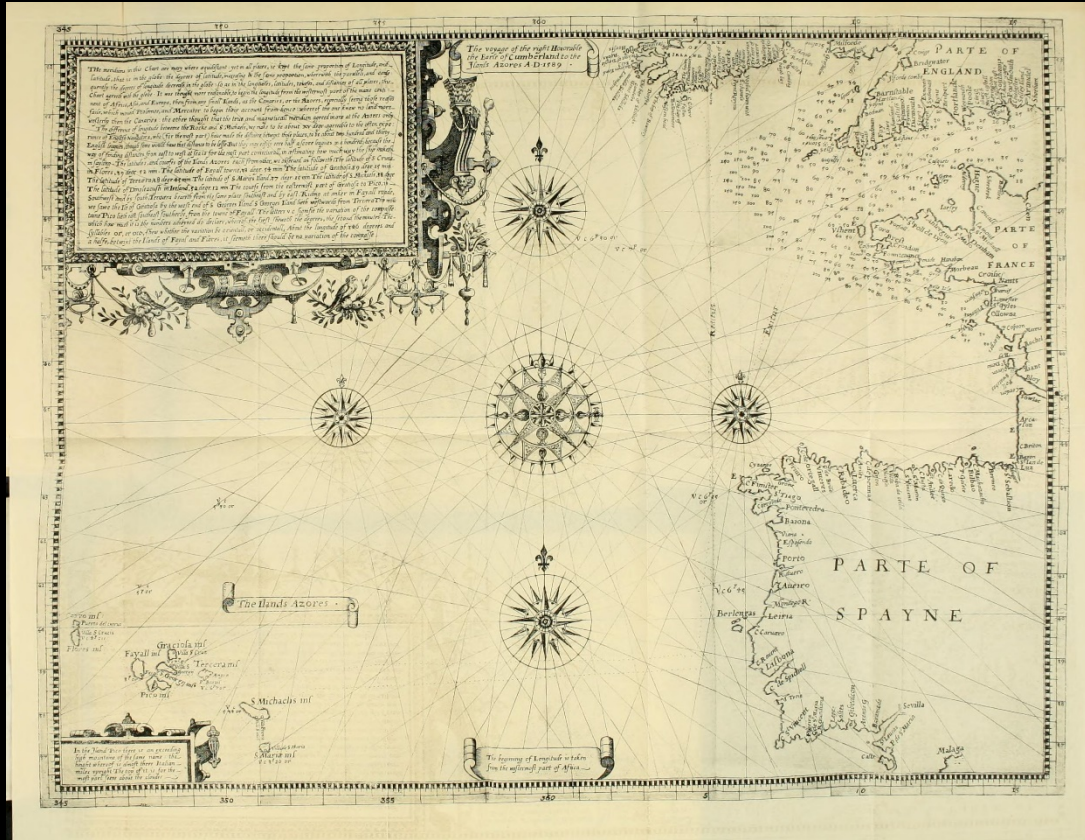


Privateer and Mathematician The Voyages of Edward Wright



Stephen Johnston
History of Science Museum, University of Oxford

Certaine
ERRORS IN
NAVIGATION,

Arising either of the ordinarie erroneous making or vsing of the sea Chart, Com-
passe, Crosse staffe, and Tables of
declination of the Sunne, and
*fixed Starres detected and
corrected.*

By E. W.



Printed at London by Valentine
Sims. 1599.

ERRORS IN
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1 Error of two, or three whole points of the
Compass, and more sometimes, by reason of ma-
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latitude.

2 Error of one whole point, and more many
times, by neglecting the variation of the Com-
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3 Error of a degree and more sometimes, in
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*Detected and corrected by often and
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with the towne and platforme of Fayal.

By Edward Wright.

Printed at London for Ed. Agas. 1599

Alternative
title pages
for
*Certaine
Errors*
(1599),
with
different
publishers

Edward Wright (1561-1615)

Norfolk family background (*'mediocris fortunae'*)

Cambridge – entered Gonville and Caius College as sizar 1576; successively BA (1580-1), MA (1584) and fellow (1587-1596)

Diversions from academic life: to sea with the Earl of Cumberland, 1589

Astronomical observation programme 1594-7 in London

Married 1595 and resigned Cambridge fellowship 1596

Diverse and precarious London career: author on navigation, astronomy, sundials, logarithms, magnetism as well as active technical consultant

High-placed patrons such as Henry, Prince of Wales and latterly employment by the East India Company – but apparently dies in relative poverty

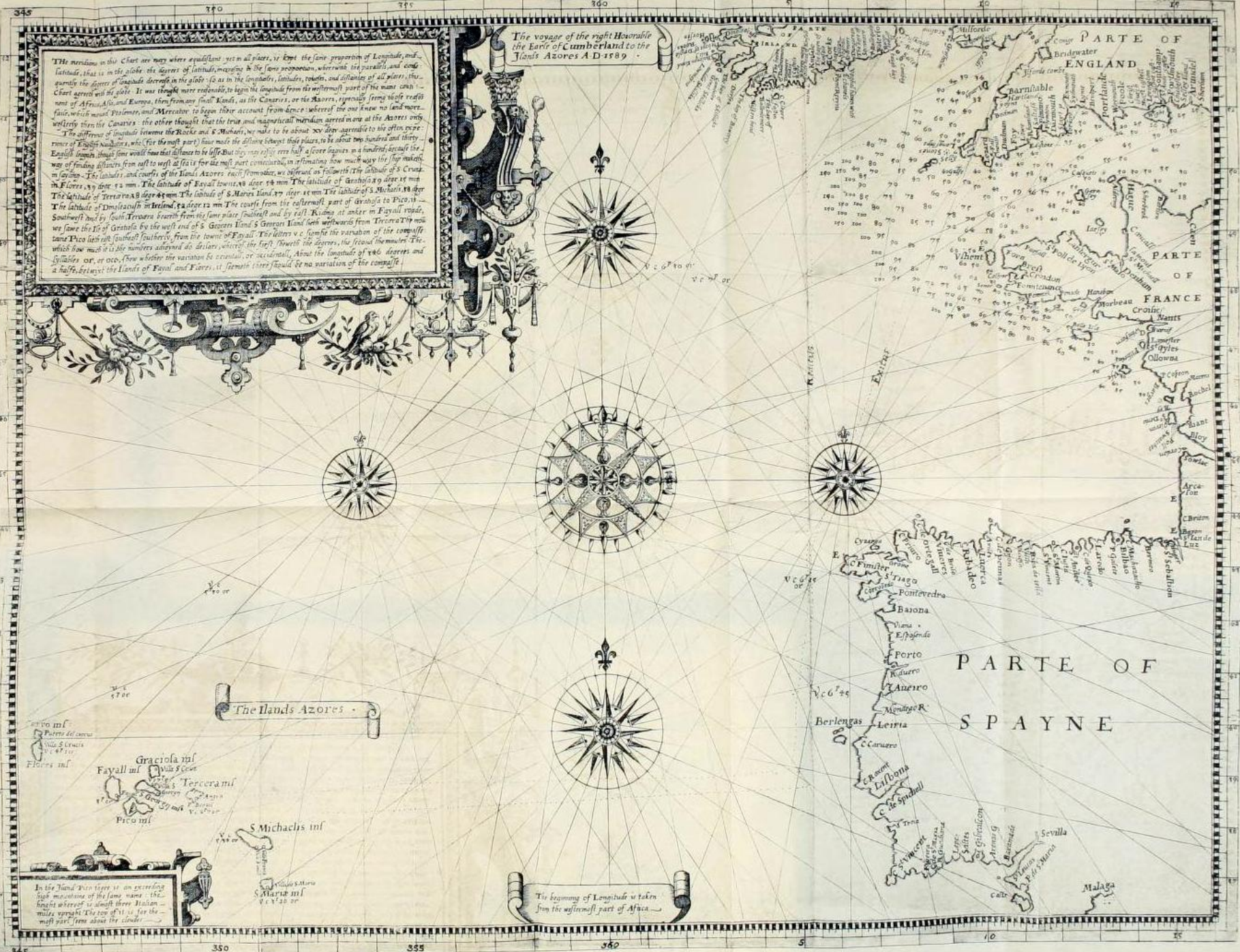


Sir George Clifford, 3rd Earl of Cumberland (1558 – 1605)

Cumberland headed a series of privateering fleets which set out most summers in the 1580s and 1590s

Portrait miniature by Nicholas Hilliard, c. 1590, showing him wearing tilting armour as Elizabeth I's Champion

(National Maritime Museum)



The voyage of the right Honourable the Earle of Cumberland to the Ilands Azores A.D. 1689

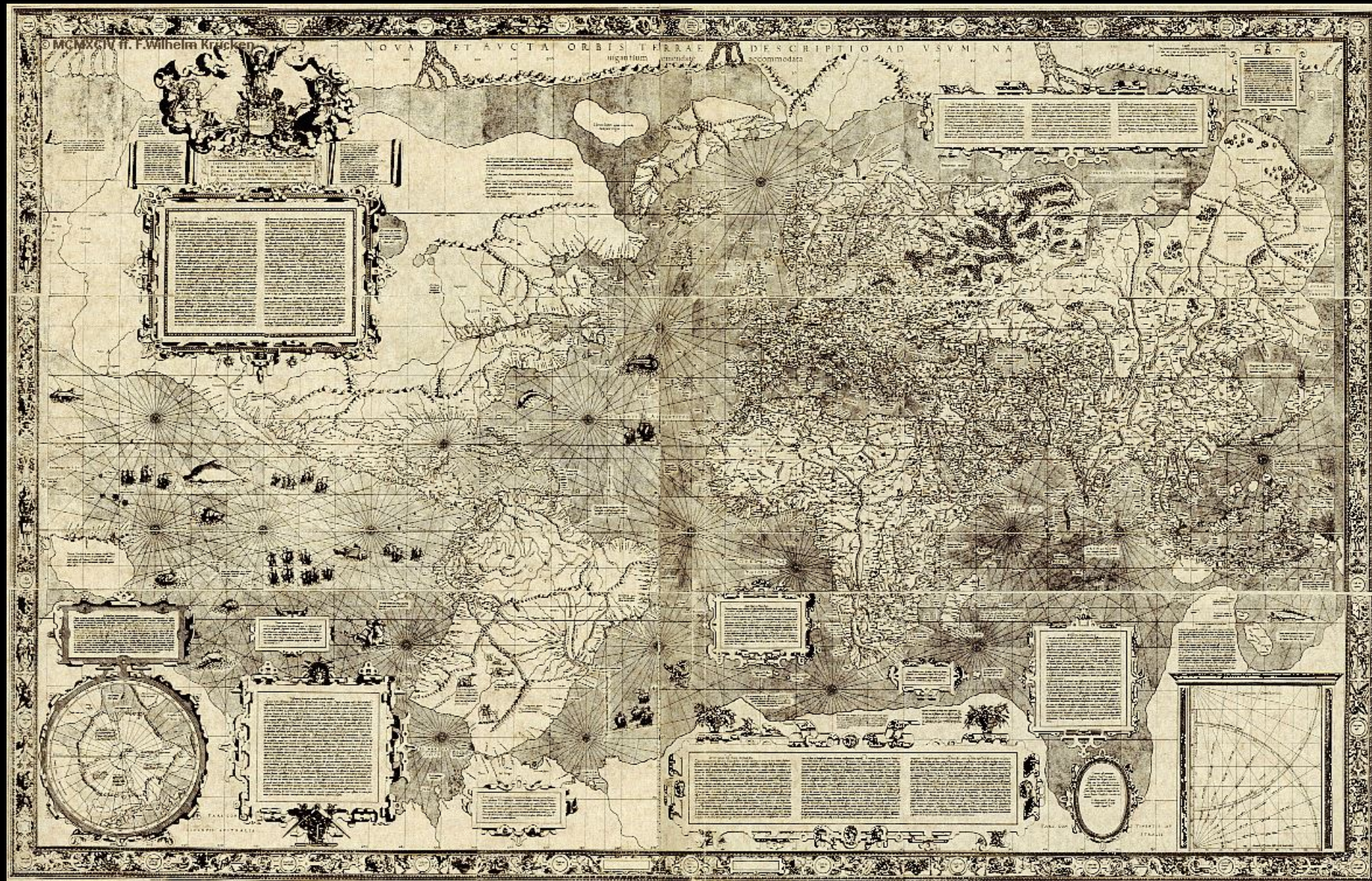
The meridians in this Chart are every where equidistant yet in all places, except the same proportion of Longitude, and Latitude, that is in the globe, the degrees of latitude, increasing in the same proportion, whereas the parallels, and consequently the degrees of longitude decrease in the globe, as in the longitudes, latitudes, courses, and distances of all places, this Chart agrees with the globe. It was thought more reasonable, to begin the longitudes from the westernmost part of the main continent of Africa, Asia, and Europe, than from our small Islands, as the Canaries, or the Azores, especially since the great sail, which was used by Ptolemy, and Mercator, to begin their account from hence: whereas of the one knew no land more westerly than the Canaries: the other thought that the true and mathematical meridian agreed more at the Azores only.

The difference of longitude between the Rocks and S. Michaels, we make to be about 200 degrees according to the observations of English navigators, who for the most part have made the distance between these places, to be about two hundred and thirty English leagues, though some would have that distance to be less. But they may easily see half a score leagues in a hundred, because the English leagues, though some would have that distance to be less. But they may easily see how much way the ship makes way of finding distances, from east to west, as far as for the most part compassed, in a hundred leagues, in a hundred leagues, the latitude, and course of the Ilands Azores, each from other, as different as follows. The latitude of S. Cruz is 37 degrees 30 minutes. The latitude of Fayall is 36 degrees 30 minutes. The latitude of S. Michaels is 35 degrees 30 minutes. The latitude of Terceira is 34 degrees 30 minutes. The latitude of S. Maria is 33 degrees 30 minutes. The latitude of S. Maria is 33 degrees 30 minutes. The latitude of S. Maria is 33 degrees 30 minutes.

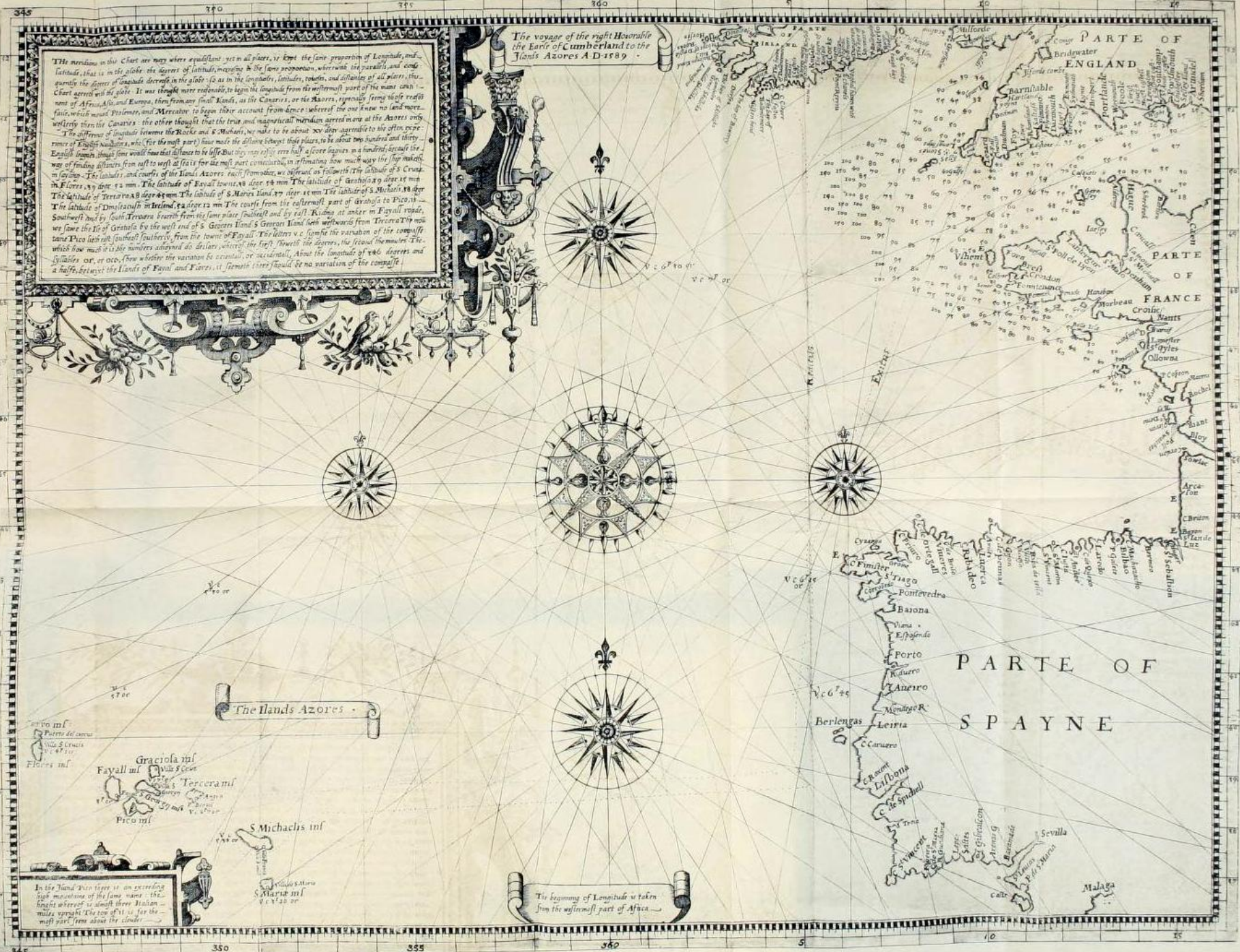
The Ilands Azores

The beginning of Longitude is taken from the westernmost part of Africa

In the Iland Pico there is an exceeding high mountain of the same name: the height whereof is almost three Italian miles, upward the top of it is for the most part free above the clouds



Gerard Mercator, *Nova et Aucta Orbis Terrae Descriptio ad Usum Navigantium Emendate Accommodata* (1569)



The voyage of the right Honourable the Earle of Cumberland to the Ilands Azores A.D. 1689

The meridians in this Chart are every where equidistant yet in all places, except the same proportion of Longitude, and Latitude, that is in the globe, the degree of latitude, increasing in the same proportion, whereas the parallels, and consequently the degree of longitude decrease in the globe, as in the longitude, latitude, routes, and distances of all places, this Chart agrees with the globe. It was thought more reasonable, to begin the longitude from the westernmost part of the main continent of Africa, Asia, and Europe, than from our small Islands, as the Canaries, or the Azores, especially since the great sail, which was used by Ptolemy, and Mercator, to begin their account from hence: whereas of the one knew no land more westerly than the Canaries: the other thought that the true and mathematical meridian agreed more at the Azores only.

The difference of latitude between the Rocks and S. Michaels, we make to be about 200 degrees according to the given reckoning of English navigators, who for the most part have made the distance between these places, to be about two hundred and thirty English leagues, though some would have that distance to be less. But they may easily see half a score leagues in a hundred degree the way of finding distances from east to west as far as for the most part concerned, in estimating, how much way the ship makes in sailing. The latitude and course of the Ilands Azores, each from other, we observe as follows: The latitude of S. Cruz is 44 degrees 40 minutes. The latitude of Fayall is 42 degrees 40 minutes. The latitude of S. Michaels is 40 degrees 40 minutes. The latitude of Terceira is 38 degrees 40 minutes. The latitude of S. Maria is 36 degrees 40 minutes. The latitude of Pico is 34 degrees 40 minutes. The latitude of S. Michaelis is 32 degrees 40 minutes. The latitude of S. Maria is 30 degrees 40 minutes. The latitude of Pico is 28 degrees 40 minutes. The latitude of S. Michaelis is 26 degrees 40 minutes. The latitude of S. Maria is 24 degrees 40 minutes. The latitude of Pico is 22 degrees 40 minutes. The latitude of S. Michaelis is 20 degrees 40 minutes. The latitude of S. Maria is 18 degrees 40 minutes. The latitude of Pico is 16 degrees 40 minutes. The latitude of S. Michaelis is 14 degrees 40 minutes. The latitude of S. Maria is 12 degrees 40 minutes. The latitude of Pico is 10 degrees 40 minutes. The latitude of S. Michaelis is 8 degrees 40 minutes. The latitude of S. Maria is 6 degrees 40 minutes. The latitude of Pico is 4 degrees 40 minutes. The latitude of S. Michaelis is 2 degrees 40 minutes. The latitude of S. Maria is 0 degrees 40 minutes. The latitude of Pico is 34 degrees 40 minutes. The latitude of S. Michaelis is 32 degrees 40 minutes. The latitude of S. Maria is 30 degrees 40 minutes. The latitude of Pico is 28 degrees 40 minutes. The latitude of S. Michaelis is 26 degrees 40 minutes. The latitude of S. Maria is 24 degrees 40 minutes. The latitude of Pico is 22 degrees 40 minutes. The latitude of S. Michaelis is 20 degrees 40 minutes. The latitude of S. Maria is 18 degrees 40 minutes. The latitude of Pico is 16 degrees 40 minutes. The latitude of S. Michaelis is 14 degrees 40 minutes. The latitude of S. Maria is 12 degrees 40 minutes. The latitude of Pico is 10 degrees 40 minutes. The latitude of S. Michaelis is 8 degrees 40 minutes. The latitude of S. Maria is 6 degrees 40 minutes. The latitude of Pico is 4 degrees 40 minutes. The latitude of S. Michaelis is 2 degrees 40 minutes. The latitude of S. Maria is 0 degrees 40 minutes.

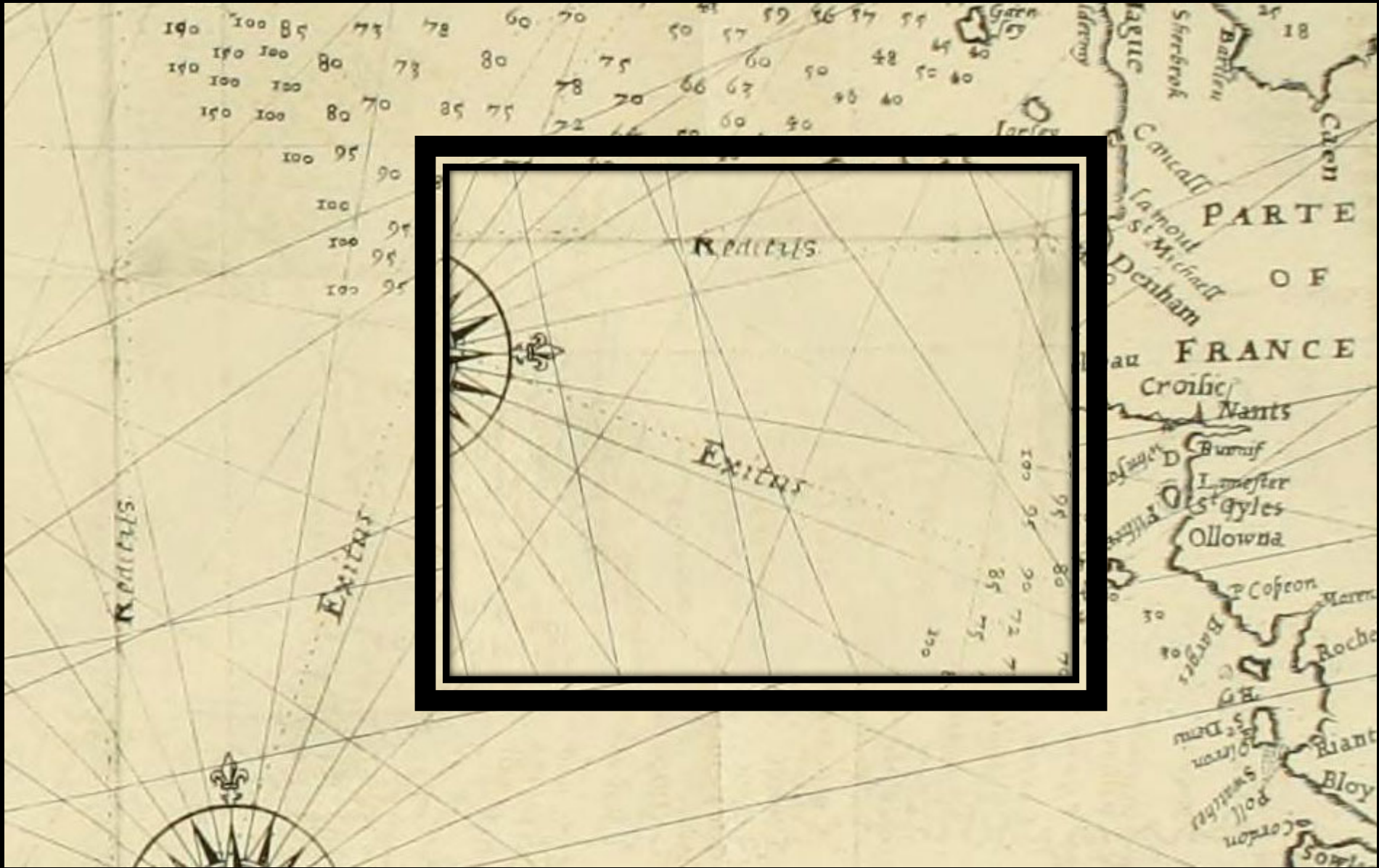


The Ilands Azores



In the Iland Pico there is an exceeding high mountain of the same name: the height whereof is almost three Italian miles, upward the top of it is for the most part free above the clouds.

The beginning of Longitude is taken from the westernmost part of Africa



Redoubt

Exeter

Redoubt

Exeter

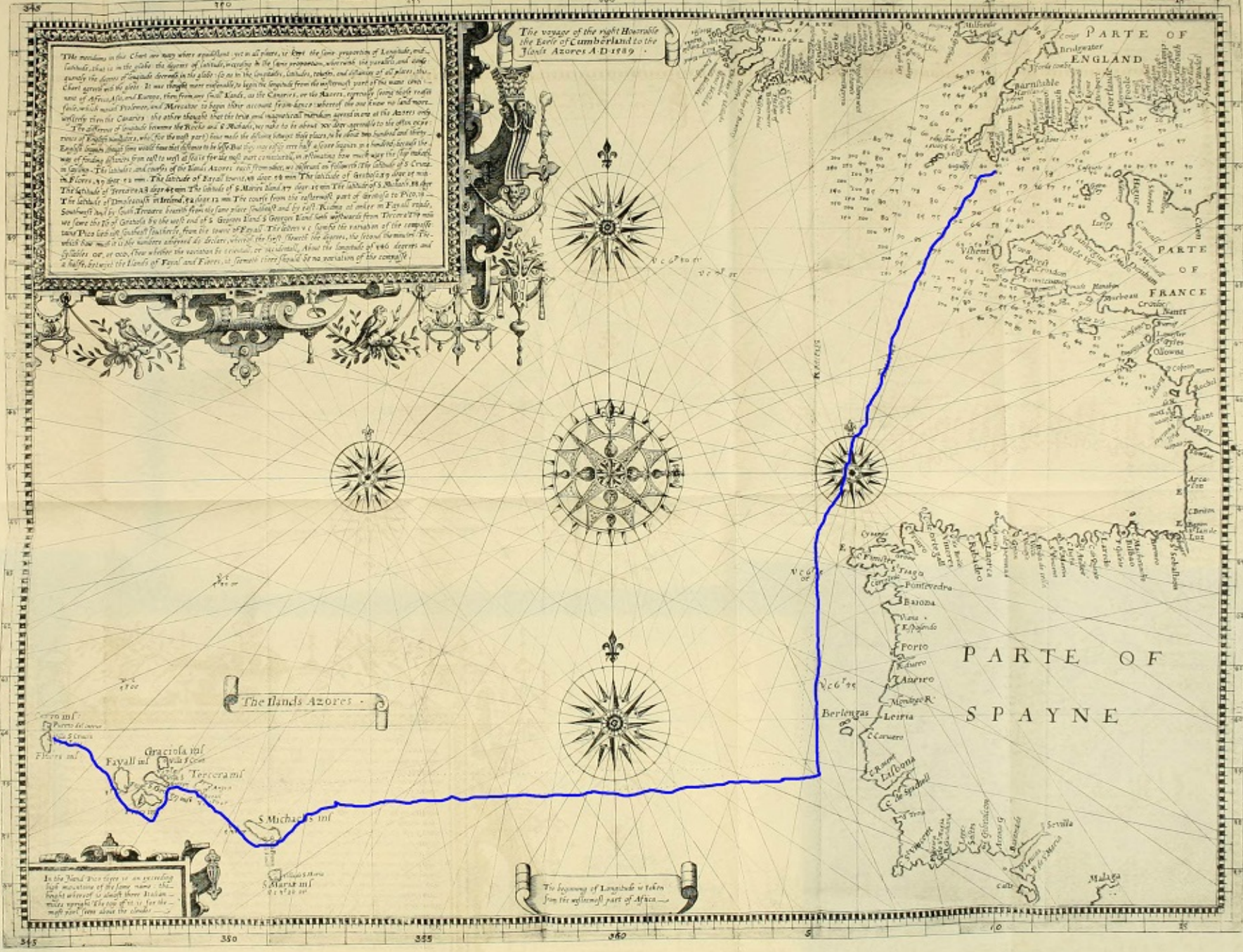
PARTE OF FRANCE

Nantes

Ollowna

Roche

Bloy



The voyage of the right Honourable the Earle of Cumberland to the Ilands Azores A.D. 1589

The motions in the Chart are such, as if a parallel were drawn in all places, it kept the same proportion of Longitude, and Latitude, that is in the globe, the figures of Islands, according to the same proportion, were made the parallels and longitudes, according to the figures of Islands drawn in the globe, so as to be longitudes, latitudes, heights, and distances of all places, the Chart agree with the globe. It was thought more reasonable to begin the longitudes from the westernmost part of the main land, west of Africa, than from Europe, then from some small Islands, as the Canaries, or the Azores, especially seeing that the first parts, which were first discovered, and discovered to begin their account from hence, whereof the one knew no land more, whether they be the Canaries, the other thought that the first and westernmost part was one of the Azores only.

The distance of longitudes between the Rocks and S. Michael's, was taken to be about 200 leagues, according to the old and true rates of English navigators, who (for the most part) have made the following voyage, that is, to be about 200 leagues, and the distance of the English Islands, from the westernmost part of the main land, is about 100 leagues, and the distance of the Azores Islands, from the westernmost part of the main land, is about 100 leagues, and the distance of the Azores Islands, from the westernmost part of the main land, is about 100 leagues.

The latitude of the Islands of the Azores, was taken from the latitude of the westernmost part of the main land, which is about 49 degrees, and the latitude of the Islands of the Azores, is about 38 degrees, and the distance of the Islands of the Azores, from the westernmost part of the main land, is about 100 leagues.

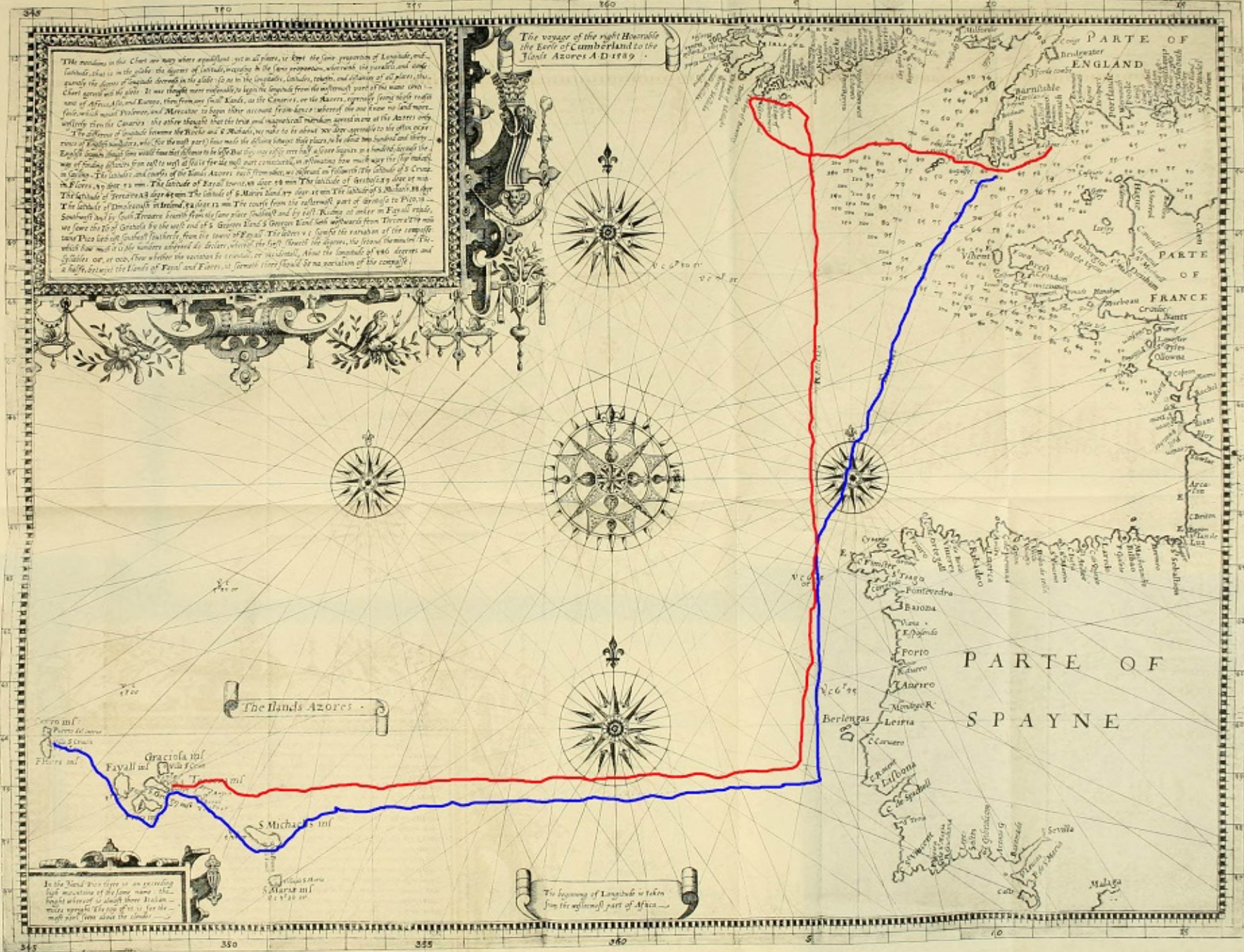
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The Ilands Azores

The beginning of Longitude is taken from the westernmost part of Africa

In the North Sea there is an exceeding high mountain of the same name, the highest mountain is almost three Italian miles high, the top of it is seen the night time from above the clouds



The voyage of the right Honourable the Earle of Cumberland to the Ilands Azores A.D. 1589

The motions in the Chart are such as are appointed, yet in all places, to keep the same proportion of Longitude, and Latitude, that is in the globe, the figures of Longitude, according to the same proportion, were made the parallels and longitudes, the figures of Longitude, according to the globe, so as to be Longitude, latitude, and distance of all places, the Chart agree with the globe. It was thought more expedient to begin the Longitude from the westernmost part of the main land, west of Africa, than from any other part, as the Canary, or the Azores, because being such right lines, which would have been difficult to be kept, that they may not have any error, which the sea know no land more, especially since the Canary, the other thought that the true and mathematical meridian passed in one of the Azores only.

The distance of Longitude between the Rocks and S. Michaels, was made to be about 200 leagues, according to the often experience of English navigators, who (for the most part) have made the distance between these places to be about 200 leagues, and thereby the English learn that the true distance is to be kept, that they may not have any error, which the sea know no land more, especially since the Canary, the other thought that the true and mathematical meridian passed in one of the Azores only.

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The Ilands Azores

The beginning of Longitude is taken from the westernmost part of Africa

In the Ilands Azores there is an exceeding high mountain of the same name: the highest thereof is almost three Italian miles, enough to be seen of 20 or 30 leagues, and seen about the clouds.

Life (and death) at sea

Coming home from the Azores voyage of 1589:

'Now in every corner of the ship were heard the lamentable cries of sick and wounded men sounding woefully in our ears, crying out and pitifully complaining for want of drink, being ready to die, yea many dying for lack thereof, so as by reason of this great extremity we lost many more men than we had done all the voyage before'

(Certaine Errors, 1599 edition)

Wright reflecting on mariners' experience, in which they were:

'banishing themselves (as it were) from their nearest friends and native country, to remain in a wooden prison, always within one span of present death, with the dangerous adventure of their dearest lives also at sea many times'

(Certaine Errors, 1610 edition, dedication)

Date	Time and course	Distance	Wind	Direction	Speed	Remarks
24	at anchor	6	S	N.N.W.	6	
25	at anchor	18	S	N.W.	4	
26	at anchor	10	S	S.W.	4	
27	at anchor	6	S	S.W.	4	
28	at anchor	20	S	N.W.	12	
29	at anchor	16	S	N.W.	10	
30	at anchor	20	S	N.W.	12	
1	at anchor	12	S	N.W.	10	
2	at anchor	10	S	N.W.	10	
3	at anchor	26	S	N.W.	12	
4	at anchor	18	S	N.W.	12	
5	at anchor	12	S	N.W.	10	
6	at anchor	16	S	N.W.	12	
7	at anchor	10	S	N.W.	10	
8	at anchor	6	S	N.W.	6	
9	at anchor	10	S	N.W.	10	
10	at anchor	6	S	N.W.	6	
11	at anchor	18	S	N.W.	12	
12	at anchor	4	S	N.W.	4	
13	at anchor	12	S	N.W.	10	
14	at anchor	6	S	N.W.	6	
15	at anchor	10	S	N.W.	10	
16	at anchor	12	S	N.W.	10	
17	at anchor	8	S	N.W.	8	
18	at anchor	6	S	N.W.	6	
19	at anchor	8	S	N.W.	8	
20	at anchor	3	S	N.W.	3	
21	at anchor	12	S	N.W.	10	
22	at anchor	6	S	N.W.	6	
23	at anchor	10	S	N.W.	10	
24	at anchor	18	S	N.W.	12	
25	at anchor	10	S	N.W.	10	
26	at anchor	12	S	N.W.	10	
27	at anchor	12	S	N.W.	10	
28	at anchor	12	S	N.W.	10	
29	at anchor	12	S	N.W.	10	
30	at anchor	12	S	N.W.	10	

Date	Time and course	Distance	Wind	Direction	Speed	Remarks
1	at anchor	12	S	N.W.	10	
2	at anchor	10	S	N.W.	10	
3	at anchor	10	S	N.W.	10	
4	at anchor	10	S	N.W.	10	
5	at anchor	10	S	N.W.	10	
6	at anchor	10	S	N.W.	10	
7	at anchor	10	S	N.W.	10	
8	at anchor	10	S	N.W.	10	
9	at anchor	10	S	N.W.	10	
10	at anchor	10	S	N.W.	10	
11	at anchor	10	S	N.W.	10	
12	at anchor	10	S	N.W.	10	
13	at anchor	10	S	N.W.	10	
14	at anchor	10	S	N.W.	10	
15	at anchor	10	S	N.W.	10	
16	at anchor	10	S	N.W.	10	
17	at anchor	10	S	N.W.	10	
18	at anchor	10	S	N.W.	10	
19	at anchor	10	S	N.W.	10	
20	at anchor	10	S	N.W.	10	
21	at anchor	10	S	N.W.	10	
22	at anchor	10	S	N.W.	10	
23	at anchor	10	S	N.W.	10	
24	at anchor	10	S	N.W.	10	
25	at anchor	10	S	N.W.	10	
26	at anchor	10	S	N.W.	10	
27	at anchor	10	S	N.W.	10	
28	at anchor	10	S	N.W.	10	
29	at anchor	10	S	N.W.	10	
30	at anchor	10	S	N.W.	10	

26 lat. man. 4th N Downton

August.	Place & course	Leag.	Variat Copasi	Height of the pole.	Winds
22	westward a little from the island	2.073			
23	betwixt flows and corvo from S ternze in corvo flows N.	1 $\frac{3}{2}$	293 E	39 48	
24	W. Snow From the ib Corvo. N.E and by N north (by)	12			ESE E.S.
25	S Snow W Snow	N E 6 N. N W. NE by W	13 1 $\frac{1}{2}$ 2 $\frac{1}{2}$	Or Or 1 cont 2 or.	S.E. E.S.E E.
26	E Snow S. Snow W. Snow	N W 2 by N N E 2 6 E N E 6 E.	5. 5 7	41 40	NE Somewhat N.ESE NNW NNW.
	gho. man S. Snow	E N E. E 6 N	74 4	41 55.	NE North North

	27	W. Summ N. Summ.	E 6 S E 6 S	5.6		*41 48	N.E. 6 N N.E. 6 N
	28	E. Summ S. Summ W. Summ N. Summ	E. S. E.	10		41 * 35	N.E.
			S. E. 6 E.	4			
			S. E. Easterly	5			
	29	9 9 6	S. E. 6 S.	6	S. E.	40 33	N.E. East
			N 1/2 point Easterly	6			ES-E
			N. N. E.	5			
	30	8 4 12	N. E. 6 E.	6		*41 10	S. E.
			N. E.	4		41. 27.	SE-6E
			N E 6. E.	28			SE-E
	31	7 5 12	N E Easterly	14	S. E.	43 x 0	S
			N E. 6. E.	11	E		S
			N. E. 6. E	30			S
	September		N E 6. E	30		hor. 4 ant. 5.6 W	

N.N.E.

*41

48.

N.E.6.N

N.E.6.N

41

*35

N.E.

N.E.

Septemb	Place and course	Leag.	Variat Comp.	Height of Pol.	Winds.
12	East South West	12	4. or 8. E.		
6				47.58	
7			Sum. r. fr at E 0 N fr. v.	0 0, 48.4	
8	current was from us at noone N E. and by N.	3.		d. 0, 48.26	

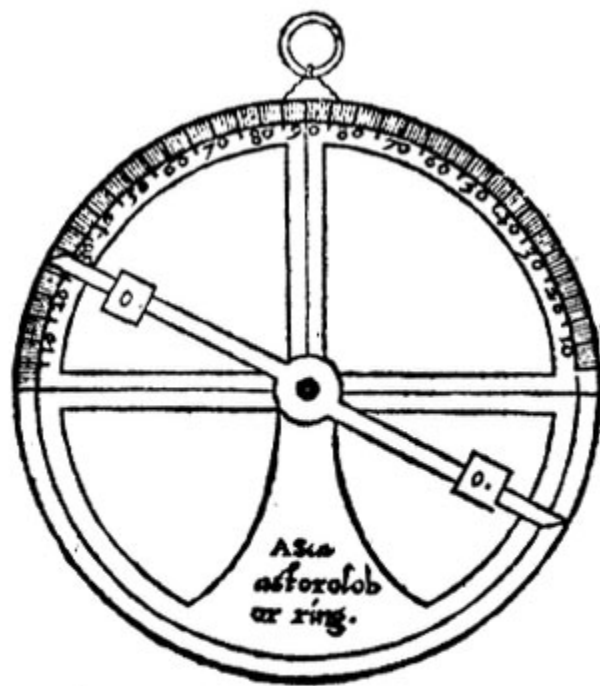
0 0,
48.4

d. 0,
48.26

The regiment for the Sea.

The Balla Stella or Crosse

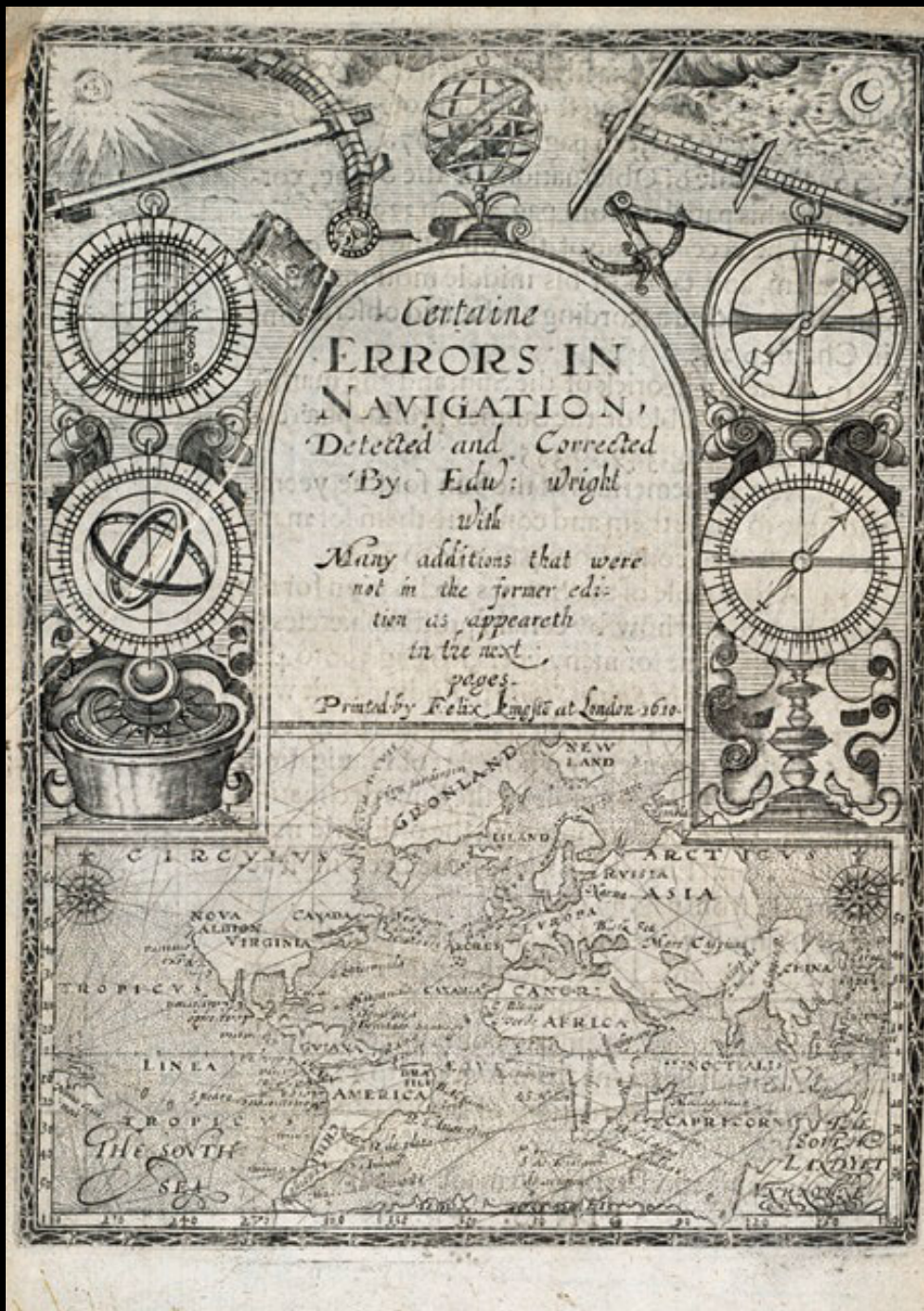
staffe: to take the heighth of the
Sunne or Starre.



10				⊙ X d. 49.0.	
11			d. 9. E. *49.25 ⊙ E. d. high. 4 3 d. 9. E.	→ ⊙ O 49.30	
12	6 From Lizard SSE this morning was seen first in sight of it	6 or 7	Sun rise at E. 3 p. North by d. 9. E.	→ 49.50.	
	5 From Lizard E.S.E.	5 or 6.			
	In the morning was seen in an				

☉ X
d
49.0.

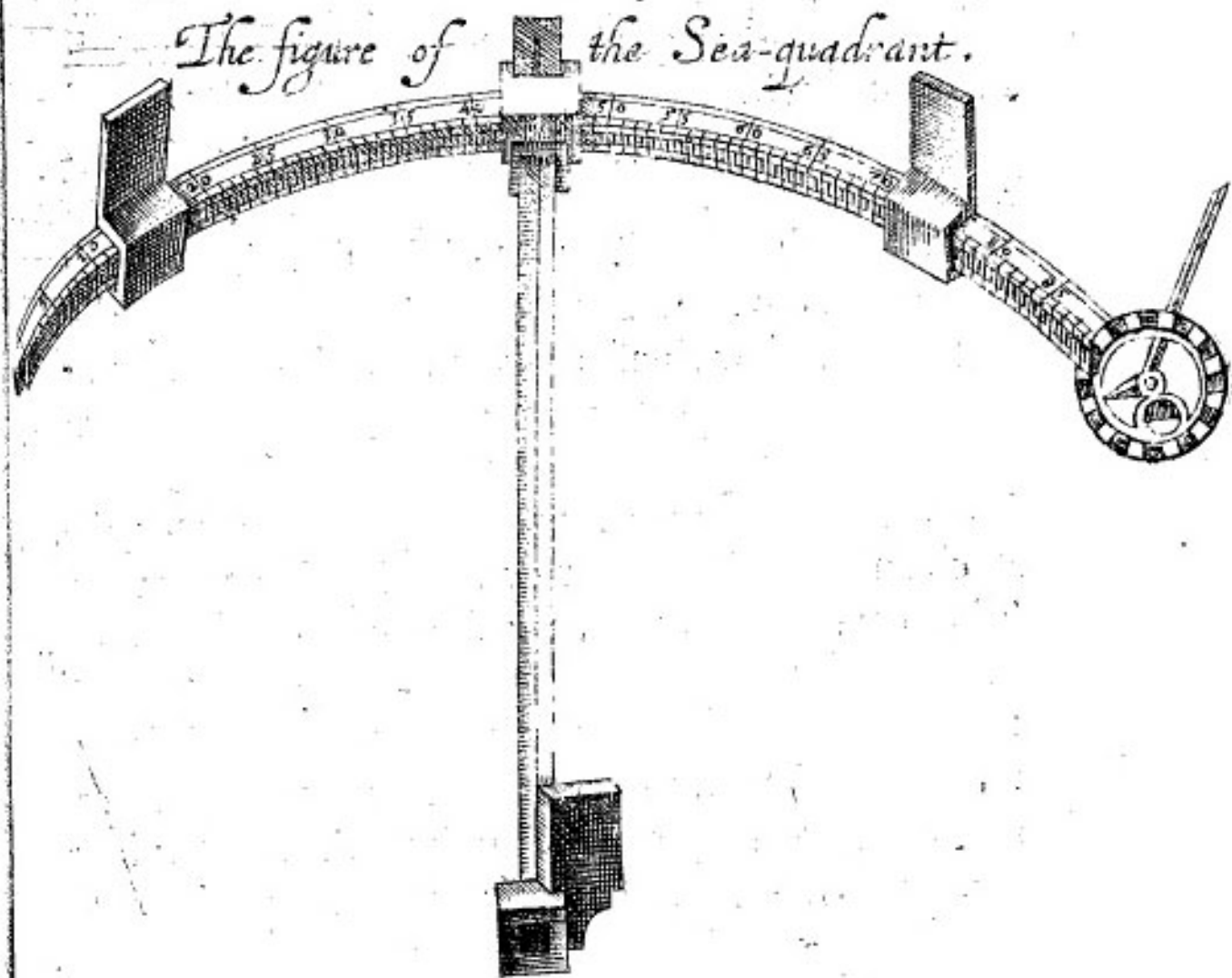
d. →
g. E. *49.25
☉ E. d. 4 $\frac{1}{3}$
high. ☉ O
d. 49.30
g. E.



*Certaine Errors in
Navigation, ... Detected
and Corrected*

Second edition, 1610

The figure of the Sea-quadrant.



F f 3

CHAP.

Certaine
ERRORS IN
NAVIGATION,

Arising either of the ordinarie erroneous making or vsing of the sea Chart, Com-
passe, Crosse staffe, and Tables of
declination of the Sunne, and
*fixed Starres detected and
corrected.*

By E. W.



Printed at London by Valentine
Sims. 1599.

ERRORS IN
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1 Error of two, or three whole points of the
Compass, and more somtimes, by reason of ma-
king the sea-chart after the accustomed maner,
with right lined rumbes, and equall degrees of
latitude.

2 Error of one whole point, and more many
times, by neglecting the variation of the Com-
passe.

3 Error of a degree and more sometimes, in
the vse of the crosse staffe, especially by not re-
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4 Error of 11. or 12. minures in the decli-
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and consequently error of halfe a degree in the
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5 Error of halfe a degree, yea an whole de-
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of the principall fixed starres, set forth to be ob-
serued by mariners at sea.

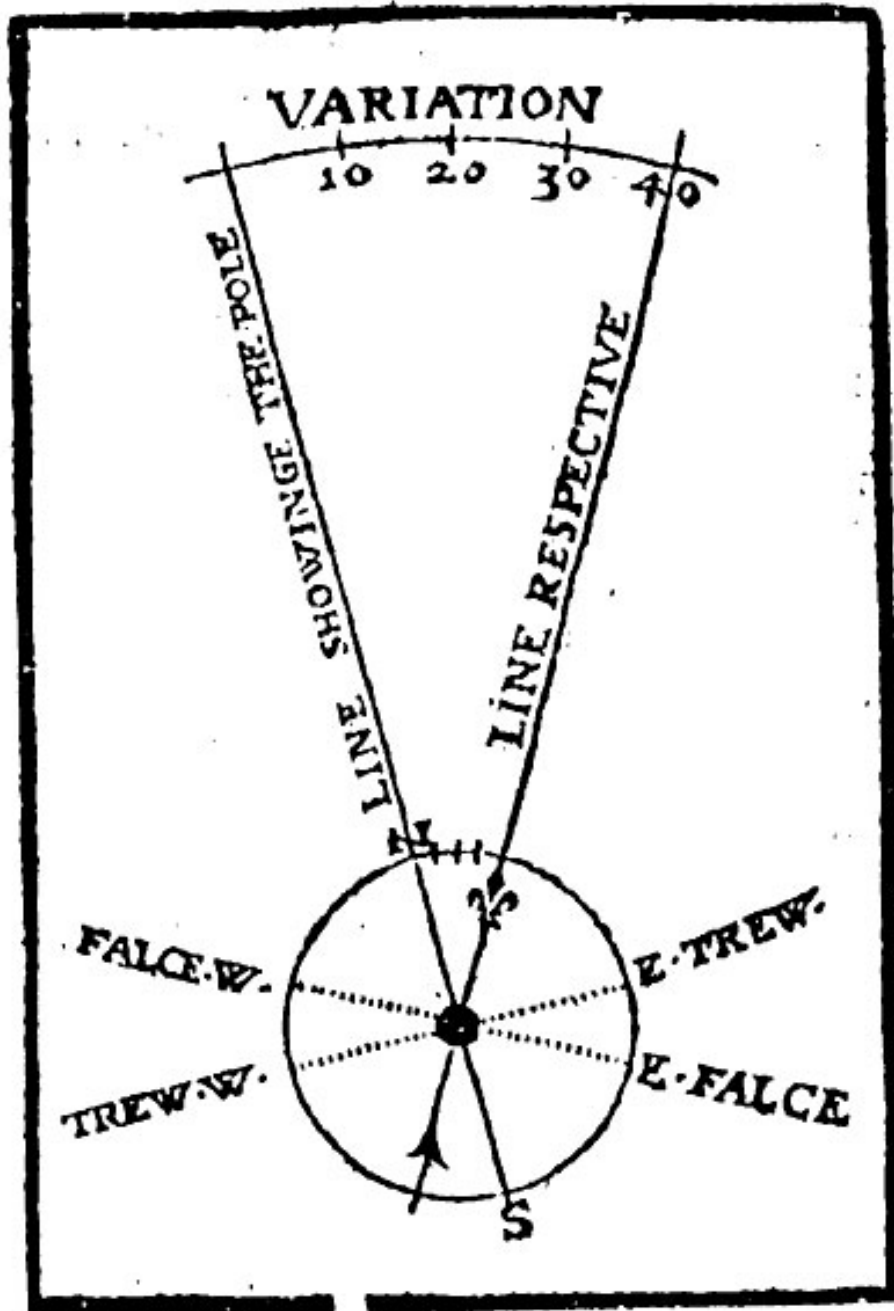
*Detected and corrected by often and
diligent obseruation.*

Whereto is adioyned, the right H. the Earle of Cumber-
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with the towne and platforme of Fayal.

By Edward Wright.

Printed at London for Ed. Agas. 1599

Item 2: the
variation of
the compass



Robert Norman, *The Newe Attractive* (1581)

Explaining compass variation.

Gerard Mercator,
north polar view of
the world



G V I L I E L M I G I L
 B E R T I C O L C E S T R E N -
 S I S , M E D I C I L O N D I -
 N E N S I S ,

D E M A G N E T E , M A G N E T I -
 C I S Q V E C O R P O R I B V S , E T D E M A G -
 n o m a g n e t e t e l l u r e ; P h y s i o l o g i a n o u a ,
plurimis & argumentis, & experimentis demonstrata.



L O N D I N I

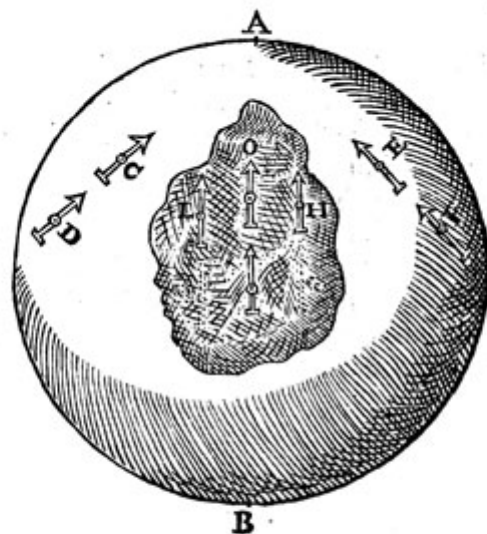
E X C V D E B A T P E T R V S S H O R T A N N O
 M D C .

C A P . I I .

Q u o d v a r i a t i o a b i n æ q u a l i t a t e e m i n e n t i u m
 t e l l u r i s p a r t i u m e f f i c i a t u r .



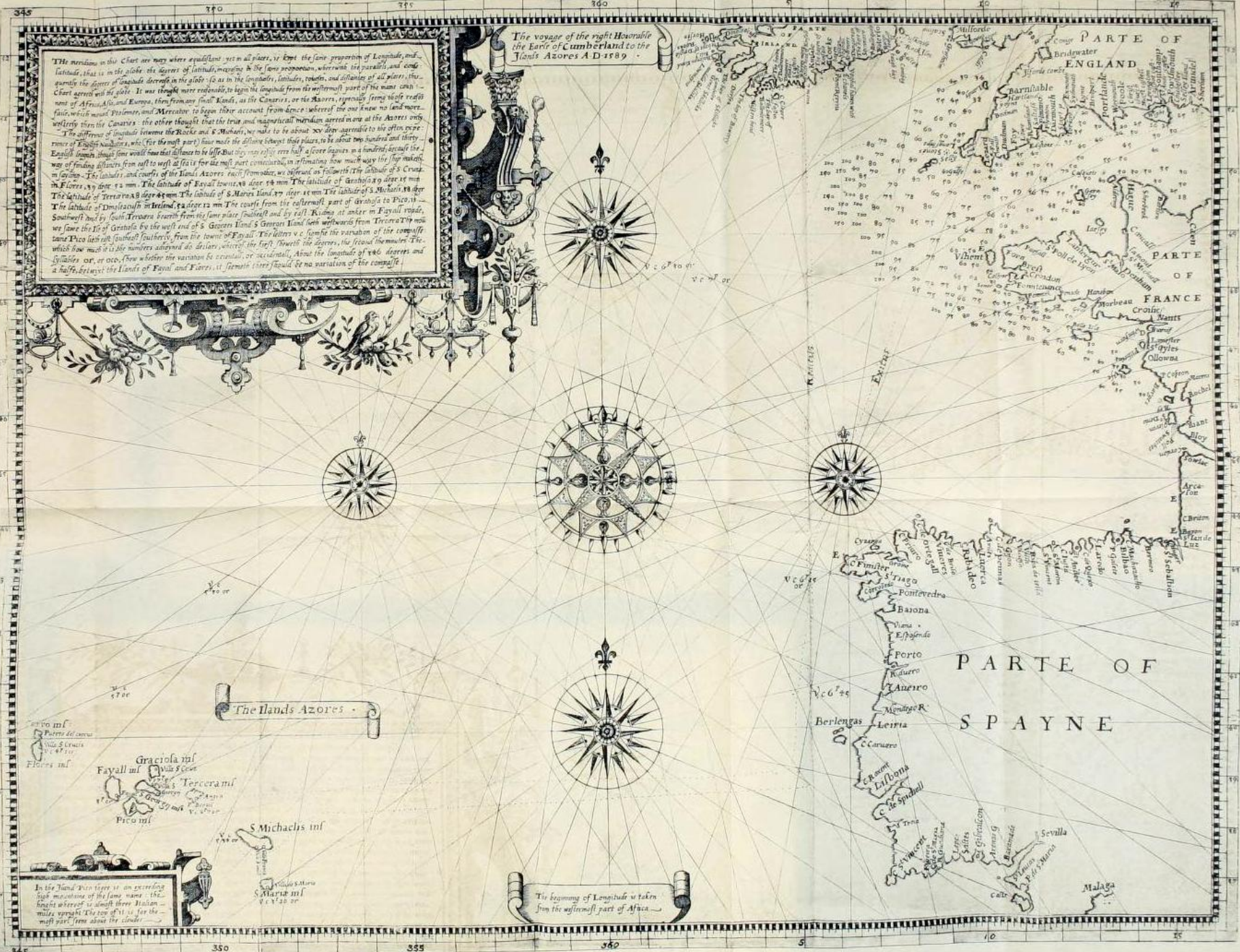
E m o n s t r a t u r h o c i p s u m m a n i f e s t è p e r t e r r e l l a m ,
 h o c m o d o : s i t l a p i s r o t u n d u s a l i q u a p a r t e i m p e r f e -
 c t i o r , & m a r c o r e l a b e f a c t a t u s (t a l e m h a b u i m u s
 p a r t e q u a d a m c a r i o s a , a d s i m i l i t u d i n e m m a r i s A t -
 l a n t i c i , s i u e O c e a n i m a g n i) p o n e f i l a f e r r e a l o n g i -
 t u d i n i s g r a n o r u m d u o r u m h o r d e a c e o r u m s u p e r l a -
 p i d e m , v t i n s e q u e n t e f i g u r a . A B , T e r r e l l a p a r t i b u s q u i b u s d a m
 i m p e r f e c t i o r , & v i r t u t e i n c i r c u m f e r e n t i a , i n æ q u a l i s ;



V e r f o r i a E , F , n o n v a r i a n t ; s e d d i r e c t è p o l u m A r e s p i c i u n t : p o s i t a
 s u n t e n i m i n m e d i o f i r m æ & v a l e n t i s p a r t i s t e r r e l l æ , l o n g i u s a b i m -
 p e r f e c t a : s u p e r f i c i e s p u n c t i s & l i n e i s t r a n s u e r s i s i n s i g n i t a , i m b e c i l l i -
 o r e s t . O (v e r f o r i u m) e t i a m n o n v a r i a t (q u i a i n m e d i o i m p e r f e c t æ
 p a r t i s) s e d i n p o l u m d i r i g i t u r , n o n a l i t e r a t q ; i u x t a o c c i d e n t a l e s A -
 z o r e s

William Gilbert,
De magnete
 (1600)

Accounting for
 magnetic
 variation



The voyage of the right Honourable the Earle of Cumberland to the Ilands Azores A.D. 1689

The meridians in this Chart are every where equidistant yet in all places, except the same proportion of Longitude, and Latitude, that is in the globe, the degrees of latitude, increasing in the same proportion, whereas the parallels, and consequently the degrees of longitude decrease in the globe, as in the longitudes, latitudes, courses, and distances of all places, this Chart agrees with the globe. It was thought more reasonable, to begin the longitudes from the westernmost part of the main, than some of Africa, Asia, and Europe, then from our small Islands, as the Canaries, or the Azores, especially since the great sail, which was used by Ptolemy, and Mercator, to begin their account from hence: whereas of the one knew no land more westerly than the Canaries: the other thought that the true and mathematical meridian agreed more at the Azores only.

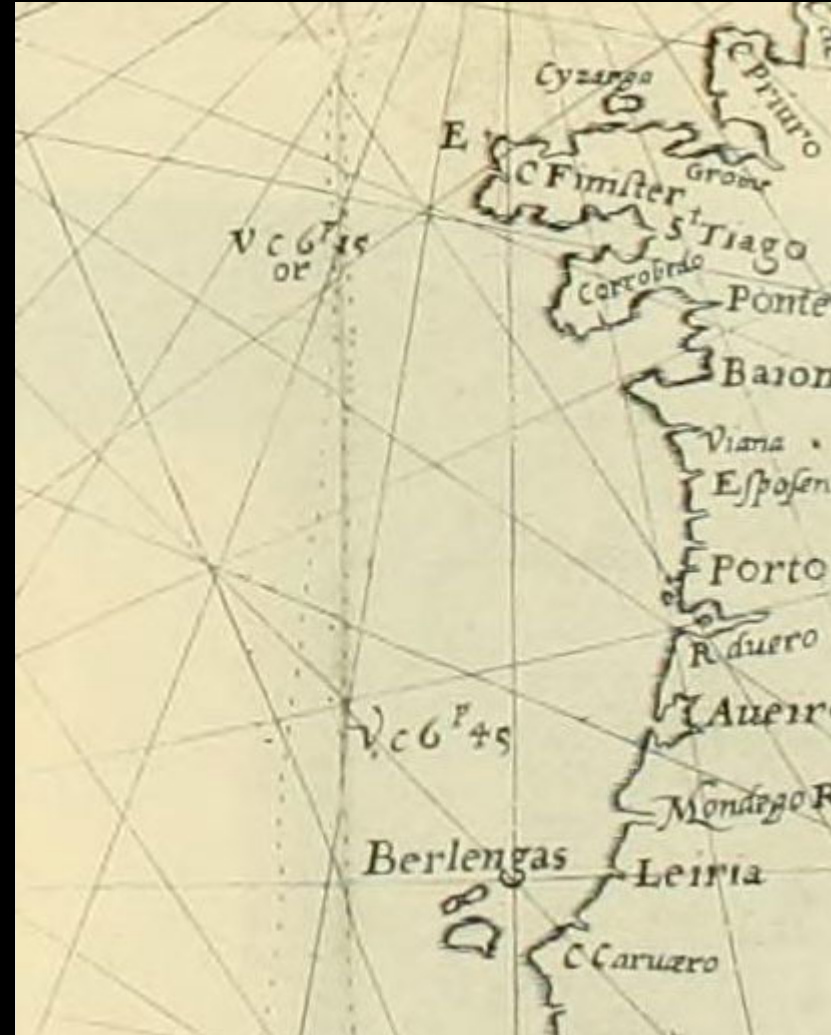
The difference of longitude between the Rocks and S. Michaels, we make to be about 200 degrees according to the observations of English navigators, who for the most part have made the distance between these places, to be about two hundred and thirty English leagues, though some would have that distance to be less. But they may easily erre half a score leagues, in a hundred, because the way of finding distances, from east to west, is for the most part contrived, in estimating, how much way the ship makes, in sailing. The latitude, and course of the Ilands Azores, each from other, we observe as follows: The latitude of S. Cruz is 44 degrees 40 minutes. The latitude of Fayall is 42 degrees 40 minutes. The latitude of S. Michaels is 40 degrees 40 minutes. The latitude of Terceira is 38 degrees 40 minutes. The latitude of S. Maria is 36 degrees 40 minutes. The latitude of S. Michael is 34 degrees 40 minutes. The latitude of Ponta Delgada is 32 degrees 40 minutes. The latitude of S. George is 30 degrees 40 minutes. The latitude of S. Peter is 28 degrees 40 minutes. The latitude of S. Paul is 26 degrees 40 minutes. The latitude of S. Jago is 24 degrees 40 minutes. The latitude of S. Vincent is 22 degrees 40 minutes. The latitude of S. Thomas is 20 degrees 40 minutes. The latitude of S. Martin is 18 degrees 40 minutes. The latitude of S. Antonio is 16 degrees 40 minutes. The latitude of S. Francisco is 14 degrees 40 minutes. The latitude of S. Xavier is 12 degrees 40 minutes. The latitude of S. Roque is 10 degrees 40 minutes. The latitude of S. Agostinho is 8 degrees 40 minutes. The latitude of S. Pedro de Azores is 6 degrees 40 minutes. The latitude of S. Maria da Formosa is 4 degrees 40 minutes. The latitude of S. Joao da Formosa is 2 degrees 40 minutes.

The Ilands Azores

The beginning of Longitude is taken from the westernmost part of Africa

In the Iland Pico there is an exceeding high mountain of the same name: the height whereof is almost three Italian miles, upwards the top of it is for the most part free above the clouds.

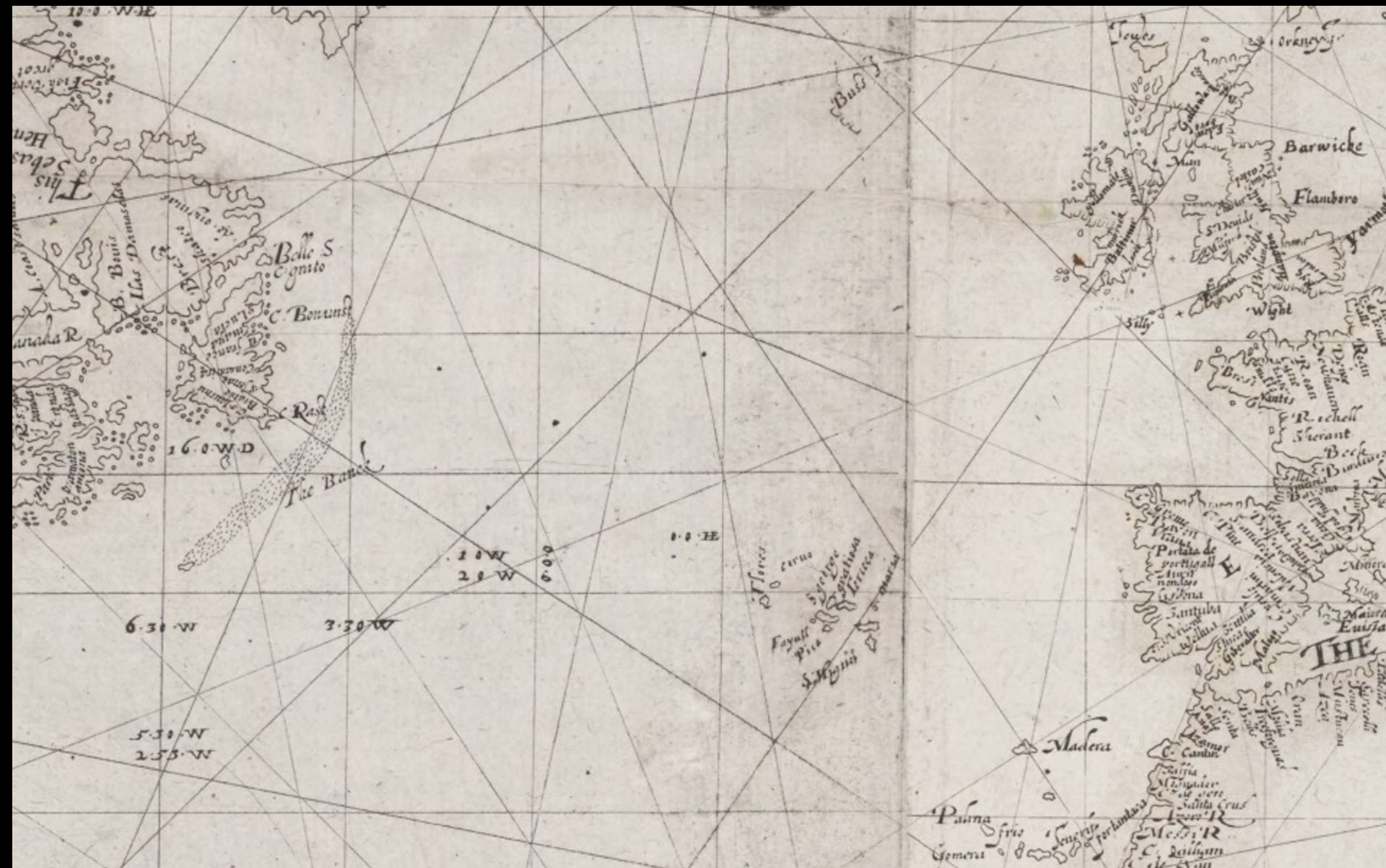
“The letters *vc* signifie the variation of the compasse: which how much it is, the numbers adioyned do declare, whereof the first sheweth the degrees, the second the minutes. The syllables *or* or *occ* shew whether the variation be orientall, or occidental.”



Edward
Wright,
Mercator
world map
from 1610
edition of
Certaine
Errors



North Atlantic from
Wright's 1610
world map



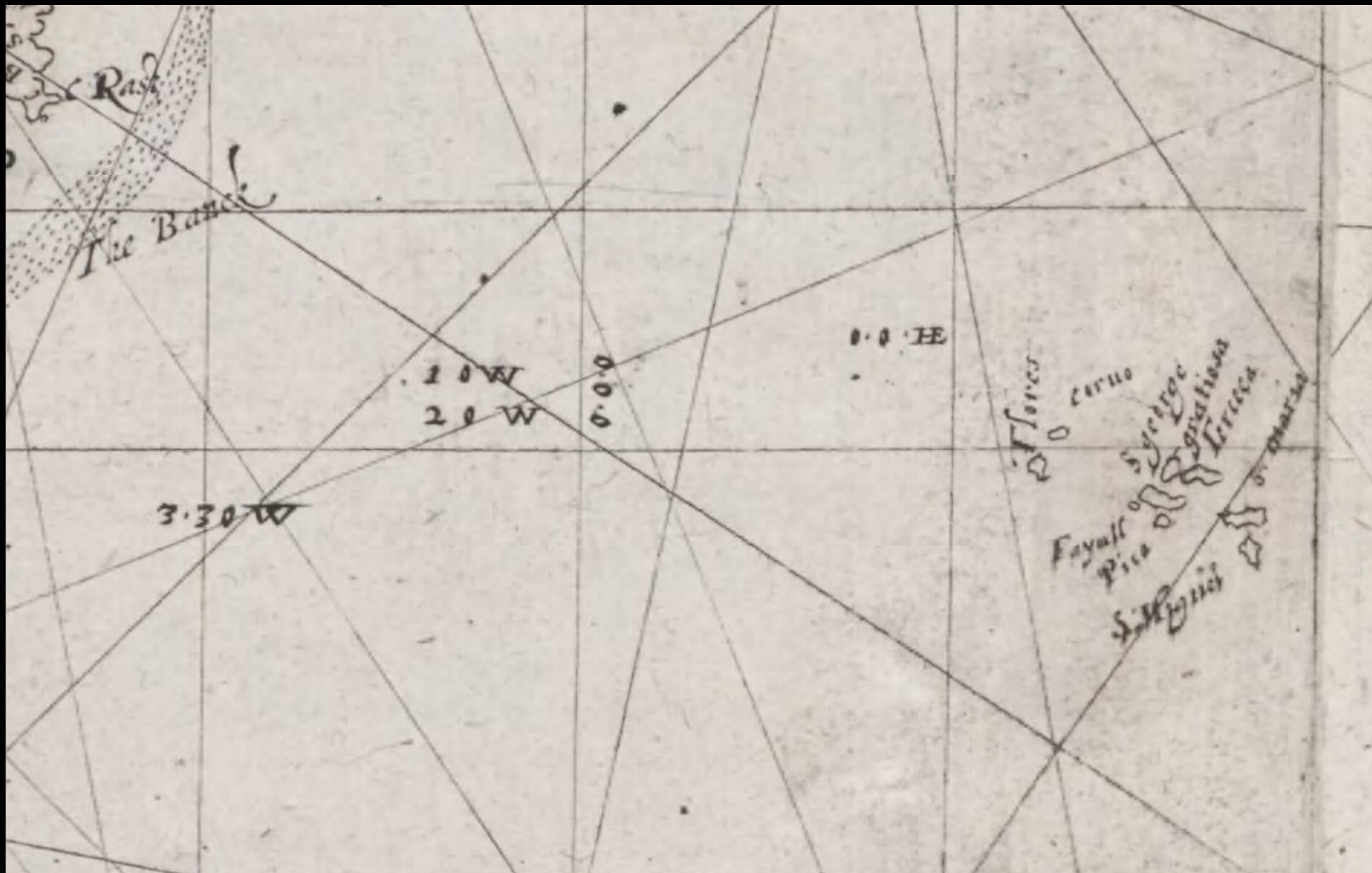
The numbers scatteringly dispersed here and there in this sea chart, signifie the variation of the compass. The letters E and W shewe whether it be East or west. The other letters following signifie the observers names: as D. Davis, K. Kendall, H. Hall; L. Lynschot, C. Candish, ca. Iohn de castro. &c

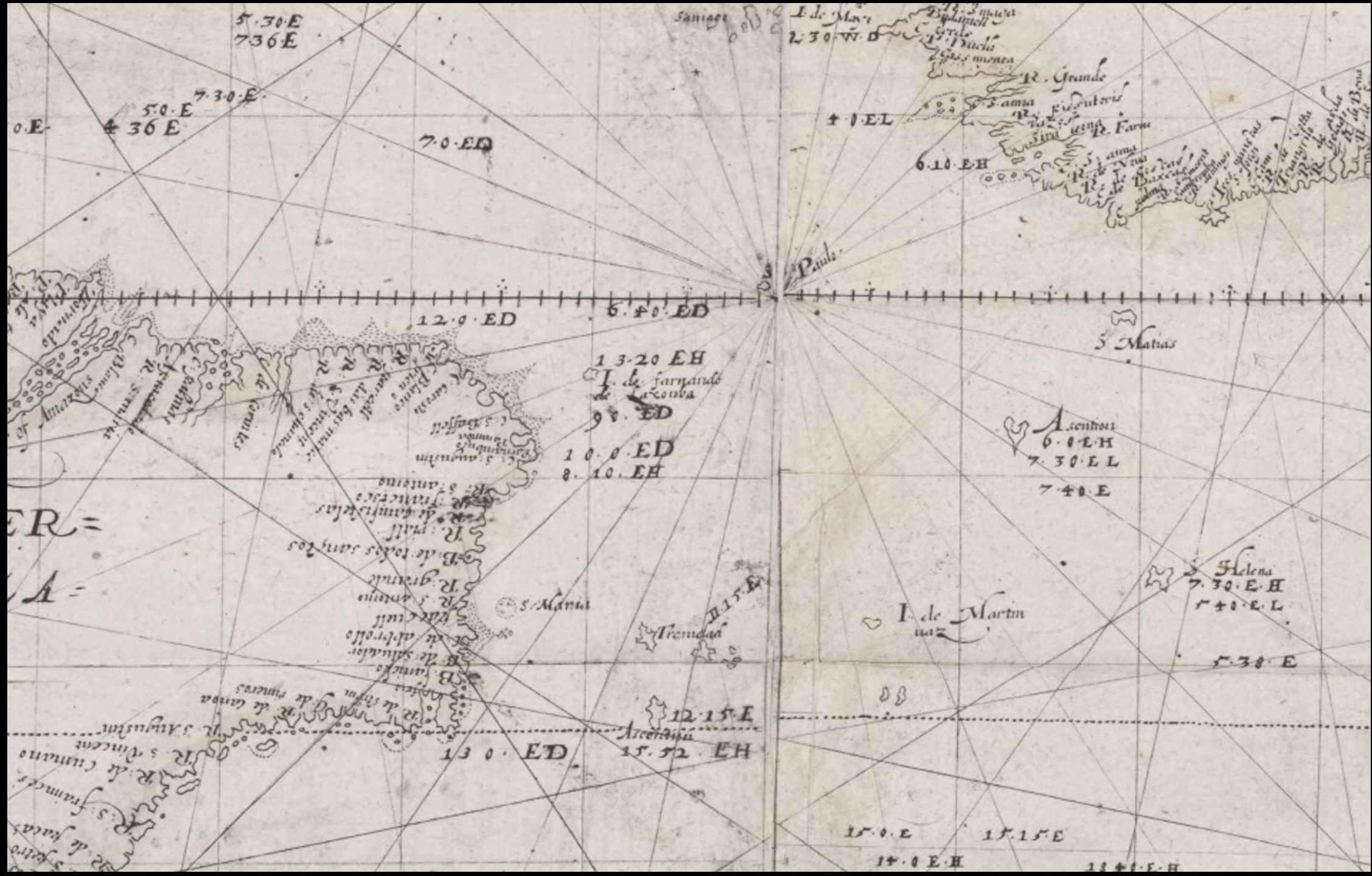
20

30

40

50





5.30.E
736E

Santa

I. de Mart
2.30.W.D

0.E
50.E
730.E
436E

70.ED

1.0.EL

6.10.EH

12.0.ED

6.40.ED

13.20.EH

I. de Fernando
de Albuquerque

9.0.ED

10.0.ED

8.10.EH

S. Matias

A. condor
6.0.E.H
7.30.E.L
7.40.E

ER=

A=

S. Maria

I. de Martin
11.5.E

Helena
7.30.E.H
5.40.E.L

5.30.E

12.15.E

15.52.EH

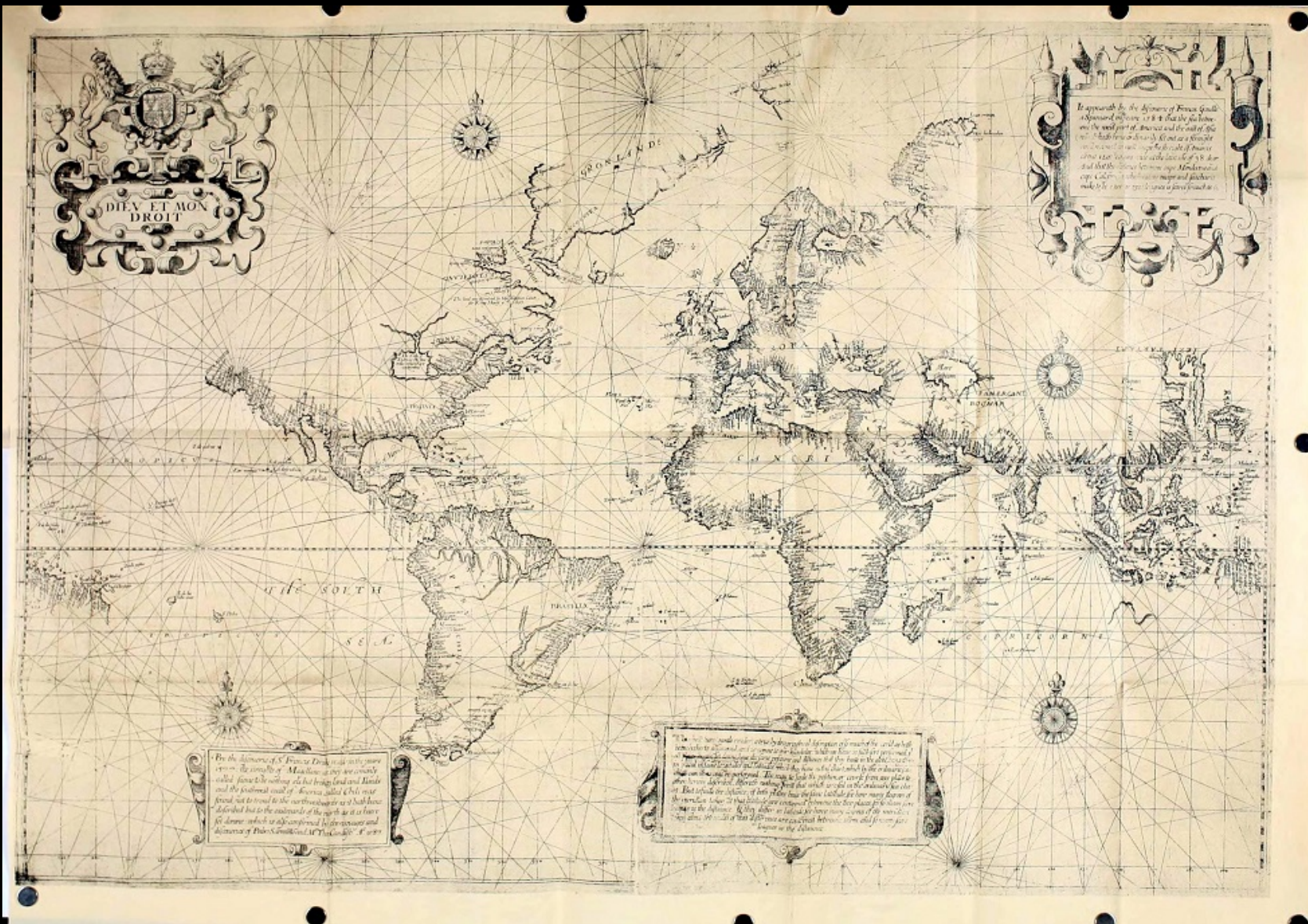
13.0.ED

15.0.E

15.15.E

14.0.E.H

14.10.E.H



World map on Mercator projection, from Richard Hakluyt, *Principal Navigations*, 2nd edition (1598-1600)