims about having recorded there a temperature of 100° in the shade—when hundred-

degree-shade temperatures are rare, if they occur at all, at a distance upstream and above sea level on the Amazon that are similar to the inland distance and altitude figure of Fort Yukon.

At the end of his reasoning about the heat of the sub-Arctic and Arctic summer, Best concludes.

“... Therefore wee neede no longer to doubt of the temperate and commodious habitation vnder the Poles, during the tyme of Sommer.”

Little did Best know! The debate is still raging, else we would not be writing this chapter.

The search for a northwest passage in connection with which Best did his thinking and from which he drew conclusions of experience has produced a literature that is vast and from which we call only a few of the leading protagonists to the witness stand.

John Davis, distinguished sailor, was author, besides, of works on the theory and practice of navigation. He made three voyages in 1585-87 up into the waters which bear his name and which separate Greenland from the Canadian Arctic lands. His farthest north was around 73°, perhaps 400 miles north of the Arctic Circle. In his book, *The Seaman's Secrets*, he has the sections “How many Zones be there?” and “Of the frozen Zones.” We quote both in full, for they are to our purpose, taking them from pages 305-307 of the London, 1880, *The Voyages and Works of John Davis* that was edited for the Hakluyt Society by Albert Hastings Markham, himself a

distinguished polar explorer:

“How many Zones be there?

“There are 5 zones—2 temperate zones, 2 frozen zones, and one burning zone. The burning zone lieth between the two Tropicks, whose latitude is 46 degrees 56 minutes, which zone by auncient Geographers is reported to be not habitable, by reason of ye great heat which there they supposed to be, through the perpendicularitie of the Sunne beames, whose perpetuall motion is within the said zone, but we finde in our trauels, contrary to their reporte, that it is not onely habitable, but very populous, containing many famous and mightie nations, and yeeldeth in great plentie the most purest things that by natures benefits the earth may procreate: twice I have sayled through this zone, which I found in no sorte to bee offensive, but rather comfortable vnto nature, the extremitie of whose heat is not furious but tollerable, whose greatest force lasteth but 6 howers, that is, from 9 of the clocke in the morning vnto 3 in the afternoone, the rest of the day and night is most pleasing and delightful, therefore they did nature wrong in their rash reporte.

“Of the frozen Zones.

“The frozen zones are contained within the polar circle, the Artick frozen zone within the Artick polar circle, and the antartick frozen zone within the Antartick polar circle, which are also reported not to be habitable, by reason of the great extremity of colde, supposed to be in those parts, because of the Sunnes far distance from those zones, but in these our dayes we find by experience that the auncient Geographers had



not the due consideration of the nature of these zones, for three times I haue been within the Artick frozen zone, where I found the ayre very temperate, yea and many times in calme wether marueilous hot: I haue felt the Sunne beames of as forcible action in the frozen zone in calme neere vnto the shore, as I haue at any time found within the burning zone; this zone is also inhabited with people of good stature, shape, and tractable conditions, with whom I have cōuerced and not found them rudly barbarous, as I have found the Caniballs which are in the straights of Magilane and Southerne parts of America. In the frozen zone I discovered a coast which I named Desolation at the first viewe thereof, supposing it by the loathesome shape to bee wast and desolate, but when I came to anker within the harbours thereof the people presently came vnto me without feare, offering such poore things as they had to exchange for yron nailes and such like, but the Canibals of America flye the presence of men, shewing themselues in nothing to differ from brute beastes: thus by experience it is most manifest that those zones which haue beene esteemed desolate and waste, are habitable, inhabited and fruitful. If any man be perswaded to the contrary of this truth, he shall doe himselfe wrong in hauing so base an imagination of the excellency of Gods creation, as to think that God creating the world for mans vse, and the same being deuided but into 5 partes, 3 of those partes should bee to no purpose: but let this saying therefore of the Prophet Esayas be your full satisfaction to confirme that which by experience I have truely spoken. ‘For thus sayeth the Lorde that created heauen, God himselfe that framed the earth and made it, hee that prepared it, hee created it not in vaine, hee framed it to bee inhabited, &c.’ Esay. 45, 18.”

Henry Hudson, famous product of London's East End, is known to Americans primarily for his visit to the river of his name in 1609 and for his tragic death in the bay of his name in 1611. In 1607 he visited the Spitsbergen group of islands where he had the wisdom to forecast the development of that great "fish oil" industry which eventually led to armed and diplomatic struggles between various countries, chiefly Holland and England, and which made fortunes for generations of sailors and traders, the while Spitsbergen oil was light to half the world of European commerce. What Hudson foresaw about the fishery that grew up in part on the strength of his report was epitomized in his saying of Spitsbergen: ". . . I think this land may bee profitable to those that will adventure it."

On the warmth of Arctic summers we have examined G. M. Asher's London, 1860, Hakluyt Society edition of *Henry Hudson the Navigator*.

In that part of the Asher volume which is written by Hudson himself we find but one remark on Arctic temperature. This is for the Spitsbergen shore about 900 miles north of the Arctic Circle, and says of a bay which they were exploring: "Heere wee found it hot."

Samuel Purchas, diligent gatherer of manuscripts and information on geographic discovery, was a contemporary of Hudson. It would be out of character for him not to have conversed with a number of men who had been on the Hudson voyage to Spitsbergen and he may have seen documents by Hudson or about that voyage which we do not possess. We therefore quote, still from the Asher volume, the opening sentences of the chapter "Of Hudson's Discoveries and Death,"

originally printed at London in *Purchas His Pilgrimage*, 1626:

“Henry Hudson, 1607, discovered further north toward the pole, then, perhaps, any before him. He found himselfe in 80 degrees, 23 minutes, where they felt it hot, and dranke water to coole their thirst.”

A golden period of northward exploration was ending about the time of Hudson; for more than a hundred years thereafter travelers penetrated the sub-Arctic rather than the Arctic. So we do not resume our study until with the overland journey of Samuel Hearne which, although it was mainly sub-Arctic, did penetrate a hundred or so miles beyond the Circle in middle Arctic Canada along the Coppermine River. Practically he dashed into the Eskimo territory and dashed out again, for there was a feud between his forest Indian companions and the prairie dwellers of the northern coast. During that brief time his thoughts were taken up mainly with a tragedy which he describes, a massacre of a sleeping group of Eskimos by his own Indians. Still we do find three temperature references that are far enough north to be within our technical limits.

On July 10, 1771, Hearne believed himself to be north of 68°, but was probably not so far north, just about on the Arctic Circle. His entry for that day is:

“. . . about noon the weather became so hot and sultry as to render walking very disagreeable; we therefore put up on the top of a high hill, and as the moss was then dry, lighted a fire, and should have made a comfortable meal, and been otherwise tolerably happy, had it not been for the muskettoes, which were uncommonly numerous, and their stings almost

insufferable.”

The next day when, by the direction of march Hearne was somewhat farther north, he tells us that “The eleventh [of July] was hot and sultry, like the preceding day.” The twelfth of July, when probably fifty miles or so north of the Arctic Circle, it was “so exceedingly hot and sultry, that we did not move.”

All this was just east of the Coppermine River when the party were approaching it, traveling northwesterly. They struck the river at Sandstone Rapids, according to J. B. Tyrrell whose Champlain Society, Toronto, 1911 edition we use—*A Journey from Prince of Wales’s Fort in Hudson’s Bay to the Northern Ocean In the Years 1769, 1770, 1771, and 1772*, by Samuel Hearne. According to Franklin, who gave the Sandstone name to these rapids, they would be around fifty-five miles north of the Arctic Circle. The country in this section is a stony prairie, except that along the river itself the forest extends some fifteen or twenty miles farther north. By recent estimates, the most northerly Coppermine trees are found about eighteen miles from the sea.

The next man to journey north through interior Canada was Alexander Mackenzie when in 1789 he descended to the Polar Sea the river that now bears his name. On the return, when still some distance north of the Arctic Circle, he said for July 25 that “The weather was now very sultry.” This seems to have continued through several days while he was approaching and crossing the Circle, southbound, for we read for July 29 that “Yesterday the weather was cloudy and the heat insupportable; and now we could not put on clothes warm enough to keep us warm.”

The chilling of the weather July 29 can scarce have been due to the party having escaped from the heat of July 28 by traveling south. Mackenzie gives us a key in the next sentence: “We embarked at a quarter past four with an aft wind, which drove us on at a great rate.” The direction of the wind had changed, and it was now blowing from the Arctic Sea.

The Mackenzie River, second largest of North America, became a highway of trade soon after Alexander Mackenzie’s time and has now been inhabited by whites for more than a hundred years down to that Arctic section which he was traversing in July, 1789; and we have innumerable reports from travelers and residents on how the weather there changes with the wind. Coupled with some of these reports is the explanation:

Water has a power of storing chill; and so has earth, but with an important difference. In the ground, chill is imprisoned by the insulating power of rock and soil so that the modern travelers find just what Mackenzie explained in one of his July entries, where he says that on the walks away from the river he was hardly ever able to drive the blade of his knife down into the ground more than six inches, for the “eternal frost,” which we now know to be hundreds of feet deep, was that near to the surface in 1789, as it is today. These topmost six inches of thawed soil and muck imprison the chill below them so effectively that Mackenzie, as he tells us, found the heat of the day sultry and scarcely to be endured. It is far otherwise with the sea.

We understand it as a principle, and know it through innumerable reports, that the winter, though less cold over the

northern sea than over the land just to the south of it, is nevertheless able to store in the sea a chill which is released during the summer. That release is effective partly because there is no non-conductor layer possible on a body of water comparable to the upper layer of the firm earth, and partly because there is movement in sea water so that if the surface is warmed it is soon replaced by colder waters from below—through the moving of currents and the stirring of waves. This chill sea is able to chill the air above it effectively.

The topography of the Mackenzie valley is such, with its strip of lowland running from the ocean south and southeast, that the chilled sea air frequently moves south during summer along this channel. It moves with greatest frequency and greatest freedom along the valley proper. Therefore, it happens that when you travel up and down the main stream, or live on its very shores, you are exposed throughout the summer to more and colder sea winds than you would be if you lived in a side valley.

We do not find in the books of travelers, therefore, nearly as frequent reports of great summer heat from the immediate vicinity of the Mackenzie stream bed as we do from those people who have traveled and camped either along the branch rivers that flow into the Mackenzie from east and west or in the tree-clad flat land with its maze of lakes that occupies the region between the Rocky Mountains and the Coppermine River north of the Arctic Circle.

From Mackenzie there was a gap between notable journeys of three decades, when came the overland travels of Sir John Franklin. Some of our testimony from his two expeditions (the

first between 1819 and 1822, the second between 1825 and 1827) is by Franklin himself, some by his companion Dr. John Richardson, later recognized as a leading naturalist of Britain, Europe's foremost authority in that day on the plants and animals of the sub-Arctic and the Arctic.

The quarto volume *Narrative of a Journey to the Shores of the Polar Sea, in the Years 1819, 20, 21, and 22*, London, 1823, has few references to extreme heat. That is quite in line with the usual trend of Arctic narratives, for they seldom report much heat from the sea or from near the sea; and most of Franklin's overland and river travel north of the Arctic Circle was too early or too late in the season. Perhaps their only complaint of heat is on July 14, 1821, when they were just a little way from the ocean on the Coppermine River, about fifty miles north of the Arctic Circle. The thermometer recorded 75° in the shade at 3 P.M., with "sultry weather."

The *Narrative of a Second Expedition to the Shores of the Polar Sea, in the Years 1825, 1826, and 1827*, London, 1828, has a heat entry from about the same place where Mackenzie had been troubled by the heat nearly forty years earlier; for, describing August 29, 1825, at N. Lat. 67° 10', Franklin says: "The weather was extremely sultry throughout this day."

Tiny Nicholson Island of the Mackenzie delta is placed by Franklin at 69° 57' N., thus some 200 miles north of the Arctic Circle and within the grasp of the chilling northern sea. From here he tells us on July 16 that "The sun's rays were very powerful this day, and the heat was oppressive, even while sitting at rest in the boat."

By 1846 the Hudson's Bay Company had been occupying for some years and with financial success the post named Fort McPherson, which is some twenty miles up the Peel, an easterly affluent of the Mackenzie and about seventy miles north of the Arctic Circle. They also had a post at La Pierre's House near the headwaters of what is now the Bell River, about four days' walk for men carrying packs westward over the divide. In 1847 Alexander Hunter Murray received orders to cross from McPherson to La Pierre's House and descend the Bell and Porcupine to establish a post at its junction with the Yukon. He did establish that post, now called Fort Yukon, and took there a series of weather observations for eleven months, from the first of July, 1847, to the last of May, 1848.

The claim that it might be hot in the vicinity of Fort Yukon, just north of the Arctic Circle, was apparently first made in writing by Murray when he was reporting to his superiors upon the establishment of the post.

There are in Murray's "Journal of the Yukon," as published at Ottawa, 1910, few remarks about the weather, for he kept a meteorological journal separately—in which he makes no comments on how hot it felt.

When crossing the divide from McPherson to La Pierre's House on the Bell, Murray speaks of warmth for the first time on June 11 when he says ". . . the day was clear and warm, and the mosquitoes had already begun their ravages . . ." This would have been about seventy miles north of the Arctic Circle. June 12, at about the same latitude but well up on the divide, fairly high above sea level (perhaps 2,000 or 3,000



feet), Murray says that he “. . . took a short *nap* in the heat of the day, preferring to walk during night, when, although the sun is always shining at this season, it is cool. Again refreshed, we began to ascend the mountains, by a ‘zig-sag’ route amongst the rocks and snow banks, and in three hours arrived at the summit. Although calm and oppressively hot below, we had here a cooling breeze . . .” On the 21st of June when on the Porcupine River, still some fifty or sixty miles north of the Circle, Murray writes: “Compelled again to encamp early on account of rain, it cleared up in the evening and became very warm, and the mosquitos more troublesome than usual.”

For our purposes, mosquitoes are an indication of heat if not a measure of it. We quote Murray for June 25 just after they entered the Yukon from the Porcupine:

“Bearing to the south and sou’east another mile, we put ashore at the entrance to a small lake at ½ past 9 o’clock for the purpose of encamping, but the mosquitos seemed determined we should not, we were congratulating each other on starting at getting clear of Peels River before the mosquito season, but this is ‘out of the frying pan into the fire.’ I have been in the swamps of Lake Ponchartrain and the Balize, along the Red River (Texas) and most parts of the ‘Gullinipper’ country, but never experienced anything like this; we could neither speak nor breathe without our mouths being filled with them, close your eyes, and you had fast half a dozen, fires were lit all around, but of no avail. Rather than be devoured, the men, fatigued as they were, preferred stemming the current a little longer, to reach a dry and open spot a little further on, of which the Indians informed us. Another half hour’s hard *tugging* brought us to it, and we encamped on the

banks of the Youcon.

“I must say, as I sat smoking my pipe and my face besmeared with tobacco juice to keep at bay the d——d mosquitos still hovering in clouds around me, that my first impressions of the Youcon were anything but favourable.”

Murray has a statement of Fort Yukon summer on page 55:

“We were fortunate in having generally fine weather but there were often gales of wind, thunder storms and rain, the month of July was oppressively warm, the thermometer ranging so high that it would not have disgraced the tropics. I never before spent a summer so far north and could scarcely have credited others had I been told, that, on the banks of the Youcon, not far from the Arctic circle, the thermometer was, at 2 o’clock on the afternoon of July 10th, 90 degrees above zero—but of the weather anon; a meteorological journal was kept from the 1st of the month of which you shall have a copy.”

Thunder storms are frequently mentioned in the “Remarks” column of the meteorological journal, but there is no description beyond such notes as July 1, “Thunder with vivid lightning; heavy showers of rain;” July 2 “Heavy peals of thunder, gusts of strong wind and showers of rain.” And in apologizing for the omission of June from the meteorological journal Murray says: “The weather during the month of June much resembled that of May, generally clear and dry, but several thunder storms and showers of rain.”

Since we have no description of Yukon thunder from Murray, we borrow one from a chronicler of about fifty years later,

Archdeacon Hudson Stuck of the Episcopal mission, Fort Yukon. It is not from the post itself but from some distance downstream; Murray's notes of "heavy peals of thunder" were from north of the Arctic Circle; Stuck's description is from fifty miles south of it:

"It was in this fine region that the writer witnessed the grandest and most memorable thunder-storm of his experience. We were journeying up the Yukon from Anvik to Tanana, late in July, 1909, in the launch *Pelican*, after a week of the most intense sultry heat; and because it was too hot to run the boat by day and navigation was easy, we were running all night. Ponderous masses of cloud had accumulated about the peaks and domes of this range before it grew dark, and almost as soon as the last twilight faded the electrical combat began. The lightning fulminated from peak to peak, now in one blinding flash after another, now tremulously constant for several seconds at a time, illuminating their dark, cavernous recesses and revealing the whole wide river landscape, and shining so brightly through the windows of our engine-room that the polished parts of the motor gleamed in its light. The thunder crashed and pealed, and the reverberating boom from every shoulder and buttress had not begun to grow faint ere another crash and peal split the air. Now the clouds seemed to have advantage and descended to envelop and grapple with the peaks, as though to split and rend them with thunderbolts at close quarters; now the mountains seemed to prevail and the clouds withdrew awhile to reinforce themselves for another attack. And the strange thing about it was that the atmosphere of the river was wholly undisturbed by the titanic conflict; the storm was confined to the mountain tops and the region of the air they penetrated. All the brief night through,

the majestic spectacle was maintained, as hour after hour we pushed on from Melozikaket to Kokerines, and all night long, now at the wheel, and now leaning out of a cabin window, I watched it, entranced. As we passed Kokerines and the dawn appeared the conflict abated, but it was not until the thunder-storm on the mountains was over and the day was come that we ran into violent wind and rain that for a while tossed the launch about like a cockle-shell. The sultry heat was gone for the summer.

“Thunder-storms are not very common on the Yukon, though when they occur they are likely to be violent and notable, but there is no country I have lived in that stretches such vivid rainbows across its skies as does the Yukon country . . .”

From Sir John Richardson, Franklin’s companion, mentioned above, we find in the literature numerous references to Arctic heat. He derived some of these from his journeys with Franklin and some from his own expedition of 1848, when he searched for the then lost third Franklin expedition along northern coasts of Canada. Instead of laboring the point by numerous citations from this traveler-scientist we quote his summing up, found on page 144 in Volume I of his *Arctic Searching Expedition*, London, 1851:

“The irritability of the human frame is either greater in these northern latitudes, or the sun, notwithstanding its obliquity, acts more powerfully upon it than near the equator; for I have never felt its direct rays so oppressive within the tropics as I have experienced them to be on some occasions in the high latitudes.”

It seems that the nearest thing Richardson could find to long-continued observations of temperature north of the Arctic Circle in interior North America was the eleven-month series taken by Murray. From this he deduced a mean temperature for the hour of 1 P.M. during the five warmest months as being about  $49^{\circ}$  for May,  $62^{\circ}$  for June,  $75^{\circ}$  for July,  $71^{\circ}$  for August and  $53^{\circ}$  for September.

This statement by Richardson is clarifying to our inquiry, for we are investigating at the moment not merely how hot the travelers said it was on those rare occasions when they were so annoyed or oppressed by the heat that they wrote of it in their diaries; rather we are trying to find out whether these references are to a warm spell that was long enough to be considered a period, a warm season, indeed, a true summer.

That Richardson's Fort Yukon temperatures are for 1 P.M., rather than for the maximum heat of each day, tends to make his determination of the warm period somewhat conservative; a further degree of understatement is in that 1 P.M. is probably not on the average the warmest part of an Arctic July day.

Different places in the Arctic seem to have different times of the mid-season afternoon that incline to be highest. The Ray expedition concluded, for instance, on the basis of a year at Point Barrow, some 300 miles north of the Arctic Circle, that the warmest part of the day there was 4 P.M. If we take various points between Fort Yukon, about on the Arctic Circle, and Barrow, 300 miles beyond it, it seems likely that the period of the day which is usually hottest in July will be found somewhere between 1 and 7 P.M., say around 3 or 4 P.M.

The Richardson contention, then, being interpreted, means that both May and September are really a little warmer than he indicates, and that the warm period, therefore, is in reality somewhat longer than will be inferred from his figures, if we trust them.

Between 1836 and 1839 Thomas Simpson was engaged in a series of expeditions that are among the most notable in the history of northern Canadian exploration. During these he completed the mapping of the Arctic coast westward from the Mackenzie to Point Barrow, Alaska, and filled in the previously uncharted gaps eastward to the vicinity of King William Island, thus being, as some maintain, the real discoverer of the Northwest Passage.

When dealing with Simpson's *Narrative of the Discoveries on the North Coast of America*, London, 1843, we find that he descended or ascended the Mackenzie and Coppermine Rivers too early or late in the season for a chance to meet the sort of temperatures reported from those parts by other travelers. What we are able to quote from him is for the sea coast where, like the rest of the travelers, he was under the temperature control of the nearby chilled ocean. However, he does tell us from about 175 miles north of the Circle that on Tent Island in Mackenzie Bay, July 8, 1837, the thermometer read 78°. At the tiny Behrens Isles in Coronation Gulf, about 100 miles north of the Arctic Circle, July 17, 1838, he says that "As the day advanced the weather became sultry, and we were tormented on the water by swarms of mosquitoes." On July 21, somewhat to the east, there was "a sultry land breeze." On July 22, a bit farther east still: ". . . at noon . . . the thermometer stood at 71° in the shade, . . ."—which, by traveler standards, is a high

reading for a coastal temperature (as this was) though not high for inland.

Richard King, another of the medical men who have been northern explorers, seems to have been so much troubled by sultry weather on the early part of his journey northeast toward and along Back River that he ceased writing much in his diary about the heat before he got as far as the technical Arctic. A little north from Fort Reliance, when about 250 miles south of the Circle, he tells us, for instance, that “In an atmosphere of 107° of Fahrenheit . . . we of necessity proceeded at but a slow pace . . .,” and from Artillery Lake, a bit farther north, that “The temperature . . . was overpowering . . .” But he does make a heat entry for a point on the Back River about 75 miles north of the Arctic Circle that “. . . the weather was calm and the thermometer in the shade 72°.”

A subdivision of the dispute between the travelers and the cosmographical thinkers relates to Arctic vegetation. At first the systematic reasoners did not want to have any; but when reports continued to flow in about herds of grazing animals there was developed the explanation that, although the Arctic was too cold for grasses and the sort of vegetation to which we are most accustomed, there did exist certain lowly and hardy plants, the mosses and lichens, that could manage to live away up there, and that these were the food of the animals. In the more formal literature, such as school texts on geography, it was up to 1900 typical to find that “the vegetation of the Arctic is mosses and lichens” or that “the prevailing vegetation of the Arctic is mosses and lichens.”

Combating this “lowly vegetation” idea, some travelers have

gone to the extreme of claiming that north of the Arctic Circle there would be ninety-nine tons of flowering plants for every ton of non-flowering. They maintain that upon every Arctic island of size there is a far greater tonnage of flowering than of non-flowering plants.

During the first half of the nineteenth century, meadows, a presumptive indication of a climate not without a summer, were reported so frequently from mainland north of the Arctic Circle that it is not worth while to particularize. We do mention, however, the first of many references with which we are familiar to meadows in the Canadian islands. Such conditions are more frequently described from the southerly island tier, Banks and Victoria, perhaps (the traveler school says) not because they are more southerly but rather because the islands are larger so that, in the traveler view, they are able to create larger quantities of their own heat through having the sun striking greater areas of dark land; then, also, the winds that come to this tier from the south are not really sea winds, for they have been traversing the continent and have not needed to cross anything but narrow straits that are just wider than a river.

The second tier of Canadian islands going northward—Prince Patrick, Melville, Bathurst—has components that are smaller and there are to the south of them wider straits so that even the south winds are practically sea winds—and so, of course, are the west, north and east winds, as you will see by the map. Then these islands are more rugged—Melville, the one with which we are particularly dealing, has mountains estimated by travelers at more than 4,000 feet, from the valleys of which they have reported some glaciers. The area of Melville Island



is only 16,000 square miles as against 26,000 for Banks and 80,000 for Victoria.

From small and rugged Melville, then, an island the south tip of which is more than 500 miles north of the Arctic Circle, we learn in the Parliamentary Blue Books of Great Britain for 1855 that Lieutenant Frederick Meham reported he had seen grasslands which reminded him of English meadows. The passage runs: "Traced the shores of Murray Inlet as far as latitude 75° 19' N. . . . Between Capes Hoare and Beechy the land is remarkably rich in vegetation, which, at the time I passed, was a regular swamp, much resembling an English meadow. Great numbers of musk oxen, reindeer, and hares were seen to the eastward of Cape Smyth; the first mentioned in very great numbers on the land about Point Bailey."

The sequence of views on plant life in the Arctic was: there was none, because of the cold; there was very little, because of the cold; the little there was had to be of a special kind—it was decided that this would be mosses and lichens. When returning travelers continued to describe Arctic flowers the view was still further modified—there could be some flowering plants, but they would be described as hardy, lowly, coarse, stunted through the lack of summer heat.

Because it was an absence of real summer that was said to control the vegetation, it is material to our discussion that we give traveler-tale descriptions of those parts of the Arctic which are beyond the tree-line.

In 1893 Henry Seebohm, distinguished as an ornithologist, author of the books *Siberia in Europe* and *Siberia in Asia*, was

president of the geographical section of the British Association for the Advancement of Science. His presidential address, delivered at Nottingham during September of that year, was published in the *Journal* of the Royal Geographical Society of London for October. We quote extracts that describe vegetation and other life in such terms as to indicate whether they were probably the result of a warm summer. We call special attention to what he has to say about whether these northern lands should be referred to as Barren Grounds; for we mean to follow Seebohm, who speaks for Siberia, with a quotation from an author who speaks particularly of northern Canada.

The title of Seebohm's paper is "The North Polar Basin." He deals with it particularly from the point of view of his experience in Siberia which, according to the mentioned books, would be chiefly along the Pechora and Yenisei Rivers, therefore between the Arctic Circle and 72° N. Lat., a region the most northerly portions of which are about 350 miles north of the Arctic Circle. However, the address is a summary of recent polar exploration and brings in testimony from a variety of sources.

After saying about tundra that "In the language of science it is the country beyond the limit of forest growth," he goes on:

"By far the greater part of the tundra, both east and west of the Ural Mountains, is a gently undulating plain, full of lakes, rivers, swamps, and bogs. The lakes are diversified with patches of green water-plants, amongst which ducks and swans float and dive; the little rivers flow between banks of rush and sedge; the swamps are masses of tall rushes and sedges

of various species, where phalaropes and ruffs breed, and the bogs are brilliant with the white fluffy seeds of the cotton grass. The groundwork of all this variegated scenery is more beautiful and varied still—lichens and moss of almost every conceivable colour, from the cream-coloured reindeer moss to the scarlet-cupped trumpet moss, interspersed with a brilliant alpine flora, gentians, anemones, saxifrages, and hundreds of plants, each a picture in itself, the tall aconites, both the blue and yellow species, the beautiful cloudberry, with its gay white blossom and amber fruit, the fragrant *Ledum palustre* and the delicate pink *Andromeda polifolia*. . . . So far from meriting the name of Barren Ground, the tundra is for the most part a veritable paradise in summer. But it has one almost fatal drawback—it swarms with millions of mosquitoes.

“The tundra melts away insensibly into the forest . . .”

Farther on, in connection with a discussion of how life is distributed over the earth, Seebohm indicates what he thinks of those who try to make parts of the earth seem lifeless, or unsuited for plants and animals, because of low or high mean temperatures:

“Animals recognize facts, and are governed by them in the extension of their ranges; they care little or nothing about generalisations. The mean temperature of a province is a matter of indifference to some plants and to most animals. The facts which govern their distribution are various, and vary according to the needs of the plant or animal concerned. To a migratory bird the mean annual temperature is a matter of

supreme indifference. To a resident bird the question is equally beside the mark. The facts which govern the geographical distribution of birds are the extremes of temperature, not the means.”

We said we would follow up the description of the Old World Arctic lowlands by one of New World lowlands. Our witness for the Canadian Arctic is the Canadian naturalist Ernest Thompson Seton.

Seton had been hearing a lot in southern Canada about the Barrens, Barren Lands or Barren Grounds of northern Canada. He made a journey to see them, traveling down the Athabaska and Slave rivers and then going overland north from Great Slave Lake. He did not reach the technical Arctic; but he did penetrate far into what southern Canadians speak of as the Arctic Barrens. His resulting book, *The Arctic Prairies*, New York, 1908, tells that on August 1, 1907, he was paddling northeast along Artillery Lake, about 200 miles south of the Arctic Circle:

“As we spun along the south-east coast of the lake the country grew less rugged; the continuous steep granite hills were replaced by lower buttes with long grassy plains between; and as I took them in, I marvelled at their name—*the Barrens*; bare of trees, yes, but the plains were covered with rich, rank grass, more like New England meadows. There were stretches where the herbage was rank as on the Indiana prairies, and the average pasture of the bleaker parts was better than the best of central Wyoming. A cattleman of the West would think himself made if he could be sure of such pastures on his range, yet these are the *Barren Grounds*.”

At the turning point of his journey, a little farther north, Seton gives a description and an impression of the Barren Lands:

“As I stood on that hill [north of Lake Aylmer, about 150 miles south of the Arctic Circle] the foreground was a broad stretch of old gold—the shining sandy yellow of drying grass—but it was patched with large scarlet mats of arctous that would put red maple to its reddest blush. There was no Highland heather here, but there were whole hillsides of purple red vaccinium, whose leaves were but a shade less red than its luscious grape-hued fruit.

“Here were white ledums in roods and acre beds; purple mairanias by the hundred acres, and, framed in lilac rocks, were rich, rank meadows of golden-green by the mile.

“There were leagues and leagues of caribou moss, pale green or lilac, and a hundred others in clumps, that, seeing here the glory of the painted mosses, were simulating their ways, though they themselves were the not truly mosses at all.

“I never before saw such a realm of exquisite flowers so exquisitely displayed, and the effect at every turn throughout the land was colour, colour, colour, to as far outdo the finest autumn tints of New England as the Colorado Canyon outdoes the Hoosac Gorge. What Nature can do only in October, elsewhere, she does here all season through, as though when she set out to paint the world she began on the Barrens with a full palette and when she reached the Tropics had nothing left but green.

“Thus at every step one is wading through lush grass or

crushing prairie blossoms and fruits. It is so on and on; in every part of the scene, there are but few square feet that do not bloom with flowers and throb with life; yet this is the region called the *Barren Lands of the North*.

“And the colour is an index of its higher living forms, for this is the chosen home of the Swans and Wild Geese; many of the Ducks, the Ptarmigan, the Laplongspur and Snowbunting. The blue lakes echo with the wailing of the Gulls and the eerie magic calling of the Loons. Colonies of Lemmings, Voles, or Ground-squirrels are found on every sunny slope; the Wolverine and the White Wolf find this a land of plenty, for on every side, as I stood on that high hill, were to be seen small groups of Caribou.

“This was the land and these the creatures I had come to see. This was my Farthest North and this was the culmination of years of dreaming. How very good it seemed at the time, but how different and how infinitely more delicate and satisfying was the realisation than any of the day-dreams founded on my vision through the eyes of other men.”

Some time back we mentioned that a trend of optimism with regard to the Far North began with the disappearance from men's minds of the imaginary wall of fire to the south which had prevented Europeans from attempting voyages across the tropics—that Europe's dread of frost in the North tended to be weakened by their ceasing to dread fire in the south. From this developed, again as we have said, the belief of Columbus that the Arctic was habitable like the tropics, and, among later things, the campaign of the British for a northerly passage to the Indies which gained momentum in the time of Queen

Elizabeth.

The optimism upon which the crusade for the Northwest Passage had been based came to a full stop with a tragedy that seized the imagination of the whole world beyond most tragedies of history. This was the disappearance in the Arctic of Sir John Franklin and his 129 men, flower of the nobility, gentry and yeomanry of England. They vanished in 1845; the last expedition definitely in search of them as possibly still living was just after the American Civil War.

From Columbus to Franklin it had not been the chief motive of the explorers to be heroic and to grow famous; polar exploration had not been in the spirit of a marathon or of mountaineering. The explorers were not seeking triumphs, as such, or records. They had as their chief motive, to which fame and immolation were secondary, a desire to find something that would be profitable—a new and better seaway, a resource of land or of ocean. There was, accordingly, a motive and a temptation to report things as better than they were, or at least to play up the favorable and play down the unfavorable.

Now Europeans commonly feel that a warm and long summer is a good thing, tending to increase the feasibility of a highway or the value of a resource. We may consider, then, that all the witnesses we have cited between Columbus and King were likely to report warmth rather than chill, grass and flowers rather than snow and ice, schools of whale and herds of caribou rather than a lifeless sea and a barren land.

Our main theme, in this chapter, is the running fight of two thousand years between the travelers who pretended to report

how things were beyond the Arctic Circle and the philosopher-scientists who knew from principle how things must be. We turn, then, from our listing of travel reports to a review of what the scholars were saying during this period about whether there was a real summer in the Arctic.

Not untypical for the beginning of our story is J. Cowley's *A New and Easy Introduction to the Study of Geography*, which he says was "Written originally in High Dutch by the late celebrated Mr. Hubner, and now faithfully translated with Additions and Improvements." We use the third edition, London, 1746. On pages 18 and 19 we find, under the heading "Of the Frozen Zones," a dialogue:

"Qu. How are these *Zones* divided?

"Ans. Into Northern and Southern.

"Qu. Which is the North Frozen *Zone*?

"Ans. That Part of the Globe, which extends from the *Arctic Polar Circle*, to the *Arctic Pole*, and contains 23 Degrees and a half, or 1,410 *English Miles*. . . .

"Qu. What is the Nature or Quality of these *Zones*?

"Ans. They are always very cold; they have for six whole Months continual Day-Light, and no Nights; and the remaining six Months a continual Dusk."

There were, accordingly, as late as 1746 adherents to the doctrine of the warmth-less Arctic. However, the post-Columbian optimism to which we have referred, or possibly a



readiness for accepting traveler reports at face value which strenuous scholars would think gullibility, led some geographers long before this to take their views of the Arctic not from theory but from the narrative of explorers. A sample of these is Bernard Varenus who published in 1650 his *Geographia Generalis* in which he went to the narratives of the 1594-97 Dutch voyages to Spitsbergen and Novaya Zemlya for a description of the northern polar regions.

That American geographers did not lag behind the British, and the rest of the Europeans, in optimism regarding the summer climate of the Arctic, we see, for instance, from Jedidiah Morse. *The American Universal Geography*, published 1793, tells us on page 54 “That in the highest latitudes, we often meet with a heat of 75 or 80 degrees; . . .”

How the classic view of northern climate battled the traveler tales in the minds of geographers during the eighteenth century, and during the first half of the nineteenth, we can indicate so dramatically from the pages of one of the great scholars that we might perhaps be going farther and faring worse if we quoted a dozen authorities from each of the two main schools. We quote Malte-Brun.

Conrad Malte-Brun was born a Dane and brought up as Malte Conrad Bruun. An exile in Paris, he wrote the famous *Précis de la géographie universelle*, six volumes, 1810-29. He was one of the best known and most respected geographers of his time and one of the founders of the Geographical Society of Paris.

We use a three-volume quarto edition of Malte-Brun’s A

*System of Universal Geography*, “With Additions and Corrections by James C. Percival,” as published by Samuel Walker at Boston in 1836. We give first the optimistic view of northern summers, the one that fits in with the traveler tales and the spirit of the Northwest Passage crusade. We take from page 149 of Volume I:

“Beyond the 60th degree, and as far as the 78th, (which appears to be the limit of the habitable earth in the northern hemisphere,) only two seasons are generally known; a long and rigorous winter, succeeded often suddenly by insupportable heats. The power of the solar beams, though feeble, from the obliquity of their direction, accumulates during the days, which are extremely long, and produces effects which might be expected only in torrid zone. There have been examples of forests having been set on fire, and of the pitch melting on the sides of ships. . . . The days for several months, though of a monotonous magnificence, astonishingly accelerate the growth of vegetation. In three days, or rather three times twenty-four hours, the snow is melted, and the flowers begin to blow.”

In the second volume Malte-Brun hedges upon the optimism, and swings pretty well to the classic view, where he asks on page 177:

“Who, however, will dare to penetrate these frightful abodes of eternal winter; this gloomy region, where the sun sheds in vain his oblique rays on a soil doomed to perpetual barrenness; plains that are overspread with dreary moss, and valleys in which the echoes never repeat the warbling of even a solitary bird; these places, in fine, where nature sees her vivifying

influence expire, and witnesses the awful termination of her vast empire?”

## THE DECADES OF HEROISM AND MODESTY

Students of Arctic travel narratives find that passages dwelling upon extreme heat, and drawing therefrom optimistic conclusions such as those of George Best and John Davis, are proportionately most numerous from Elizabethan time, and become fewer to a low that followed 1850 or 1860. Analyzing the reports still further, we see that the few accounts since 1850 which picture from the Arctic the sort of heat we complain about in New York and Chicago are almost exclusively from river or overland journeys, hardly ever from the sea coast. This is in contrast with Elizabethan travelers who were wont to resemble John Davis in telling stories of summer heat even from coast lines. Davis himself brought his tales from what is now Davis Strait, where the shore of Greenland is chilled on two sides—by the ocean to the west and the inland ice to the east. Some students of traveler yarns from beyond the Arctic Circle have noticed that there were fewer tales, at least in percentage, of extreme heat from the north in the half century following the search for the lost Franklin expedition than there were in the half century before those expeditions.

The explanation may be the one we have suggested earlier, that from Columbus through Frobisher and Davis as far down at least as Hudson, the explorers were frequently sanguine adventurers, looking for an easy road to new lands of wealth and promise. Their expeditions were the more successful the

better the report—the less the ice, the calmer the seas, the gentler the breezes, the warmer the summers. The explorer was an advance agent of commerce and development, a herald of empire.

With the Franklin tragedy that period of northern exploration came to a full stop. Thereafter the explorers tended to become pioneers of science if not martyrs of science, daring souls who, with a modesty equal to their fortitude and their self-sacrifice, risked their lives to expand the horizon of man's knowledge. There crept in, too, the spirit of the marathon runner and the scaler of mountains, a striving for records of various kinds—the longest boat journey, the longest sledge journey, the attainment of the farthest north. The navigation of the Northwest or the Northeast Passage was not now as formerly a commercial enterprise but one that would reflect credit upon the leader of the successful expedition and upon his nationality.

This change in the motivation and procedure of exploration was perhaps in the nature of response to a law of supply and demand. After Franklin nobody for half a century believed in the possibility of a near and commercially valuable seaway to the Far East. The public did not expect an explorer to achieve any type of financial success. For instance, they took it for granted that if minerals were found the expense of mining them would be too great.

What the public now wanted from their explorers was a record which they could admire for perseverance in the face of difficulties, courage in the face of danger, triumph over obstacles—which made it desirable that the difficulties should

be many and the dangers great. The readers of newspapers, magazines and books wanted their explorers to excel—to go farther, to suffer more, and to be modest about it all when they got back.

With exploration changed from a quest for riches to a quest for honor, and with the rewards no longer proportionate to resources found but rather to hardships endured and difficulties overcome, there was no longer a motive for emphasizing the favorable; its place had been taken by a motive for dwelling upon the unfavorable. Now it is usual to think of cold as unfavorable and a hardship, warmth as favorable, making things easy. It would be strange if there had not been a shift in reports on Arctic summer warmth that corresponded with this change in the aims and rewards of northern travel.

Whatever the reason, traveler yarns about great heat beyond the Arctic Circle were few during the second half of the nineteenth century.

In one section of the continental Arctic, the Alaska part, there was following 1867 a spirit similar to that which led Henry Hudson and John Davis to undertake their northern journeys. The United States had purchased Alaska for \$7,200,000, a sum considerably larger than it is now. The money had been paid out by a Republican administration and so the Democrats naturally complained that it had been wasted. They called Alaska Seward's Folly, Seward's Lump of Ice. It was up to the Republicans to see to it that the Democrats did not have everything their own way; so there was from that angle a motive for publicizing whatever good there might be in the Territory.

Then Alaska was not sufficiently remote or unknown to be a particularly happy hunting ground for the new school of explorers, the modest heroes. With that avenue not available, there was a natural tendency to swing in the other direction, to discover resources and to find that things were not so bad as many had supposed.

These are at least plausible theories for explaining why it was that from Alaska poured a stream of testimonials about warm summers and a “tropical” growth of vegetation—and this during a period when the Arctic was particularly chilly elsewhere.

While as yet it seemed impractical to lay a submarine telegraph across the Atlantic there was a plan for a round-the-world system by way of Alaska and Siberia. During the special flurry of optimism created by that enterprise William H. Dall was “Director of the Scientific Corps” of the Western Union Telegraph Expedition. In that capacity he journeyed along the Yukon River. On June 23, 1867, he arrived at Fort Yukon and spent a few days north of the Arctic Circle. “The sun was so intensely hot that in the middle of the day we could do nothing, but during the cooler hours much of interest was added to my collection and my companion’s portfolio. At noon, out of the direct rays of the sun, one of Greene’s standard thermometers stood at 112° Fahrenheit.” Thus wrote Dall for the book we quoted some time back, *Alaska and Its Resources*.

July 8, 1884, a U.S. Revenue Marine Expedition, commanded by Lieutenant John C. Cantwell, left the *Corwin*, Captain M. A. Healy, at Cape Krusenstern, Alaska, about forty miles north of the Arctic Circle, and headed toward Hotham Inlet.

They were going to explore the westward-flowing Kowak (now less correctly named Kobuk), the channel of which varies generally between ten and fifty miles north of the Circle. The report of the survey, published in 1889, gives shade temperatures in “average for the day.” Averages of 85° in the shade are recorded for July 8, 11, 23, 24, and for August 14, 18, 19, and 20. Averages of 90° are given for July 9, 12, 15, 20, 25, 30, and for August 4 and 11. An average of 95° is given for July 19, 22, 26, 28, 29, and for August 5 and 12. It is forty-three days between Cantwell’s first and last entries that the “average heat” of the day was 85° F. in the shade. The August 20 record of 85° F. is pretty definitely the end of this hot spell; whether July 8 was the beginning is not to be learned from the diary, for it starts on that day.

The report does not explain why no temperature figure is published for about half of the days: it was probably because Lieutenant Cantwell forgot to enter the estimate in his diary. Some days, for which no average temperature estimate is given, are mentioned as warm.

Next year Lieutenant Cantwell was again in command of an exploring expedition, which began the ascent of the Kowak (Kobuk) on July 2, 1885. The published report does not give temperature estimates by days similar to those of the previous expedition and we have merely an occasional reference. The first of these is for July 13: “After a sound night’s sleep on the soft moss of the tundra we got away at an early hour, so as to take advantage of the cool air of the morning. On fine days the thermometer ranges from seventy-five to eighty degrees in the shade.”

For the first two weeks of the upstream passage, July 2-15, we have a general statement which we used in the introduction to this chapter and which we repeat here because it now has background and context: “The temperature of the air increased as we advanced until the thermometer registered as high as ninety-six degrees in the shade and seldom fell below eighty-eight degrees during the day, . . .”

In connection with July 16 we read that “The weather continued fair and intensely hot. The mosquitoes were simply terrific, and our lives were a burden to us altogether until we emerged from the low country and reached a portion of the river inclosed by high bluff banks.”

Evidently the heat continued, for it is from the days between July 19 and 23 (Cantwell does not mention all his dates) that we have another previously quoted sentence: “With the thermometer standing steadily at ninety-four degrees in the shade, and with no time to rest, one could ring the changes on a popular song and sing ‘an *explorer*’s lot is not a happy one’ with great feeling.”

There are no further references to great heat. On July 27, for instance, we are at the level of “. . . the air was warm and pleasant . . .”

In 1883 Lieutenant Frederick Schwatka of the U.S. Army made a “Reconnaissance of the Yukon Valley.” On that river journey he was naturally beyond the Arctic Circle only when in the vicinity of Fort Yukon. He reports that July 29 “. . . was an exceedingly hot, blistering day on the river and almost unbearable on the raft. . . . Here, within the limited part of the



Yukon River in and near the arctic zone, our greatest discomforts were the blistering heat and dense swarms of gnats and mosquitoes that met us at every turn.” That was how Swatka phrased it in his official report. The easiest way to see that document nowadays is in a huge quarto *Compilation of Narratives of Exploration in Alaska*, Washington, Government Printing Office, 1900, where you find our quotation on page 316.

A condensation of the journey narrative which made the heat seem, if anything, hotter appeared in *The Century Magazine* for October, 1885. When the Gold Rush created new interest and a renewed optimism the whole report was edited for popular reading. It was then a book called *Along Alaska's Great River* (Chicago, 1898). In the chapter “Through the Yukon Flat-Lands,” we read:

“Although we were at the most northern part of our journey while in this level tract, actually passing within the Arctic regions for a short distance at old Fort Yukon, yet there was no part of the journey where we suffered so much from the downpouring heat of the sun, whenever the weather was clear; and exasperatingly enough our greatest share of clear weather was while we were floating between the upper and lower ramparts.”

Such reports as those of Lieutenant Cantwell from the Kowak, and of Lieutenant Swatka and Dr. Dall from Fort Yukon, were not soft-pedalled during the Klondike gold rush when scores of printing shops in dozens of American and European cities turned out manuals, handbooks, guide books, for Alaska and the Yukon. We give a sample from pages 59-60 of

*Klondike: A Manual for Gold Seekers* by Charles A. Bramble, New York, 1897:

“‘Talk about it being hot here to-day,’ said one bearded Yukoner to a Seattle man, ‘why, this is cool weather compared to what we get during the Alaskan summer along the valley of the Yukon. The sun swings around there in a circle for three months, just dipping below the horizon part of the time for a night which is from three minutes to three hours long. It is one day for six weeks, when the sun never sets, and the only night is one conjured up in the imagination. Talk about it being hot. Why, up in the Yukon Valley in the foothills, the average temperature during the summer is 105 to 120 degrees. It never rains and the heat is pitiless.’”

Our *Manual* returns to the same topic on page 61:

“‘In summer the heat is something awful in the valleys of those little tributaries, and the miner is compelled to wear a closely-woven mosquito netting over his face and gloves on his hands, to keep from being blinded by the mosquitoes and black flies, which swarm in countless numbers in the valleys. So bad are they that the sleeves at the wrists and the trousers at the ankles must be tied tightly, or the little pests will crawl inside.’”

For mainland Canada north of the Arctic Circle we have found a general statement which saves us quoting miscellaneous authorities. This is from the report of William Ogilvie concerning his surveys in the lower Mackenzie section in 1888 which was published by the Dominion Government in Sessional papers, 4th Session, 6th Parliament, but which is

more readily accessible in *The Unexploited West*, A Compilation, by Major Ernest J. Chambers, Ottawa, 1914. We quote from pages 235-36 of the latter book:

“I do not know of any regular record of temperature having been kept at Fort McPherson, the most northerly point at which anyone is permanently settled in the district [about eighty miles north of the Arctic Circle]. The only information which I have is my own record for the last ten days of June while I was camped in the valley near the fort. The lowest temperature during that period was 37.3° Fahr. on June 20, and the mean minimum from June 20 to June 30 was 43.3° Fahr. The highest observed temperature during the same period was 74° Fahr. at 1.30 P.M. on June 21, and the mean temperature at that hour for the ten days was 62° Fahr. The lowest of these temperatures would not injure vegetation. The mean minimum for the whole month would be below this, probably two or three degrees, but even that would not arrest vegetable growth. When, in connection with the temperature, we consider the number of hours of sunshine in June and July, it seems evident that Fort McPherson has all the essentials for the successful cultivation of most cereals and vegetables. At this northern point refraction extends the time during which the sun does not set, so that there are about twenty-four hours of sunshine each day from June 1 to July 15. On May 1, the sun is up for about seventeen and one-half hours, and during August the hours of sunlight vary from nineteen on the 1st to fifteen on the 31st. The total hours of sun are seven hundred and six in May; seven hundred and twenty in June; six hundred and eighty-four in July; and five hundred and twenty-seven in August; in all two thousand six hundred and thirty-seven hours of sun out of the total, day and night, of two thousand, nine

hundred and fifty-two hours in the four months. As twilight continues while the sun is less than eighteen degrees below the horizon there is actually no darkness during this period. When the temperature is suitable, vegetation under these conditions thrives to an almost incredible degree, as the following shows. When I arrived at Fort McPherson on June 20, the new buds on the trees were just perceptible, and on the evening of June 22, the trees were almost fully in leaf.

“The mean minimum temperature for the month of July was 45.4° Fahr. The mean temperature for 1.30 P.M. was 64.7° Fahr., but on two occasions the thermometer went to 78° in the shade, and ten times to 70°. These temperatures were noted along the river, at different points of course, although during the greater part of the month my latitude did not change very much.”

Ogilvie's forecast about cereals at McPherson is now supported by representatives of the Department of Agriculture of the Dominion Government, as we shall bring out later. We mention here only one of their statements, to the effect that during most seasons when wheat has been planted it has ripened successfully, without hothouse or other special methods, at Thunder River, which is about as far north as Fort McPherson but on the east side of the Mackenzie.

It is hard to study this mass of testimony favoring Arctic heat and to remain unimpressed. Remaining unimpressed must have been even harder around 1900, for not merely the travel books but also the newspapers and magazines were then filled with tales of Arctic sweltering. Besides, nearly

every town of size in the United States and southern Canada had one or more of its native sons in the Yukon Gold Rush of 1897-98 or in the Alaska Gold Rush that followed. These men kept writing home; many of them eventually returned and brought with them their stories of mosquitoes and heat.

The mosquitoes, apparently, never succeeded in breaking into the textbooks, at least not in considerable numbers. But many geographies of the period 1895-1905 acquired at least a modicum of Arctic summer warmth. We feel the 1894 edition of *Primary Geography* by Alexis Everett Frye is typical. On page 77 of that book we read: "The cold belt of the north has very long winters and short summers. Along the Arctic coast in this belt the soil is deeply frozen the year round. The hot sun of the summer thaws it only a few inches in depth."

Once there, "the hot sun of summer," kept its position in Frye's *Primary Geography* through the 1898 edition, and beamed that year also from the pages of Frye's *Elements of Geography*. The 1906 edition of his *First Steps in Geography* tells that "During the few warm weeks of summer the topsoil thaws and wild flowers spring up."

However, the effect of the Gold Rush publicity of Arctic summer heat did not last; by 1920 it was perceptibly wearing off. In Frye's *New Geography* of that year we read on page 68, under "Frigid Zones": "The zones that spread round the poles are the *frigid zones*. . . . There is no warm season in the frigid zones, and even in summer the air is cold."

The gradual chilling, or re-chilling, of the Arctic by the school geographies, during the first decade of the century, may not

have been universal; but it was at least typical. Examine, for instance, the textbooks that were published over the name of Richard Elwood Dodge.

The Dodge *Elementary Geography* of 1904 tells us that “About the North Pole, and extending nearly one-fourth of the way to the equator, is the *North Cold Cap*, in which the climate is so cold that no crops can be grown.” Now one-fourth of the way from the North Pole to the equator is only twenty-two-and-a-half degrees, so that Professor Dodge has the southern limit of his Cold Cap at  $67\frac{1}{2}^{\circ}$  N. Lat., a degree (about 70 miles) north of the Arctic Circle—likely in deference to the Gold Seeker yarns about how hot it was on the Circle at Fort Yukon.

But as with the Frye geographies, the Dodge victory of the summer heat was short-lived. The forces of chill must have counter-attacked successfully; for in the 1911 edition of the same book we read that “About the North Pole and extending about one-third of the way to the equator is the *North Cold Cap*, in which the climate is so cold that no crops can be grown.” A third of the way to the equator is thirty degrees, which means that the dominion of heatless summers has been extended to Latitude  $60^{\circ}$ , about 450 miles south of the Arctic Circle.

This proved no momentary triumph of cold over heat, for we read twenty-six years later, in the 1927 edition of the *Elementary Geography*, now under the signature of Earl Emmet Murray as well as of Richard Elwood Dodge, that “Around the North Pole and extending about one-third of the way toward the Equator is the *North Cold Cap*, in which the

climate is so cold that no crops can be grown. In those portions of the North Cold Cap lying farthest south, or nearest the Equator, the snow melts in midsummer, and some moss, grasses and a few quick-growing plants thrive. No forests are found anywhere in this area, and only a few small shrubs and stunted trees grow there.”

We see, then, that the Arctic, after its sixty-mile retreat of 1904, not only regained that lost ground but captured from the north temperate zone by 1911 more than 400 additional miles, and held its gains in these textbooks at least down to 1927.

The directness of the issue between the cosmographers and the travelers on summer heat and its effects, has seldom been more clearly shown than by Dodge and Murray in what they say about there being no forest a third of the distance south from the Pole, 60° N. Lat. A glance at the map reveals that practically all of Alaska except the panhandle is north of 60°, therefore devoid of forest according to our textbook—and that was particularly interesting for 1911 because the administration of President Theodore Roosevelt had just been in a row involving the forest resources of Alaska that filled the newspapers; the famous Pinchot-Ballinger dispute which must have seemed, at least to Dodge and Murray, an academic discussion.

It was in 1913, two years after the Dodge and Murray southward extension of the Cold Cap, that Elihu Stewart, who held in Canada a position similar to Pinchot's in the United States, issued his book *Down the Mackenzie and Up the Yukon* in which he reported forests not merely north of 60° but even

100 miles north of  $66\frac{1}{2}^{\circ}$ . In that period, too, was published the famous atlas of the Imperial Government of Russia which placed the northern limit of the Siberian forest 250 miles north of the Arctic Circle, about 700 miles farther north than Dodge and Murray have it.

It seems, then, that the flurry of Alaskan heat reports for the Arctic summer, connected with the Yukon and Alaska gold rushes, caused in the textbooks a retreat of the Frozen Zone northward as much as a degree beyond the Arctic Circle, 60 or 70 miles; but that within a decade began a reverse swing of the pendulum, which we have symbolized through quotations from Dodge and Frye geographies. This wiped out not merely the gains beyond the Circle which had been made by the travelers but threw them back an additional 400 miles.

Two or three times in our presentation we have mentioned a theory which, if accepted, would go at least part way toward solving our mystery of why travelers and cosmographers remain in disagreement on whether Arctic lands have a summer. The suggestion is that in periods of optimism, of geographic pioneering and of an "expanding economy," the controlling motive of the traveler is a desire to find something of commercial value. Under that influence there is a tendency to magnify whatever is believed to be advantageous. For the Arctic this would include a tendency to lengthen and warm up the summer. In periods of discouragement and retrenchment there would be a reciprocal tendency to "look facts in the face," and to conclude that "we might as well admit first as last" such things as the hopelessness of trying to build up in Canada (or in a country resembling Canada) a nation



comparable to the United States—when the northern half or two-thirds of Canada is (“if we will only face the facts”) so cold that nothing would grow there and nobody would want to live there.

During optimism periods the cosmographers would be met with a barrage of testimony, from enthusiasts who had been in the remote North, that in the Arctic, where no summer ought to be according to the doctrine of zones, there really is a usable and valuable summer. In the periods of retrenchment the cosmographers would have little opposition.

But even if this be true, or at least partly true, we still have to explain why it is that theoreticians cling so desperately to the doctrine of the summer-less polar zones—after having surrendered, practically to a man, the sister doctrine of the burning and uninhabitable tropics.

The fact is, of course, that the burning tropics simply had to be given up—it was not possible for theory to cope with a year-round traffic that, decade after decade, traversed the ocean between Cancer and Capricorn, bringing home uniform testimony that although the heat was continuous it was not intense. That could not be ignored, but they could manage better with the Arctic; for no considerable traffic was using it for its highway.

And then came the Antarctic, a godsend to believers in frozen zones. The southern polar land, when it began to be explored around the 1900's, did not prove an identical twin with the Greek concept; but there was a strong family resemblance.

An orthodox frozen zone should never be warm. From south of the Antarctic Circle it was reported that whole years had been spent by an expedition without the temperature rising above  $38^{\circ}$ , while  $47^{\circ}$  is nearly if not quite the maximum. What a relief that was to the cosmographers, after struggling to explain away Arctic records of  $97^{\circ}$  in the shade!

An ideal frozen zone has all its land always covered by vast quantities of snow. The region within the Antarctic Circle seems to be at least 95 per cent snow-covered, in many places to depths of thousands of feet. That really is coming up to expectations. No bother there to explain such things as the claim for Arctic Alaska that in summer it has less snow than the State of Washington, and that in Alaska itself there is a thousand times more August snow within a hundred miles of the south coast than there is within a hundred miles of the north coast.

Rightly there ought to be no vegetation at all in a polar land, although of recent years it has been conceded that the Arctic may have some mosses and lichens; beyond the Antarctic Circle there are few mosses and lichens, and apparently no flowering plants—as against more than 800 flowering species reported from north of the Arctic Circle.

A frozen zone should have no land animals. There are none in the Antarctic, against the millions of caribou, and the great numbers of other beasts, that have been reported from the Arctic.

The Antarctic, in short, is an honest-to-goodness Frozen Zone. One author of several books on the Antarctic, and of one on

the Arctic, the Reverend J. Gordon Hayes, has gone so far as to say that, with the exception of Greenland, there is no really Arctic land in the Arctic; and even Greenland, he is forced to admit, is a bit disappointing.

There is, for instance, the trouble about Greenland that although it is more than 1500 miles long there is in summer more snow within 50 miles of its south tip than within 50 miles of its north tip. And, what is worse, snow-free Peary Land, handiest of all neighbors to the North Pole, does not conform very well to the elementary proprieties. Bare land in the Antarctic is usually considered to be snow-free because the wind has blown the snow away, but for the Arctic the travelers claim that the snow of winter leaves even Peary Land as it leaves Vermont or Dakota, by melting—which requires heat. Not even the vegetation has ever heard of Emily Post. It should be mosses and lichens. But mosses and lichens do not “prevail” up there; for chief in quantity are such flowering plants as grasses and sedges. To cap the improprieties, there are grazing animals feeding at all seasons, spending in Peary Land their entire lives. The flowers even have insects fluttering about them—Peary reported butterflies and bees.

So, even with Greenland available in the north, it is a true lifesaver to have in the south the Antarctic continent.

In the study of our problem, we have imputed motives to travelers for playing up summers and summer warmth during times of optimism. We have also suggested that during the period of heroism and modesty, which developed following the tragedy of the Franklin expedition, there was a reverse motive for dwelling upon cold and blizzards and saying little of

butterflies and sultry weather. So far we have not imputed motives to the cosmographers.

Cosmographers are thinkers, and it has long been recognized as a deep craving of the mind to bring order from chaos. Greek thought, from which much of ours is descended, was swayed by doctrines of beauty, of simplicity and of symmetry. Mathematics is the most effective tool of the orderly thinkers. When the philosophers gradually developed into scientists they relied on mathematics more and more; until it began to be said, and is frequently said nowadays, that a true science deals only with things that can be measured and are measured.

Cosmographic ideas of weather temperatures have always depended upon measurements, assumed or real. First the Greeks made the tropics burning and the Arctic freezing by simple estimates of distance—the equator was too near the sun and the Arctic Circle too far away. Later, when the sun had been moved to such a distance that the difference in remoteness between pole and equator became negligible, other measuring schemes had to be devised. It was then figured out that if the beams of the sun strike a surface at an angle they are spread over a larger area than if they strike it vertically. This principle was for a time as satisfying as the Greek one of distance—it explained why the equator was hottest and why the poles were coldest. It explained that the equator had both intensity and uniformity of heat and that the polar zones were not merely intensely cold but also uniformly cold.

When this reasoning in its turn no longer sufficed there were discovered several ways to explain what were said to be exceptions to the rule. Chief explainers were the currents of the

ocean; but there were also currents or trends of wind and there was topography.

But it has been known for many centuries (we have shown George Best knew it in 1578) that for determining in advance the probable temperature of a lowland remote from the sea you must give equal consideration to at least two factors—how much light the sun delivers to a unit area per hour and for how many hours a day the delivery is made. Best was led to a conclusion which is scarcely over-simplified when we say he figured that in late June twenty-four hours of Arctic daylight would deliver as much heat to the North Pole as twelve hours of tropical daylight can deliver to the equator.

One of the logical conclusions, then, from Best's argument would be that if the whole square mileage within the Arctic Circle were a lowland, the first week of July would be as hot at the North Pole as it is on lowland at the equator.

It seems a bit difficult to understand why the cosmographic type of thinker did not find this reasoning agreeable. It was mathematical enough; indeed it has been computed that Best was right about heat delivery being as great in twenty-four hours within the Arctic Circle as within the tropics—you find that result in tables used by standard works of meteorology, such as Hann's.

A possible answer is that the cosmographic type of thinker nowadays is usually a teacher, and teachers have a deeper craving than most of us for simplicity and symmetry. Few things are more teachable and learnable than the ancient Greek statement that in the tropics it is always hot, that in the

temperate zones it is not very hot or very cold, and that in the polar regions it is always cold.

Moreover, the cosmographer-pedagogue has found that his view is in the main upheld for the southern half of the earth, or at least for the polar zone of the southern-half; that it is more or less upheld in the north by Greenland is also a big help to him.

The northern ocean, too, is partly on the side of the cosmographers. It manages a simplicity of temperature control that resembles the Greek if you do not analyze it too closely. Through its well known absorption gifts, water can store cold in winter and release it in summer. This release of chill is sufficient to preserve throughout the summer a considerable part of the snow that fell upon the northern ice the previous winter. This snow, too, cooperates with the theorists by reflecting a large portion of the sunbeams, preventing them from being converted into heat.

So far so good. But if you look more closely you will find that even at sea more heat is being developed than strictly fits the ancient theory. There is distributed nearly or quite all over the Polar Mediterranean a microscopic plant called "pink snow," so that in April or May, while temperatures are still dropping to 20 below zero at night, snow banks on the drifting sea ice even hundreds of miles from land begin to turn slightly yellowish or pinkish. That sort of thing grows by what it feeds on. The yellower the snow bank the more sunlight fails to be reflected and is converted into heat; and the more heat so developed the yellower the snow becomes. Then you find here and there sea plants and sea animals that have been embedded in the ice. When one of these is at the surface, perhaps because

the chunk of ice has been turned upside down by pressure, a lake of thaw water will form around each dark animal or plant nucleus. The sea ice in spring is pockmarked by the resulting lakes.

Also, there are the splinters and snags of ice that are sticking up at various angles because the floes have been crushed by pressure generated through winds or currents. This ice, when there is much salt in it, is a creamy white; but the salt is eliminated gradually and many of the snags are blue because they are a year or more old and the salt has been eliminated. On these the melting is appreciably more rapid than upon white snow surfaces.

And so it came to pass that when Papanin and his three companions were established in a scientific encampment upon a drifting floe at the North Pole in 1937 they began presently to send out radio messages telling about difficulties with thaw water on top of the sea ice; later they started telling about the rain. For, the Greeks and a few modern die-hards to the contrary notwithstanding, it does rain in summer all over the polar sea, including that focus of newspaper concern the North Pole.

From the Antarctic, then, and to a more qualified extent from Greenland and from the Polar Sea, the believer in a simple mathematical treatment of climate has at least apparent support. Then he has a good fortune of a related kind; the cooperation of the sea is particularly effective in that until recently nearly all Arctic weather observation stations were located on coasts. What these stations usually measured was therefore the chill of sea air that was flowing inland across the

shore line. For if it be right, as the travelers claim, that snow disappears from the land in spring and that it becomes fairly warm, or even terrifically hot, a few miles or a few score miles inland, then there would be a tendency for warmed air to rise over the land and cold air to flow inland from the sea to take its place.

In Canada and Siberia the orderly thinkers have had a still further advantage, that weather observation stations which were not located on a sea coast were mainly set upon the banks of north-south rivers. It is a common observation of travelers down the Mackenzie that usually the wind is from the north, up the river channel—travelers often say the wind is from the north three days out of four, but it need not be quite that much and still be enough to have a profound effect upon mean temperature records. It is reported that if you have occasion to go sidewise from the Mackenzie (and the like will apply to the north-flowing rivers of Siberia) you will find the weather not only much hotter when you get five or ten miles up a branch stream but you will also be able to confirm that this is usual by noting that the forest growth is much heavier—the trees are bigger, more straight and stand closer together on the average, which is no doubt from the combined result of more summer heat and less summer wind.

The orderly mathematical thinker, pleased with the chill reports from shore and river, takes that gift horse without looking in its mouth and regales us with an explanation of why it is always cold, one which he borrows from his colleague, the physicist. For simplicity of presentation, we repeat, clergyman-style, the text of our discussion, which we have from Professor Trewartha in the cited 1937 *An Introduction to Weather and*



## *Climate:*

“In spite of the long duration of sunshine in summer, temperatures remain low, the rays being too oblique to be genuinely effective. Moreover, much of the solar energy is reflected by the snow and ice or is consumed in melting the snow cover and evaporating the water, so that neither the land surface nor the air adjacent to it becomes warm.”

Thus, in the best scholastic tradition, do a few stalwarts hold high in our time the banner of Parmenides and Aristotle, fighting the ancient battle with modern weapons.

There have been serious inroads, however, into the ranks of the orthodox, and perhaps for reasons of the kind we have given. An optimism spirit has been maintained for Alaska. The U.S. Government is still wanting to make good on its purchase from Russia. They have agricultural experimental farms in different parts of the Territory, and they issue pamphlets. The Weather Bureau has been drafted and sends in its reports constantly, among other places from that hot spot of the Alaskan Arctic which was made conspicuous in 1867 by the lurid report of William H. Dall.

In Canada the situation has been less favorable to the optimists, and perhaps for a special reason. Therefore we leave Canada for separate consideration and pass on to Siberia.

It seems agreed that the Siberian Arctic is hotter in summer for a given latitude than the North American Arctic. This is, of course, because the land mass of Asia has been able to push the northern sea farther back toward the Pole. The most

northerly tip of Alaska is about 340 miles north of the Arctic Circle; of Canada 380 miles; of Siberia 800 miles.

Travel reports seem uniform that an evergreen forest is not found in the Arctic except at places which have intense summer heat, shade temperatures well above 80° F. This means that sea breezes do not reach the trees effectively, which in turn means that either the place is far from the sea or it is protected from sea winds by the topography. On this basis travelers feel they have demonstrated intense heat wherever they have demonstrated that there is an evergreen forest. According to the forestry information of the three chief Arctic countries, the treeline is a little more than 100 miles north of the Arctic Circle in Alaska, about 180 miles north of it in Canada and about 400 miles north of it in Siberia. In all three countries the place where the forest is most northerly is in a district that is remote from any pronounced influence of a known warm ocean current.

There have been in the Soviet Union since 1917, or perhaps since the end of the fighting period some years later, more powerful causes for optimism than have as yet applied to northern lands in any other part of the world.

The Soviet Government, according to its own statements, expected a war in the North Pacific. They knew that their Trans-Siberian railway was unequal to the transport problem and felt they could not rely upon a southerly route for vessels—the Suez or Panama canals or the passages around Good Hope or the Horn. Therefore they simply had to open up a seaway from the Atlantic to the Pacific around the north of the Old World, which gave a powerful motive for the discovery of

warmth where cold had been thought to be, of open water where ice was thought to be.

The great rivers of the Soviet Union flow north into the polar ocean. Two or three of them are comparable to the Mississippi as potential arteries of commerce, perhaps even better in having deeper channels. Several other rivers are comparable to the Ohio or the Hudson. If these streams could be used as water highways, the produce of central Asia could come down them to the sea for carriage by steamers to where needed in the Soviet Union, or to markets abroad.

The reasons of commerce and development were the same as the military—it was desirable to find in the north of the Soviet Union as many resources and good qualities as possible. Many have been found. The summers are reported longer and warmer than formerly believed, there is less ice in the sea—in short, the Northeast Passage is a practical seaway.

To support the traveler position on the Soviet Arctic we need not quote many travelers separately; for the view of the Soviet Government, deduced from many reports of explorers, has been placed in a nutshell by H. P. Smolka's book *Forty Thousand Against the Arctic*. He is quoting Professor Otto J. Schmidt, now retired because of ill health to a position of high honor and scholarly quiet as vice-president of the Soviet Academy of Sciences, but active when he spoke to Smolka and virtual dictator for all mainland territory east of European Russia and north of 62°, as well as for the islands in the Polar Sea. He was in control of practically every activity on sea and land in that vast empire, the mainland part of his territory alone being in extent about the equivalent of two-thirds of the

continental United States. Speaking in 1936 Professor Schmidt said:

“Russia has embarked upon a great scheme of industrialization, navigation and aviation in the Arctic. We are building towns and ports in the Polar regions, factories, mines, vegetable plantations, aerodromes, schools and hospitals. People believe that the Arctic is waste-land, incapable of development, useless to mankind, a frozen desert. They are utterly wrong. . . .

Beautiful flowers grow in the Arctic—violets, marguerites, forget-me-nots, they grow even bigger than here, because their growth is not arrested overnight. The same applies to our cabbage plantations. We get larger cabbage leaves in the Arctic than on the Volga. . . . Now we are experimenting with wheat and oats. Our geographic position demands that we should look north. The whole northern coast of Asia is ours. . . . Our largest rivers flow north into the ice-bound sea, the Obi, Yenisei and Lena. They are the longest rivers of Asia, among the longest of the world. We are going to take products up and down these rivers, change them over to ocean vessels at their mouths, and thereby establish communication from Europe and America, . . .

“Our new Polar towns grow rapidly. One, Igarka, has up to 20,000 inhabitants during the summer, the permanent population is 12,000. Their life does not differ very much from that of other Russians. They have cinemas and theaters, dance halls, restaurants, kindergartens and clubs. In the summer of 1935 they were visited by forty foreign ships which came to take Siberian timber away.

“Our Polar settlements are linked by air lines—we have a fleet

of over one hundred Arctic 'planes, 10,000 miles of regular passenger lines.

“We have opened the North-east Passage for navigation during three months of the year. An old dream has come true now that this new shipping route between Europe, Asia and America is established. It links our European territories to the Far East. In three hundred years not more than nine little boats have passed Cape Chelyuskin, the northernmost tip of Asia. In the summer of 1935 eleven of our cargo boats assembled there simultaneously. . . .

“All the men and women who have gone to the North are unanimous in praising its beauty—its colors and shapes, the particular charm of the landscape—summer as well as winter. There are no diseases; the air contains no germs, it is the ideal country for tuberculosis nursing-homes and holiday hotels. We fully believe the word stamped by the American Polar explorer Stefansson: ‘The friendly Arctic.’ But we do not only believe in it, we are really making friends with the Polar world, we are bringing it to life and life to it.”

All of this, but particularly what is said about experimenting with wheat and oats, will indicate that the Soviet Government has adopted a national policy based upon the traveler's tale picture of Arctic continental lowlands. They claim that there is less permanent snow in a million square miles of Siberia north of the Arctic Circle than there is in the southern half of Canada's British Columbia. They maintain that they have already produced wheat 150 miles north of the Arctic Circle, thus about 75 miles farther north than Canada has, which means intense heat that far north since wheat does not ripen

otherwise.

In a way the United States has also adopted the traveler's tale picture of the Alaskan Arctic as basis of American policy. Being a capitalist state and not a socialist, they are not in a position to build cities and develop mines through governmental agencies; they have had agricultural experiment stations, the most northerly, however, some fifty miles south of the Circle—but they claim to gather information from north of the Circle, as we shall see.

We have quoted for the period before 1900 several books and reports printed by the United States Government which gave circulation to tales of extreme summer heat—those of Dall, Schwatka and Cantwell are the ones we cited, but they published many others. This activity is being continued by the Government, particularly through the agency of the Weather Bureau, the work of which we shall discuss more in detail toward the end of our study. We now present travelers who, through books, have been reporting Arctic summer heat from Alaska since 1900.

Our first witness is the famous Arctic traveler A. W. Greely who commanded the American expedition which wintered in Ellesmere Island 1881-84. Later he was chief of the U.S. Army Signal Corps, in which connection he traveled widely in Alaska. In 1909, then Major General, Greely published his *Handbook of Alaska*. The introduction says, speaking of him in the third person:

“Twice he has exercised supreme military command over Alaska, and under his control and supervision was built the

Alaskan military telegraph system—over 4,000 miles of land lines, submarine cables, and wireless. In six visits to Alaska he has thrice traversed the whole Yukon Valley, visited Fairbanks and Prince William Sound twice, and Nome three times.”

The *Handbook*’s section on climate makes clear Greely’s view that the top summer heat records of the Territory are not materially contributed to by the influence of the sea, and points out that the greatest Alaska heat up to that time reported was from north of the Arctic Circle—the southeast tip of Alaska is about 800 miles farther south. Greely says:

“The culmination of the summer heat and of the winter cold is found at almost the greatest distance from the surrounding seas—in the valley of the upper Yukon. The typical station for this region is Fort Yukon with its July mean of 64° and a January mean of -31° . . . .”

During 1908 T. A. Rickard was in Alaska. He is by profession a mining engineer but has written a number of books outside that specialty, such as *Man and Metals*, works which rank him among the world’s foremost authorities on the primitive relation between man and the mineral kingdom. He has varied interests, among them agriculture, and spent some time with Dr. C. C. Georgeson, special agent of the U.S. Department of Agriculture in charge of an agricultural experiment station at Rampart, about 50 miles south of the Arctic Circle. Dr. Georgeson was able to give information about conditions beyond the Circle. We quote Rickard’s paraphrase from *Through the Yukon and Alaska*, San Francisco, 1909:

“Potatoes always do well, and they are doing better as potatoes

grown in Alaska are used for seeding. It is a fact that this staple tuber has been grown 60 miles north of the Arctic Circle; that is as far as any pioneer gardener has yet ventured. Cabbages also, with cauliflower, peas, turnips, radishes, lettuce, carrots, parsnips, parsley, beets, onions, squash and rhubarb, all flourish during the short warm summer.”

By inference this shows Dr. Georgeson’s view on how summer temperatures run for at least the first 50 or 75 miles north of the Arctic Circle. Then comes the east-and-west Brooks Range with its mountain climate; beyond that lies the great Arctic prairie triangle of Alaska, its base nearly 800 miles long from the Mackenzie to Cape Lisburne along the north side of the Brooks Range; its apex at Point Barrow, more than 300 miles within the Circle. How the temperatures of that plains country strike travelers of the geologist and geographer type we can infer from some verbatim diary extracts for the summers of 1924 and 1926 which were kindly furnished through a letter dated June 7, 1940, by Dr. Philip S. Smith, Chief Alaskan Geologist of the U.S. Geological Survey.

On June 18, 1924, Dr. Smith was at the junction of the Killik and Colville Rivers, therefore about 175 miles north of the Arctic Circle and about 100 miles from the northern sea. That night the tent was “so hot we all ate outside.” Four nights later, a little farther west but about the same distance north, he “slept in open on hillside all night and was very comfortable.” The 23rd they were still the same distance north but now about 150 miles from the sea, for Point Barrow, apex of the prairie triangle, was almost straight north of them: “It was perfectly glorious all day—so warm that we sweat heavily while working and even wading knee-deep (in the river) didn’t



get chilly.”

Just before the middle of July they began ascending the Awuna, thus getting a little farther north as they continued. On July 14 they were a bit less than 200 miles north of the Arctic Circle and nearly 150 from the sea when on July 14 Dr. Smith entered in his diary: “Sprinkled a few drops but on whole hot summer day. . . . Hot day and sweat a lot.”

In August of the same year Dr. Smith was on the Ikpikpuk, therefore in lower country though not yet out of the mountains, distance about 200 miles north from the Arctic Circle and about 90 miles from the ocean. The night of August 5 he “slept badly on account of mosquitoes and heat.”

On another expedition Dr. Smith found himself during June near Point Lay on the Arctic coast of Alaska, about 250 miles north of the Arctic Circle. On June 18, 1926, it was “So hot I rowed all the time in my undershirt.”

During early July the party was on its way southward up the Kuk River about 275 miles north of the Circle and not far from salt water, although inland; for the Kuk is in that section really a long fjord stretching south. The night of July 10 it was “so warm that it was hard to keep covered from the mosquitoes and yet cool enough to sleep.” The 11th they “Had miserable night as it was so hot;” and the 12th it got “pretty warm by morning.” The 15th it was “another good day, but hot.”

The 19th, at the head of the Avalik River, about 150 miles north of the Circle and 80 miles from the sea, it “got very warm and I had to sleep on top of bed. . . . The heat

unbearable. . . . The mosquitoes have been about the worst I have ever seen and the heat most enervating.” From the map this was in among some pretty high foothills. The 23rd “it cleared off, however, and was quite hot;” the 24th it was “very hot morning—within the tent insufferable;” and the 26th “it is very warm.”

In a letter of June 3, 1940, Dr. Smith gives a more general impression of that inland Arctic summer heat upon which the quoted diary entries were based:

“As to non-instrumental observations, it is, of course, a matter of common knowledge that the temperatures sensed by outdoor men in the summer in central and northern Alaska are often oppressive. On a number of the Geological Survey expeditions we have preferred during the summer to work during the period from 8 P.M. to 6 A.M., because it was somewhat cooler and less trying on the men and animals than during the other part of the day.”

The Dall and Schwatka opinion of Arctic heat in the Fort Yukon vicinity has stood the local test up there at least to 1929; for in 1930 Mary Lee Davis in her *Uncle Sam's Attic* copies with approval the Schwatka tirade which we quoted, and adds a passage we did not use:

“We [Schwatka's party] drifted down the hot river, by low banks that needed nothing but a few breech-clouted negroes to convince us that we were on the Congo.”

Then she comments, seemingly on the basis of her own local experience: “One surely does not enter through any ice portal,

to reach these flattened polar areas! In fact, temperatures of 110° and 115° in the sun have been recorded here.”

In another chapter Mrs. Davis confirms this on the authority of Dr. Grafton Burke who was stationed at Fort Yukon for many years in charge of the Hudson Stuck Memorial Hospital of the Episcopal mission: “Dr. Burke tells me that four miles within the Arctic Circle, at Fort Yukon, a mark of 100° has been recorded at the official and carefully read Weather Bureau station there.”

To illustrate the effect of such heat in the Yukon valley Mrs. Davis says: “Memorial Day is garden-planting day with us. Celery and cauliflower, already started in our hothouses, are now set out; and pansy beds are made. . . . We plant our ninety-foot all-round-the-house nasturtium beds, knowing that all in an unbelievably short time they will be up and blooming, for by June first there is continuous daylight. And we townspeople take a great delight and pride in our flowers, and mass our summer cabins with them. I’ve seen sweet peas grow in profusion, twelve feet high, completely smothering tiny cabins that were so short a time before snow-covered.”

According to the traveler point of view, the Arctic resembles the temperate zone in that great summer heat is associated with low flat land. Up on plateaus and in mountains the days may be hot, though not so hot as lower down; the notable difference is in the nights, which are cooler in the mountains. Frosts at night are common, or at least come earlier in the season.

This chapter, on the problem of Arctic summer heat, has

naturally stressed lowland testimony; for it is from low flats, like those of the Yukon and Kobuk, that you get extremes of temperature readings and of human reactions. To round out the picture we should describe a mountain summer. We do so for Wiseman which is about 400 miles east from Bering Sea, about 200 miles south from the Polar Sea and about 70 miles north of the Arctic Circle. It is about 675 feet above sea level, a valley town set among mountains.

Our portraitist for this Arctic mountain village is Robert Marshall, later in the forest services of the U.S. Government; the book is his *Arctic Village*, New York, 1933. We take from the chapter "Climate" Marshall's description of spring, summer and autumn as they seemed to him in 1931. He had arrived at Wiseman the previous August.

"By the middle of April there is no more total darkness. The snow commences to melt on the roofs under the influence of the high sun. . . . Early in May the niggerheads are already in blossom, though most of the ground is still buried under snow.

"Before the middle of May there is so little snow left in the flats that sledding becomes impossible. Then some day, without any warning, you perceive that the ice is gone from the river and the water is running free. Day by day the snow continues to disappear until the flats are all bare, and the mountainsides show a spectacular speckling of white and green. Only the north slopes still remain a pure white. But not for long. Under the constant vigor of the sunlight, which is already shining more directly than it ever does in temperate zones, the snow is taken away so rapidly that you can almost see it disappearing, hour by hour. . . .

“Meanwhile the flowering plants are at the height of their glory. The delicate white blossoms of the Arctic anemone are sprayed along the warmer banks as early as the middle of May. They are shortly followed by the golden dandelions and buttercups, the purple violets, the goldthread, and the angowuk. Early in June the spruce forests are carpeted with the large, white blossoms of the Dryas, most widely distributed of all the Arctic plants. Throughout the month this eight-petaled flower makes the woods glorious. Its place of prominence is followed by the golden California poppy and the Arctic sage and later still by a myriad of blue forget-me-nots. . . .

“In summer the weather becomes as warm as in many mountainous parts of the United States. On July 29, 1923, the temperature in the shade rose as high as 90° F. at the Weather Bureau Station at Allakaket. . . . [A U.S. Weather Bureau map shows an “Average Annual Maximum Temperature” of 90° for Allakaket, which is just on the Arctic Circle. This map gives Wiseman an average maximum of 85°.]

“If you come to Wiseman for the first time during the summer months there is little to suggest the Arctic. You see green hills rising all around you to end in rocky summits three thousand feet above the valley, yet not a trace of snow on any of them. There is dark green timber in all of the valleys and well up on the south-facing mountain slopes. The muddy flats are covered with clumps of sedges, and many delicate flowers are in bloom from the valley floor to the highest summit. . . .

“There will come a night, some time about the middle of August, when the thermometer will drop well below freezing, and in the morning when you rise to look outside your cabin

you will notice the whole valley tinged with yellow. From then on summer will keep building toward autumn. First the birches, then the cottonwoods, then the willows become bright golden. The hillside herbs turn red and purple and yellow. . . .

“Early in September the birch leaves come down in great numbers, and soon after the cottonwood commences to lose its foliage. . . . The ground becomes frozen even in mid-day, making walking delightfully easy after all the mud of summer. Some cloudy day the falling rain will commence to turn to snow, and in a few hours everything will be white. But it is still only autumn, and the sun is sufficiently high that a few hours of shining will melt all the snow in the valley. . . . Some time early in October there will be a little heavier snowstorm than before, and then one morning you will wake up to find that the ground is buried to remain so, and that winter is really at hand.”

The Works Projects Administration of the New Deal has taken a hand at spreading reports of Arctic heat. Under their auspices Merle Colby published in 1939 *A Guide to Alaska, Last American Frontier*—this was not printed by the Government but by a commercial publisher, the Macmillan Company of New York. On page xliv of the introduction we find under “Popular Errors About Alaska” a rebuttal of the contention that “there nothing green doth grow.” Colby maintains that summers are hot and that “cabbages, potatoes, and other hardy vegetables flourish far north of the Arctic Circle. Roses, lilacs, peonies, lilies, honeysuckles, and many varieties of bushes and berries grow profusely. Delphiniums bloom recklessly, growing eight or nine feet high.”

Of the region between the Yukon River and the Brooks Range, some of it more than a hundred miles north of the Arctic Circle, Colby says: "The climate is characteristically continental in type, having short, warm summers and long, cold winters."

In discussing the Arctic prairie which lies between Point Barrow and the Brooks Range, therefore at distances varying between 100 and 300 miles north of the Arctic Circle, he says: "In summer the temperature frequently rises to 80 or higher."

If we, then, accept the traveler reports, supplemented at Fort Yukon, Wiseman and Point Barrow by observations of the U.S. Weather Bureau, we have during the first sixty miles northward from the Arctic Circle a drop from the 100° F. maximum to one of 95°; but this drop is at least partly explainable by a growing height above sea level as you climb into the foothills of the Brooks Range. From the mountains proper we have a highest record of 85°, noted July 24, 1901, on a Geological Survey expedition by Dr. Frank Charles Schrader on the Anaktuvuk River. Dropping down north from the mountains onto the coastal prairie we find no temperature records; but there are a good many traveler complaints about the heat like those we quoted from Dr. Smith. It may be these which Colby has summarized into the statement which we just gave, that temperatures on the north Alaska prairies run to about 80°. That figure would seem reasonable (on the traveler's-tale basis) as holding for about 150 miles north beyond the mountains, or until you get within fifty or twenty-five miles from the ocean—indeed, one of Dr. Smith's complaints is practically from the sea coast, for he was on the Kuk River where it has the width of a fjord and where the

waters, at least with high tide, would be salty. And then there is the fact that the Weather Bureau has reported 75° F. right from the seaside at Barrow.

Such is, for Alaska, the story of the traveler-type witnesses. The reports are not different from mainland Canada or mainland Siberia. They are not even very different from those islands to the north of Canada which are of considerable size and are not mountainous; for, as we have seen, the British, through Meham, started in the 1850's to report grass fields "like English meadows" from islands as much as 500 miles north of the Arctic Circle. That sort of testimony eventually grouped itself into a pattern to indicate that snow does not last on large islands no matter how far north unless there are mountains of several thousand-foot altitude—whereupon glaciers form in the valleys, particularly those facing north. With the disappearance of the snow, the land acquires power to change sunlight into heat, and does. Or, at least, so the travelers claim.

But not even such publicity as that given by Peary and others to reports of grasses, flowers and insects in Peary Land, about 450 miles from the North Pole, was able to sway the really staunch supporter of the modern variant of the Greek doctrine—which claims that north of the Arctic Circle it is never warm, explaining this not by distance from the sun but by a great slant of the sunbeams and by their being reflected from the snow before they have a chance to produce much heat.

The cosmographer reasoning and its products form what is, at least to the cosmographer mind, an impregnable circle. The light cannot make heat because it glances off from the snow;



the snow stays there because not enough heat has been created for melting it away.

It does not, then, put the true cosmographer out of countenance that travelers keep reporting absence of snow in summer from vast square mileages of Arctic country. The Alaska geologists who have traveled the plain between the Brooks Range and Point Barrow report not merely that in this vast triangle with an 800-mile base and a 200-mile vertical height there is no snow in summer now; they even say that so far as they can discover there was no permanent snow, no glaciation, through any of the ice ages. From Canada travelers have brought like reports; and, as we have said, the Russians claim that in their vast mainland Arctic territory there is in summer less snow than in Switzerland.

In the face of all this, and more, we find the position of the true cosmographer still unchanged.

### **THE LAST PHASE IN ARCTIC CANADA**

In our presentation of the case so far, whether for or against the cosmographers, we have been neglecting, in a way that may have seemed deliberate, that country which appears likeliest to give us a clear answer. The neglect was deliberate; we wanted to reserve Canada till near the end.

“Know thyself” surely would be an implied national motto. All countries want to succeed, want to prosper, want to become as great as may be. Population, wealth and power will depend on area and on natural resources. Among the chief resources is

climate. Then surely Canada will know its own climate, and from Canadian sources we ought to be able to secure clear and decisive information. Canada is reckoned to have at least 500,000 square miles of land suited to our study north of the Arctic Circle; for, by universal consent, these territories are about as remote as any in the world from influences of Gulf Stream or Japan Current.

It is a fundamental of education in many lands, and is frequently stated to be so in Canada, that objects of the public schools are to teach love of country and an understanding of one's native land in all its aspects. We turn, then, naturally to the school books of Canada to see what the youngsters are being taught as a basis of patriotism, optimism and good citizenship. We confine ourselves, because of the limits of our inquiry, to the problem of whether, in the opinion of the Canadians themselves, there is beyond the Arctic Circle in Canada a real summer.

As an introduction to our study of what Canadian textbook writers say of Arctic Canada we might perhaps glance at a few samples of what the closet scholars were having a chance to read, after 1900, that had been published by Canadian travel writers. We cite specimen travelers, chronologically, but only to 1929, for reasons which will appear.

The Superintendent of Forestry for the Dominion of Canada, Elihu Stewart, published during 1913 in London, Toronto and New York his book *Down the Mackenzie and Up the Yukon in 1906*. On page 106 Stewart is journeying westward afoot from Fort McPherson toward Bell River and is, therefore, about 80 miles north of the Arctic Circle when he says that "The

weather was sultry and threatened rain which finally overtook us.” That was July 24. The next day “The weather was hot till late in the afternoon . . .” although the party were then at a considerable altitude, for they were crossing the divide between the Mackenzie and Yukon River systems.

In various parts of his narrative Stewart has commented on the heat and the mosquitoes but we do not quote these references because they are south of the technical Arctic Circle; but they are mentioned in the chapter on “Climate” from which we use most of the first page:

“I have already referred to the extreme heat which we experienced along the Athabaska River and at Fort Chippewyan, and that this hot wave extended beyond the Arctic Circle was testified to by Indians who suffered the loss of some of their dogs from this cause, on crossing the portage between the Bell River and Fort McPherson. Of course this was exceptional and lasted only a few days, but nevertheless, there is no question that for a couple of months in midsummer the aggregate amount of heat which is imparted by the sun’s rays interrupted only for a few hours out of the twenty-four, and shining through a wonderfully clear atmosphere goes far to counterbalance what is lost by their refraction owing to the obliquity of their course in reaching the earth.”

In 1907 Captain Ernest J. Chambers published *Canada’s Fertile Northland*, “A Glimpse of the Enormous Resources of Part of the Unexplored Regions of the Dominion.” Under that head you expect optimism, and you find it. For instance, at Good Hope, about ten miles south of the Arctic Circle,

Chambers reports maximum temperatures for various months: April, 63°; May, 80°; June, 82°; July, 86°; August, 81°; September, 66°.

For Arctic Red River, about eighty miles north of the Arctic Circle, the figures are: April, 52°; May, 74°; June, 85°; July, 89°; August 82°; and September, 73°.

You will note that the September maximum temperature for Red River is seven degrees higher than for the more southerly Good Hope. Figures not published by Chambers show that Fort McPherson, about the same distance north as Arctic Red River, has a maximum six degrees higher—95° for McPherson and 89° for Red River.

In 1920 Michael H. Mason, fellow of various British scientific societies, came north for a two-year stay in northwestern Arctic Canada and in immediate adjoining Alaska. Mason sketches the Arctic summer, as he says he found it, on pages 3 and 4 of his book *The Arctic Forests*, London, 1924:

“In April the snow begins to melt, and in May the whole country is under slush, the ice rots in the rivers and breaks up.

“In June the ice and snow are gone from the low ground and the lakes are clear; then the mosquitoes start and make life an increased burden as time goes on through the July heat to the middle of August. The sun is now up throughout the night and the temperature sometimes goes to 100° F. and even 110° F. in the shade. I think that most of the northern folk prefer the winter, with its bracing cold, to the sweltering months of fighting the insect pests.”

The book says and implies a good deal about summer temperatures where it discusses the spread of colonization in Canada:

“The majority of people have been led, by sensational fiction and an insufficient education, to believe that the Arctic regions are uniformly barren wastes, inhospitable and cold, where life is a continual round of hardship and where agriculture and stock-raising are impossible. Nothing is more detrimental to the progress of Canada than this apparently ineradicable fallacy that the farther to the north one goes the less favourable do conditions of life become. To a certain extent this is true, to-day, but the difficulties are not caused so much by the latitude as by the remoteness from civilization and the consequent labour of transport.

“. . . And northward it [colonization] still must go, and is still going, though hampered by this wretched popular delusion of the unfitness of northern countries for settlement.

“A hundred years ago, the whole of Canada was regarded as one huge snowfield, incapable of producing anything but fish, fur, and lumber. Thirty years ago Winnipeg was thought to be the ‘back of beyond’ by the comfortable farmers of Southern Ontario. Twenty years ago Edmonton was ‘way up north’ to the Manitobans. Ten years ago Peace River was ‘outside the map’ to the townsmen of Edmonton, and to-day the Peace River farmers look on the Mackenzie River valley as the ‘remote district of frightful cold’ which has run through the whole story from beginning to end.

“And yet when we get there, to the Arctic and sub-Arctic

inland regions of Canada, what do we find? A vast tract of ground covered by forest (potential building material and railway ties), most of its great area uninhabited, but not uninhabitable.”

Toward the close of this chapter, “The Future Empire,” Mason says: “I shall probably be accused of lunacy by nine-tenths of the people who read this, but let me put forward one suggestion: if the Arctic forests were the damnable Gehenna they are popularly imagined to be, would not we, who have lived there, be the first to denounce them? But we all sing the same song of praise (and no one ever believes us).”

It will appear from our examination of Canadian school books presently that Mason was not much out, so far as they were concerned. The authors of the texts either did not read him or did not believe what they read.

In March, 1928, E. M. Kindle, paleontologist of the Geological Survey of Canada, published through the *Canadian Field Naturalist* his practically book-length article, “Canada North of Fifty-Six Degrees.” This is in some part an onslaught upon ideas of Canadian Arctic and sub-Arctic temperatures, which, according to Kindle, are prevalent in southern Canada but are not based upon conditions that really exist in northern Canada.

Clearly intending to startle his southern readers, Kindle says early in the presentation that “The climate of northern Canada from some points of view is one of its greatest assets.” The arguments to back this up are numerous; we stick to those that bear directly upon summer temperatures. On page 57 Kindle says:

“The summer climate of northern Canada is apt to surprise even well informed travellers who cross the Arctic Circle via the Mackenzie River for the first time. This is well illustrated by the testimony of Mr. Elihu Stewart, formerly Superintendent of Forestry for Canada, in his book *Down the Mackenzie and Up the Yukon*. ‘We had counted on escaping the usual July heat,’ Mr. Stewart writes, ‘but for the greater part it had really been more oppressive and certainly more constant, extending right through the long twenty-four-hour day, than I had ever before experienced.’ Another author speaking of his experience northeast of Great Bear Lake writes that all of his party agreed ‘We had never in our experience suffered as much from cold as we suffered from heat that summer.’”

We have said we would present samples of what Canadian travel writers had been publishing about heat beyond the Arctic Circle between 1900 and 1929, which we have now done. We chose the year 1929 because we have not had a chance to examine Canadian grade school books published since then.

It is usual in Canada that books for the schools are “authorized” by one or another of the governmental subdivisions, usually the governments of provinces but sometimes the local administrations of cities.

The lower school books we shall quote are: *Ontario Public School Geography*, authorized for use in the public schools of Ontario; *The Teacher’s Manual*, authorized for use of teachers in Ontario; *Public School Geography*, authorized for use in the public schools of Alberta; *Manual of Geography*, I, authorized for use of teachers and high-school students of Alberta; Dent’s

*Canadian Geography Readers*, Book II, optional or supplementary reading in several provinces; *The Canadian School Geography*, authorized for use in the public schools of British Columbia, Manitoba, Nova Scotia, Quebec and Saskatchewan; *Canadian Readers*, authorized for use in the public schools of Manitoba, Saskatchewan, Alberta and British Columbia.

The material of these books, then, represents not merely what was being taught in Canadian schools during 1929 but also a government policy with regard to the teaching; for the texts would not have been “authorized” if there had been in them much that conflicted with government policy or, let us say, with the views of governmental officials then in control.

We now quote and paraphrase sections which either speak directly of summer temperatures or tell about vegetation and other things from which summer temperatures may be inferred. Say our documents, speaking of Canada north of the Arctic Circle:

“Much of this vast area is a treeless wilderness of rock and swamp, covered with mosses and lichens which provide food for the caribou and musk ox.” “In the extreme north,” says another, “[there is] a cold desert where, however, vegetation is not entirely wanting; for in the marshes in summer the ground becomes covered with reindeer moss on which the caribou and musk oxen feed.” “Why cannot trees grow there?” asks a third, to which the general textbook reply is that the winters are too cold for them. A reading selection continues the work of the geographies with, “In that land there is little but ice and snow.”

...



Lest the child may think that the desolation and worthlessness are largely confined to the Arctic Circle proper, a fifth-year reader instructs him in part as follows: "Long before the treeless wastes are reached, the forest ceases to be forest except by courtesy. . . . On the shores of Great Bear Lake [which is, of course, in the Temperate Zone] four centuries are necessary for the growth of a trunk not so thick as a man's wrist. . . . Still farther north the trees become mere stunted stems set with blighted buds that have never been able to develop themselves into branches; until, finally, the last vestiges of arboreal growth take refuge under a thick carpet of lichens and mosses, the characteristic vegetation of the Barren Grounds."

The textbook editor borrows this heartening description, and much other cheerful information about Canadian resources and climate, from a book entitled "Greater Canada."

Some books used in the Canadian schools have a definite statement that it is never warm north of the Arctic Circle, with nothing anywhere in that particular volume to contradict the view; but there are other books which say, where they generalize on the climate, that the Arctic is never warm even in summer, contradicting this elsewhere by specific reports of great heat for considerable periods experienced well north of the Arctic Circle. In these cases the author or editor does not point out to the children that there is a contradiction between the generalization and the specific information. One of the school geographies says that "In that land [Canada north of the Arctic Circle] there is little but ice and snow," but says and implies elsewhere that there is much in the Arctic besides ice and snow.

Some textbooks make an effort to reconcile statements which, on their surface, are contradictory; as, for instance, the two ideas (a) that everything is covered with snow and (b) that there is some vegetation. One case of this sort of adjustment is “there are no trees in this cold land, but there is a kind of hard brown moss that grows under the snow.”

The idea that plants in Arctic Canada do their growing underneath the snow, most or all of it, is not confined to the texts of the lower schools—naturally not, for when you go through the university, as most of us do, without any study of geography you will retain into if not throughout maturity the geographic ideas which you received in the grades.

The best example of this we have found is from Volume I, No. 1, of the *Canadian Geographical Journal*, official organ of the Canadian Geographical Society, Ottawa, Canada. The author of the article we shall quote, “With the Arctic Patrol,” is Sir Frederick Grant Banting who holds several kinds of doctorates in addition to that of doctor of medicine from several universities, has been professor of medical research at the University of Toronto since 1923, and is known not merely in Canada but throughout the world in connection with insulin. He is probably Canada’s most famous scientist and is one of the most famous in the world.

It appears that Sir Frederick had been on a northern cruise in 1927, far beyond the Arctic Circle. For one of the Canadian islands he offers what is, by implication, his explanation of how it is that vegetation is found in the Arctic in spite of such lack of summer heat that there is snow on the ground. For he tells us of Bache Peninsula: “The plateau above

is barren, but below there is a narrow fringe of vegetation. Varieties of saxifrage, fireweed and stunted willow spring up beneath the snow and ice.”

By 1929 there had been enough protest in Canada against textbooks, which said little or nothing about Arctic summer heat, to cause a small and brief journalistic furor. The complaint that the Arctic was being maligned in Canadian school books as having no summer, or a negligible one, had been presented by a number of writers somewhat along the line taken by Mr. Kindle in the extract just given. The contrary position was stated under the title “There Is a Frozen North,” signed by Evan Lloyd and published in *MacLean’s Magazine*, for April 15, 1930.

This author began by pointing out that there is a schism among the textbook writers—that some do present a warm summer. He says about a text which he describes without naming: “We learn that the plains are free from snow in the summer, and can see so for ourselves in the photographs, and that the Eskimo is a skilful hunter over these grassy plains in summer. . . .”

From the same, or another, textbook, the article has several other statements that imply warm summers and the absence of snow. It is said of the Mackenzie that “The banks of the river are wooded right to the shore of the Arctic Ocean.” Still another citation reads: “Perhaps the million and a half of square miles given over to the fur trader may some day be used for other purposes. The Northern Plain is anything but barren. The great warmth and continued light of the summer sun, which shines for twenty hours a day, clothes favored parts of these lands almost magically with a mantle of grass and

flowers.”

It seems clear from the article, then, that in 1929, if not earlier, there really was a schism among the textbook writers of Canada. One of them, perhaps several, had gone over to what we name the traveler point of view, with claims that at least some parts of the Canadian Arctic remote from warm ocean current effect were snow-free and even hot in summer.

So the argument of the article seems to be against the Frozen North idea; whereupon the title “There Is a Frozen North” requires explanation. This is found in the author’s contention that, in spite of warm summers, the Arctic should be looked upon as the Frozen North because it has long and cold winters and because these winters will keep the territory from being colonized. Discussing that subject would be too much of a digression and we do not go beyond quoting a little more from Kindle’s previously cited “Canada North of Fifty-Six Degrees”:

“The popular misconceptions are so deeply rooted that it will require decades of education to eradicate them. It is almost universally believed by those who have made no special investigation of the matter that winter climate increases steadily in severity as the North Pole is approached, and that the Pole itself is coincident with the pole of greatest cold. This is about as far from the truth as would be the assumption that the rainfall of any region is proportionate to its distance from the sea coast. . . .

“A clear perception of the fact that latitude is a factor, but often

the least important one, in controlling temperature is fundamental to any adequate evaluation of the potential resources of Arctic Canada. . . .

“If the growth of population in all parts of Canada is a desirable thing, there is no part of the Northland which needs more to be brought to the notice of the public than the Arctic coast and the region northwest of Hudson Bay. If it can be demonstrated that large settlements of the white race can live in that region as contentedly and happily as the Eskimo do, the vacant lands to the south will fill up fast enough to put our frontier railroads on a paying basis at an early date.”

These quotations are Mr. Kindle’s phrasing of his own view. Toward the end of his discussion he states the case for colonization of the Far North in the words of his former colleague of the Geological Survey, later professor at McGill University, J. J. O’Neill:

“Professor O’Neill, after describing the climate of the Arctic coast, where he spent two winters, writes: ‘It may be seen, then, that as far as the climate is concerned, there is nothing to prohibit settlement. Game and fish abound and there should be little difficulty in establishing a mining industry if the mineral deposits prove to be valuable. Underground mining could be carried on throughout the whole year without much inconvenience.’

“The lowest temperature recorded during his second winter on the coast was  $-44^{\circ}$ . The minimum temperature for the same season (1915-1916) at Edmonton was  $-45^{\circ}$ . Conditions which appear to decidedly encourage settlement on the Arctic coast

are stated by Professor O'Neill as follows: 'The sun is quite hot in April, the seals come out on the ice and the caribou begin their migration to the northern islands. In May, the wild-fowl arrive and after them the small birds; the sun shines for twenty-four hours and the vegetation responds rapidly, so that by the middle of June many wild flowers are in bloom, the slopes and the valleys are green and small animals are seen everywhere.'"

Writing in New York during 1940, with no library of Canadian school books to consult, we can say no more definitely than that within Canada our problem had not been solved up to eleven years ago—the Canadians themselves had not yet decided whether to take seriously people like forestry commissioners and geological survey explorers who reported considerable summer heat for considerable periods north of the Arctic Circle.

That some Canadian schoolbook writers had accepted the traveler view, as we indicated some pages back, is the very thing which shows that the problem had not been solved. Textbook writers may ignore travel writers but they do not ignore each other; the educational publishers of Canada were clearly aware in 1929 that there was an issue between cosmographers and the travelers, since at least one of them had swung over. This makes it significant that a number of others were still maintaining the classic position—they had compared the testimony of one faction with the laws of nature as expounded by the other and were still siding with David Hume.

There is abroad a notion that climates not too cold for men

may nevertheless be too cold for women. Those who maintain the North is colonizable use many arguments for rebuttal, chief among them to ask why it is that in winter our women on the average dress more lightly than our men if they are either less able or less willing to face a chilly day.

The line of our presentation in this chapter is a minimum of argument and a maximum of testimony. On whether women dislike cold more than men do, we call to the witness stand a woman. Mary Lee Davis has spent many winters at Fairbanks, Alaska, and in others of those portions of Alaska which have the Territory's coldest Weather Bureau midwinter records. In the book previously quoted, Mrs. Davis says:

“After years of all-season living in that part of Alaska which is actually the winter-coldest, and which has a greater yearly variation in temperature than has the very Arctic Slope itself, I must truthfully say that I have never suffered any hardship directly attributable to cold, nor have I ever known a day when mere cold made me uncomfortable or necessarily kept me within doors. I have felt very much *colder* at plus 30 degrees, in wet snow which penetrated clothing, than at clear dry minus 50 in a fur parka. I have had accidents and adventures, yes; but many of the adventures were due solely to my own ignorance, and accidents will happen in the best-regulated, and mildest localities. . . . In fact, from fifteen to twenty-five below we think the most ideal mushing weather, and I myself have driven with dogs, for sheer pleasure, on days when the thermometer read minus twenty-five and thirty.”

So, according to Kindle and O'Neill for Arctic Canada and Mrs. Davis for Alaska, these territories need not be called the

Frozen North on account of not being colonizable. But that is, of course, no more than the view of one of the parties to our controversy.

## **THE DISPUTE SINCE 1929**

During the last ten years the travelers have had most of the innings; but there has been stout resistance by the cosmographers. The published writing has favored summer heat in quantity, but not thereby necessarily in its effect on mass thinking. For there is as yet very little snow-free Arctic land and very little summer warmth in the pages of a number of textbooks on climatology that are widely used in schools and colleges.

It is true that some of the textbook writers, an increasing number, have been swinging over to the heat enthusiasts. But it is also true that a few travelers of long northern experience and high scientific standing have taken a position well to the right of center. While admitting, or even proclaiming, that there is a good deal of snow-free land beyond the Arctic Circle in summer and considerable vegetation (usually “a surprising amount of vegetation”) they tend on the whole to support the cosmographers—through being reiterant that the summers are short (which, indeed, not even the travelers deny), that the summers are not very warm, and that the vegetation is lowly, sparse, hardy, shrunken, stunted and so on for a dozen kindred adjectives.

A letter written at Fort Francis, Ontario, September 29, 1929, is placed in our chronological scheme under its date, although



some of the information goes back twenty-five years.

For more than a hundred years the Hudson's Bay Company has been running craft of various sorts across the Arctic Circle, shuttling back and forth along the Mackenzie River. For more than half a century they have been using steamers. In that service was Captain Albert E. Isherwood. We quote enough of his letter so that it is self-explanatory—it gives the statements which bear on summer temperatures with enough collateral matter for background:

“Your very welcome letter of Sept. 10th received, asking me for a certified statement regarding what I told you about the excessive heat and thunder storms which I witnessed while north of the Arctic Circle in the years 1905-6-7, and also the different countries in which I have been.

“I have never been off this American continent . . . I have seen almost the entire continent between New York and the Delta of the Mackenzie River and as far south on the Pacific Coast as Portland, Oregon. The greater part of my life has been spent in Fort Francis, Ontario. I was born in Hamilton, Ontario, in the year 1865 and was raised in the city of Philadelphia, Penn., until ten years of age when we moved to Toronto, Canada. In 1881 we moved to Fort Francis, after which I went to Kenora . . . where I stayed one year. Then I started sailing on Lake of the Woods where I sailed for twenty years, sailing during the summer seasons and going out on surveying parties and exploring for timber in the winter months. In 1904 I was recommended by the Steam Boat Inspector to sail the Hudson's Bay Co. steamer which was just built on the Saskatchewan River. Being a lake and river navigator and on

account of Great Slave Lake and Mackenzie River, I was transferred there in 1905, where I sailed the S.S. *Wrigley* for three years. Leaving the North I came back to Fort Francis and sailed until 1919 . . .

“I have a very good memory and have always made a study of the weather . . . I remember Philadelphia being a very warm place in the summer, but never remember it as hot as inside the Arctic Circle, as far north as Arctic Red River when the thermometer [aboard the *Wrigley*] registered a shade above 100 degrees in the shade. This was during the month of July, not only one year but during the entire time of my sojourn in the Arctic Circle. In fact any place along the Mackenzie River is hot in July, a great deal hotter than at Fort Francis, which is on the 49th parallel, 93° being about the hottest known during my time. . . .

“Rainy River [Ontario] is noted for its thunder and rain storms, and I have witnessed the worst of them, but the storms which I saw while going through what is called the Big Ramparts on the Mackenzie River, which is, I believe, 75 miles north of the Arctic Circle, beat anything that I had ever seen here or elsewhere for thunder and lightning and heavy rain. This I will swear to . . . (Signed) Albert E. Isherwood.”

The *Geographical Review* of New York for January, 1933, published what is, on the surface at least, a pretty severe attack upon the cosmographer view of Arctic summers—an article, “Gardens of the Mackenzie,” by W. D. Albright, Superintendent of the Canadian Government experimental farms at Beaverlodge and Fort Vermilion in the Peace River section of Alberta.

Some of Albright's most persuasive arguments are pictorial, where he shows forests, of trees said to be 70 or 80 feet high, a hundred miles north of the Arctic Circle. He has photographs, too, of gardens and cultivated fields. His Figure 17 is a "Potato Garden of the Oblate Mission at Aklavik, July 11, 1930. Potatoes planted June 14 measured 3 to 6 inches"—which apparently was on July 11, the day he got to Aklavik.

Albright tells us that on July 10, 1930, at Arctic Red River, 80 miles beyond the Circle, he asked:

"“Any gardens here?’ . . .

““Sure,’ answered D. McLeod, ‘come up and see mine.’ The garden sloped sharply down from his residence, which stood perhaps 40 feet above the water's edge. True enough, there was the universal patch of potatoes, clean and neat. They had been planted June 4 and were promising a yield. In a little corner at the foot stood a patch of grain planted May 17 and inundated directly afterwards by an ice-jam flood. The irrigation appeared to have done it no harm, for the wheat was 2 feet tall and in the shot blade. The barley measured 2 feet, 9 inches and was heading. Blue joint (*Calamagrostis*) and other grasses stood breast high. Fireweed was rank in full bloom. Wild currants, gooseberries, and raspberries grew luxuriantly. The currants were especially heavily laden.”

Under the head of "Rhubarb Pie in the Delta" we find that:

"At 1.30 A.M. of July 11 we landed at Aklavik, flying by mid-evening because it was cooler for the engines—there is really no midnight in early July. Mid-day heat was oppressive.

“Aklavik is in the delta [about 130 miles within the Arctic]. It is about 60 miles from Mackenzie Bay [of the Arctic Sea] and 1015 miles north of Edmonton. We pictured it as in the bleak tundra country. . . .

“The first surprise was the heat. At 1.30 A.M. we rode 2000 feet in the air with perfect comfort, bareheaded, and lightly clad. The next surprise was the forest, occupying the islands and bordering the river though not reaching far back from it in that latitude. Spruce trees 8 to 10 inches thick were plentiful, with odd specimens 70 or 80 feet tall and up to 18 inches in diameter, it was said.”

After his journey Albright kept in touch with the Arctic horticultural situation. One item from his correspondence is that “October airmail messages from Aklavik reported success in 1932 with lettuce, carrots, and potatoes, and the author received plump, well ripened samples of barley and oats. Even wheat produced fair-sized kernels although not of milling grade.”

In the October, 1933, issue of the *Geographical Review*, Albright followed up his “Gardens of the Mackenzie” with an article “Crop Growth in High Latitudes.” In this he tells us that the mean July temperature is about the same from the great wheat country of southern Canada all the way to the Arctic Circle: “Throughout the latitudinal spread of 944 miles from Lacombe to Good Hope it [the July mean temperature] is practically uniform.” Specifying, he says that for Lacombe in the south it is 60.2° and gives for McPherson, a degree north of the Arctic Circle, 59°. For Aklavik it is 56.6°.

*Canada's Western Northland* by W. C. Bethune was published at Ottawa in 1937. This author tends to be "conservative" in his discussion. His verbal text says nothing about high temperature records in the Arctic section of the Mackenzie district. On page 47, however, he has a table that reinforces and, to an extent, goes beyond the Chambers material we quoted. The highest Good Hope temperature given by Chambers was 86°; Bethune gives 95°. But it is still more to the point that Bethune goes nearer the sea than Chambers and cites Aklavik with an extreme highest record of 93°. That is 70 miles farther north than Arctic Red River and McPherson whence come the records of 89° and 95°, respectively, which we have quoted.

In May, 1940, Richard Finnie published at Philadelphia *Lure of the North*. The book tells that he made his first Arctic journey in 1924, at the age of seventeen, going as far as 78° 50' or more than 800 miles beyond the Circle. That voyage was to the eastern Canadian Arctic; since then he has made four others to that section. In 1930 he went north for a winter and summer in the Western Canadian Arctic, in the Coronation Gulf and King William Island district, which he has visited twice since—in 1934 and 1939.

## PLATE XVI



Arctic sun-bathing. As early in the spring as April 15, when this photograph was taken, Richard Finnie stripped to the waist for the sake of comfort while traveling with dogs over the ice of Coronation Gulf, which he often did thereafter on fine days until the end of the season. Although already tanned, he sustained a painful sunburn during a sled trip late in May (see his *Lure of the North*, p. 207).

Finnie's view of the Arctic summer is stated on his first page:

“The Man in the Street pictures the Arctic as a land of eternal ice and snow, inhabited mainly by refrigerated, blubber-saturated savages. True, the Arctic winter is long and severe, but there is a summer, too, when the snow disappears from the land, hundreds of varieties of wildflowers bloom, birds sing and build their nests, and flies and mosquitoes swarm. As well as glaciers and grinding ice floes there are towering forests, awe-inspiring mountains and vast prairies.”

After varied Arctic narratives, Finnie generalizes about climates again on page 75:

“‘The Frozen North.’ That is a familiar term, and most people are inclined to think of the Far North as the Frozen North—frozen all the year round—where marine navigation is possible only for ice-breakers. That is an impression that those of us who know the country have trouble in dispelling among those who don’t. It is hard, then, to tell convincingly of summer activities in the Arctic—of a snowless land and an iceless sea.”

In a letter dated May 25, 1940, which supplements his book, Finnie says:

“I have suffered from the heat during June and July in several parts of the Arctic—particularly at Aklavik in the MacKenzie Delta, and on the tundra near the mouth of the Coppermine River.

“The most painful sunburn I have ever had was received while I was on a trip north of Coppermine at the end of May (see *Lure of the North*, page 207).

“Even in the latter days of April, when traveling with dogs

over the sea-ice of Coronation Gulf, I have stripped to the waist for the sake of comfort (see [picture](#)).”

The “see picture” of the letter refers to a photograph enclosed, where you can see Mr. Finnie in trousers and snow goggles, stripped to the waist, standing beside his dog sled on the ice of Coronation Gulf.

These witnesses have all been from Canada. We do not call Alaska witnesses, for the clamor of the heat propagandists has there grown into a continuous din. The Weather Bureau, for instance, persists in reporting temperatures above 90° in the shade, and “growing seasons” long enough for vegetable gardens, from a half dozen points north of the Arctic Circle, though none of them more than 50 miles beyond it—they could not do that, even by traveler standards, for all Weather Bureau stations in Alaska more northerly are either in the Brooks Range, thus having a mountain climate, or else they are on or near the sea.

During the last ten years there have not been published, so far as we know, any traveler reports for that prairie to the north of the Brooks Range which lies at distances between 100 and 300 miles north of the Circle—all we have from north of the Range is coastal reports, but they are unexpectedly favorable to the traveler side of the argument. For it is in this decade that Barrow, near the ultimate northern point of Alaska, more than 300 miles north of the Circle, has reported 75° in the shade—pretty extreme for an instrument that is only a few hundred yards from the icy waters of the northern sea.

For the Soviet Union there has been an avalanche of favorable



reports—which is natural, at least if you accept the theory we have advanced, that stories of great Arctic heat are likeliest to come in a period of expansion when the motive of the explorer is not to show that he endured a lot of hardships but rather that he found a good many things that were promising.

Soviet optimism with regard to northern summers is so well known that we can afford to dismiss it here by referring to their claims, which we see frequently in our publications, running from the daily press through the popular magazines to the technical journals, that they are building great cities in the Arctic, some of them hundreds of miles north of the Circle, that they are raising wheat a hundred miles beyond the Circle and garden vegetables 200, 300 and 400 miles beyond it. We read, for instance, in the book *Land of the Soviets* by Nicholas Mikhailov, New York, 1939:

“The Soviet Far North has now ceased to be a wasteland. Thousands of new inhabitants have settled on the coast of the Arctic Ocean, and during the last six years the population of the Far North has doubled. . . . Arctic agriculture had to be created, so a series of Far Northern agricultural stations were established: the Khibin Station (67° 44' N.) on the Kola Peninsula; the Pechora Station (65° 27' N.), the Obdora Station (66° 31' N.), the Igarka Station (67° 17' N.) and others. . . . A study was made of the experiences of northern agriculture in other countries, in particular Alaska. . . .

“The Polar North responded to the energy of the investigators by unprecedented harvests.

“In the Khibins, on the experimental field, a yield of 20 tons of

potatoes to the acre was obtained. Southern varieties of barley and wheat ripened. Oats rose almost to the height of a man and in one year two mowings of fodder grass were obtained. Cabbage, carrots, onions, rutabaga, turnips, radishes, kohlrabi, peas, beans, horse-radish, cucumbers, pumpkins, and other vegetables now grow beyond the Polar circle.

“Dozens of State farms have been established beyond the Polar circle with the assistance of scientific stations. Vegetable and dairy farming is carried on in the new town of Igarka [on the Yenisei River] lying more than 62 miles north of the Polar circle: and here on experimental fields, as much as eighteen tons of rutabaga to the acre have been harvested. In some of the State farms of the Turukhansk District (where the Yenissei crosses the Polar circle) the wheat harvest exceeded 1,760 lbs. [29 bushels] to the acre. . . . There are several State farms at the gold fields along the Kolyma River and a scientific and research institute of Polar agriculture and livestock-raising is being established in Igarka.

“The geographical limit of agriculture has been extended enormously. The old and the new limits of agriculture can be compared on map 11 (page 55). On Dickson Island (73° N.) Chinese cabbage has been successfully cultivated in open soil. . . .

“A hot summer follows the icy winter. The days are long and dry and the sun scorches. In Verkhoyansk the average temperature for July is +59.9° F. (and this beyond the Arctic Circle). In Yakutsk the average July temperature is even slightly higher than in Moscow (+66.3° F. compared to +65.6° F.). The thermometer often registers 86° to 95° F. During the

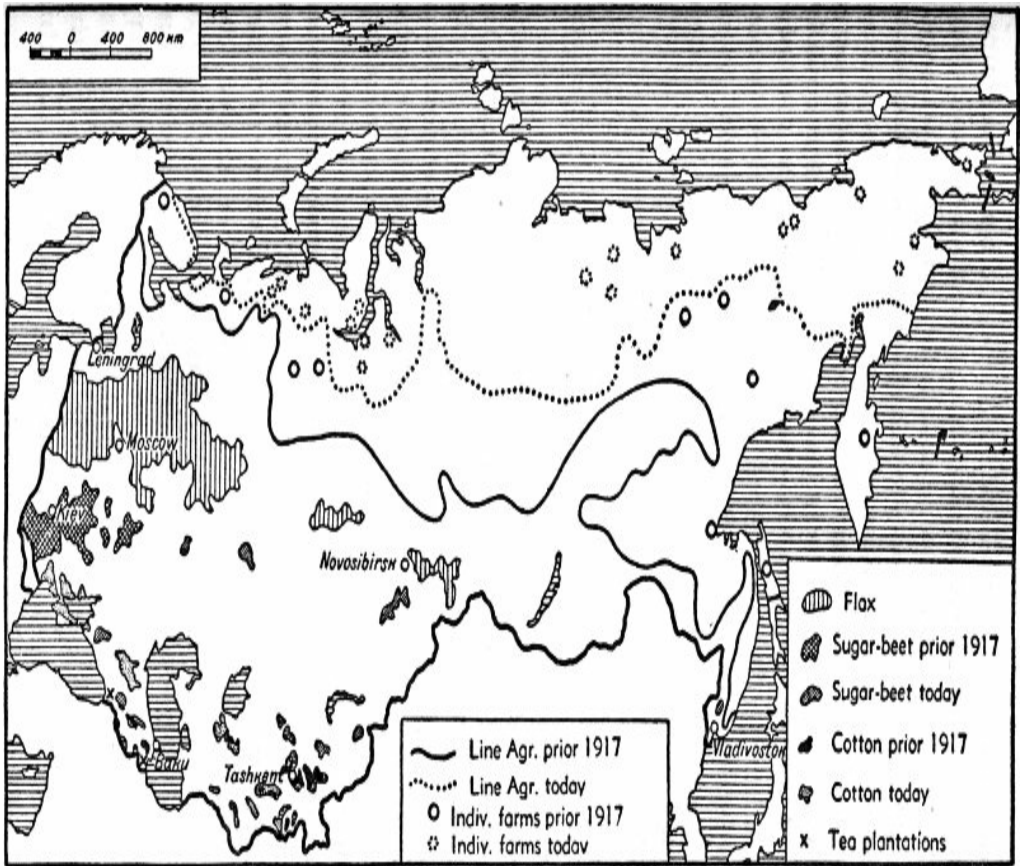
short but hot summer, wheat, vegetables, and even melons ripen in central Yakutia.”

We reproduce on [page 349](#) Mikhailov’s map showing 1917 and 1938 limits of Soviet agriculture.

The most northerly station from which successful vegetable gardens have been reported by the daily press of Moscow is Tixie Bay, 385 miles north of the Arctic Circle. It is a remarkable report even from the point of view of the travelers, not because it is from far north but on account of being from the sea coast—for Tixie Bay is on the shore of the Polar Sea. Of course it is in the delta of a great river, the Lena; but so is Canada’s most northerly vegetable garden at Aklavik in the delta of a great river, the Mackenzie.

Since we are emphasizing throughout the difference between the traveler and the cosmographic viewpoints we look at the case of Aklavik and Tixie Bay from a slightly different angle.

## **PLATE XVII**



Map showing 1917 and 1938 limits of Soviet agriculture, from Nicholas Mikhailov's *Land of the Soviets* (1939), published by Lee Furman, Inc., New York.

To the cosmographer, if he puts any faith in either report, the remarkable thing is that Tixie has, to judge by the accounts, gardens as good as those of Aklavik though 280 miles farther north. What surprises the traveler is that Tixie, although right up against the chill ocean, has gardens that equal those of Aklavik which is about fifty miles upstream.

There is no point in saying to the traveler that warm Lena waters spread all about Tixie Bay, for presumably equally warm Mackenzie waters lap the foot of the Roman Catholic mission garden at Aklavik. Until someone brings along something more plausible, the travelers will rest tentatively on an explanation to be inferred from what is common report, though we quote it here from only one source, Dr. Willis Ray Gregg's *Aeronautical Meteorology*. He says on page 337 of the second edition, New York, 1930: ". . . in summer the Arctic region in Siberia is warmer than any other at the same latitude."

Dr. Gregg was a meteorologist, therefore a member of a profession which today furnishes leaders to the cosmographic school of weather men. But the volume we quote, particularly Chapter 12 which deals with Arctic flying, shows he considers the Arctic zone pretty warm in summer. This authority, who later became Chief of the U.S. Weather Bureau, was definitely a renegade from the cosmographic faith.

By quoting an available large number of meteorologists as siding with Pytheas against Aristotle, and of geographers as siding with Pytheas against Strabo, we might, it seems possible, create the impression that the mystery has been solved, the verdict being against the cosmographers. But that would not be conducive to a true solution of our problem, for the reasoning would be based, mistakenly, on an impression we may have been giving in the last considerable number of pages, that while there are defections from the cosmographic army the travelers are a force united. We must now make clear that this is by no means the case.

There is, for instance, Kaj Birket-Smith. He is a distinguished anthropologist, a polar explorer, who has spent many years in Greenland and, what is more to the point, in the Canadian Arctic, some of that time on the mainland. You will have to be keener than we if you discover in his writings that he has suffered from Arctic heat or that he believes the tales of others who say they have.

During 1921-24 Birket-Smith was ethnologist and archaeologist on the famous Rasmussen Fifth Thule Expedition. It was part of his work to spend some time with the Caribou Eskimos who live on the “Barren Grounds” west of Hudson Bay. One of his several volumes that are products of this expedition is called *Geographical Notes on the Barren Lands*. We summarize, by quotation of extracts, his view on Arctic summer temperatures.

Birket-Smith starts the discussion on climate by telling us that “Only the stretch along the coast of the Northwest Passage lies to the north of the Arctic Circle and within the Polar zone in the mathematical sense. The Arctic climate, however, comprises a much larger area.” In other words—the Arctic climate stretches far south into the north temperate zone.

After presenting a mathematical formula for Arctic climate he goes on: “The Arctic climate is dominated by two low-pressure areas, over Iceland and the Aleutians respectively, and two high-pressure areas over Siberia and North America. . . . The Mackenzie region and the Barren Grounds both being shut off from the mild influence of the Pacific by the wall of the Cordilleras, but on the other hand being open to the north, these regions are at the mercy of the polar winds.” So parts

from which we have been getting some of the hottest of our heat testimony are “at the mercy of the polar winds.” That suits the travelers; for, as we have said, they keep explaining that the immediate banks of the Mackenzie, from which most of the official Canadian records of non-coastal temperature come, have prevailing sea winds from the north and therefore fewer hot days than there would be in one of the side valleys.

Our author goes on: “And yet in the Mackenzie basin we find a climate that is quite different to that which prevails farther east. In four years out of five wheat ripens at Fort Simpson. . . .” Thus Birket-Smith stops wheat at Latitude  $61^{\circ} 50'$ , more than 300 miles south of the Arctic Circle, instead of at Thunder River, about 80 miles north of the Circle.

That is the key to Birket-Smith’s discussion of the Arctic climate—he leans considerably toward the side of the cosmographers but still not enough quite to fall into their camp—certainly enough, though, to indicate that he is not of the Dall-Albright-Finnie school.

On page 72 of the climate section we have Birket-Smith’s own picture of the Arctic summer:

“Towards the end of May it often freezes during the day, and at night the temperature may fall to  $-10^{\circ}$  [ $14^{\circ}$  F.]; in the sun, however, it is warm. Thus in that month spring is rapidly approaching. After the first thaw the Eskimos reckon that there will still be two periods of frost, the last one not until the caribou fawns have been born (i.e., in June), for which reason it may do considerable harm. How high the temperature usually rises in summer I cannot say; but the mean temperature

in July may be taken to lie somewhere between  $+5^{\circ}$  [ $41^{\circ}$  F.] and  $+10^{\circ}$  [ $50^{\circ}$  F.]. July is always the warmest month in the Arctic, for in June an enormous amount of heat goes towards melting the ice and snow of winter, and the heat of the sun decreases rapidly in August. In the beginning of June there are still some days of frost. At Dolphin and Union Strait the maximum temperature in the years already referred to lay above  $+15^{\circ}$  [ $62^{\circ}$  F.], and similar temperatures are to be found on warm days on the Barren Grounds, especially some distance away from the coast, where the ice-filled sea always brings cold and fog.”

Analyzing the Birket-Smith view for cosmographic elements, and for traveler tales, we find a situation about halfway between.

This author says nothing about sunlight being so reflected from snow that very little of it is turned into heat. Therefore he takes in this respect the traveler position, which is that in very few parts of the Arctic except on the Greenlandic Inland Ice is it true that most of the sunlight is reflected by snow. On the rest of the Arctic lands, the travelers claim, there are considerable areas wholly free of snow toward the end of winter, because of wind action; there are stones, all the way from rock to pebble, sticking up here and there through other stretches; where you find neither stones nor bare patches, grass is likely to be showing, and bushes. Therefore the pure white surface which the cosmographers postulate does not exist except in negligible areas outside Greenland.

On the next point Birket-Smith is halfway between the travelers and those modern cosmographers who, like Ward and



Trewartha, want most of the sun-created heat throughout the whole summer to be absorbed by melting snow. Here Birket-Smith gives them right for June but will not follow them through July and August.

There is a leaning in the thermophobe direction where Birket-Smith stops wheat growth in the Mackenzie valley 400 miles farther south than Albright—by implication, then, stopping it cosmographer-fashion chiefly by latitude, not traveler-fashion chiefly by sea winds.

He is the cosmographer when he takes sea coast temperatures from Dolphin and Union Strait and says that “similar temperatures are to be found on warm days on the Barren Grounds”—when the traveler-minded would assume that the heat away from the coast would be considerably greater than on the coast.

At the very end of his description of the Arctic summer Birket-Smith swings to the traveler position and sort of contradicts himself by implying that there is less warmth on the coast than inland, because of the ice-filled sea which “always brings cold and fog.”

Can it be, then, that we have a solution of our problem in a fifty-fifty position like Birket-Smith’s, developing a picture of northern summers by taking a stand halfway between those who say it is never hot and those who say there may be “tropical” heat? But that would be like hearing two groups of witnesses, one testifying that a house has been burnt to the ground, the other that there has been no fire, and then deciding that probably the house was burnt halfway to the ground.

And remember, we are not in any case trying to develop by our own devices an accurate picture of summer in the Far North. We are, instead, trying to decide between those who say that it is never hot (and who explain why it cannot be hot) in the Arctic, and those who call witness after witness to testify that great heat has been observed.

To summarize the case for the jury of our readers, we consider the main points at issue between the iconoclast travelers and the die-hard cosmographers.

There are a number of climatologist-geographers who have published within the last five years things that parallel the quoted 1939 Trewartha pronouncement that “In spite of the long duration of sunshine in summer, temperatures remain low, the rays being too oblique to be genuinely effective. Moreover, much of the solar energy is reflected by the snow and ice or is consumed in melting the snow cover and evaporating the water, so that neither the land surface nor the air adjacent to it becomes warm.”

Being analyzed, such statements consist of the assertion that *it is never warm in the Arctic* and of three main supporting explanations:

1. *The rays of the sun are too oblique to be genuinely effective.* To this the traveler reply is that although it is true the tropic sun delivers more heat per hour while shining, it is also true that the Arctic sun in midsummer shines more hours. When hundred-degree temperatures are reported both from the Amazon and the Yukon, the travelers consider the explanation

to be that double the heat delivery for half the time comes to about the same thing as half the heat delivery for double the time—there being twelve sun hours a day on the Amazon but twenty-four on the Yukon.

2. *Much of the sunlight is reflected from snow without being converted into heat.* The traveler reply is that no land in the Arctic except Greenland has large areas of spotless snow to fit the implied specifications. On most Arctic lands large patches of ground are bare of snow at the end of winter, because of wind action, and grass sticks up through the snow in most other places, so that the sun can go right to work in the early spring getting its light converted by dark things into heat.

3. *Much of that part of the sunlight which is converted into heat has its warming effect neutralized by the melting of snow and the evaporating of water.* Here the answer of the travelers is the same as under 2.

The result of it all, say the travelers, is that in regions far from Gulf Stream or Japan Current influences, gardens have been successful more than 300 miles north of the Arctic Circle and wheat more than a hundred miles beyond the Circle. Instead of being mainly snow-covered, continental Arctic Siberia is 99.9 per cent freed from snow by the summer, with about the same percentage of Arctic mainland Canada and about 99.5 per cent of Arctic Alaska, the remaining fraction of a per cent being represented by deep snow drifts in the lee of hills or in ravines.

Having explained away, at least to their own satisfaction, the three main elements in the contention of the theoreticians, the

travelers go on to say that anyhow most witnesses testify as if the traveler explanation and not the main explanation of the cosmographers were the true one. That brings us to subsidiary explanations that are used by the cosmographers.

Ignoring the traveler contention that most Arctic lands are snow-free in summer, the cosmographers explain that most Arctic lands are permanently snow-covered because while the sun can melt snow on slopes facing south it has not the power to melt it from level lands. By this argument, the Arctic sun for a greater reason lacks the power of melting snow from northward slopes. Robert DeCourcy Ward says in the second edition of his *Climate*, page 153: "In the highest latitudes the summer temperatures are not high enough to melt snow on a level. Exposure is therefore of the greatest importance."

The travelers reply that hedging of this type on the simon-pure cosmographic doctrine is not very successful. How could it be, they ask, that the entire million-square-mile snow-free 99.9 per cent of continental Arctic Siberia slopes southward? Anyhow, if it did slope south, the advantage would not be as great as Dr. Ward seems to imagine; for although there would be a less oblique angle to the mid-day sun there would be, to the same extent, a more oblique angle to the midnight sun; and, say the travelers, the thawing accomplished by the midnight sun is by no means to be sneered at, particularly when you get several hundred miles beyond the Arctic Circle. Here the prize exhibit is Peary Land, only about 450 miles from the North Pole. Its northward hill slopes are nearly as successful as the southward slopes in freeing themselves from snow. In Peary Land as elsewhere, say the travelers, the snows which persist are not mainly those on north slopes; they are rather the

drifts accumulated by winds to a great depth in various kinds of lees.

The travelers deny that Ward is correct for any extensive flat lowland in the Arctic at any latitude when he says that “The summer temperatures are not high enough to melt snow on a level.”

But when the travelers feel themselves to have disposed of the Ward type of reasoning, they are faced with such contentions as those of Trewartha, that while warmth, or even heat, really is found north of the Arctic Circle, there is not enough of it to justify speaking of a warm period. You remember he says: “Certain explorers to the contrary, the polar areas cannot be made to appear warm by noting that occasional days with temperatures over 80° have been experienced beyond the Arctic Circle. ‘One swallow does not make a summer.’ . . .”

In reply to this the travelers customarily maintain it to be a violation of our language to say that a given region is without a summer if it has a period of several weeks during which residents and travelers complain about the heat and use devices to neutralize or escape it. They feel you cannot very well deny a warm period to a district that raises wheat successfully during most years. According to officials of the Canadian Department of Agriculture, wheat ripens most years to 80 miles beyond the Arctic Circle in the Mackenzie district; according to Soviet agriculturists wheat ripens more than twice that far beyond the Circle in their Arctic—while, as said, vegetable gardens are by their testimony successful more than 350 miles north of the Circle and right down to the shore of the Polar Sea. Wherever such things are true, say the travelers,

there is a warm period, a summer.

Once again, perhaps for the third or fourth time in this presentation, we have stated the case so that it is hard to avoid feeling the travelers have the best of it. You feel ready to agree there is a warm period, or a true summer, north of the Arctic Circle in places not markedly influenced by Gulf Stream or Japan Current. You may feel inclined to agree, further, that there will be a true summer, no matter how far north, if the land is fairly level and not close to the sea or close to snow-covered mountains—which, in turn, means that you will have a true summer over at least a million square miles north of the Arctic Circle in Siberia and over a third of that square mileage in Arctic Alaska and Arctic Canada, with bits of true summer in many Arctic islands, even in Greenland for all of its snow-covered mountains and a neighboring sea.

It may appear not to be surprising, then, that a verdict in favor of the traveler school was arrived at by members of the staff of the U.S. Weather Bureau at least ten years ago. For in 1931 Charles Fitzhugh Talman, meteorologist of the Bureau, published his *The Realm of the Air* and said on pages 239-40-41:

“That high temperatures necessarily go with low latitudes and low temperatures with high latitudes is one of the most stubborn of delusions. This notion has come down to us from the ancient Greek philosophers. . . . It is false even in regard to average temperatures of the year, and it is conspicuously false in regard to the extreme temperatures of summer and winter. . . . The region around Verkhoyansk [about 70 miles north of the

Arctic Circle] is known as the ‘winter cold pole.’ In contrast to its frigid winters, the summers of this region are often too hot for comfort. . . . Verkhoyansk itself has reported a summer maximum of 94°.”

But that was nine years ago. Since then, Talman’s book, and whatever evidence he had upon which to base his conclusions, have been available to scientists without and within the Bureau. What those not on the Bureau staff think of the evidence, and of such views as those of Dr. Talman, we have already seen through our quotations from Professor Trewartha. What fellow scientists within the Bureau think we may infer from a terse statement by another member of the Bureau, Thomas A. Blair.

According to the 1938 *American Men of Science*, Dr. Thomas A. Blair is at the Weather Bureau office, Lincoln, Nebraska. He is A.B. from Stanford University and is assistant professor of meteorology at the University of Nebraska. His specialties are given as “Correlation of weather and wheat yields; temperature correlations; seasonal pressure anomalies.” In 1937 Professor Blair published *Weather Elements. A Text in Elementary Meteorology*. On page 298 he has:

“About 8 per cent of the earth’s surface is included in the polar zones. . . . There is great insolation for a short time in summer, but since it falls on a snow or ice surface, there is little warming. . . .”

Thus we have the pro-traveler Bureau verdict of 1931 reversed through a pro-cosmographer Bureau verdict of 1937.

Meantime, as we have said, it is what we learn in the common school geography courses that shapes the geographic thinking of most of us. For of those who go on from the common to the high school and then to the university, not one in a thousand studies geography after leaving the sixth or seventh grade. Many of us never go to high school, and still fewer to college. It is therefore an infinitesimal percentage who are influenced directly by the textbooks on meteorology and geography that are used in the colleges.

But the writers of the common school textbooks have arrived at no decision on our problem; or, rather, each has arrived at his own decision. They do not, apparently, read the same authorities, or at least do not believe the same ones. It will seem, for instance, that authors like Talman and not those like Blair have been read by A. W. Abrams and E. L. Thurston; for they tell in their *World Geography* that “Continental Arctic lands are warm in summer. . . . Temperatures as high as 80° F. in the shade are common.” But it will seem equally clear that authors like Blair and not those like Talman must have been read by Alexis Everett Frye, for he says in his *New Geography*: “The zones that spread round the poles are the *frigid zones*. The word ‘frigid’ means *very cold*. There is no warm season in the frigid zones, and even in the summer the air is cold.”

Our problem, then, has not been solved. Many travelers still remain unconvinced by the logic of the cosmographers that the Arctic has no warm period, no true summer, and continue to rest their views on what they believe themselves to have seen and felt; many cosmographers similarly remain unconvinced by the hot weather reports of the travelers and continue



holding, with Parmenides, Aristotle and Strabo, that no warm season exists beyond the Arctic Circle because the laws of nature are such that it could not exist.

With that situation prevailing as we go to press, we leave to the jury of our readers to hand down, if they feel like it, an interim verdict on what to them are the merits of the case. Perforce they and we must leave to coming years the final decision—the conversion of all travelers by the cosmographers or of all cosmographers by the travelers.

And to those coming years we must leave also the final decision on the veracity of Columbus, though perhaps not on that of Pytheas.

Pytheas has been exculpated to the extent that if not found innocent he has at least not been found guilty. For it may be that all he claimed was to have sailed fifty or so miles north from the northwest corner of Iceland, whereupon, by everybody's agreement, he could have encountered, summer or winter, the "sea lung" condition that may characterize the fringe of the pack in that quarter.

Columbus stands otherwise. The historians, according to Professor Nowell, still follow the lead of Ruge and Vignaud. For them, and for that public which hearkens unto them, Columbus is still the liar, a chief proof of which is his claim to have sailed in February, 300 miles north from Iceland without seeing ice.

## BIBLIOGRAPHY

Our second and third chapters, those on Columbus and on the climate of the Arctic, usually give the necessary bibliographical information at the point where authorities are quoted. So we have not made up a formal bibliography to support those chapters.

The Pytheas chapter, on the other hand, frequently refers to authorities without giving bibliographical information. Accordingly, we have made up a list of the chief works there consulted.

### WORKS CONSULTED FOR PYTHEAS CHAPTER

ADAM OF BREMEN: *Gesta*, 1075.

ADAMNAN, ABBOTT OF IONA: *Vita S. Columbae*, Book I, ch. vi;  
Book II, ch. xlii.

ASHE, THOMAS: *History of the Azores or Western Islands*,  
London, 1813.

ASSOCIATED PRESS: Despatch from Barrow, Alaska, July 29,  
1938.

BAKER, J. N. L.: *A History of Geographical Discovery and  
Exploration*, London, 1937.

BEDA: *De Ratione Temporum* (comment on 2 Kings xx 9).

- BENEDIKTSSON, EINAR: *Thules Beboere. Brudstykker til Belysning af Islands Forhistorie*, Kristiania, 1918.
- BROCHE, GASTON-E.: *Pythéas le Massaliote*, Paris, 1935.
- BRÖGGER, A. W.: "Opdagelsenes Nye Århundre," *Norsk Geografisk Tidsskrift*, Vol. VI, Oslo, 1936.
- BUNBURY, E. H.: *A History of Ancient Geography*, London, 1879.
- BURTON, RICHARD F.: *Ultima Thule; or a Summer in Iceland*, Edinburgh, 1875.
- CARY, M. and E. H. WARMINGTON: *The Ancient Explorers*, New York, 1929.
- COLLINDER, BJÖRN: "Der älteste überlieferte germanische Name," *Namn och Bygd*, vol. 24, 1936.
- CLOWES, G. S. LAIRD: *The Story of Sail*, New York, 1936.
- CRANTZ, DAVID: *The History of Greenland, Containing a Description of the Country and Its Inhabitants . . .*, London, 1767.
- DICUIL: *Liber de Mensura Orbis Terrae*, Parthey edition, Berlin, 1870.
- EGEDE, HANS: *Description of Greenland*, London, 1818.
- ELTON, CHARLES I.: *Origins of English History*, London, 1890.

*Encyclopaedia Britannica*, 14th edition, New York, 1929.

FITZPATRICK, BENEDICT: *Ireland and the Foundations of Europe*, New York and London, 1927.

GJERSET, KNUT: *History of Ireland*, New York, 1924.

HENCKEN, H. O'NEILL: *The Archaeology of Cornwall and Scilly*, London, 1932.

HENNIG, RICHARD: *Terrae Incognitae*, Leiden, 1936-1939.

HOBBS, WILLIAM H.: "A Remarkable Example Of Polar Mirage," *Science*, December 1, 1939.

——: *Annals*, Association Of American Geographers, December, 1937, pp. 229-240.

HORNELL, JAMES: *British Coracles and Irish Currachs*, London, 1938.

HOVGAARD, WILLIAM: *The Voyages of the Norsemen to America*, New York, 1914.

HUBBARD, FATHER BERNARD R.: News despatch dated July 28, 1938.

JONES, CAPTAIN E. D.: Personal communication.

JOYCE, P. W.: *Old Celtic Romances*, London, 1879.

KAEMPFERT, WALDEMAR: *New York Times*, August 20, 1938.

- LISIANSKY, UREY: *A Voyage Round the World in the Years 1803, 4, 5, & 6; Performed, by Order of His Imperial Majesty Alexander the First, Emperor of Russia, in the Ship Neva*, London, 1814.
- MALYE, JEAN: "Pythéas," *Bulletin de l'Association Guillaume Budé*, Paris, October, 1933.
- MARKHAM, CLEMENTS R.: "Pytheas, the Discoverer of Britain," *Geographical Journal*, June, 1893.
- NANSEN, FRIDTJOF: *In Northern Mists*, New York, 1911.
- RICKARD, T. A.: *Man and Metals*, New York, 1932.
- : *Through the Yukon and Alaska*, San Francisco, 1909.
- STEENSBY, H. P.: "Pytheas fra Massilia og Jyllands Vestkyst," *Geografisk Tidsskrift*, 24 Bd. Hefte 1, Copenhagen, 1917.
- STEFANSSON, VILHJALMUR: *Iceland: The First American Republic*, New York, 1939.
- : (edited by): *The Three Voyages of Sir Martin Frobisher*, London, 1938.
- TOZER, H. F.: *A History of Ancient Geography*, Cambridge, 1935 (2nd edition with additional notes by M. Cary).
- VON LANGSDORFF, H. G.: *Voyages and Travels in Various Parts of the World, during the Years 1803, 4-5-6-7*, London, 1813-14.

WRIGHT, JOHN K.: *The Geographical Lore of the Time of the  
Crusades*, New York, 1925.

## Footnotes

[1] Pytheas placed Thule under the 66th degree of north latitude, which is the latitude of the north of Iceland.

[2] This is apparently a reference to a map which in H. Hermannson's "The Cartography of Iceland" is called "The Paris-Portuguese Map, Ca. 1500." It contains a legend referring to ice and snow in Iceland. This is significant to Charcot because he accepts the view of Charles de la Roncière that this map contains information supplied by Columbus—then as a result of a 1477 voyage to Iceland.

[3] "In the journal which Columbus wrote on his first journey to America, which still exists, he says: 'I have sailed throughout the Mediterranean Sea; to the north I have gone all the way to England and south all the way to Guinea.' This would seem to indicate that the story about the journey to Iceland is pure fiction, together with many other things in that book: 'Historie del *Fernando Colombo*.'"

[4] Note also that *scemare* and *crèscere* are definite terms used in modern Italian as well as in the Italian of Columbus's time to connote the ebb and flow of the tide.

[5] See [Plate VII](#).

[6] Modified his view after Las Casas was published.

[7] May have gone to Iceland; 100 leagues beyond impossible.

[8] See [Plate XIII](#).

[9] In view of some disputes which arose, we might perhaps give the reader the best dope we can on the authorship of the remarkable document we have been quoting, *Thirty Years in the Golden North*.

It is not true, as intimated by some reviewers of this Book-of-the-Month-Club non-fiction volume, that the alleged author, Jan Welzl, was non-existent. For a man calling himself Jan Welzl, and apparently a Czech as the author of the book was said to be, was found living at Dawson in the Yukon—where, incidentally, the lowest winter temperatures are a good deal colder than any so far recorded by the weather stations which operate on the New Siberia Islands. However, when charged by his fellow-Dawsonites with having told lies, Welzl denied responsibility, claiming he had not even known that he was the author of the book until people started ribbing him about its contents. He admitted that, while on a visit to Czechoslovakia, he had told a good many yarns to some newspapermen; but maintained that these stories were not



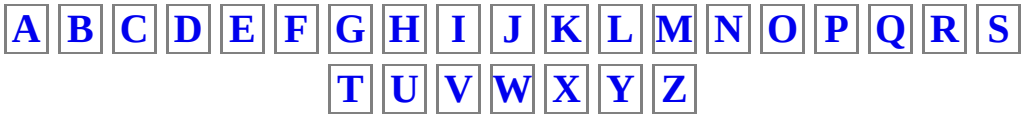
those which appeared in *Thirty Years in the Golden North*.

When the United States Treasury attempted to collect from Welzl moneys which they believed had come to him from royalties, he contended that he had never received any royalties. So far as he knew, all proceeds of this bestseller were going to Czechoslovakia; certainly they were not coming to Dawson, Y. T. Perhaps some of them at least were going to Karel Capek, famous dramatist, author of *Insect Comedy*, *R.U.R.* and a number of other plays which contain material which is nearly as strange as the experiences of Welzl on the New Siberia Islands. For Capek signed the foreword to *Thirty Years*.

[\[10\]](#) See [Plate XIII](#).

[\[11\]](#) See [Plate XIII](#).

# INDEX



## A

Abbe, Cleveland, Jr., on Arctic summer heat, [231](#).

Abrams, A. W., and E. L. Thurston, on Arctic temperatures, [359](#)-360.

Adam of Bremen, on Thule, [28](#);  
on North America, [110](#);  
on Vinland, [246](#)-247;  
“Gesta Hammenburgensis” by, [363](#).

Adamnan, Abbott of Iona, on island thought to be Iceland, [57](#),  
[58](#);  
his “Vita S. Columbae,” [363](#).

Admiral, The. *See* Christopher Columbus.

Aeneas Silvius, his writing known by Columbus, [264](#).

Africa, Greeks on climate of, [4](#);  
Portuguese voyages to, [265](#)-266.

Agathemerus, on length of day in Thule, [82](#).

Agricola, Julius, Thule sighted by, [27](#), [82](#).

Ailly, Pierre d’, “Imago Mundi” of known to Columbus, [264](#).

Aklavik, [342](#)-343, [344](#), [348](#);  
summer heat of, [344](#), [345](#).

Alaska, whalers of, [39](#);  
summer temperatures of, [41](#), [42](#), [228](#), [230](#)-231;  
umiak travel in, [42](#)-43;  
natives of, [45](#);  
purchase of [297](#)-298;

vegetation of, [297](#), [320](#), [322](#)-323;  
Gold Rush, [304](#), [306](#);  
forests of, [306](#);  
climate of, [325](#)-326;  
snow free in summer, [355](#)-356.

Albright, W. D., on Canadian Arctic vegetation, [342](#)-344;  
on summer temperatures of Aklavik, [344](#);  
quoted, [342](#)-344.

Aleutians, barometric pressure over, [351](#).

Aleuts, boatmanship of, [38](#).

See Eskimo.

Alexander the Great, [11](#), [13](#), [17](#).

Alexander VI (Rodrigo Borgia), [110](#), [111](#), [209](#);  
mention of Greenland by, [110](#), [263](#).

Allakaket, maximum temperature of, [324](#).

Amber, [9](#), [17](#), [23](#).

Anaktuvuk River, [326](#).

Anderson, Rasmus B., [218](#).

André, Marius, [162](#), [217](#).

Antarctic, [313](#);

Charcot's voyage to, [161](#);

climate of, [308](#);

resources and vegetation of, [308](#)-309.

Antipodes, [129](#).

Anvik, [282](#).

Apollonius of Rhodes, quotes Pytheas, [84](#)-85.

Archaeology, evidence of, on antiquity of navigation, [31](#)-35;  
in Iceland, [64](#)-65;  
in Greenland, [263](#), [264](#), [265](#).

Arctic, summers, [225](#) ff.;

definition of, [226](#);

see also Climate, Temperatures.

Arctic Red River, [343](#), [344](#);  
temperatures of, [330](#), [342](#).  
Arimaspians, [241](#).  
Aristotle, [15](#), [132](#), [237](#), [251](#), [253](#), [314](#), [350](#), [360](#);  
on zones, [237](#)-238.  
Artillery Lake, [285](#), [290](#).  
Ashe, Thomas, [363](#).  
Asher, G. M., [218](#), [275](#).  
Associated Press dispatch, [363](#).  
Athabaska River, [329](#).  
Athens, [1](#).  
Avalik River, [321](#).  
Avienus, Rufus Festus, on speed of ancient ships, [77](#);  
on Thule, [82](#), [84](#)-85.  
Awuna River, [321](#).  
Azevac, M. d', [150](#).

## B

Bache Peninsula, [336](#).  
Back River, [285](#).  
Baidarka. *See* kayaks.  
Baker, J. N. L., [363](#).  
Banks Island, [207](#), [286](#).  
Banting, Sir Frederick, on Arctic vegetation, [336](#);  
quoted, [335](#)-336.  
Barcia, Gonzales de, [138](#).  
Bardarson, Ivar, [261](#).  
“Barren Grounds,” [228](#) ff.  
Barros, João de, [176](#).  
Barrow, Sir John, [141](#).

Bartlett, Captain Robert A., mirage observed by, [51](#).  
Bathurst Island, [287](#).  
Beaufort, Admiral, Sir Francis, [190](#).  
Beaverlodge, [342](#).  
Beazley, C. Raymond, [218](#).  
Bede, Venerable, [242](#), [363](#);  
    on Iceland as Thule, [27](#), [58](#), [242](#).  
Beerenberg, [206](#)-207.  
Behrens Isles, [285](#).  
Belerium, [19](#), [22](#).  
Belknap, Jeremy, [218](#).  
Bell River, [279](#), [280](#), [329](#).  
Benediktsson, Einar, [363](#);  
    on Thule, [25](#).  
Berger, Hugo, on Geminus' quotation from Pytheas, [87](#).  
Bering Sea, weather of, [41](#);  
    Eskimos, [40](#);  
    Japan current in, [227](#).  
Bessel, W., [85](#).  
Best, George, on navigability and habitability of Arctic, [269](#)-  
    272;  
    on heat in Arctic and tropics, [269](#)-270, [295](#);  
    on Arctic sunlight, [270](#)-271, [310](#)-311.  
Bethune, W. C., [344](#).  
Big Ramparts, [342](#).  
Biremes. *See* ships.  
Birket-Smith, Kaj, [351](#)-354.  
Biscay, Bay of, [19](#), [34](#), [195](#).  
Blair, Thomas A., quoted, [359](#).  
Bligh, William, [49](#).  
Blosseville coast, [179](#), [206](#).  
Bochartus, on etymology of Thule, [25](#).

Boats, age of, as invention, [31](#);

“... of two thwarts” mentioned by Dicuil, [49](#).

*See also* coracles, curraghs, dories, kayaks, umiaks, ships.

Bolza, Giov. Batt., on meaning of *marea*, [196](#).

Bonnefoux, P. M. J., Baron de, [218](#).

Borgia, Rodrigo. *See* Alexander VI.

Bougainville, Louis Antoine de, identified Thule with Iceland, [28](#).

Bramble, Charles A., [301](#)-302.

Bristol, [117](#), [127](#), [191](#);

commerce with Iceland, [117](#), [124](#), [151](#), [155](#), [170](#), [172](#),  
[178](#), [183](#), [184](#), [186](#), [213](#), [215](#);

Columbus familiar with sailors of, [264](#).

Britain, [240](#);

Pytheas' voyage to, [2](#);

his circumnavigation of, [5](#), [22](#);

Pytheas on size of, [22](#);

Polybius on Pytheas and, [23](#);

Pytheas on length of day in, [23](#);

Bronze Age voyages to, [32](#);

Dicuil on islands near, [62](#);

Strabo quotes Pytheas on, [88](#).

*See also* Britons.

Britannica. *See* “Encyclopaedia Britannica.”

Britons (ancient), probable discovery of Iceland by, [29](#) ff., [36](#)  
ff., [56](#) ff., [101](#), [242](#);

skin boats of, [40](#);

culture level of, [48](#).

*See also* Britain.

Broche, Gaston-E., [28](#), [72](#)-73;

on date of Pytheas' voyage, [15](#);

on month of Pytheas' departure, [19](#);

of Tacitus' identification of Thule, [27](#);  
identifies Thule with Iceland, [28](#), [83](#), [103](#)-104;  
rejection of "Norway is Thule" argument by, [74](#);  
on mileages of Pytheas, [75](#);  
credits to Pytheas passages in Pliny and Mela, [79](#);  
on farthest north of Pytheas, [97](#)-98;  
quotes authorities on Iceland, [101](#).

Brögger, Dr. A. W., [363](#);  
on antiquity of navigation, [31](#) ff.;  
on Bronze Age navigation, [32](#)-33.

Bronze Age, ships of, [31](#);  
navigation of, [32](#) ff.;  
commerce of, [32](#);  
Brögger on navigation of, [32](#)-33.

Brooks, Alfred Hulse, quoted, [231](#).

Brooks Range, [320](#), [326](#), [327](#), [346](#).

Bunbury, E. H., [363](#).

Burgundy, Duke of, and Greenland falcons, [263](#).

Burke, Dr. Grafton, temperatures, [322](#).

Burning Tropics. *See* Tropics.

Burton, Sir Richard Francis, [101](#)-102, [218](#);  
on etymology of Thule, [25](#).

## C

Cabot, John, [204](#).

Caddeo, Rinaldo, [218](#).

Canada, Arctic, [328](#) ff.;

Mason on climate of, [330](#)-332;

Kindle on climate of, [332](#)-333, [337](#)-338;

Banting on vegetation of, [335](#)-336;

O'Neill on temperature, vegetation and colonization of,  
[338](#);

Isherwood on heat and thunderstorms in, [341](#)-342;  
Albright on vegetation in [342](#)-344.  
“Canadian Field Naturalist,” [332](#).  
“Canadian Geographical Journal,” [335](#).  
Canadian Public School geographies, [333](#)-335, [338](#)-339.  
Canby, Henry Seidel, [248](#).  
Cantion, farming methods of, [23](#).  
Cantwell, Commander John C., [228](#), [301](#), [318](#);  
    on Arctic summer temperatures, [299](#)-300.  
Capes: Beechy, [287](#);  
    Cartegna, [117](#);  
    Chelyuskin, [317](#);  
    Farewell, [54](#);  
    Finisterre, Bronze Age voyages from, [32](#);  
    Hoare, [287](#);  
    Krusenstern, [299](#);  
    Lisburne, [320](#);  
    Ortega, [19](#);  
    St. Vincent, [19](#);  
    Smythe, [298](#);  
    South, [167](#).  
Capella, Martianus, on uninhabitable zones, [237](#).  
Capek, Karel, [250](#).  
Cardinali, Francesco, on meaning of *marea*, [196](#).  
Caribou Eskimos, [351](#).  
Carthage, [15](#);  
    control of Strait of Gibraltar by, [10](#)-11, [15](#).  
Cary, M., and E. H. Warmington, on probable date of Pytheas’  
    voyage, [15](#);  
    on Pytheas’ exaggeration of size of Britain, [22](#).  
Casaubon, Isaac, identified Thule with Iceland, [28](#).  
Cassiterides, tin trade with, [10](#);



maritime route to, [11](#).  
“Century Magazine,” [300](#).  
*Challenger Voyages*. See Sir John Murray.  
Chambers, Major Ernest J., [302-303](#), [330](#), [344](#).  
See also William Ogilvie.  
Champlain Society, [276](#).  
Charcot, Jean B., [161-164](#), [165](#), [174](#), [179](#), [218](#), [221](#);  
voyages beyond Iceland, [161](#);  
on critics of explorers, [161](#);  
on Vignaud, [162](#);  
on Columbus, [162-166](#);  
on ice conditions north of Iceland, [164](#);  
believes Columbus tried to reach Greenland, [164](#);  
on ice between Greenland and Iceland, [206](#).  
Charles V., [113](#), [152](#).  
Chiapas, Bishop of. See Las Casas.  
Chicago World’s Fair, papal documents exhibited at, [111](#).  
Chronology, of Archbishop Ussher. See Ussher.  
Churchill’s Voyages, [113](#), [114](#), [116](#), [121](#), [131](#), [141](#).  
Circumnavigation, of Africa, [5](#);  
of Britain, by Pytheas, [23](#).  
Clarke, Richard H., [218](#).  
Clavus, Claudius, map by, [125-127](#);  
knowledge of Greenland by, [260-261](#);  
on habitability of zones, [261](#), [262](#);  
probable influence on Columbus by, [265](#).  
Cleomedis, on behavior of sun in Thule, [79](#).  
Climate, of Greece, [4](#);  
of Africa, [4](#);  
Greek conceptions of, [4](#), [8](#), [12-13](#), [232](#), [310](#);  
of North Atlantic, [49-50](#);  
of Iceland, [52](#), [195](#), [244-245](#), [247](#);

Las Casas on polar, [130](#)-131;  
of Jan Mayen, [166](#)-167, [189](#);  
of Arctic regions, [225](#) ff., [351](#), [354](#);  
Pliny on Hyperborean, [241](#);  
Hippocrates on northern, [252](#);  
of Greenland, [256](#)-258, [259](#);  
of Antarctic, [308](#);  
of Alaska, [323](#)-326;  
of Arctic Canada, [328](#) ff.  
Clowes, G. S. Laird, [363](#);  
    on ancient curraghs, [47](#).  
Coast Guard (U. S.), [41](#), [46](#).  
Colby, Merle, [325](#)-326.  
Cold, Solinus on effects of, [247](#);  
    Welzl on same, [249](#)-250;  
    Quazwini on same, [251](#);  
    Davis on ability of women to stand, [339](#)-340.  
“Collectanea rerum memorabilium.” See Solinus.  
Collinder, Björn, [363](#);  
    on etymology of word “Thule,” [25](#).  
Columba, Adamnan’s biography of, [57](#).  
Columbus, Bartolomé, [149](#).  
Columbus, Christopher, [292](#), [296](#), [360](#);  
    identifies Thule with Iceland, [28](#);  
    ships of, [56](#);  
    voyage to Iceland, [109](#) ff., [265](#), [268](#), [361](#);  
    agent of Spain, [109](#);  
    nationality of, [111](#), [136](#), [137](#), [139](#);  
    life of, by son Ferdinand, [114](#) ff.;  
    characterization of, [116](#)-118;  
    on Ptolemy, [117](#), [124](#), [154](#), [155](#), [178](#), [183](#), [184](#);  
    on latitude of Thule, [117](#), [123](#)-124, [171](#), [177](#), [182](#), [183](#),

[184](#), [216](#);

description of Thule by, [117](#);

on habitability of zones, [117](#), [123](#), [124](#)-125, [129](#), [154](#),  
[158](#), [177](#), [182](#), [186](#), [187](#), [188](#), [189](#), [266](#), [269](#), [292](#);

Las Casas on, [121](#)-122;

his ability as navigator, [117](#), [122](#)-124, [211](#);

as God's chosen agent, [134](#), [178](#);

Ulloa on, [137](#)-139;

veracity doubted by Vignaud, [140](#);

Vignaud on, [140](#)-146;

Magnaghi on, [140](#), [146](#)-153;

Storm on, in Iceland, [153](#)-161;

Storm on early voyages of, [154](#);

Storm on intellectual development of, [156](#);

Storm on exaggeration of distances by, [156](#), [158](#);

Storm on planned North Pole voyage by, [158](#)-159, [160](#);

as believer in warm Arctic summers, [263](#);

familiar with Bristol sailors, [264](#);

probably knew works of Clavus, [265](#);

planned Arctic voyage, [267](#);

Charcot on, [162](#)-166;

Vignaud on Faroe voyage of, [162](#);

his probable attempt to reach Greenland, [164](#);

letter of, to Doña Juana de la Torres, [164](#);

Charcot on intended polar voyage of, [164](#);

Thoroddsen, on voyage of, [171](#)-173;

Madariaga on, [176](#)-179;

Fiske on, [182](#)-183;

Thacher on, [184](#);

McCaskill on, [185](#) ff.

Columbus, Diego, [149](#).

Columbus, Ferdinand, [170](#)-171, [174](#), [184](#);

claimed his father visited Iceland, [109](#), [268](#);

“Historie” by, [112](#), [114](#) ff., [174](#);

character of, [113](#), [118](#);

“Historie” of quoted, [114](#)-118, [135](#), [197](#);

illegitimacy of, [118](#);

Ulloa on “Historie” and, [137](#)-139;

Magnaghi on, [146](#), [147](#) ff.;

as cosmographer, [152](#);

Storm on, [155](#);

Fiske on “Historie” of, [182](#);

McCaskill translation of “Historie” passages, [185](#), [186](#) ff.

Columbus, Don Luis, [149](#), [152](#)-153.

Colville River, Alaska, [320](#).

Commerce. *See* Trade.

“Compilation of Narratives of Exploration in Alaska,” [300](#).

Copernicus, [237](#).

Coppermine River, [275](#), [276](#), [278](#), [285](#), [345](#).

Coracle, British, [45](#).

*See also* Curraghs, Boats.

Cormac, voyage of, [57](#)-58, [242](#).

Cornish, Dr. Vaughan, quoted, [189](#)-190.

Cornwall, tin mines of, [9](#);

description of, by Pytheas, [19](#), [22](#);

Stone Age implements found in, [33](#);

megalithic tombs in, [34](#);

Bronze Age commerce of, [35](#).

Coronation Gulf, Canada, [285](#), [345](#), [346](#).

*Corwin*, [228](#), [298](#).

Cosa, Juan de la, [175](#);

map by, [181](#), [202](#)-205, [215](#);

Hermannsson on, [202](#)-203;

McCaskill on, [203](#)-205, [208](#);

Iceland on map of, [205](#);  
Jan Mayen on map of, [206-207](#), [216-217](#).  
Cosmas Indicopleustes, [80](#).  
Coudert, Frederic C., [218](#).  
Cowley, J., quoted, [293](#).  
Crantz, David, [363](#);  
    on umiak, [46](#).  
Cromlechs, [34](#).  
Cronium, [92](#).  
Ctesias of Cnidus, name of Thule traced back to, [25](#).  
Curragh, Irish, [43-45](#);  
    Hornell on, [44](#);  
    model of ancient, [47](#);  
    Clowes on ancient, [47](#);  
    probable antiquity of, [47](#);  
    seaworthiness of, [100](#).  
See Boats.

## D

d'Ailly, Pierre, "Imago Mundi," of, known to Columbus, [264](#).  
Dall, W. H., [230-231](#), [232](#), [235](#), [271](#), [298](#), [301](#), [314](#), [318](#), [322](#),  
    [352](#).  
Danes, colonization of Greenland by, [66](#).  
Davis, John, [272-274](#), [295](#), [297](#);  
    voyages of, [272](#);  
    on zones, [272-274](#);  
    on Arctic summer heat, [273](#), [295-296](#).  
Davis, Mary Lee, on Alaska temperatures and vegetation, [322-323](#).  
Davis Strait, [296](#);  
    visited before Columbus, [66](#).  
Dawson, [250](#).

Day, length of, Pytheas on, in Britain, [23](#);

Las Casas on, at poles, [130](#);  
in Thule.

*See also* Thule and Iceland.

Day, P. C., [230](#);

on Fort Yukon summer temperature, [231](#).

Daylight and darkness, hours of, on Pytheas' voyage, [52](#)-53,  
[75](#)-77;

of Thule, [63](#), [80](#) ff.;

Geminus of Rhodes on, [80](#);

on Jan Mayen Island, [180](#);

at Fort McPherson, [303](#).

*See also* Sun.

De Costa, Rev. B. F., [218](#).

De Hevesy, André, [218](#).

de la Cosa, Juan. *See* Cosa, Juan de la.

De Lollis, Cesare, on Columbus in Iceland, [150](#), [218](#).

De Roo, P., [218](#).

"Description of the Earth," title of work by Pytheas, [15](#).

Dicaearchus, mentions Pytheas, [15](#).

Dickinson, R. E., and A. J. R. Howarth, [237](#)-240.

Dickson Island, [348](#).

Dicuil, [58](#)-64, [180](#), [243](#), [244](#);

identifies Thule with Iceland, [27](#)-28;

on Irish in Iceland, [49](#), [180](#), [243](#);

first unquestioned reference to Iceland, [59](#), [60](#), [242](#);

on habitability of world, [61](#), [243](#);

on daylight and darkness of Thule, [63](#), [84](#), [89](#);

on islands near Britain, [62](#).

Dimashqi on habitability of earth, [252](#).

Diodorus, [19](#)-22, [87](#).

Dionysius Periegetes, on Thule, [81](#).

“Discovery of America.” *See* John Fiske.

Disko Island, [246](#).

Dodge, Richard Elwood, [305](#), [306](#).

Dolphin and Union Strait, [352](#).

Donworth, Albert B., [218](#).

Dories, seaworthiness of, [40](#), [43](#).

*See also* Boats.

## E

Earth, Pythagorean conception of, [3](#), [236](#);

Ussher Chronology of, [29](#);

habitability of, [61](#).

Easter Island, discovery of, [32](#), [52](#).

Edmonton, [331](#), [338](#), [343](#).

Edrisi, on northward extent of life, [251](#).

*Effie M. Morrissey*. *See* Robert A. Bartlett.

Egede, Hans, [363](#);

on length of Greenland umiak, [46](#).

Ekerold, Hagbard, [166](#), [169](#), [174](#), [179](#).

El Fisco, trial of, [147](#)-148.

Elizabeth, Queen, [292](#);

belief in warm Arctic summers during reign of, [226](#), [295](#).

Ellesmere Island, [319](#).

Elton, Charles I., [87](#), [90](#), [363](#).

“Encyclopaedia Britannica,” on Pytheas, [14](#);

on navigation of South Sea Islanders, [32](#);

on Dicuil, [59](#);

on Emperor Theodosius, [60](#);

on Azores, [66](#);

on Alexander, [110](#).

Equinoctial, [117](#), [129](#).

Eratosthenes, on reliability of Pytheas, [16](#);

on zones, [236](#);  
on habitability of Arctic, [252](#)-253, [263](#);  
Strabo on, [253](#).  
Erik the Red, [261](#);  
in Greenland, [246](#), [255](#), [256](#).  
Eriksson, Leif, voyage of, [54](#);  
Church knew of voyage by, [58](#).  
Eskimos, modern Stone Age, [35](#), [47](#);  
skin boats of, [37](#)-38;  
boatmanship of, [37](#), [38](#), [40](#), [45](#)-46;  
care of skin boats by, [42](#);  
archaeological remains of, [65](#).  
Eudoxus corrected by Pytheas, [13](#), [74](#).  
Eyjolfsson, Bishop Magnus, [172](#).

## F

Faeroe Islands. *See* Faroe Islands.  
Fairbanks, [319](#), [339](#).  
Falcons, Greenland, [111](#), [209](#), [259](#)-260, [263](#);  
used as ransom in Crusades, [263](#);  
Frederick II, on, [260](#).  
Faroe Islands, distance from Iceland, [36](#), [70](#);  
climate of, [41](#);  
visibility from Shetlands and Orkneys, [51](#), [53](#)-54;  
wild sheep in, [66](#)-67;  
as Thule, [77](#), [164](#), [186](#)-187, [213](#);  
Vignaud on Columbus reaching, [162](#);  
Fiske on, [183](#), [213](#);  
as Frisland, [183](#), [185](#).  
Ferro meridian, [155](#), [157](#).  
Finnie, Richard, [344](#)-346, [352](#);  
on "Frozen North," [345](#);



on Canadian Arctic heat, [345](#)-[346](#).  
Fiske, John, [186](#), [187](#), [200](#), [206](#), [208](#), [218](#);  
quoted on Columbus, [182](#)-[183](#);  
on Columbus and three Thules, [183](#), [213](#).  
Fitzpatrick, Benedict, [59](#), [363](#).  
Flamborough Head, [23](#).  
Florio, Iohn, on meaning of *marea*, [196](#).  
Fog, [95](#), [96](#), [98](#).  
Fort: Chipewyan, [329](#);  
Francis, [341](#);  
McPherson, [279](#), [280](#), [302](#)-[303](#), [329](#), [330](#), [344](#);  
Reliance, [285](#);  
Simpson, [352](#);  
Vermilion, [342](#);  
Yukon, [230](#)-[231](#), [271](#)-[272](#), [279](#)-[281](#), [283](#)-[284](#), [298](#), [301](#),  
[305](#), [322](#), [326](#).  
Franz Josef Fjord, [171](#).  
Franklin, Sir John, [278](#), [279](#), [309](#);  
on heat in Arctic, [279](#);  
disappearance of, [292](#), [296](#).  
Frederick II, reference to Greenland by, [110](#);  
on falcons, [260](#).  
Friesland. *See* Frisland.  
Frisland, [117](#), [124](#), [155](#), [183](#);  
Ptolemy's Thule as, [155](#), [182](#), [184](#), [186](#), [204](#);  
usual name for Iceland in Columbus' time, [160](#), [185](#);  
Faroe Islands as, [183](#), [185](#);  
Iceland as, [205](#), [208](#);  
distance from Illa Tille to, [205](#).  
*See also* Iceland.  
Frislandia. *See* Frisland.  
Frizeland. *See* Frisland.

Frobisher, Sir Martin, [37](#), [269](#), [296](#).

“Frozen Sea,” Strabo on, [92](#);

Solinus on, [92](#);

Pliny on, [92](#);

Pytheas on distance of, from Thule, [92-93](#);

Columbus on, [117](#), [188](#), [196](#);

limits of, [188](#).

Frozen zones. *See* Zones.

Frye, Alexis Everett, [306](#);

on Frigid Zones, [304](#), [360](#);

on heat in Arctic, [304](#).

## G

Galileo, [237](#).

Gassendi, quoted by Broche, [100](#).

Geminus of Rhodes, on daylight and darkness in north, [80](#);

gives only preserved direct quotation from Pytheas, [80](#),  
[86](#), [87](#).

“Geographical Review,” [342](#), [344](#).

Georgeson, Dr. C. C., [319](#);

on Alaska temperatures, [320](#).

Gibraltar (Strait), Carthaginian blockade of, [11-12](#), [15](#);

Pytheas passes through, [19](#).

Gilbert, Sir Humphrey, [269](#).

Giraldus Cambrensis, [258](#);

Nansen quotes, [259](#).

Gjerset, Knut, [363](#);

on location of Thule, [24](#);

on etymology of Thule, [26](#).

Good Hope, [344](#);

maximum temperatures of, [330](#).

Good Hope, Cape of, [269](#), [315](#).

Goodrich, Aaron, [217](#).

Great Bear Lake, [334](#).

Great Slave Lake, [290](#), [341](#).

Greek, [3](#) ff., [234](#) ff., [310](#)-311;

conceptions of climate, [4](#), [8](#), [12](#)-13, [232](#), [310](#);

Markham on, ships, [18](#);

ships, [48](#);

folklore, [234](#)-235;

beliefs concerning sun, [310](#).

Greely, A. W., [319](#).

Greenland, [127](#), [171](#), [175](#), [181](#), [244](#), [246](#), [253](#), [272](#), [311](#), [313](#),  
[350](#), [353](#), [355](#);

kayakers of, [38](#);

Coast Guard patrol of, [41](#);

large umiaks reported from, [46](#);

mediaeval Europeans of, [67](#);

disappearance of ruins from, [68](#);

bishopric of, [110](#), [209](#);

referred to by Frederick II, [110](#);

Adam of Bremen on, [110](#);

America known by, [111](#), [210](#);

falcons of, [111](#), [209](#);

Iceland visible from, [120](#);

on Clavus map, [125](#);

believed connected with Russia, [127](#);

Icelanders in, [159](#), [168](#), [172](#), [210](#);

probable attempt of Columbus to reach, [164](#);

distance from Iceland to, [179](#);

ice of, [180](#);

as Thule, [187](#);

Scoresby region of, [206](#);

Charcot on ice conditions of, [206](#);

Norway's relation to, [210](#);  
current, [245](#);  
colonization and development of, [245](#), [246](#);  
Erik the Red on west coast of, [246](#);  
summer in, [246](#);  
naming of, [246](#);  
"The King's Mirror" on, [254](#), [256](#)-258;  
ice cap of, [254](#)-255;  
description of, [254](#)-256, [309](#);  
climate of, [256](#);  
Cambrensis on, [258](#)-259;  
"Rímbegla" on, [262](#);  
knowledge of, by Rome, [263](#), [264](#);  
archaeology in, [263](#)-265.

Gregg, Dr. Willis Ray, quoted, [350](#).

*Grosse maree*. See *maree*.

Gulf Stream, [227](#), [245](#), [328](#), [355](#), [358](#).

Guistianini, [137](#).

## H

Hakluyt, [261](#);

Society, [272](#), [275](#).

Hale, Edward Everett, [218](#).

Hamilton, H. C., [88](#);

on latitude of Thule, [100](#).

Hann, Dr. Julius, [311](#).

Hanno, [10](#).

Harrisse, Henry, [218](#);

Ulloa on, [138](#)-139;

Magnaghi on, [150](#);

Storm on, [153](#).

Hayes, Dr. I. I., [253](#)-254.

Hayes, Reverend J. Gordon, [309](#).  
Healy, Captain M. A., [298](#).  
Hearne, Samuel, journey of, [275](#)-276;  
    on Arctic heat, [276](#);  
    quoted, [276](#).  
Helgafell, [172](#).  
Heligoland, source of amber, [23](#).  
Helps, Arthur, [218](#).  
Hencken, H. O'Neill, [363](#);  
    on Stone Age navigation, [33](#)-35, [363](#).  
Hennig, Richard, [363](#).  
Henry, Prince, the Navigator, [5](#), [125](#), [176](#), [267](#), [269](#).  
Hercules, Pillars of. *See* Pillars of Hercules.  
Hermannsson, Halldór, [162](#), [185](#), [218](#);  
    on Juan de la Cosa, [202](#).  
Herodotus, on Black Sea, [22](#).  
Hesiod, [226](#).  
Himilco, [10](#).  
Hipparchus, [16](#), [33](#).  
Hippocrates, [252](#).  
"Historia Norwegiae," [262](#).  
Hobbs, Professor William H., [363](#);  
    on mirages, [51](#)-52.  
Holmes, Oliver Wendell, versatility of, [86](#).  
Holsteinsborg, [67](#).  
Horn, [93](#), [94](#).  
Hornell, James, [363](#).  
Hotham Inlet, [298](#).  
Howarth, A. J. R. *See* R. E. Dickinson.  
Hovgaard, Professor William, [363](#);  
    on mediaeval ships, [56](#);  
    on speed of Viking ships, [77](#).

Hubbard, Father Bernard, [363](#);  
on seaworthiness of umiak, [43](#).  
Hudson, Henry, [296](#), [297](#);  
voyage of 1607, [168](#);  
sailing directions of, [261](#);  
visit to Spitsbergen by, [274](#)-275;  
forecasts “fish oil” industry, [274](#);  
on heat in Arctic, [274](#)-275.  
Hudson Bay, [337](#).  
Hudson Stuck Memorial Hospital, [322](#).  
Hudson’s Bay Company, [279](#), [341](#).  
Hume, David, [234](#), [339](#).  
Hvalfjord, [172](#), [173](#).  
Hyperboreans, [131](#), [226](#), [234](#), [235](#), [252](#), [263](#);  
Pliny on, [241](#);  
Columbus believed in, [264](#).

## I

Ice, Nansen on sea, [93](#), [96](#)-97;  
absence of from Norway vicinity, [93](#);  
off Iceland coast, [94](#), [142](#), [145](#), [150](#), [157](#)-158, [164](#), [179](#),  
[180](#), [192](#), [206](#), [208](#), [215](#), [216](#), [312](#)-314;  
north of Thule, [95](#) ff.;  
relation of tides to, [191](#);  
ship in pack, [192](#), [254](#).  
Ice Cap (Greenland), [254](#).  
Iceland, identification of, with Thule, [24](#), [27](#), [28](#), [100](#) ff.;  
Dicuil on, [26](#);  
probable British discovery of, [29](#) ff., [56](#), [102](#);  
possible Bronze Age navigation to, [35](#)-36;  
distance from Faroes to, [36](#);  
visibility of, [50](#);

mirage of, [51](#);  
climate of, [52](#), [64](#), [248](#);  
visibility over, [53](#);  
voyages between Scotland and, [55](#);  
voyages to, after Pytheas, [56](#) ff.;  
Norse voyages to, [57](#), [59](#);  
Irish in, [57](#), [59](#) ff.;  
first undisputed reference to, [59](#), [60](#), [242](#);  
archaeology in, [64](#)-65;  
possible ancient sheep reserve, [67](#);  
source of eider down, [67](#);  
pre-Norse Irish settlement in, [68](#);  
distance from Scotland to, [75](#);  
behavior of sun in, [79](#);  
length of day in, [84](#);  
volcanoes of, [85](#)-86;  
latitude of, [100](#), [147](#), [149](#)-150, [151](#), [152](#), [155](#), [171](#);  
Columbus' voyage to, [109](#) ff., [117](#);  
knowledge of America before Columbus, by, [109](#), [210](#);  
Adam of Bremen on, [110](#), [246](#);  
Columbus on latitude of, [117](#), [123](#)-124;  
Bristol trade with, [117](#), [124](#), [141](#), [155](#), [170](#), [172](#);  
as country beyond Atlantic, [119](#)-120;  
Las Casas on, [120](#), [124](#);  
literature of, [127](#);  
ice conditions of, [94](#), [142](#), [145](#), [150](#), [151](#), [158](#), [179](#), [208](#),  
[215](#), [216](#);  
tides in, [143](#), [145](#), [151](#), [157](#)-158, [160](#), [187](#), [208](#);  
Storm on size and latitude of, [155](#);  
people from in Greenland, [159](#)-168;  
Thule as mediaeval name for, [161](#), [175](#);  
Charcot's voyages to sea north of, [161](#), [164](#), [206](#);

great seafaring age of, [168](#);  
Thoroddsen on English trade with, [170](#), [171](#)-172;  
voyages of Icelanders to Vinland, [172](#), [173](#);  
distance from Greenland, [179](#);  
as Frisland, [205](#);  
on de la Cosa map, [205](#);  
sagas on climate of, [244](#), [245](#);  
Solinus on climate of, [247](#);  
Birket-Smith on low pressure area over, [351](#).

Ictis, island of, [22](#).

Ierne, [240](#).

Igarka, Schmidt on life in, [317](#);  
agricultural station in, [347](#);  
scientific research at, [348](#).

Ikpikpuk River, [321](#).

Illa Tille, [203](#);  
distance from Frisland to, [205](#);  
as Jan Mayen, [206](#), [207](#), [208](#).  
*See also* Thule.

“Imramha,” [44](#).

India. *See* Indies.

Indicopleustes, Cosmas. *See* Cosmas.

Indies, [116](#), [173](#), [267](#), [269](#), [292](#);  
west, [124](#).

Innocent III, knew of countries beyond Atlantic, [111](#), [263](#).

Insula d’Ureslant, [203](#).

Interiano, [137](#).

International Polar Year Expeditions, [164](#), [169](#), [174](#).

*Investigator*, [207](#).

Irish, [211](#);  
folklore, [44](#), [46](#);  
references to Iceland, [57](#);



in Iceland, [59](#) ff., [243](#);  
remains in Iceland, [64](#), [65](#);  
curraghs, *see* curraghs.

Irving, Washington, [218](#).

Isherwood, Captain Albert, on Canadian Arctic climate, [341](#),  
[342](#).

Islands, use of uninhabited, as sheep reserve, [67](#);  
colonization and desertion of, [67](#)-68.

## J

Jan Mayen Island, [142](#), [174](#), [180](#), [204](#);  
“Pola” Expedition on, [164](#), [169](#);  
meteorological station on, [164](#), [166](#);  
climate of, [166](#)-167, [189](#);  
discovery of, [183](#);  
as Thule, [187](#), [205](#), [212](#)-213;  
storm near, [193](#);  
description of, [206](#), [207](#);  
Beerenberg mountain on, [206](#)-207;  
Illa Tille as, [206](#)-207;  
Alexander King’s expedition on, [207](#);  
McCaskill on Illa Tille as, [208](#);  
on de la Cosa’s map, [206](#)-207, [216](#)-217.

Jane, Cecil, [218](#).

Japan Current, [227](#), [328](#), [355](#), [358](#);  
in Bering Sea, [227](#).

John O’Groats, [74](#).

Jones, Captain E. D., on umiak, [41](#), [46](#);  
letter from, [363](#).

Joyce, P. W., on curraghs, [44](#)-45;  
“Old Celtic Romances” by, [363](#).

## K

Kaempffert, Waldemar, on age of Swanscombe Man, [30](#)-31;  
press report from, [363](#).

Karelians, [261](#).

Kayaks, Eskimo, description of, [37](#)-38;  
seaworthiness of, [43](#).

Kent, [19](#), [22](#).

Kerr's Voyages, [113](#), [141](#).

Khibin Agricultural Station, [347](#).

Killik River, [320](#).

Kindle, E. M., [332](#)-333, [336](#), [337](#)-338, [340](#);  
on climate of Canada, [332](#)-333, [337](#)-338;  
on popular misconceptions of the North, [337](#).

King, Alexander, expedition of, on Jan Mayen Island, [207](#).

King, Richard, [293](#);  
on Arctic temperatures, [285](#)-286.

King William Island, [285](#), [345](#).

"King's Mirror." *See* "Konungs Skuggsjá."

Kobuk. *See* Kowak.

Kokerines, [283](#).

Kola Peninsula, [347](#).

Kolyma River, [348](#).

"Konungs Skuggsjá (Speculum Regale, The King's Mirror)," [259](#);

on Greenland, [254](#), [256](#)-258;

Laurence M. Larson edition of, quoted, [256](#).

Kowak River (Kobuk), [229](#), [323](#).

Kuk River, [321](#), [326](#).

## L

Lacombe, temperatures of, [344](#).

Labrador, [127](#).

Lake Aylmer, [290](#).  
Lake of the Woods, [341](#).  
Land's End, [19](#).  
Langsdorf. *See* Von Langsdorf.  
La Pierre's House, [279](#).  
La Roncière, Charles de, [162](#), [219](#).  
Las Casas, Fray Bartolomé de, [175](#);  
    "Historia de las Indias" by, [114](#) ff.;  
    publication of, [114](#), [119](#);  
    quoted, [121](#)-135;  
    style of, [120](#)-121;  
    characterization of, [118](#)-119;  
    on childhood and character of Columbus, [121](#)-122;  
    on habitability of zones, [129](#)-133, [177](#);  
    on climate of poles, [130](#)-131;  
    quotes Aristotle, [130](#)-132;  
    quotes Ptolemy on Thule, [130](#), [178](#);  
    quotes St. Anselm, [133](#);  
    on Thule, [134](#);  
    Ulloa on "Historia" of, [137](#)-139;  
    Magnaghi on, [150](#).  
Lena River, [317](#), [348](#), [349](#).  
Lisiansky, Urey, [363](#);  
    on passenger capacity of skin boats, [45](#)-56.  
Lloyd, Evan, [336](#)-337.  
Louis the Pious, [59](#).  
Lung, Sea. *See* Sea-Lung.

## M

McCaskill, Eloise, [181](#);  
    on Columbus, [185](#) ff.;  
    translation of "Historie" passages by, [185](#)-187;

on three Thules, [186](#), [200](#);  
on meaning of *marea*, [196](#)-200, [208](#), [214](#);  
on Juan de la Cosa, [203](#)-205, [208](#);  
on Illa Tille as Jan Mayen, [208](#).

M'Clure, Sir Robert J. Le Mesurier, charting of Banks Island  
by, [207](#).

Mackenzie, Alexander, on Arctic heat, [276](#)-277.

Mackenzie Bay, [285](#), [343](#).

Mackenzie River, [278](#), [284](#), [302](#)-303, [313](#), [320](#), [329](#), [331](#), [336](#),  
[341](#)-342, [348](#), [349](#), [351](#), [352](#), [357](#).

MacKie, Charles Paul, [218](#).

McLeod, D., [343](#).

Macedonians, [11](#), [13](#).

Macrobius, [242](#);

on fiery tropics, [237](#);

on zones, [237](#).

Madariaga y Rojo, Salvador de, [176](#), [205](#), [219](#), [220](#);

on Columbus in Iceland, [112](#), [176](#)-179.

Maeldun, Voyage of, [44](#).

Magellan, Ferdinand, [268](#);

Strait of, [269](#), [273](#).

Magnaghi, Alberto, [140](#), [146](#), [164](#), [174](#), [180](#), [189](#), [217](#), [220](#),  
[222](#);

on Ferdinand and Christopher Columbus, [146](#)-153;

on Vignaud, [146](#);

on ice conditions beyond Iceland, [151](#);

on tides in Iceland, [151](#);

quotes Ribero and Silvani on latitude of Iceland, [152](#);

compared with Vignaud, [152](#);

on ells, [187](#).

Magnússon, Finnur, [219](#);

on ice conditions north of Iceland, [150](#);

- on Columbus in Iceland, [172](#).
- Major, R. H., [266](#).
- Malte-Brun, Conrad, [294](#).
- Malye, Jean, [363](#);
  - on relations between Massilians and Spaniards, [11](#);
  - on Carthaginian blockade of Strait of Gibraltar, [11](#)-12;
  - on date of Pytheas' voyage, [15](#);
  - identifies Thule with Norway, [28](#), [103](#).
- "Man and Metals." See T. A. Rickard.
- Mare Cronium. See Cronium.
- Marea*, McCaskill on meaning of, [196](#)-200, [208](#), [214](#).
- Markham, Albert Hastings, [272](#)-274.
- Markham, Sir Clements R., [219](#), [363](#);
  - on Pytheas, [16](#)-17;
  - on Massilian ships, [18](#), [55](#)-56;
  - on rowing power of ancient ships, [18](#)-19, [69](#), [77](#).
- Markland, [127](#), [128](#).
- Marseilles, [117](#). See Massilia.
- Marshall, Robert, [323](#)-325.
- Mason, Michael H., quoted, [330](#)-332.
- Massilia, birthplace of Pytheas, [1](#);
  - description of, [2](#)-3;
  - history and characterization of, [9](#) ff.;
  - Pytheas' voyage likely financed by, [17](#) ff.;
  - return of Pytheas to, [23](#).
- Mecham, Lieutenant Frederick, on meadows of Melville Island, [287](#), [327](#).
- Mejorada, [159](#).
- Mela, Pomponius, on Thule, [79](#);
  - on sun in Thule, [81](#), [83](#).
- Melville Island, [287](#);
  - Mecham on meadows of, [287](#).

Melozikaket, [283](#).  
 Mermaids, Columbus on, [117](#)-118.  
 Midnight sun, [79](#), [84](#), [93](#), [234](#);  
     Dionysius Periegetes on, of Thule, [81](#);  
     Nansen on, [83](#);  
     Pomponius Mela on, [83](#);  
     Pytheas on, in Thule, [102](#).  
*See also* sun.  
 Mikhailov, Nicholas, [346](#)-348.  
 Mirage, [50](#), [51](#)-52.  
     *See also* Visibility.  
*Morrissey, Effie M. See Effie M. Morrissey.*  
 Morse, Jedidiah, [294](#).  
 Mosquitoes, in Arctic, [228](#), [276](#), [280](#)-281, [300](#), [301](#)-302, [304](#),  
     [321](#), [330](#).  
 Müllenhoff, K., on identification of Thule, [27](#), [186](#).  
 Muñoz, Juan Baptista, [141](#).  
 Murmansk, [167](#).  
 Murray, Alexander Hunter, [279](#);  
     quoted, [280](#)-282.  
 Murray, Earl Emmet, [305](#), [306](#).  
 Murray Inlet, [287](#).  
 Murray, Sir John, [7](#), [219](#).  
 Mythology, Apollonius quotes Pytheas on northern, [85](#)-86.

## N

Nansen, Fridtjof, [25](#), [256](#), [193](#)-194, [236](#) ff.;  
     identifies Thule with Norway, [28](#);  
     admirer of Pytheas, [69](#)-70;  
     argument of, favoring Norway as Thule, [73](#)-74, [77](#)-78, [83](#),  
     [89](#)-93;  
     on Geminus' quotation from Pytheas, [87](#);

- on Strabo's description of Thule, [89](#) ff.;
- on sea ice, [93](#), [96](#)-97;
- on sea north of Thule, [95](#)-97;
- on Arctic gale, [193](#)-195;
- on Juan de la Cosa's map, [204](#);
- on Hippocrates, [252](#);
- quotes Cambrensis, [258](#)-259;
- on habitability of Arctic, [262](#).

Navigation, of Phoenicians, [30](#);

- Bronze Age, [31](#)-32, [33](#);
- of South Sea Islanders, [31](#)-32;
- Brögger on great period of ancient, [32](#) ff.;
- Stone Age, [33](#)-34;
- Columbus on his skill in, [116](#).

Navigator. *See* Henry the Navigator.

Nearchus, distance estimates by, [22](#).

New Siberia Islands, [249](#), [250](#).

Newfoundland, [40](#), [127](#), [183](#);

- dories, [40](#).

Newton, Arthur Percival, quoted, [242](#).

Nicholson Island, [279](#).

Nidaros, [210](#).

Nome, [319](#).

North Atlantic, climate of, [49](#)-50;

- mirages of, [50](#);
- visibility in, [53](#).

North Cape, [93](#).

North Pole, [311](#), [327](#), [356](#);

- Columbus plans sailing to, [158](#)-159, [164](#);
- snow-free land near, [255](#);
- North Cold Cap* surrounding, [305](#);
- cold pole not at, [337](#).

Northeast Passage, [296](#);  
    opening of, by Soviet Union, [315](#)-316;  
    Schmidt on, [317](#).  
Northwest Passage, [272](#), [285](#), [292](#), [296](#), [351](#).  
Norway, Thule as, [23](#), [24](#), [27](#), [69](#) ff.;  
    Bronze Age commerce of, [32](#);  
    voyages between Scotland and, [55](#);  
    Pliny and Mela on Thule as, [79](#);  
    behavior of sun in, [79](#)-80;  
    vicinity of, ice-free, [93](#), [96](#);  
    Greenland Church administered from, [210](#);  
    Nansen on Thule as, *see* Nansen.  
Novaya Zemlya, [294](#).  
Nowell, Charles E., [361](#);  
    on Columbus and Iceland, [112](#), [139](#)-140, [217](#), [220](#)-221;  
    on Vignaud, [220](#).

## O

Ob River, [317](#).  
Obdora Agricultural Station, [347](#).  
Ocean, Pytheas' reports on northern, [2](#);  
    life in polar, [6](#);  
    animal life in, [7](#);  
    Greek view on animal life in, [7](#);  
    northern, [311](#)-312.  
    *See also* "frozen sea."  
O'Curry, Professor Eugene, on Maeldun, [44](#).  
Ogilvie, William, quoted, [302](#)-303.  
"Old Celtic Romances." *See* P. W. Joyce.  
"On the Ocean," work by Pytheas, [15](#), [80](#).  
O'Neill, Professor J. J., [340](#);  
    on Arctic Canada, [338](#).



Ontario, [331](#).  
Oomiak. *See* umiak.  
Oporto, [19](#).  
Orano, Don Luis Columbus exiled to, [149](#).  
Orcades. *See* Orcas.  
Orcas, [23](#), [26](#), [103](#);  
    location of, [23](#), [105](#);  
    Scots of, [24](#).  
    *See also* Orkneys.  
Orkneys, as Thule, [27](#), [82](#), [103](#);  
    Bronze Age commerce of, [32](#);  
    distance from, to Shetlands, [36](#);  
    visibility of Faroe Islands from, [51](#), [53](#);  
    as Pytheas' farthest, [69](#);  
    Solinus on distance to Thule from, [70](#);  
    Las Casas quotes Ptolemy on, [130](#).  
    *See also* Orcas.  
Oronsay, Island of, [34](#).  
Orosius, on habitability of cold lands, [242](#).  
Oviedo, Gonzalo Fernandez de, [137](#).

## P

Papanin, Ivan, expedition of, [6](#), [312](#)-313.  
Parmenides of Elea, [314](#), [360](#);  
    on zones, [236](#).  
Parthey, G., editor of Dicuil, [60](#).  
Peace River, [331](#), [342](#).  
Peary, Admiral Robert E., [327](#);  
    discovery of Peary Land by, [255](#).  
Peary Land, [255](#), [356](#);  
    vegetation and animal life in, [309](#), [327](#).  
Pechora Agricultural Station, [347](#).

Pechora River, [288](#).  
Peel River, [279](#), [281](#).  
Penck, Professor Albrecht, on age of man in Alps, [29](#).  
Peragallo, [150](#).  
Percival, James C., [294](#).  
Perdita, Island of, [132](#)-133.  
Pessagno, G., [219](#).  
Petermann, A., believed in “open polar sea,” [253](#).  
Phoenicians, said to have crossed Torrid Zone, [5](#);  
    navigation of, [30](#);  
    as discoverers of Azores, [32](#).  
Pillars of Hercules, [3](#), [93](#).  
Pinchot-Ballinger dispute, [306](#).  
Pinkerton’s Voyages, [113](#).  
Plant life (Marine), at North Pole, [6](#).  
Pliny, on Sea of Azov, [22](#);  
    cited by Dicuil, [61](#), [62](#);  
    on distance of Thule from Britain, [70](#);  
    on Norway as Thule, [79](#);  
    on behavior of sun in Thule, [81](#);  
    on distance from Thule to “frozen sea,” [92](#);  
    on Scythia, [241](#);  
    on Hyperboreans, [241](#).  
Point Bailey, [287](#).  
Point Barrow, [284](#), [285](#), [320](#), [326](#), [327](#), [346](#).  
Point Lay, [321](#).  
“Pola” Expedition, on Jan Mayen Island, [164](#).  
Polar Ocean. *See* Ocean.  
Pole, celestial, [13](#).  
Poles, Las Casas on habitability of, [130](#)-131.  
    *See also* North Pole, Pole, celestial.  
Polybius, lost books of, [16](#);

on Pytheas, [17](#);  
on Pytheas in Britain, [23](#);  
Nansen on, [96](#);  
on tropics, [237](#), [262](#).

Pomponius Mela. *See* Mela.

Pope Alexander VI. *See* Alexander VI.

Popini, Mrs. Alexander. *See* Eloise McCaskill.

Porcupine River, [279](#), [280](#).

Posidonius, on tropics, [237](#), [262](#).

Prince Patrick Island, [287](#).

Prince William Sound, [319](#).

Priscian, on Thule, [62](#).

Procopius, on Thule as Norway, [28](#), [79](#), [103](#).

Propontide, [80](#).

Pterophorus, [241](#).

Ptolemy, on relation of land and sea, [33](#);

on length of day in Thule, [82](#);

Columbus on, [117](#), [124](#), [154](#), [171](#), [182](#), [183](#), [186](#);

Ulm edition of, [127](#);

quoted by Las Casas, [130](#);

Vignaud on, [143](#);

“Colombina” of, cited, [143](#);

Columbus took latitude of England from, [156](#);

Thule of, [200](#), [202](#), [204](#).

“Purchas His Pilgrimage.” *See* Samuel Purchas.

Purchas, Samuel, quoted, [275](#).

Pythagoras, on shape of earth, [3](#);

on zones, [236](#).

Pytheas, [188](#), [227](#), [232](#), [233](#), [234](#), [242](#), [350](#);

considered a liar, [1](#), [225](#);

honored by Massilia, [1](#), [97](#);

voyage to Thule, [2](#) ff., [243](#), [360](#);

voyage to Britain, [2](#);  
circumnavigation of Britain by, [5](#), [22](#);  
as scientist, [13](#)-14, [94](#);  
as astronomer, [13](#), [48](#), [74](#)-75;  
as geographer, [13](#);  
probable age of, at time of voyage, [13](#);  
fixes latitude of Massilia, [14](#);  
mentioned by Dicaearchus, [15](#);  
Broche on date of voyage, [15](#);  
Broche on month of departure of, [19](#);  
on size of Britain, [22](#);  
Polybius on, [22](#);  
on length of day in Britain, [23](#);  
location of Thule by, [70](#)-71, [188](#);  
Broche on, [72](#), [74](#)-75, [97](#)-98;  
as navigator, [75](#);  
probable mileages of, [75](#)-77, [94](#);  
northern mythology connected with, [85](#)-86;  
Apollonius of Rhodes on, [85](#)-86;  
on “frozen sea” [92](#) ff., [102](#);  
on Arctic climate, [225](#).  
“Pytheas.” See Jean Malye.

## Q

Quaritch, Bernard, on Las Casas’ “Historia,” [120](#).  
Quazwini, on Land of Rum, [251](#)-252.

## R

Raleigh, Sir Walter, [269](#).  
Rampart, [320](#).  
Ramus, Petrus, [28](#).  
Rasmussen Fifth Thule Expedition, [351](#).

Ray Expedition at Point Barrow, [284](#).  
Red River. *See* Arctic Red River.  
Regnard, Jean François, links Iceland with Ultima Thule, [101](#).  
Reinel, King. *See* Renee.  
Renee, King, [117](#), [123](#).  
Revelli, Paolo, [218](#).  
Reykjavik, climate of, [195](#).  
Rhipaeen Mountains, folk belief concerning, [5](#), [234](#);  
    description of, [6](#);  
    Pliny on, [241](#);  
    cold in, [252](#);  
    Hippocrates on climate of, [252](#).  
Ribero, Diego, on latitude of Iceland, [151](#).  
Richardson, Sir John, [278](#);  
    quoted, [283](#)-284.  
Rickard, T. A., [35](#), [319](#).  
“Rímbegla,” [262](#);  
    on Greenland, [262](#).  
Ripaeen Mountains. *See* Rhipaeen Mountains.  
Rome, Church of, relation of, to Columbus’ Iceland voyage,  
    [109](#) ff., [136](#);  
    administered Greenland from Norway, [210](#);  
    knowledge of Greenland by, [263](#), [264](#).  
Roosevelt, President Theodore, [306](#).  
Ruge, Sophus, [112](#), [140](#), [145](#), [150](#), [167](#), [169](#), [174](#), [217](#), [220](#),  
    [360](#);  
    on Columbus’ farthest, [150](#).  
Rum, land of, [252](#).  
Russia. *See* Scythia.

## S

Sacred Promontory. *See* Cape St. Vincent.

Sagas, [262](#);  
confirm pre-Norse Irish settlement of Iceland, [68](#).  
St. Anselm, Las Casas on, [133](#).  
St. Kilda, [66](#).  
Salvagnini, A., [219](#).  
San Jorge de la Mina, [182](#).  
Saracens, [111](#), [209](#), [263](#).  
Saunders, Frederick, [219](#).  
Saxo Grammaticus, [262](#);  
on Thule as Iceland, [28](#).  
Scania Island, [102](#).  
Schmidt, Professor Otto J., [316](#)-318.  
Schott, Dr. G., on height of waves, [190](#).  
Schrader, Dr. Frank Charles, on Arctic summer heat, [326](#).  
Schwatka, Lieutenant Frederick, [300](#), [301](#), [318](#), [322](#).  
Scilly Isles, megalithic tombs found in, [34](#).  
Scolvus controversy, [137](#).  
Scythia, southern boundary of Frozen North in, [4](#);  
Pliny on, [241](#).  
Sea-Lung, [188](#), [189](#), [360](#);  
Strabo quotes Pytheas on, [94](#)-95.  
*Sedov*, drift of, [167](#).  
Seebohm, Henry, [288](#)-289.  
Seneca, [134](#)-135, [176](#), [205](#);  
quoted by Las Casas, [134](#)-135;  
“Medea” of, cited by Madariaga, [176](#).  
Servius, [25](#);  
on location of Thule, [70](#).  
Seton, Ernest Thompson, [290](#)-292.  
Shackleton, Sir Ernest, boat voyage of, [49](#).  
Shetland Islands, [23](#);  
as Thule, [27](#), [69](#), [82](#), [186](#), [200](#), [213](#);

Bronze Age commerce of, [32](#);  
Bronze Age remains from, [32](#);  
distance from Orkneys to, [36](#);  
distance from Faroes to, [36](#), [70](#);  
weather of, [41](#);  
visibility of Faroe Islands from, [51](#), [53](#);  
distance to Norway from, [70](#).

Ships, Pytheas', [18](#), [69](#);  
estimated crew of Pytheas', [19](#);  
Markham on Greek, [18](#)-19;  
rowing power of ancient, [18](#)-19, [69](#), [77](#);  
of South Sea Islanders, [31](#)-32, [48](#);  
Greek, [48](#), [72](#), [77](#)-78;  
Hovgaard on mediaeval, [56](#);  
Massilian, *see* Greek.

Shirazi, on cold in Thule, [252](#).

Sibbald, Sir Robert, on etymology of Thule, [25](#).

Siberia, [327](#), [351](#);  
Seeböhm in, [288](#)-289;  
northern forest limits of, [306](#);  
weather stations in, [313](#);  
summer temperatures in, [314](#)-315;  
Arctic summers in, [350](#);  
Arctic practically snow-free in summer, [355](#), [356](#).  
*See also* Soviet Arctic.

Silvani, Bernardino, on latitude of Iceland, [152](#).

Simpson, Thomas, [284](#), [285](#).

Skin boats, types of, [37](#);  
seaworthiness of, [40](#);  
Eskimo care of, [42](#);  
supposed voyages in, [44](#);  
Lisiansky on passenger capacity of, [45](#)-56.

Smith, Dr. Philip S., [326](#);  
    on Alaska summer heat, [320](#)-322;  
    on Arctic mosquitoes, [321](#).  
Smithsonian Institution, [230](#).  
Smolkà, H. P., [316](#)-318.  
Snaefellsnes, [179](#), [206](#).  
Solinus, G. Julius, [249](#);  
    on Thule, [62](#);  
    on distance from Orkneys to Thule, [70](#);  
    on daylight and darkness in Thule, [81](#)-82;  
    on sea beyond Thule, [92](#);  
    on climate of Iceland, [247](#).  
South Sea Islanders, navigation of, [31](#), [36](#);  
    ships of, [31](#), [48](#).  
Soviet Union, Arctic, [346](#) ff.;  
    Mikhailov on, [347](#)-348.  
    *See also* Siberia.  
Spain, knew of America before Columbus, [109](#), [136](#);  
    claim to New World, [109](#), [209](#);  
    Columbus agent of, [109](#);  
    motives of, for hiding Columbus' Iceland voyage, [109](#),  
        [209](#)-210.  
Spitsbergen, [171](#);  
    Cape South, [167](#);  
    as center of "fish oil" industry, [168](#);  
    Hudson's visit to, [274](#)-275;  
    Dutch voyages to, [294](#).  
Spotorno, G. B., [219](#).  
*Stalin*, meeting of icebreaker, with *Sedov*, [167](#).  
Steensby, H. P., [363](#);  
    on Pytheas' route, [105](#).  
Stefansson, Vilhjalmur, Schmidt cites "Friendly Arctic" of,



[318](#).

Stephanus, on daylight and darkness of Thule, [82](#).

Stewart, Elihu, [306](#), [329](#)-330;

Kindle on, [332](#).

Stone Age, Eskimos of early, [35](#), [47](#);

British skin boats of, [40](#);

umiak of modern, [40](#) ff.;

skin boats of, [43](#), [45](#).

Storm, Gustav, [153](#), [154](#)-160, [174](#), [185](#), [187](#), [202](#), [208](#), [209](#), [212](#), [219](#);

on Harrisse, [153](#);

on Las Casas, [153](#);

on Columbus' early voyages, [154](#);

cites Columbus' views on habitability of tropics and Arctic, [154](#);

on size and latitude of Iceland, [155](#);

on Bristol commerce with Iceland, [155](#);

on Ferdinand Columbus, [155](#);

on intellectual development of Columbus, [156](#);

on Columbus' exaggeration of distances, [156](#), [158](#), [215](#);

on tides of Iceland, [157](#), [160](#), [214](#);

on ice conditions in Iceland, [157](#)-158;

on Columbus' plans for North Pole voyage, [158](#)-159, [160](#);

conclusions of, [160](#)-161;

cited by Charcot, [164](#);

compared with Charcot, [165](#);

differences of opinion between, and Thoroddsen, [168](#).

Strabo, [232](#), [350](#), [360](#);

on northward boundary of life, [4](#), [240](#), [251](#);

quotes Pytheas inaccurately, [16](#), [71](#);

his dislike of Pytheas, [16](#), [71](#);

on distance of Thule from Britain, [70](#), [92](#);

on speed of ships, [77](#);  
quotes Pytheas on Thule, [81](#), [94](#)-95;  
on food and harvesting in Thule, [87](#)-88;  
on nearness of Thule to “frozen sea,” [92](#);  
Nansen on, [96](#);  
doubts veracity of Pytheas, [99](#)-100;  
on “frozen sea,” [188](#);  
on Eratosthenes, [253](#).

Streicher, F., [203](#).

Stuck, Archdeacon Hudson, Yukon journey of, [282](#)-283.

Sun, assumed height of, [4](#);

control of life by distance from, [4](#), [130](#), [232](#);

age of, [29](#);

behavior of, in Iceland, [79](#), [84](#);

behavior of, in Norway, [79](#)-80;

behavior of, in Thule, [80](#) ff., [84](#);

heat from, [130](#)-131, [232](#), [270](#)-271, [298](#), [310](#)-311;

King’s Mirror on, in Greenland, [258](#);

Greek beliefs concerning, [310](#);

reflected by snow, [353](#);

action of, in Arctic, [355](#)-356.

Swanscombe Man, age of, [30](#).

## T

Tacitus, on identification of Thule, [27](#), [82](#), [186](#);

Broche on, [27](#).

Talman, Charles Fitzhugh, [358](#), [359](#), [360](#).

Tanana, [282](#).

Temperate Zone. *See* Zones.

Temperatures, Arctic summer, [8](#), [168](#);

Fort Yukon, [8](#);

Alaska summer, [41](#), [42](#), [228](#), [230](#)-231, [326](#);

relation of, to long sea voyages, [50](#);  
on Jan Mayen Island, [166](#);  
highest, [266](#);  
Richardson on Fort Yukon mean, [283](#)-284;  
Simpson on Arctic, [285](#);  
King on Arctic, [284](#)-286;  
Morse on Arctic, [294](#);  
Cantwell on Arctic, [298](#)-300;  
Ogilvie on Arctic, [302](#)-303;  
Greely on Alaska, [319](#);  
Davis on Alaska, [322](#);  
Burke on Fort Yukon, [322](#);  
maximum, of Allakaket, [324](#);  
Chambers on maximum of Good Hope and Red River,  
[330](#);  
Fort McPherson maximum, [330](#);  
Canadian Arctic coast minimum, [338](#);  
Isherwood on Canadian Arctic, [341](#)-342;  
Albright on Mackenzie River July mean, [344](#);  
Bethune on Good Hope and Aklavik, [344](#);  
on Point Barrow, [346](#);  
Mikhailov on Soviet Arctic, [348](#);  
average July Verkhoyansk, [348](#);  
average July Yakutsk, [348](#);  
Birket-Smith on mean Arctic, [352](#)-353;  
Talman on Arctic, [358](#);  
Abrams and Thurston on Arctic, [360](#).

Tent Island, [285](#).

Thacher, John Boyd, [183](#), [184](#), [186](#), [200](#), [206](#), [213](#), [219](#).

Theodosius, Emperor, expeditions dispatched, [60](#), [61](#);

Saint, referred to by Dicuil, [60](#).

Thoroddsen, Thorvaldur, [112](#), [168](#), [170](#)-174, [217](#), [220](#);

on ice conditions on north coast of Iceland, [150](#);  
quoted by Storm on ice conditions, [158](#);  
standing of, [168](#);  
on Bristol commerce with Iceland, [170](#)-172;  
on Columbus, [170](#)-173, [213](#)-214;  
on latitude of Iceland, [171](#).

Thule, [174](#);

question of, [1](#)-2, [212](#)-213;  
Pytheas' voyage to, [2](#) ff., [67](#) ff., [243](#);  
Norway as, [23](#)-24, [69](#) ff.;  
Iceland as, [24](#), [69](#) ff.;  
location of, [24](#), [70](#), [102](#);  
etymology of, [25](#)-26;  
Burton on etymology of, [25](#), [103](#);  
identification of, [27](#);  
sighting of, by Agricola, [27](#), [82](#);  
probable discovery of, by British, [29](#), [36](#) ff., [54](#)-56, [101](#),  
[242](#);  
Dicuil on, [60](#) ff., [242](#), [243](#);  
Isidore on etymology of, [62](#);  
Priscian on, [62](#);  
Solinus on, [62](#), [70](#), [81](#)-82;  
Pliny on distance of, from Britain, [70](#);  
Servius on location of, [70](#);  
Arctic pack reached by Pytheas from, [71](#);  
distance and direction of, from Britain, [71](#), [74](#), [102](#);  
Nansen on, as Norway, [73](#)-74, [77](#)-78;  
Pytheas' probable mileages on voyage to, [75](#)-77;  
daylight and darkness in, [80](#) ff.;  
Geminus of Rhodes on, [80](#);  
Cleomedis on behavior of sun in, [80](#)-81;  
Strabo on, [81](#);

Mela on, [81](#);  
Pliny quoted on, [81](#);  
Dionysius Periegetes on, [81](#);  
Agathemerus on, [82](#);  
Avienus on, [82](#);  
identification of, with Orkneys or Shetlands, [82](#);  
Stephanus on, [82](#);  
Avienus on, [84](#)-[85](#);  
Pytheas on inhabitants of, [87](#);  
Strabo on food and harvesting in, [87](#)-[88](#);  
nearness of, to “frozen sea,” [92](#) ff.;  
sea beyond, [94](#) ff., latitude of, [100](#), [205](#), [208](#), [213](#);  
Columbus on latitude of, [117](#), [123](#)-[124](#), [171](#), [182](#), [183](#),  
[184](#), [186](#), [200](#), [202](#);  
Columbus’ voyage beyond, [117](#), [123](#), [154](#), [171](#), [182](#), [183](#),  
[184](#), [186](#), [210](#);  
Las Casas quotes Ptolemy on, [130](#);  
Columbus’ knowledge of, [133](#);  
Las Casas on, [134](#); Vignaud on, [143](#);  
Columbus on size of, [154](#);  
Columbus on tides of, [155](#), [171](#), [178](#);  
Ptolemy’s, as Frisland, [155](#);  
Latin name for Iceland was, [161](#), [175](#);  
tides of, [171](#);  
Fiske on three, . . . ’s, [183](#), [213](#);  
Thacher on two, . . . ’s, [184](#);  
McCaskill on three, . . . ’s, [186](#);  
Jan Mayen as, [187](#), [205](#);  
Shirazi on, [252](#).

*See also* Iceland, Norway, Orkneys, Shetlands.

Thunder River, [303](#).

Thurston, E. L. *See* A. W. Abrams.

Thyle. *See* Thule.

Thyphis. *See* Tiphys.

Tides, [195](#)-200;

in Iceland, [143](#), [145](#), [151](#), [187](#), [208](#), [213](#), [214](#);

Columbus on, [155](#), [171](#), [178](#), [197](#);

Storm on, of Iceland, [157](#), [170](#);

and ice, [191](#), [195](#);

Las Casas on, [198](#).

Tile. *See* Thule.

Timaeus, use of direct information from Pytheas by, [16](#), [19](#).

Tin, trade, [9](#), [17](#);

Pytheas on mining and smelting of, [19](#), [22](#).

Tin Islands. *See* Cassiterides.

Tiphys, [135](#), [177](#).

Tixie Bay, most northerly gardens at, [348](#), [349](#).

Torrid Zone. *See* Zones.

Torp, Professor Alf, on etymology of Thule, [26](#).

Torres, Antonio de, [267](#).

Torres, Doña Juana de la, letter of Columbus to, [164](#),  
[266](#)-267.

Toscanelli, Paolo, [154](#), [159](#).

Tozer, H. F., [363](#).

Trade, tin, [9](#), [17](#);

between Britain and Mediterranean after 2000 B.C., [34](#)-35;

in Late Bronze Age, [35](#).

Trewartha, Dr. Glenn T., [229](#), [230](#), [233](#), [314](#), [353](#);

on Arctic summer heat, [229](#)-230, [232](#), [357](#);

on warmth from sun, [232](#), [314](#), [354](#).

Trinidad, [197](#).

Triremes. *See* Ships.

Tropics, supposed uncrossable, [4](#)-5;

Burning Tropics, [4](#), [234](#), [307](#), [310](#);

Polybius and Posidonius on, [237](#);  
Capella and Macrobius on, [237](#);  
Best on, [269](#), [270](#);  
J. Davis on, [272](#), [274](#).

Tule. *See* Thule.

Turukhansk District, [348](#).

Tyrrell, J. B., [276](#).

## U

Ulloa, Alonso de, [138](#), [185](#)-186.

Ulloa, Luis, [136](#), [219](#);

“Christophe Colomb” by, quoted, [137](#)-139.

Ultima Thule. *See* Thule.

Umiak, [37](#);

description of, [39](#);

seaworthiness of, [39](#)-40;

qualities of, [41](#), [46](#);

travel by, in Alaska, [42](#)-43;

seaworthiness of, [43](#);

length of Greenland, [46](#).

Ung-ee-let-ar-geeak River, [228](#).

Unipeds, [2](#), [6](#).

“United States.” *See* Hayes.

U.S. Coast Guard, [41](#).

U.S. Geological Survey, [321](#)-322.

U.S. Revenue Marine Expedition, [298](#).

U.S. Weather Bureau, [230](#), [231](#), [232](#), [314](#), [318](#), [324](#), [326](#), [339](#),  
[346](#), [350](#), [358](#).

Unst Island, [23](#).

Ural Mountains, [288](#).

Ushant, [19](#).

Ussher, Archbishop, chronology of, [29](#), [30](#).

Uxisama. *See* Ushant.

## V

Varenius, Bernard, [294](#).

Verkhoyansk, average July temperature of, [348](#);

Talman on summer maximum temperature of, [358](#).

Victoria Island, [286](#).

Vignaud, Henry, [112](#), [140](#), [141](#)-145, [150](#), [162](#), [164](#), [168](#), [173](#),  
[174](#), [178](#), [191](#), [217](#), [222](#), [361](#);

on Columbus' veracity, [140](#) ff.;

Magnaghi on, [146](#);

compared with Magnaghi, [152](#), [160](#);

compared with Storm, [160](#)-161;

Charcot on, [162](#);

admits Columbus reached Faroes, [162](#);

cited by Madariaga, [220](#);

Nowell on, [220](#).

Vikings, ships of, [48](#);

astronomy of, [48](#);

as deep-sea navigators, [49](#).

Vinland, [127](#), [128](#), [129](#), [143](#);

Icelandic voyages to, [172](#), [173](#);

Adam of Bremen on, [246](#)-247.

Virgil, on zones, [240](#).

Visibility, in Iceland, [50](#);

of Iceland through mirage, [51](#)-52;

of Faroes from Shetlands and Orkneys, [51](#), [52](#)-53;

in North Atlantic, [53](#).

*See* Mirage.

“Vocabolario degli Accademici della Crusca,” on meaning of  
*marea*, [196](#).

Von Langsdorff, G. H., [364](#);



quoted on seaworthiness of kayaks, [38](#).

## W

Ward, Robert DeCourcy, [228](#), [353](#);  
on Arctic summer heat, [229](#), [356](#).

Warmington, E. H. *See* M. Cary.

Waves, [189](#)-200;  
height of, [189](#)-190;  
Cornish on, [189](#)-190;  
Schott on, [190](#);  
and ice, [191](#)-192, [195](#);  
in Iceland, [195](#);  
Columbus on, [216](#).  
*See also* Tides.

Weather. *See* Climate.

Welzl, Jan, [248](#), [249](#), [250](#);  
on effects of cold, [249](#)-250;  
on frostbite, [249](#);  
on authorship of “Thirty Years,” [250](#).

West Indies, [115](#), [124](#);  
Columbus on harbors of, [118](#).

Western Union Telegraph Expedition, [298](#).

Wineland the Good. *See* Vinland.

Winnipeg, [331](#).

Winsor, Justin, [217](#).

Wiseman, [326](#);  
Marshall on climate of, [323](#), [325](#).

Wright, J. K., [5](#), [236](#), [253](#);  
on Eratosthenes, [236](#);  
on ancient beliefs concerning zones, [236](#)-237;  
quotes “De vegetabilibus,” [253](#).

## X

XroFerens (referring to *Christopher* Columbus), [203](#).

## Y

Yakutia, [348](#).

Yakutsk, average July temperature in, [348](#).

Yenisei River, [288](#), [317](#), [347](#).

Young Filson, [218](#).

Ysla de Estilanda, [203](#).

Yukon Gold Rush, [304](#), [306](#).

Yukon River, [279](#), [281](#), [298](#), [300](#), [319](#), [323](#), [326](#), [329](#).

## Z

Zones, frozen, [4](#), [266](#), [306](#), [307](#), [308](#)-309;

doctrine of, [5](#), [234](#), [264](#), [268](#);

habitable, [5](#);

Temperate, [4](#), [236](#);

Torrid, [5](#);

uninhabitable, [5](#), [236](#);

Dicuil on habitability of, [61](#);

Columbus on habitability of, [117](#), [123](#), [124](#)-125, [129](#), [266](#), [267](#);

Las Casas on habitability of, [129](#)-133;

Las Casas on Temperate, [131](#);

Parmenides divided earth into five, [236](#);

Eratosthenes fixed limits of, [236](#);

Wright on, [236](#)-237;

Capella and Macrobius on uninhabitable, [237](#);

Aristotle's doctrine of, [237](#)-238;

Virgil on, [240](#);

Venerable Bede on, [242](#);

King's Mirror on, [257](#);

Claudius Clavus on habitability of, [261](#);  
J. Davis on, [272](#)-274;  
Cowley on Frozen, [293](#);  
Frye on Frozen, [304](#), [360](#);  
Blair on polar, [359](#).

---

# ULTIMA THULE

## Further Mysteries of the Arctic

By  
VILHJALMUR STEFANSSON

*Author of*  
*“Unsolved Mysteries of the Arctic,”*  
*“My Life with the Eskimo,” etc.*

Illustrated

Here Mr. Stefansson explores more of those riddles of the North which have—many of them for centuries—challenged layman and scientist alike. In “Ultima Thule,” as in “Unsolved Mysteries of the Arctic,” Mr. Stefansson organizes the evidence, and illuminates it with his own experience in the far North and his immense knowledge of the history of geographic discovery. And he comes to many startling conclusions.

This book considers first the problem of Ultima Thule. Where is it? Did Pytheas visit it in the fourth century B.C. when he sailed on a “six-day ocean voyage beyond the north tip of Scotland”? Did Columbus visit it, as he says he did? The whole problem of Thule is geography’s nearest equivalent to Mayerling, the perfect mystery.

Mr. Stefansson shows an invariable mastery of his subject, a gift of phrase and a sense of humor, and a capacity to build up to a climax.

## **Recent Macmillan Books on the North**

### **UNSOLVED MYSTERIES OF THE ARCTIC**

**By Vilhjalmur Stefansson**

“A book of thrilling interest to all those to whom the Arctic is still a challenge, and to those not so familiar with Arctic history it will prove a revelation.”

—MARIE AHNIGHTO PEARY in the *Saturday Review of Literature*.

**Also by Stefansson**

**ULTIMA THULE: Further Mysteries of the Arctic**

**THE FRIENDLY ARCTIC**

**MY LIFE WITH THE ESKIMO**

**THE NORTHWARD COURSE OF EMPIRE**

**A GUIDE TO ALASKA: Last American Frontier**

**By Merle Colby**

*Federal Writers' Project (American Guide Series)*

“Superbly illustrated. If what you want is information about Alaska, well arranged for guidance and well written for enjoyment, here is your book. . . . This should be the definitive book about it for a long time to come.”

—HUGH MCNEIL SHAW in *New York Herald-Tribune Books*.

## **GREENLAND LIES NORTH**

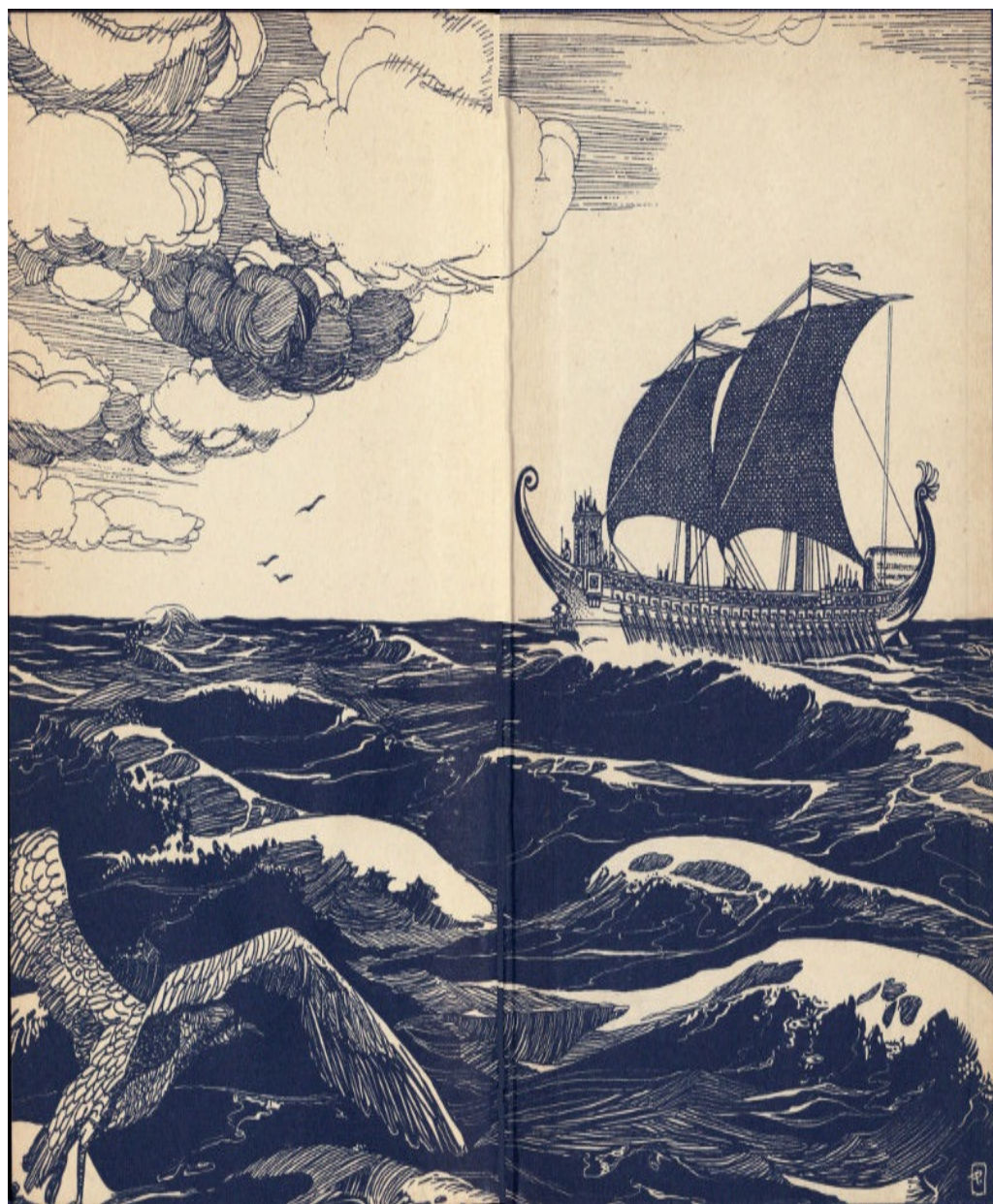
**By William S. Carlson**

A few years ago the author and a young friend were the only white men to remain at a frozen outpost in northern Greenland with the natives through the long near-Arctic winter. This is an account of the life there which they came to know so intimately. Besides being an authoritative travel book, it is a sensitive and appealing story of Greenland and her people.

## **ALASKA UNDER ARMS**

**By Jean Potter**

Here are answers to questions you want to ask about the economic, geographic, climatic, political, and military situation in Alaska at the present moment. A fair, clear, and very readable account by a reporter on *Fortune* magazine.



## Transcriber's Notes

- Silently corrected a few typos.
- Retained publication information from the printed edition: this eBook is public-domain in the country of publication.
- In the text versions only, text in italics is delimited by \_underscores\_.

[The end of *Ultima Thule: Further Mysteries of the Arctic* by Vilhjalmur Stefansson]