

## Traces of lost North European sea charts of the 15th century

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### THE TRADITIONAL THREE PRINCIPAL TYPES OF MEDIAEVAL CARTOGRAPHY AND HYDROGRAPHY

Directions as to how to approach certain coasts and ports may be traced back to the era of ancient Greeks and Romans among the peoples of the Mediterranean civilization<sup>(1)</sup>. Their sea maps have a rich tradition which reaches to the 13th century and, possibly, further back. Also in Western Europe such nautical aids have a long history<sup>(2)</sup>.

It would be wrong to infer, from the silence on this subject of old North European sources and from the scarce and hesitating written evidence of later times, that in the area of the continental North Sea coast between Flanders and North Jutland such nautical aids long were unknown, that they first appeared at the end of the 15th century, and that sea maps did not exist before the second quarter of the 16th century<sup>(3)</sup>.

The following is an attempt to find out—in the light of various old nautical and cartographic sources — whether the thesis of the late appearance of North European sailing directions and sea charts as used in the areas influenced by the Dutch and the Hanseatic League is still valid or whether it can be proved that these nautical aids were used earlier than hitherto assumed.

It will be remembered that during the Middle Ages the cartography of the Dutch, German and Danish North Sea coast was determined by three entirely different types of maps: The South European sea charts, the sheets of the so-called Mediaeval-ecclesiastical cartography, and those of the Ptolemaic type. The land maps of the clerical and religious sphere, whose latest specimens continue to the beginning of the 16th century, may be left outside the scope of our investigation. With their bizarre shape, they hardly give any useful information on the appearance of the continent at the time when they were made and offer no indications of the existence of any independent cartographic representations of Northern Europe. The same applies to the attempts by monastic scholars of the late Middle Ages to create a new type of map with the aid of the network of coordinates, the reason being that they were often rather speculative. The coast line in particular is poorly drawn in these maps<sup>(4)</sup>.

The maps of the Ptolemaic type are likewise of little help. Whatever revolutionary influence the rediscovery of Ptolemy's Geography had on the petrified Mediaeval beliefs as to the form of the surface of the earth and however stormy the further development of cartography resulting from the enthusiastically greeted classical description of the world, Ptolemy constituted an obstacle rather than a contribution to the cartographic representation of our coastal areas. In his *Quarta tabula Europae* the North Sea coast appears more or less poorly inclined, in total ignorance of the reality, from the mouth of the Rhine—running obliquely across the map approximately from SW to NE—up to the tip of the Cimbrian Peninsula (fig. 1). The respect for superior classical authority, enjoyed by Ptolemy among the scholars of the Renaissance, delayed by a century the recognition by official cartography of the actual delineation of the coast, especially the square angle of the Heligoland Bay, which had been common knowledge among the sea-farers since the middle of the 15th century. As a result, beginning with Albertin a Virga and down to the late part of the second half of the 16th

<sup>(1)</sup> In recent literature cf. D. GERNEZ, Les "periples" des anciens Grecs et leurs Rapports avec les livres d'Instructions nautiques, *Communications de l'Académie de Marine Belgique* IV, Anvers 1947/49, and his Esquisse de l'histoire de l'Evolution des Livres d'Instructions Nautiques, *ibidem* V, 1950, and its list of sources, also R. GÜNGERICH: Die Küstenbeschreibung in der griechischen Literatur, Münster 1950, as well as BACCHISIO, R. Morzo, Il Compasso da Navigare in: *Ann. della Fac. d. Lett. e Filos. d. Univers. di Cagliari*, Vol. VIII, Cagliari 1947.

<sup>(2)</sup> Cf. J. DENUCÉ and D. GERNEZ. Het zeeboek. *Uitg. der Marine van België*, Deel I, Antwerpen 1936, p. IX.

<sup>(3)</sup> W. VOGEL, Geschichte der deutschen Seeschifffahrt, Berlin 1915, p. 521 and his Die Einführung des Kompasses, in die nordwesteuropäische Nautik, *Hansische Geschichtsblätter*, Jahrgang 1911, Leipzig, 1 ff. Cf. also W. BEHRMANN, Ueber die niederdeutschen Seebücher des 15. u. 16. Jahrhunderts, *Mitt. d. Geogr. Ges. in Hamburg* XXI, 1906, 107, 132 f, 141.

<sup>(4)</sup> Cf. D. B. DURAND, The Vienna-Klosterneuburg Map Corpus, Leiden 1952 and its review by H. WINTER in *Deutsche Literaturzeitung*, Jahrgang 74, Heft 7/8, 1953 column 476 ff.

century we meet this type of representation everywhere on the older maps. The Dutchman Cornelis Aurelius (1514), the famous French mathematician Orontius Finaeus (1531) and the German Johann Schöner (1533) were not the only ones who still followed the classical conception at a time when the Ptolemaic type had long since given way to a newer and truer conception among the North European sailors. Even prominent South European authors of portolan maps, Pedro Reinel (1502), Diego Ribero (1527), or Battista Agnese (middle of the 16th century), had abandoned the traditional portolan-map style and adopted the views of the scholar of Alexandria, which were in no way nearer to truth.

Finally, about 1540, the scholars were ready to discard the classical tradition and to achieve a new type of maps of the North Sea coast. The first were Gemma Frisius of Dokkum (1540) and his disciple Gerard Mercator of Rupelmonde, both of whom still drew their sheets in the Ptolemaic style as late as 1537 and 1538 respectively (1).

Italian and Catalan sea-charts, beginning with the 13th century, give a technically perfect and surprisingly

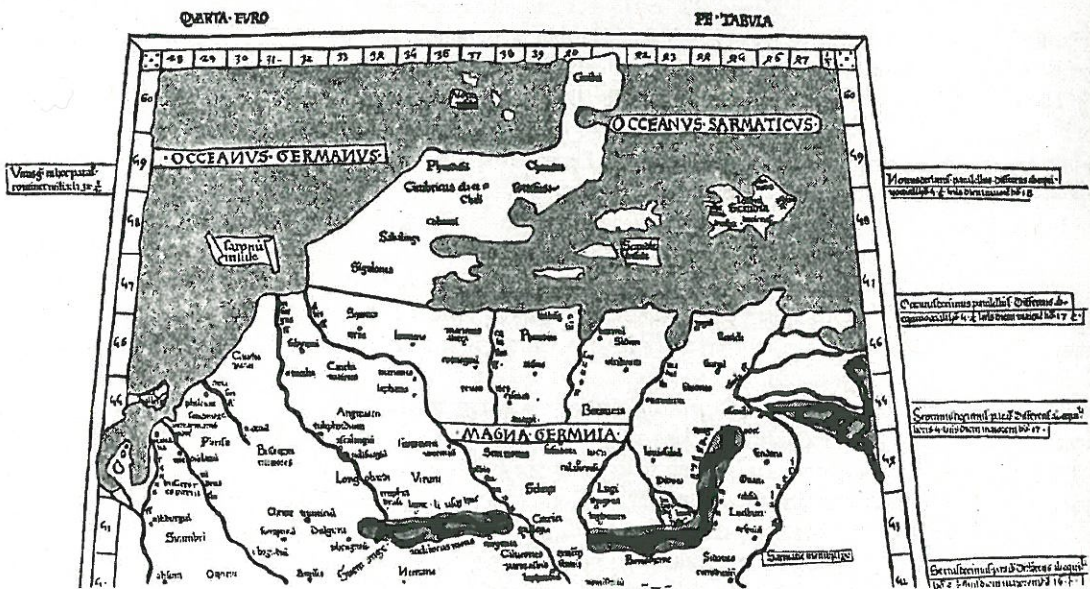
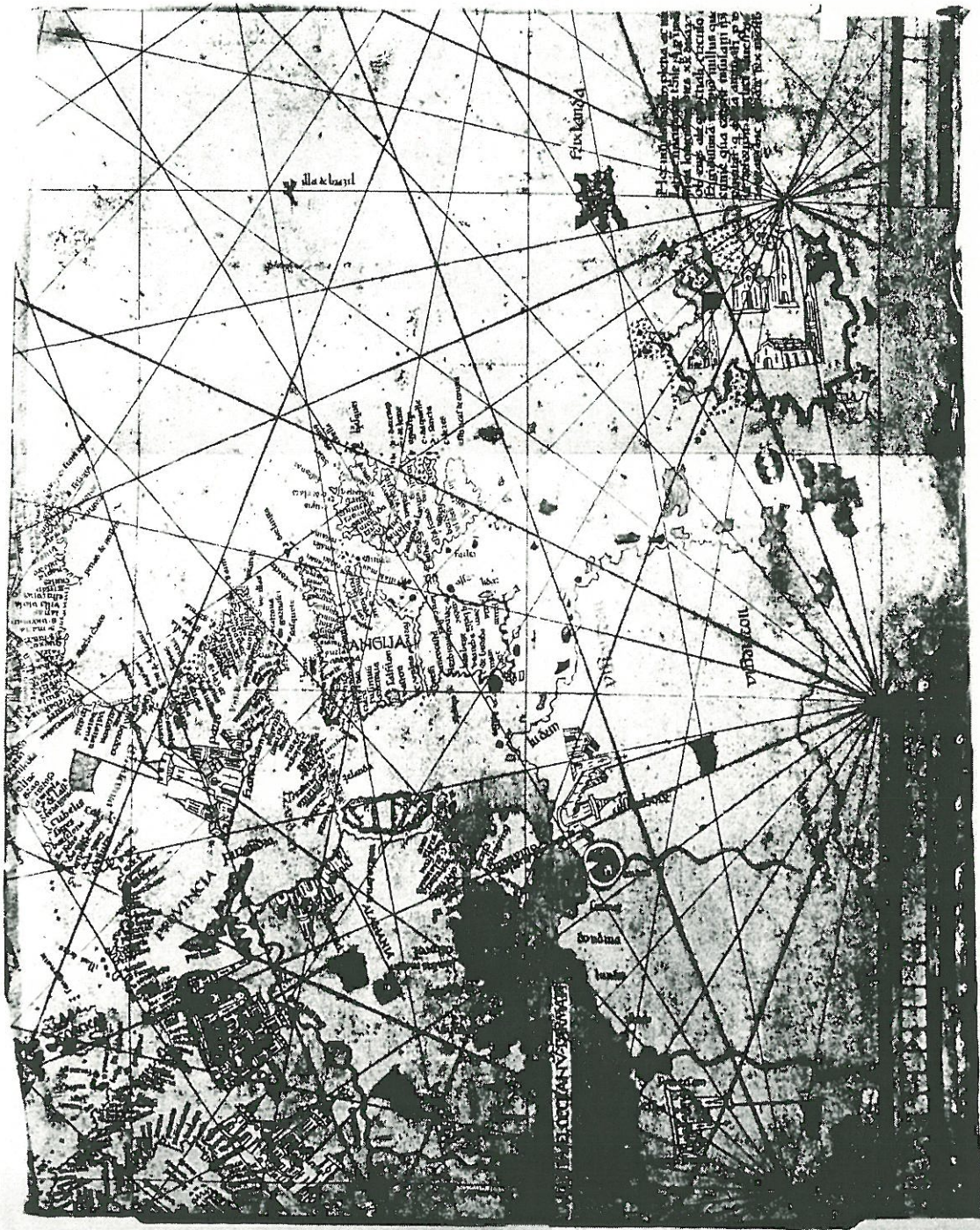


Fig. 1. "Quarta tabula Europae" the first German edition of Ptolemy (Ulm 1482). From the estuary of the Rhine to the point of the Cimbric Peninsula the coasts stretch in sharp bends across the map from the SW to the NE.

faithful representation of the European coast from the Mediterranean up to Flanders and England. With the exception of a few sheets to be discussed at greater detail, they disclose, however, great lack of knowledge in the delineation of the coast north of Flanders. Presumably with good reason, this has been explained by the fact that from the 12th to the 15th century the regular trade voyages of the South Europeans ended mostly in Flanders and occasionally in England. Accordingly, their knowledge, otherwise so outstanding, of the situation and form of the European continental coast, declined rapidly further north. The representation of the mainland north of Flanders strikes one as hypothetical and schematic, primarily because from the mouth of the Rhine the coast is shown—in direct contrast to truth—as going straight

(1) In his globe of 1537, Gemma Frisius (cf. R. HAARDT, *Imago Mundi IX*), follows Ptolemy, while his world map of 1540 (of which only smaller imitations, among others in the *Cosmography* by Peter Apian (1544), published by Gemma Frisius, are extant) already shows the modern coast configuration with the square angle of the Heligoland bay. Gemma Frisius' disciple, Gerard Mercator, follows the same path in his double-heart-shaped world map of 1538 (reproduced in *Imago Mundi VI*, p. 35 and L. BAGROW, *Die Geschichte der Kartographie*, Berlin 1951, p. 153) and his globe of 1541 (reproduced in VAN RAEMDONCK: *Les sphères terrestre et celeste de Gerard Mercator de Rupelmonde . . . St. Nicolaas, 1875*). As regards Northern Europe in Ptolemy's cartographic conception, cf. Т.Н. СТЕЧЕН, *Altgermanien im Erdkundebuch des Claudius Ptolemaeus*, Leipzig 1937, 27 ff.



PART OF THE PORTUGUESE WORLD MAP ATTRIBUTED TO COLUMBUS, CA. 1500  
(Bibliothèque Nationale, Paris)

north, without the careful bending and indenting, as is otherwise the rule in all portolan maps (1).

Just north of the Rhine estuary, the coast has a deep bay, doubtless the Zuiderzee, from the names of Utrecht, Harderwijk and Terschelling, mentioned there (fig. 2). Further north are three islands, carefully following the coast; the central one carries the name of Wangeroog. On some maps the Elbe empties here into the North Sea. Another bay of the sea, often drawn as a triangle, penetrates the mainland above the last island. Presumably, this was meant to be the German Bay. Still further north is the tripartite island of Heligoland which

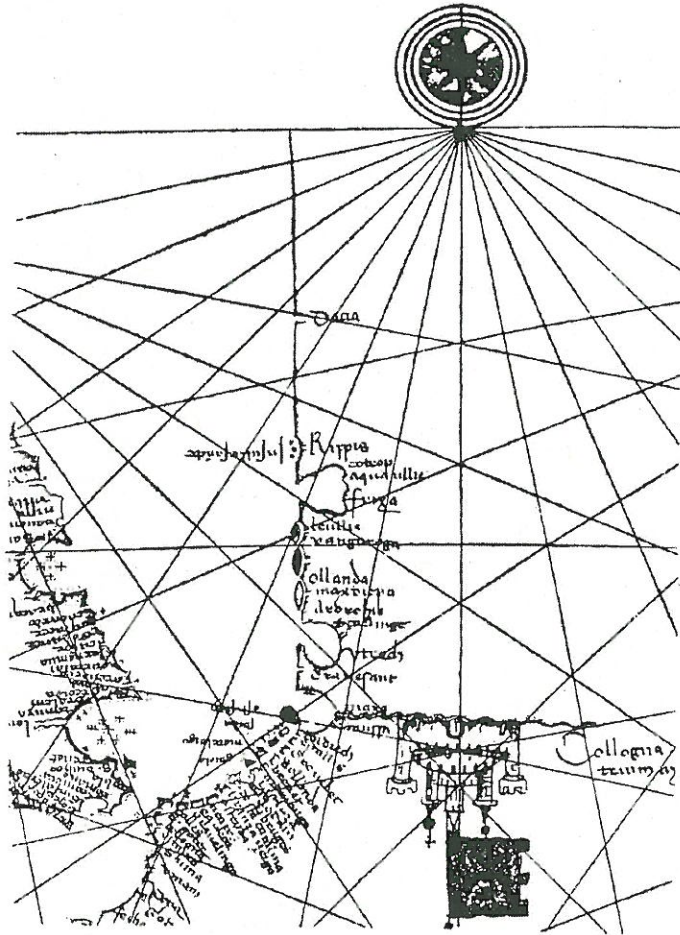


Fig. 2. Type of representation of the coast of Netherlands-Germany-Denmark from the estuary of the Rhine direct northward on medieval Italian and Catalan sea-charts (Battista Beccario, Venice 1435. Fragment).

characteristically is placed just off the West Jutland sea port of Ribe. From there on, the coast continues straight north for a distance equal to that between Ribe and the mouth of the Rhine, then turns NW and later SE.

The south and west European coast up to the Rhine estuary is richly dotted with names, mostly of larger ports. North of the Rhine and up to the outlet of the Zuiderzee there is a relatively smaller number of names of Dutch places, countries, et cetera. We see here the Meuse, Geldern and Holland, as well as Dordrecht, s'Gravezande, Egmond (2) and Utrecht (3), and, further north, the Zuiderzee with Harderwijk, Marsdiep, Vlie and Terschelling. Then the rich sequence of names is broken, and along the long stretch up to Cape

(1) For mediaeval-monastic cartography, development of the portolan maps and the influence of the rediscovery of Ptolemy on the cartography of the Renaissance cf. BAGROW, *loc.cit.* and the literature mentioned in the beginning as well as TH. FISCHER, *Sammlung mittelalterlicher Welt- und Seekarten italienischen Ursprungs*, Venice 1886, 31 ff.

(2) J. KEUNING, *Kartografie van Friesland tot 1600*, in: *Tijdschrift v. h. Kon. Nedert. aardrijkskundig Genootschap*, II Serie, Deel XXXI, Leiden 1914, 18.

(3) W. VOGEL, *Die Binnenfahrt durch Holland und Stift Utrecht*, *Hansische Geschichtsblätter*, Jahrg. 1909, Leipzig, 15 ff.

Skagen we only find Wangeroog, Friesland, Helgoland, Denmark, Ribe and, occasionally, the Elbe. Börglum, a monastic settlement in the interior of North Jutland, is also mentioned now and again <sup>(1)</sup>.

#### TRACES OF NORTH EUROPEAN PORTOLAN MAPS OF THE MIDDLE OF THE 14TH CENTURY?

This type of maps, dating from as early as the first half of the 14th century <sup>(2)</sup>, did not undergo any changes during the greater part of the 16th century, with the exception of the sheets to be discussed below. Its development was, accordingly, in practice, completed by the middle of the 14th century, so that the drawings of this type then became standardized. As a result, almost all later South European portolan maps, including those of the 16th century, show no progress after 1350 in the representation of our coasts <sup>(3)</sup>.

The question of the origin of this gross misrepresentation of the Dutch, German and Danish coasts cannot be satisfactorily answered. It may be assumed that its source is very old and that it came into being as early as the 12th century or even earlier. Considering their highly developed cartographic skill, as displayed elsewhere, it is most unlikely that the configuration of the mainland north of the Rhine is the result of surveys and observations by South European navigators. Although they occasionally sailed as far as Skagen, it is to be presumed that they drew their maps on the basis of North European sources. As regards the conception of the original map or drawing, one thinks first of Adam of Bremen, one of the earliest geographers of the North (about 1070). As a matter of fact, he asserts that at a distance of 8 days' travel south of the mouth of the Elbe is the Rhine, while Jutland stretches straight north from there <sup>(4)</sup>.

Details concerning the coastal zone of the mainland were presumably transmitted to the Mediterranean hydrographers by a certain group of North European seafarers. It is striking, in the first place, that important rivers like the Ems and the Weser are not mentioned and that even the Elbe is often omitted on the portolan maps. In the same way we may look in vain for those sea-ports which during the 13th and 14th centuries were at least as important as Ribe in West Jutland—expressly mentioned—such as Groningen, Bremen, Stade and Hamburg. This seems to indicate that not German sailors, but the Dutch going to Ribe or Ribe people going to Flanders or, still more probably, the so-called Flemish-Dutch *circumnavigators*, who began to appear more frequently about 1250, were the transmitters of geographical data <sup>(5)</sup>, at times vague and uncertain. The names given in the portolan charts also seem to confirm this. To mention Utrecht and Harderwijk, Marsdiep, Vlie and Terschelling, is to indicate the beginning of that sailing route which further led, in sighting distance of Wangeroog and Heligoland, to Ribe and, if necessary, further north. The fact that Heligoland and Ribe are shown as being close to each other on contemporary South European sea charts seems to support our assumption.

We may therefore infer from what has been said above that up to the time of the decline in the development of the portolan chart, that is the middle of the 14th century, neither sea charts nor sufficiently exact sailing directions for the North Sea coast from Flanders to Cape Skagen were known to the South Europeans and that presumably they did not exist at that time, at least not in written form. An obvious exception is a description of a single route which led from the Zuiderzee area by way of Ribe northwards to the tip of Jutland. This portolan-type description, undoubtedly handed down by word of mouth, was vague and apparently very misleading.

The above does in no way preclude that certain seafaring guilds of Flanders, Holland, Friesland, the Hanse and Denmark, for example the Flanders or Hamburg seafarers, had long had a clear and definite conception

<sup>(1)</sup> A. A. BJÖRNBO and C. S. PETERSEN, *Anecdota cartographica Septentrionalia*, Hauniac, 1908, Fasc. I p. 4 and Tab. I.

<sup>(2)</sup> KEUNING, *op.cit.*, p. 18.

<sup>(3)</sup> The exceptions are the maps discussed in greater detail below as well as a few others, such as Walsperger (1448), Kunstmann II (ca. 1502), Pedro Reinel (1502-1505), and others, which do not enter the scope of our study.

<sup>(4)</sup> MAGISTRI ADAM BREMENSIS *Gesta Hammaburg. eccl. pontificum*, edit. III cur. B. SCHMEIDLER, Hannover and Leipzig 1917, p. 4 and 227.

<sup>(5)</sup> W. VOGEL, *Geschichte der deutschen Seeschifffahrt*, *op.cit.* 185 ff. The name of "*circumnavigators*" was primarily given to the mariners of the cities of Utrecht, Deventer and Kampen, which ranked foremost in handling the Lower-Rhine-Danish trade to Ripe. There were Ripe-trading guilds in several cities. Cf. H. MATTHIESSEN, *Middelalderlige Byer*, København 1927 p. 74 ff. For early voyages of the Flemish to the European north and east cf. H. REINCKE, *Die Deutschlandfahrt der Flandrer während der hansischen Frühzeit*, *Hansische Geschichtsblätter*, Jahrg. 67/68, Weimar 1943, p. 52 and 58.

of the configuration of the coasts of Northern Europe. However, this knowledge, presumably only transmitted orally, apparently never penetrated beyond a relatively limited circle.

#### THE FIRST SIGNS OF A NEW CARTOGRAPHICAL ERA

##### A. *The use of compass and sailing directions in Northern Europe in the late Middle Ages*

Nevertheless, the decisive impulse for the reformation of the cartographic picture of our coasts did not come from Italian and Catalan pilots, still less from the scholars of the 14th and 15th centuries, but from nameless North European sailors of the Dutch and Hanseatic sphere of influence. The reason why the new elements were slow to gain recognition is undoubtedly the fact that unlike the highly developed modern trade and navigation practices in western and southern Europe, the use of writing in sea trading of the European north was sporadic and late in coming<sup>(1)</sup>.

The sailing instructions which can doubtless be considered as the forerunners of the North European sea chart were therefore, it is to be assumed, in older times transmitted mostly by word of mouth within a definite guild of long-range seafarers. Hand-written sailing directions describing the continental coast of the North Sea from Flanders to Cape Skagen are not likely to have been as common as among the Italian and Catalan navigators of the same epoch. The origin of the North European sailing directions is not clear. As regards our area, they came into being probably since the middle of the 14th century, and, to judge from all appearances, not before the beginning of the 15th century. Sailing directions as such had long been current in the European North and were not considered as something new in the 14th century. The portolan fragment by Adam of Bremen<sup>(2)</sup> which describes a sea voyage from Ribe to the Holy Land is not the only evidence in this respect. There were several Nordic sailing instructions. They were composed between 1200 and approximately 1350, like that of Olof Tryggvesson's Saga or that by Ivar Bardsson of Greenland<sup>(3)</sup>. A sailing direction in King Valdemar's *jordebok* (13th century), describing the routes from Blekinge in Sweden to Finland, is another example<sup>(4)</sup>.

The fact that Hanseatic sailors were familiar with this nautical aid is also proved by a document dating from 1441. It mentions for the first time in the Hanseatic ports, in an inventory of damages, a "map" as if it were a natural piece of equipment on board a German freighter. Presumably, it was a *Leescaart*, that is, a sailing handbook<sup>(5)</sup>.

The question of the origin of written sailing directions in the area of the continental North Sea coast is closely connected with the problem of the use of the compass by the Hanseates and the Dutch, since its knowledge is an important prerequisite for making the aforesaid directions. Contrary to the statement by Prince Henry the Navigator that the sailors engaged in the Flanders trade did not understand anything of the compass and sea chart (1434) and contrary to a similar assertion by the Italian Fra Mauro on his famous world map<sup>(6)</sup>, the belief in a surprisingly late use of the compass or of an instrument built according to like principles in the North Sea area must be considered as refuted a long time ago. The fact that here the compass was used as an important means of orientation on long voyages much earlier than was hitherto assumed—even if this

(1) Cf. H. RÖHRIG, *Vom Werden und Wesen der Hanse*, III 1943, p. 86 f. and p. 126 f., also his: *Beiträge zur hanseischen Wirtschaftsgeschichte* 1928.

(2) Cf. SCHMEIDLER, *op.cit.*, p. 228, especially footnote 8. The circumstance that one should take care not to date the first efforts in Northern Europe to gain new knowledge in the nautical sphere on the whole considerably later than the countries of the Mediterranean civilization is also proved among other things by the systematic tide measurements at London Bridge about 1200 for the determination of the harbour time. Cf. J. HALLIWEL, *Rara Mathematica*, London 1841.

(3) Ivar Bardsson, a translation of his sailing directions, in *Het Boek XVII*, Den Haag 1928, p. 227 ff.

(4) Facsimile in P. DAHLGREN and H. RICHTER, *Sveriges sjökarta*, Stockholm 1944, Appendix Table 4, *Ibidem*, also translation, comments and literature (p. 9). Reproduction also in E. W. DAHLGREN, *Om forntida seglingsanvisningar för de nordiska farvattnen* in A. E. NORDENSKIÖLD, *Periplus*, Stockholm 1897 Chapt. 11, here quoted from a separate print, p. 5 f.

(5) *Hansisches Urkundenbuch* T. VII/1 nr. 418, Inventory of goods in prize ships of the Hanseatic Bayen fleet.

(6) Cf. W. VOGEL, *Die Einführung des Kompasses etc. loc.cit.*, p. 11 ff., also PL. ZURLA, *Il Mappamondo di Fra Mauro Camaldolese*, Venezia 1806, p. 28 "per questo mar non se navega cum carta ni bussolo ma cum scandaso" (= in that sea people do not sail with maps or compass but with lead), (1459).

has been done less frequently than in the Mediterranean—had been clearly established even before Sølver's studies (1).

This means that one of the most important technical prerequisites for the composition of the nautical aids under discussion by Dutch, Hanseatic and Danish sailors was available at the end of the 13th century. One can therefore not exclude the possibility that approximately by the middle of the 14th century written sailing directions came into being in the area of the German Bay and gradually became more and more known. It is true that no such texts are extant from that period, and with the exception of the document of 1441, mentioned above, they have not been mentioned in contemporary writings. Still, their existence is indicated by a few South European portolan maps of the 15th century, which have preserved the earliest traces—partly from the first half of the 15th century—of the final abandonment of the stereotype forms, of the overcoming of the cartographic schematism, and hence of the rise of a new cartographic era.

#### B. *Valsecha and Bianco*

In 1439 the Catalan Gabriel de Valsecha published a portolan chart which betrays the use of new geographical sources. Not content to show the three superposed islands hitherto current between the Zuiderzee and the "Frisian Gulf", he was the first South European who ventured to give the whole chain of the Frisian islands, drawing altogether 9 islands. He retained the south-north direction of the coast north of Flanders and thereby gave the islands an entirely wrong position, but his way of proceeding indicates that he sought to compromise between new knowledge and old tradition. At any rate, he considered his sources reliable and did not dare to ignore them when he was out to make a new map. As shown below, the aforesaid islands in Valsecha are presumably not the Jutland islands but the Frisian chain from Texel to Wangeroog (2).

The Venetian cartographer Andrea Bianco who, as early as 1436, omitted the name of Ribe and gave Heligoland a shape consisting of two parts, instead of the traditional form of three superposed points (3), was the first to show this island, which is so important for navigation to the European North and East, as an angular form, opened up to the east by a deep bay, on his portolan map of 1448, made in London (fig. 3). There is no doubt that thereby he wanted to show in a practical and convincing manner Heligoland's most important task for navigation and to indicate the roadstead, known as Süderhafen, which had for centuries been valued by North European sailors because of its excellent position, its safe protection against N, NW and W storms and also as a place for taking fresh water supply onboard (4). This new drawing of Heligoland is all the more important, as Bianco is considered to have been a very independent cartographer, whose maps were among the best of his time. We must assume that he had had in Flanders or England models of North European origin, which so far had not been known by his countrymen or on which the latter did not rely. Valsecha and Bianco were probably moved by North European sailing directions to follow a new path. Our assumption is convincingly confirmed by a group of independent sea charts which represent the decisive change in the development of the early hydrography of Northern Europe.

### ABANDONING THE MEDIAEVAL TRADITION

#### A. *Roselli* (1462)

The new type of maps is so far represented by 4 examples, among these, only a portolan chart gives the author

(1) C. V. SØLVER, *Leidarsteinn, Vikingernes kompas, Årsbok Föreningen Sveriges Sjöfartsmuseum*, Stockholm 1941, p. 25 ff. There is no contradiction between this and the circumstance that compasses are mentioned in the North by the middle of the 14th century in Flanders and in 1394 in Germany. It is also wrong to assume that this important nautical instrument appears on the Hanseatic ships as late as 1460 (VOGEL *loc.cit.* and *Geschichte der deutschen Seeschifffahrt, loc.cit.* p. 520 f). Its use can be clearly proved as early as 1433 (Staatsarchiv Hamburg Cl. VII, Lit. Ca, No. 1. Vol. 1 a, Hambg. vouchers concerning campaign against Emden "*Item Gherde van Essen XXVII sol. vor VI Compasse*").

(2) A. CORTESÃO, *Cartografia e Cartografos Portugueses dos Seculos XVe XVI*, Lisbon 1935 Vol. I.

(3) TH. FISCHER, *Facsimile della Carta nautica di Andrea Bianco 1448*, Venezia 1881 and O. PESCHEL, *Facsimile del Atlante di Andrea Bianco 1436*, Venezia 1871, Photograph No. 6, also cf. F. C. WIEDER, *Comptes rend. Congr. Intern. de Géogr., Amsterdam 1938*, Tome II, *Trav. Sect. IV*, Leiden 1938, p. 198. Legend on the portolan map of 1448: "*Andrea biancho venecian comito de galia me fexe a Londra MCCCCXXXVIII*".

(4) Cf. A. W. LANG, *Helgoland auf alten Karten*, in *Helgoland ruft*, Hamburg 1952, p. 47.

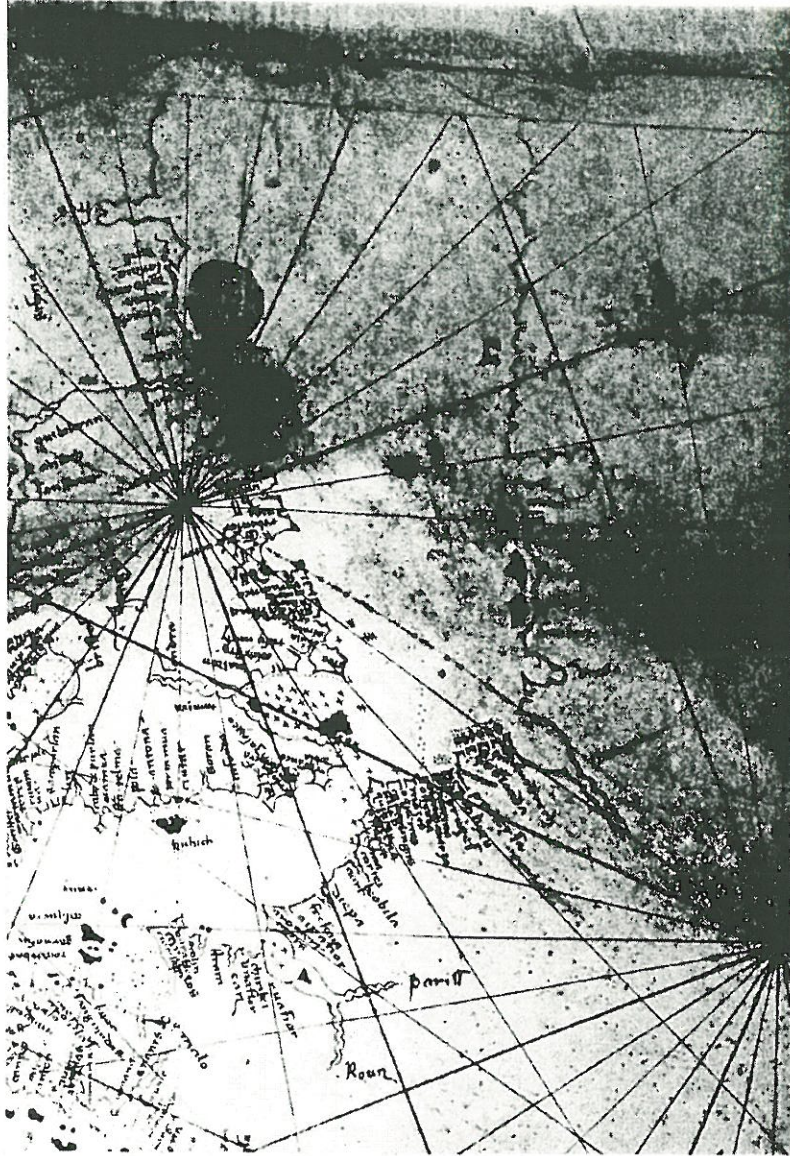


Fig. 3. The appearance in cartography of a new configurative element. The altered representation of Heligoland on a portolan chart of Andrea Bianco 1448 (London, Fragment).



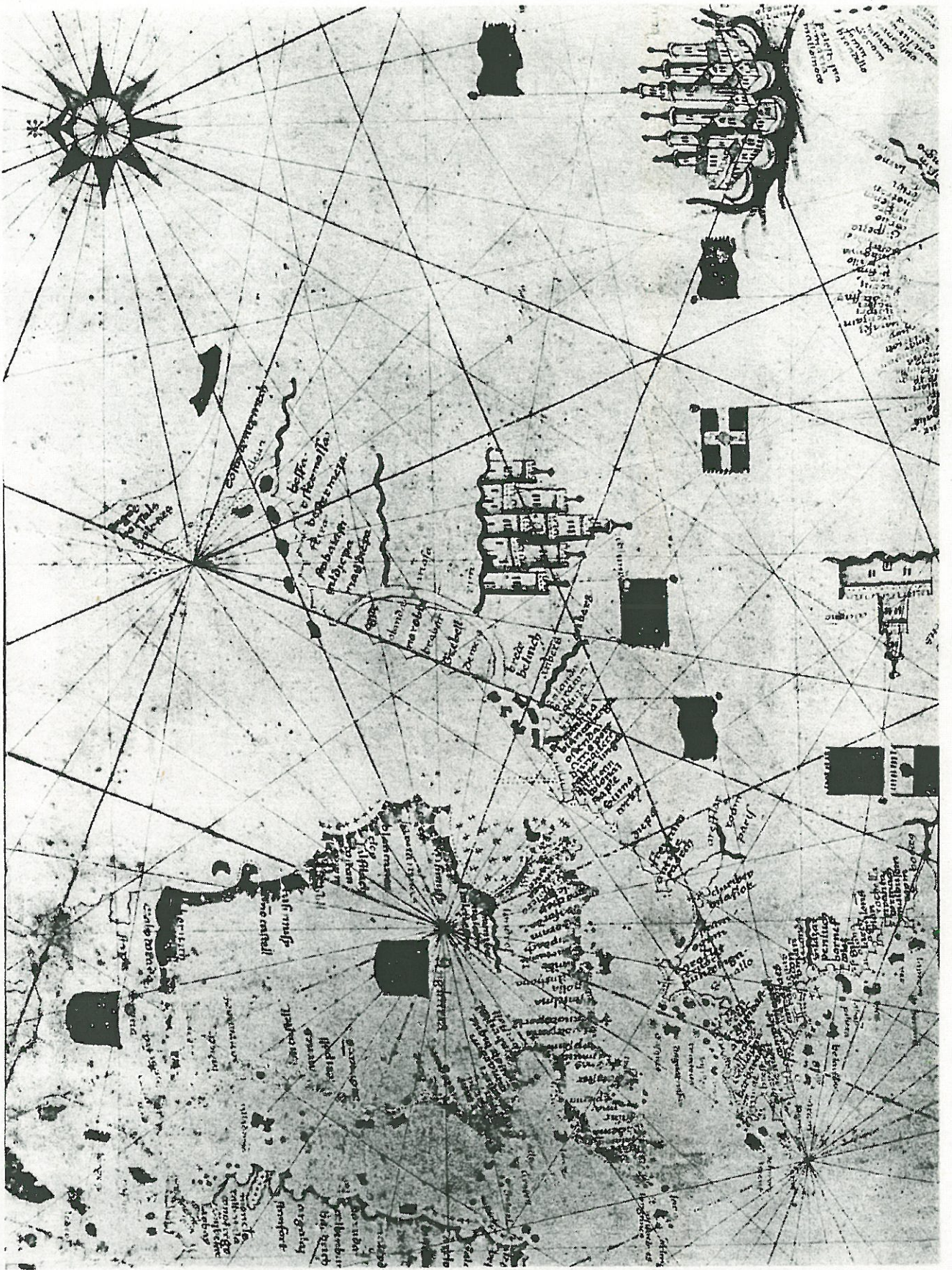


FIG. 4. FRAGMENT OF PETRUS ROSCELLI'S MAP, 1462

(Bibliothèque Nationale, Paris)

## CORRECTION

p. 37, l. 7: "facing p. 29" should be "facing p. 32"

OF OUR COASTS IT ALSO SHOWS ROSCELLI'S STYLE AND IS MORE CLOSELY RELATED TO THE FOREGOING THAN TO THAT OF THE CATALAN MASTER (4) (see map facing p. 29).

A closer examination shows that these four maps make the first known attempts to draw the main direction of the Dutch, German and Danish coasts in conformity with truth. At long last, the coast runs now NNE from Flanders to Marsdiep, the southern outlet of the Zuiderzee into the North Sea, turns here and proceeds eastwards to the mouth of the Elbe from where it continues NNW up the Hanstholm area, Jutland's north-western corner. From there, the coastline follows more or less a NNE direction to Cape Skagen where it finally turns to south-east.

Apart from a few exceptions, such as *scague* (Skagen), *frisla* (Friesland), *eleva* (the Elbe) or *masdiepa* (Marsdiep), the identification of most names, some of which are badly corrupted, presents considerable difficulties (5). It is noted that most of the current names in the South European maps have suddenly been omitted and have been replaced by others (6).

These maps constitute the first successful attempt to create faithful sea charts on the basis of the experience of North European sailors and, by omitting the tangle of place names, and historical or political notes, to stress only those places on the sea charts, which are of significance for navigators, such as landmarks, reefs, mouths of rivers or islands. Indeed, the reading of numerous, otherwise unintelligible, names becomes easier only when old sailing handbooks are used for their identification. Thus *horsals* and *halones* in North Jutland may then be easily identified as Hirtshals and Hanstholm, two important landmarks of the Jutland coast, which has only very few of them; these two landmarks are known even today as direction-finding points (7). Further to the south, we see *costa denermeh* (the Danish coast). At the side of the *eleva*, we find *vessa* (the Weser). Further to the west, there are *ostermossa* (the Osterems) and *vestermexa* (the Westerems) (8). In *frisla*, Friesland, follow *scobalasti*, the Scholbalg (9), *caldiëpa*, the so-called *Keeldeep*, a special fairway of the old Vlie between the Dutch islands Terschelling and Vlie (10) and *masdiepa* (11), Marsdiep, likewise a way to the Zuiderzee. By *egide* we probably must understand Egmond aan zee. In *olanda*, Holland we meet also *norovic*, doubtlessly Noordwijk aan zee, and in the area of *brabat*, Brabant, *grevell*, s'Gravezande (12), as well as *de meza*,

(1) Paris, Bibl. Nat. Res. Ge C. 5090, Cf. A. W. LANG, Die älteste Karte der ostfriesischen Küste, *Ostfreesland-Kalander* 1950, 46 ff. and H. WINTER, Petrus Roselli, *Imago Mundi* IX, Leiden 1952, 1 ff.

(2) London, British Museum, MS. Egerton 73.

(3) *Ibidem*.

(4) CH. DE LA RONCIÈRE, La Carte de Christophe Colombe, Paris 1924.

(5) The solution of the designations *horsals*, *caldiëpa* or *scobalasti* with the aid of the usual means, such as consulting early land maps, is not possible in practice.

(6) Thus, neither Ribe, Wiborg, Utrecht or Harderwijk nor the names of a few important localities or monasteries have been mentioned.

(7) Skagen and Hanstholm are mentioned in the so-called *Seebuch*. K. KOPPMANN, Das Seebuch, Bremen 1876 XII/5. The first printed *leeskaart* to mention Hirtshals is the *Kaert vander zee* (Amsterdam 1532) (Chap. XXXVII, 18 and 19). Edit. JHS. KNUDSEN, København/Den Haag 1914.

(8) Both mouths of the Ems are first mentioned together in 1400 (Hanserezesse T. IV, p. 537-553).

(9) The Scholbalg was an important waterway, situated between the islands of Ameland and Schiermonnikoog, from the Dutch city of Groningen to the sea. It is mentioned for the first time in 1309. By the middle of the 17th century the name is changed to Friesche Gat (Cf. M. P. VAN BUIJTENEN, De Fries-Groningse Grens in Lauwerszee en wadden, Drachten 1954).

(10) The Keydeep, Keldep or Kieldiep, is mentioned for the first time in the *Seebuch* (KOPPMANN *loc. cit.* Chap. XI, 21) also in Hans. Ub. XI, No. 409 (about 1490). By the beginning of the 16th century the name had already disappeared.

(11) The Marsdiep, a connection with the Zuiderzee, south of Texel, appears for the first time in the 8th century under the name of *Marsdiep* (cf. *Nomina Geographica Neerlandica* IV, p. 135).

(12) The towers of Egmond, Noordwijk and s'Gravezandes served as important points de repère for ships as late as the 16th century, as the Dutch dune coast is poor in landmarks. As such they are never omitted in the corresponding contemporary sailing directions.

and date: it was made in 1462 by Petrus Roselli, a hydrographer of Majorca (fig. 4) <sup>(1)</sup>. The next is evidently a copy of Roselli's aforesaid map and practically does not show anything new <sup>(2)</sup>. The third map, entirely following Roselli's style, was probably made during the last decades of the 15th century. It displays several clearly independent features, however; it is fairly badly damaged <sup>(3)</sup>. The same is true of the drawing of a Portuguese world map, made about 1500 which was wrongly attributed to Columbus. In the representation of our coasts it also shows Roselli's style and is more closely related to the foregoing than to that of the Catalan master <sup>(4)</sup> (see map facing p. 29).

A closer examination shows that these four maps make the first known attempts to draw the main direction of the Dutch, German and Danish coasts in conformity with truth. At long last, the coast runs now NNE from Flanders to Marsdiep, the southern outlet of the Zuiderzee into the North Sea, turns here and proceeds eastwards to the mouth of the Elbe from where it continues NNW up the Hanstholm area, Jutland's north-western corner. From there, the coastline follows more or less a NNE direction to Cape Skagen where it finally turns to south-east.

Apart from a few exceptions, such as *scague* (Skagen), *frisla* (Friesland), *eleva* (the Elbe) or *masdiepa* (Marsdiep), the identification of most names, some of which are badly corrupted, presents considerable difficulties <sup>(5)</sup>. It is noted that most of the current names in the South European maps have suddenly been omitted and have been replaced by others <sup>(6)</sup>.

These maps constitute the first successful attempt to create faithful sea charts on the basis of the experience of North European sailors and, by omitting the tangle of place names, and historical or political notes, to stress only those places on the sea charts, which are of significance for navigators, such as landmarks, reefs, mouths of rivers or islands. Indeed, the reading of numerous, otherwise unintelligible, names becomes easier only when old sailing handbooks are used for their identification. Thus *horsals* and *balones* in North Jutland may then be easily identified as Hirtshals and Hanstholm, two important landmarks of the Jutland coast, which has only very few of them; these two landmarks are known even today as direction-finding points <sup>(7)</sup>. Further to the south, we see *costa denermæch* (the Danish coast). At the side of the *eleva*, we find *vessa* (the Weser). Further to the west, there are *ostermossa* (the Osterems) and *vestermeza* (the Westerems) <sup>(8)</sup>. In *frisla*, Friesland, follow *scobalasti*, the Scholbalg <sup>(9)</sup>, *caldiepa*, the so-called *Keeldeep*, a special fairway of the old Vlie between the Dutch islands Terschelling and Vlie <sup>(10)</sup> and *masdiepa* <sup>(11)</sup>, Marsdiep, likewise a way to the Zuiderzee. By *egide* we probably must understand Egmond aan zee. In *olanda*, Holland we meet also *norovlic*, doubtlessly Noordwijk aan zee, and in the area of *brabat*, Brabant, *grevell*, s'Gravezande <sup>(12)</sup>, as well as *de meza*,

<sup>(1)</sup> Paris, Bibl. Nat. Res. Ge C. 5090, Cf. A. W. LANG, Die älteste Karte der ostfriesischen Küste, *Ostfriesland-Kalender* 1950, 46 ff. and H. WINTER, Petrus Roselli, *Imago Mundi* IX, Leiden 1952, 1 ff.

<sup>(2)</sup> London, British Museum, MS. Egerton 73.

<sup>(3)</sup> *Ibidem*.

<sup>(4)</sup> CH. DE LA RONCIÈRE, La Carte de Christophe Colombe, Paris 1924.

<sup>(5)</sup> The solution of the designations *horsals*, *caldiepa* or *scobalasti* with the aid of the usual means, such as consulting early land maps, is not possible in practice.

<sup>(6)</sup> Thus, neither Ribe, Wiborg, Utrecht or Harderwijk nor the names of a few important localities or monasteries have been mentioned.

<sup>(7)</sup> Skagen and Hanstholm are mentioned in the so-called *Seebuch*. K. KOPPMANN, Das Seebuch, Bremen 1876 XII/5. The first printed *leeskaart* to mention Hirtshals is the *Kaert vander zee* (Amsterdam 1532) (Chap. XXXVII, 18 and 19). Edit. JHS. KNUDSEN, København/Den Haag 1914.

<sup>(8)</sup> Both mouths of the Ems are first mentioned together in 1400 (Hanserezesse T. IV, p. 537-553).

<sup>(9)</sup> The Scholbalg was an important waterway, situated between the islands of Ameland and Schiermonnikoog, from the Dutch city of Groningen to the sea. It is mentioned for the first time in 1309. By the middle of the 17th century the name is changed to Friesche Gat (Cf. M. P. VAN BUIJTENEN, De Fries-Groningse Grens in Lauwerszee en wadden, Drachten 1954).

<sup>(10)</sup> The Keydeep, Keldep or Kieldiep, is mentioned for the first time in the *Seebuch* (KOPPMANN *loc.cit.* Chap. XI, 21) also in Hans. Ub. XI, No. 409 (about 1490). By the beginning of the 16th century the name had already disappeared.

<sup>(11)</sup> The Marsdiep, a connection with the Zuiderzee, south of Texel, appears for the first time in the 8th century under the name of *Maresdeop* (cf. *Nomina Geographica Neerlandica* IV, p. 135).

<sup>(12)</sup> The towers of Egmond, Noordwijk and s'Gravezandes served as important points de repère for ships as late as the 16th century, as the Dutch dune coast is poor in landmarks. As such they are never omitted in the corresponding contemporary sailing directions.

the Meuse. In the estuary of the Rhine, the Meuse and the Scheldt, we meet *brede*, unquestionably Brielle <sup>(1)</sup>, *velinck*, Vlissingen (?), *anvers*, Antwerp, and *miravorc*, Middelburg in Zeeland.

The somewhat later maps give additionally *de lauwers*, the Louwers and *bornirif*, Bornruff <sup>(2)</sup>.

The new cartographic representation of Holland is striking. A semi-circular waterway, beginning in the south at Brielle and ending in the area of Marsdiep, separates the province of Holland from the rest of the continent. With this greatly simplified drawing the author marks a seafaring route which actually as early as the 12th century led from the great Zealandic river delta by way of Lek, Yssel and Vecht to the Zuiderzee and further to the North Sea and was of great economic importance for centuries <sup>(3)</sup>. From Marsdiep to the Elbe there are six islands altogether. Although none of them carries a name, it is not difficult to identify them, if we consult earlier sailing handbooks. The westernmost island by Marsdiep was probably meant to be Texel, the next, near to Keeldeep, Terschelling, the third, close to Westerems and Osterems, Borkum. There follow Wangeroog in the area of the Weser and Neuwerk in the Elbe estuary <sup>(4)</sup>. Northwest of the latter we meet Heligoland, an island which, as in 1446 in Bianco, is marked as a safe harbour by a slightly twisted crescent-shaped arc.

There are no further islands on Jutland's west coast. As a matter of fact, these are also absent from the older sailing handbooks <sup>(5)</sup>. In return, the whole coast is marked by a dotted zone along it as a dangerous area of shallows, which should be avoided. In the north of Jutland we find a deep bay, probably meant to be the Limfjord.

The geographical details have been considerably supplemented in several points on the third map. The chain of the Frisian islands from Texel to Wangeroog has here 10 islands—compared with 6 on the first map—including Heligoland. By a carefully drawn and horseshoe-shaped half-circle, closed towards the NW, Heligoland is convincingly marked here as a safe haven. In the west of the southern North Sea coast, the third map reveals a slightly stressed inlet which, as we shall see below, possibly had to indicate a waterway, the Reitdiep, which is shown on a further map.

The search for Roselli's models leads us, in the first place, to the conclusion that we have to seek the creator of this new epochal geographical representation of the coast to the north of Flanders among marine professions, and not among land occupations, such as land cartographers. The legends of the sea chart—both as regards place names and drawing delineation—carefully avoid places in the interior and refer only to geographical factors on the coast and off the coast, such as are almost exclusively of interest to seafarers <sup>(6)</sup>. Statements on the map are thus exclusively within the nautical sphere. A southern European can therefore be excluded as a possible author of the model. Apart from the fact that they very seldom visited the areas described, they could hardly have known the many quite complicated details, for instance, Scholbalg and Keeldeep, the Dutch inland navigation, the Osterems, et cetera.

In the northern part of Roselli's portolan map of 1462 we have rather a cartographical reflection of lost nautical aids, created presumably by Dutch and Hanseatic sailors, whose traces have thus been preserved.

Whether there were only sailing directions or whether Roselli disposed of a kind of sea chart of North European origin, cannot be said with certainty. At any rate it is important to know that, if necessary, it would

<sup>(1)</sup> Brielle played a role as an important port as early as the 13th century, and as early as 1280 two light-fires were maintained there (cf. v. d. BERGH, *Oorkondenboek van Holland en Zeeland II*, No. 408).

<sup>(2)</sup> The Lauwerszee, situated between the Dutch islands of Schiermonnikoog and Rottum, was known under this name as early as the beginning of the 9th century (v. d. BERGH, *Handboek der Middelnederl. Geographie*, Den Haag 1949, p. 19). It was a fareway between the Hanseatic town of Groningen and the North Sea. The Bornrif is a shallow feared by the sailors since old times, in the area of Terschelling. The sea book mentions it repeatedly. (KOPPMANN, *loc.cit.* Chapt. XL, 14 and 18).

<sup>(3)</sup> W. VOGEL, *Binnenschiffahrt loc.cit.* 13 ff., *ibidem*, a survey map.

<sup>(4)</sup> At the outset probably only an island was shown on the map that was important for approaching the waterways leading inland, such as Zuiderzee, the Ems, Weser and Elbe.

<sup>(5)</sup> Cf. *Kaert vander zee* (1532). The *Seebuch* mentions only Amrum. Even in his *Caerte van oostlant* (1543) Anthonisz gives the Jutland island an entirely undetermined form. The shipping lane led at a considerable distance from the west coast and practically outside sighting distance from the island of Jutland, proceeding north (cf. A. W. LANG, Cornelis Anthonisz, *Neues Archiv für Niedersachsen*, Jahrg. 1953, Heft 5/6, p. 226, fn. 30).

<sup>(6)</sup> Even the earlier references to important trade ports are lacking and Roselli has also omitted names connected with politics, economy and culture, in contrast to the earlier richness of the South European portolan charts.

be possible to reconstruct a geographical map like that of Roselli exclusively on the basis of a few extant earlier sailing directions. The main directions of the coast line in individual sectors, partly also their length, and other details were marked in the sailing directions. Even the geographical position of Heligoland has been clearly preserved in those documents. Nevertheless it seems more probable that the Hanseatic and Dutch sea traders were using a chart made as early as the middle of the 15th century, as charts printed in Antwerp or Flanders (4) can be assumed "with more or less certainty" around the middle of the 15th century. Likewise the circumstance that all four charts under discussion have elements of forms which have not been mentioned

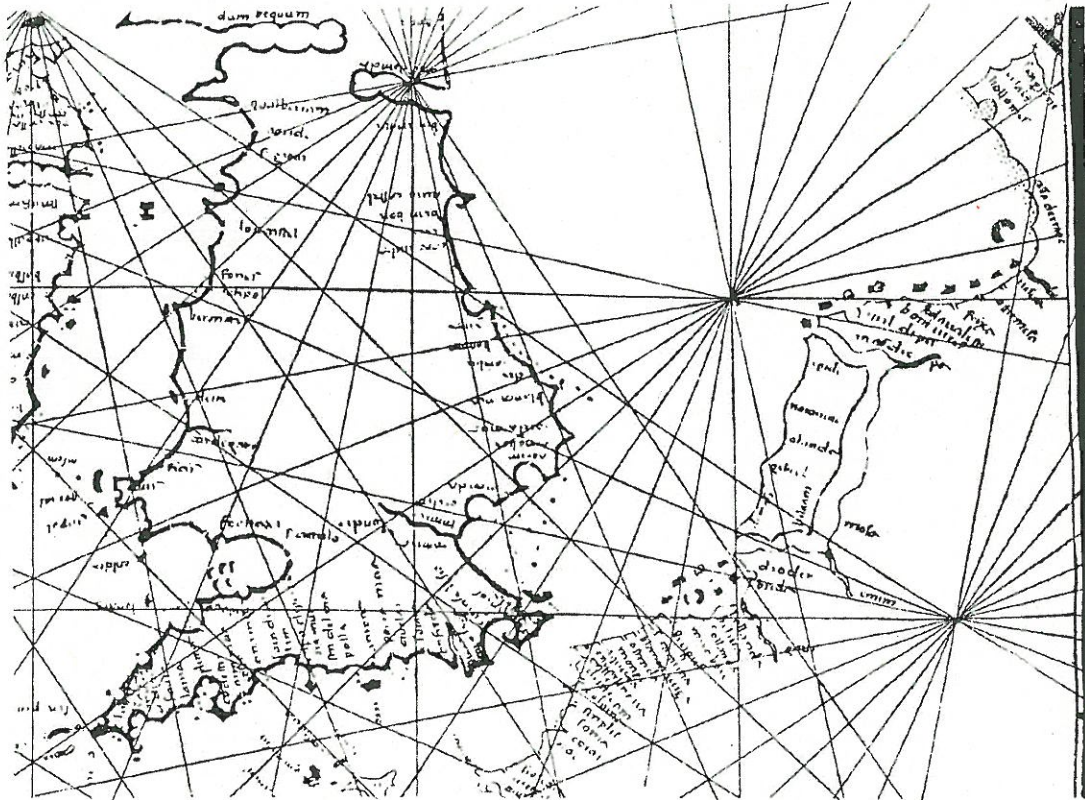


Fig. 5. The earliest known representation of the entire Frisian chain of islands (Portolan chart of late XVth century. Author unknown. Fragment).

in any of the known sailing directions speaks for the existence of North European sea charts. The unmistakable bending of the West East Frisian coast and the ingenious marking of the dangerous West Jutland coast, or the cartographic representation of Reithiep and Limfjord are among those elements.

If Roselli can be assumed to have had before him a North European sea chart, it is likely that it was only a rough outline sketch. This seems to be indicated by the scarcity of names on the coast north of Flanders, which contrasts with their richness on the French and Flemish coast and which certainly was not caused by lack of space. The drawing of the coast line as a succession of slight arcs in no way contradicts the possible existence of a North European sea chart. This is a South European element of form, which was invariably used by Italian and Catalan hydrographers.

In view of the insufficient evidence, it is also difficult to answer the question as to the contents of the original model. It seems clear that it was made by well-informed native specialists, as on the 3 or 4 charts all essential points of our coast have been mentioned, and hardly any important landmark or bay has been omitted. This

(4) J. DENUÉ, *De Geschiedenis van de vlaamsche kaartsnijkunst*, Antwerpen 1941, 5.

makes it possible to conclude that about 1460 North European sailing directions or sea charts showed a fairly high degree of knowledge which could not have been acquired lately, but had been accumulated during the preceding decades; this brings us closer to the time of Valsecha and Bianco and possibly even further back—to the turn of the 14th and 15th century.

This clearly proves that not later than by the middle of the 15th century—probably a few decades earlier—the mediaeval rigid pattern of the cartographic representation of the continental coast north of Flanders up to Skagen was beginning to be finally overcome, no matter whether it displayed the views of the mediaeval-clerical cartography, the South European sea charts, or maps of the Ptolemaic type (1).

#### B. *The Seebuch*

North European sea charts prior to 1526 have not come down to us. All the greater, therefore, is the value of the oldest North European sailing handbook, a collection of sailing directions for the Baltic and North Seas and coastal waters of England, France and the Iberian Peninsula. It came into being probably in Flanders and was repeatedly revised and expanded under Hanseatic influence. The so-called *Seebuch* was composed of several parts of various age, and some of its parts reached back as far as the 14th century. Hitherto three MSS.—partly incomplete—of almost identical text have been found (2). The age of the sections dealing with the coast from Flanders to Northern Jutland is the subject of different opinions (3). Presumably they date from the last decades of the 15th century, although it is in no wise excluded that some texts belong to the first part of the 15th century.

The *Seebuch* is a description of the coast, whose earlier models—either in the form of similar texts or of sea-charts drawn according to them—possibly served Roselli as a source when he made his chart of 1462, so important for the development of the cartography of Northern Europe. This is shown by a comparison of the contents of these two nautical aids. The descriptions in the *Seebuch* largely tally with those in Roselli's chart so closely that the *Seebuch* provides us with the most important clue to the correct interpretation of several features of the chart, which otherwise would remain unexplained.

It is true that some points in the chart are not mentioned in the *Seebuch*. Thus references to Hirtshals and Scholbalg and those to Egmond, Noordwijk and s'Gravezande are lacking. On the other hand, the text describes the Jutland west coast with strikingly great detail, while Roselli has practically no information on it. Such discrepancies are quite understandable now that Knudsen (4) has taught us that originally the sailing hand books used to come into being as unsorted and haphazard collections of loose slips of paper with written texts of different origin which were then mechanically copied and multiplied.

The differences between the chart and the "sea book" make it seem probable that various hydrographical models must have been in circulation, as the chart lists as early as 1462 the places mentioned above, while the "sea book" which was written in its extant form a few decades later does not know of them.

It is of the utmost importance that in the "sea book", and especially in its earlier models, we have the spiritual basis for the new epoch-making cartographic configuration of the continental North Sea coast north of Flanders. The main direction of each individual sector of the coast is shown approximately corresponding to the true conditions. Thus it is said that the Dutch coast runs (from Flanders) towards NNE, the Frisian coast ENE, the Jutland coast NNW and the coast from Hanstholm to Skagen in the ENE direction (5).

(1) It is true that it took several generations before the new style secured recognition in the official cartography. Even Roselli returned in his later charts—those made after 1462—to the style of the mediaeval portolans, drawing the coast from Flanders direct northwards, and thus rejected the newly acquired knowledge. Possibly he did not rely on his North European sources or else—which is as probable—the new style which broke with the old conventions did not appeal to his customers. The fact that subsequently the new knowledge was upheld and the new type of map was perfected is proved by the third map which dates from the last decades of the 15th century.

(2) Cf. KOPPMANN *loc. cit.* MS. A and B as well as G. SCHMIDT, *Fragment des Seebuches*, *Jahrb. Ver. f. niederdeutsche Sprachforschung*, Jahrgang 1876, Bremen, p. 80 ff.

(3) KOPPMANN *loc. cit.* p. XII dates the *Seebuch* to the second half of the 15th century, while KNUDSEN (*Kaert vander zee*, *loc. cit.* p. XII), believes that the manuscripts "are at least half a century more recent" and originated in the 4th decade of the 16th century. The latter opinion is contradicted by several circumstances, such as the use of the old name of *Wernerooge* for the island of Schiermonnikoog or reference to the Keydeep which no longer existed in 1532.

(4) *De kaart vander zee*, *loc. cit.* p. IX f.

(5) KOPPMANN, *Seebuch*, *loc. cit.* Chapt. XI, 13, 14, 32, XII, 5.

This means that the serious mistakes of the earlier cartographic conception had been rectified and conditions were created for the development of maps which totally differed from the traditional forms and were close to truth (fig. 6). It was not famous scholars who introduced innovations in all important points of representation of our coasts; this very thorough change in the development of North European cartography was in the last analysis based on the knowledge acquired by experience by simple unknown North European sailors. They were those who had a vital interest in a description of the coast, giving the right geographical representation, as only too often the fate of boat, cargo and life depended on such a description. Their descriptions, which at the outset were transmitted orally and later in written form, supplied the first basis for the new type of map probably as early as the first half of the 15th century.

### C. Behaim and Etzlaub

A certain further development of the new type of map, first given by Roselli, is shown already by Map 3. How the new knowledge was further developed after Roselli is indicated by maps of a type which presumably first appeared during the 3rd quarter of the 15th century, that is, approximately at probably the same time as Map 3 was made.

Also as regards maps of this type, we do not dispose of original sheets. It has come down to us by way of two mutually related representations, Martin Behaim's famous globe (fig. 7), and two pilgrim maps by Etzlaub, almost as well known, the *Romweg* and the *Lantstrassen* map of 1500 and 1501 respectively. Both used—as we shall see—the same source as regards the representation of the coast north of Flanders, as they show striking similarity in this respect. We know what served as a model for the globe "the earth apple", while we can only make assumptions with respect to Etzlaub's map. As indicated by an inscription on the globe, it was made in 1492<sup>(1)</sup>. The outlines of the continents were made on the pattern of a printed world map which Behaim had<sup>(2)</sup>. It was an uncoloured "gedruckte mapa mundi, da die gantze welt ins wegriffen ist, die da wol dint zum apffel und in die Kantzley gebenet wirrt" (= printed world map which comprises the whole world).

We have no other information on this office map which was multiplied by printing, was lost long ago, and doubtlessly was of considerable size. It is very likely that Behaim who had contact with Flanders from 1475-76, either direct or through his family, and had even spent several years in Antwerp, some time before 1492 bought the wall map in Antwerp and brought it to Nuremberg; he was also later very interested in cartography. Thus he presented to the Portuguese King Manuel a sea chart, which the latter used as a wall map. As we have already seen, woodcut and printed maps were presumably made in Antwerp as early as the middle of the 15th century, while as regards the Iberian Peninsula we have so far no information of similar printed maps of that early period. Geographical considerations alone lead us to assume that the Flemish model of the Nuremberg *Erdapfel* might have had the characteristic representation of the coast from Flanders to the

Item van Bovenberga to der elbe strectet  
 dat lant noot noot west vñ siit sitost  
 vnde der maket vil see in alle hanc  
 sielen in noorden vñ also dat id up de  
 elbe of.  
 Item de kost van vreslande strectet oft  
 noot oft vñ west sudwest bet to bor-  
 ne viff  
 Item biden wanger-oe vñ biden der  
 wanger der maket sul se sit sitost  
 mane  
 Item biden der oster enise vñ der wester  
 enise vñ der lantwerb der maket vil  
 see en sitosten mane  
 Item also gy wilt in segeley in de  
 lantwerb so seic gy dat sten hnd up  
 wanger vñ dat waer up werner  
 oge oner en bringen so lopet in de  
 vorre up in vanden vñ lopet by der  
 vorre in  
 Item also gy wilt in segeley de vorre  
 so seic gy ij torne myddes lantwerb  
 bringen van der stalluga oner vnde  
 lopet dñe in de vorre up in vanden

Fig. 6. Description of the right-hand corner of the German Bay in the so-called "Seebuch" (late half of XVth century). "From Bovenberg to the Elbe the coast stretches in the direction NNW, SSE respectively. The Frisian coast up to Bornrif takes the direction ENE, WSW respectively".

<sup>(1)</sup> O. MURIS, *Der Erdapfel von M. Behaim, Ibero-Amerikanisches Archiv* XVII, 1943/44 p. 50.

<sup>(2)</sup> E. G. RAVENSTEIN, *Martin Behaim, His Life and his Globe*, London 1908, p. 58 and 112

Elbe, revealing an intimate knowledge of the location, which we meet today only in the two cartographic products of Nuremberg, the *Erdapfel* and the *Romweg* map (1).

The authors of these two productions, Behaim and Etzlaub, collaborated closely with the artist Georg Glockendon, the earliest known "illuminist" of Nuremberg (2). As was expressly stressed, Glockendon, working for 15 weeks, transferred the wall map to the globe for Behaim. He also took care of the printing of several of Etzlaub's land maps, such as those of 1492 or the *Lautstrassen* map of 1501 (3). It may also be assumed that he also printed the *Romweg* map, which appeared a year earlier and which was undated and unsigned. This would explain why these two old works show such similarity in the drawing of the continental North Sea coast, while otherwise they are so different.

The style of the common model—which possibly came into being in Flanders during the last quarter of the 15th century—seems to have been followed more closely by the *Romweg* map which, for instance, gives a much finer drawing of our coasts than the globe (4). The two have common loans from Ptolemy (5) which

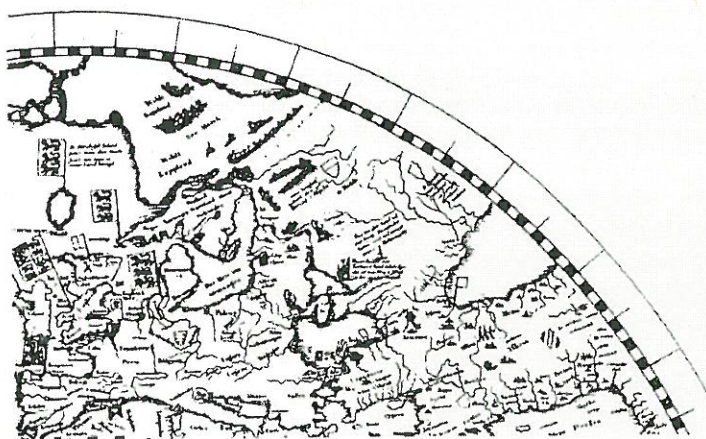


Fig. 7. Outline of the North Sea coast from Flanders to the point of Jutland [on Martin Behaim's globe of 1482 (Fragment after Jomard)]. The outline of the coast shows much resemblance to that in Etzlaub's "Romweg" map of 1500.

southern North Sea coast. Apart from the somewhat confused representation of the area of the Rhine estuary and northern Holland—presumably as a result of some inadvertence by the author—which is substantially improved in the globe and Etzlaub's *Lautstrassen* map of 1501, the drawing of the coast from the Zuiderzee to the Elbe has a striking number of well observed details. The Dutch and German coastal areas between the Zuiderzee and Hamburg correspond approximately to reality as regards their geographical shape in the *Romweg* map of 1500. The vital artery of the city of Groningen, the Reitdiep, as a fairway leading to the sea, is worked out with admirable clarity. The same is true of the wide estuary of the Ems and the deep bay of Jadebusens, and the funnel-shaped mouth of the Weser. Etzlaub has clearly emphasized sea ports

are seen in the area of the Elbe mouth and even more so north of Dithmarschen (6), where Etzlaub shows the curious "tres insulae saxonum" of the great Alexandrine, and both the globe and the map make the Jutland peninsula recede NE as in their classical model (fig. 8).

Apart from this, both representations give a coastal configuration from Flanders to the Elbe, which not only is entirely free from the classical conception, but also considerably improves the drawing first introduced by Roselli and comes much closer to the true geographical situation. This applies especially to the square angle of the German bay, drawn with convincing clarity as far as Dithmarschen, and also especially in the drawing of the

(1) Cf. F. W. GHILLANY, *Geschichte des Seefahrers Ritter Martin Behaim*, Nürnberg 1853, especially p. 34, 36, 74 and 76. Behaim claimed to be the disciple of the famous astronomer and mathematician Regiomontanus.

(2) G. KRÜGER, *Das Heilige Jahr 1500 und Ehrhardt Etzlaubs Romwegkarte*, *Erkunde*, Band 4, Bonn 1950, p. 1 and his: *Ehrhardt Etzlaubs Romweg-Map and its dating in the Holy Year of 1500*, *Imago Mundi* VIII, Leiden, 1951, p. 17 ff.

(3) G. KRÜGER, *Ehrhardt Etzlaubs Romweg-Map* *loc.cit.* 17 and 18.

(4) The coastal configuration of Etzlaub's map of 1501 *Das seyn dy lautstrassen* rejects the Zuiderzee entirely in accordance with Ptolemy. Cf. A. HERRMANN, *Die ältesten Karten von Deutschland*, Leipzig 1914.

(5) Dithmarschen is corrupted to *Chytumer* in Etzlaub's *Romweg* map.

(6) Ptolemaic influence can be shown in several places in Behaim's globe, among other things in the shaping of Scotland. Cf. MURIS, *loc.cit.* p. 55.



and other important localities engaged in navigation, such as Middelburg, Dordrecht, Brielle, Alkmaar, Groningen, Emden, Stade and Hamburg.

The abandonment of the then prevailing cartographic views of Ptolemy, the careful consideration given



Fig. 8. Erhard Etzlaub's "Romweg" map of 1500 (Fragment). The configuration of the southern coast of the North Sea is surprisingly correct. Representation of Jutland in Ptolemaic style.

to the Groningen fairway, a comparatively unimportant feature, the strikingly great stress on the coastal indentations and finally the island of Terschelling (*berselnigen*) which is expressly emphasized in Etzlaub's *Lantstrassen* map (1501), all permit of the conclusion that our coastal section was originally shaped on the

basis of a model used by mariners. Another point in support of this opinion is the fact that the *Romweg* map (1500) emphasized the coastal areas of the Netherlands and of northern Germany up to the Elbe at the expense of adjacent inland districts. This is a cartographic method which we meet again in a striking similarity on the sea charts of Jan van Hoirne (1526) and Cornelis Anthonisz (1543) <sup>(1)</sup>. This would indicate that Martin Behaim's lost wall map which in all probability was made in Flanders is based, as regards the representation of the coastal areas between Flanders and the Elbe, on North European sea charts which might be assumed to have been made approximately during the last quarter of the 15th century and possibly even earlier.

It is possible that the models of the "office" map already showed those details which are seen on the somewhat later sea chart of Juan de la Cosa, the famous pilot of Columbus (1500) <sup>(2)</sup>. We refer to two marked reefs extending far westwards, between which lies the Heligoland bay drawn truthfully on the whole. The more northerly of the two is probably the Hornsriff, and the westernmost the Bornriff, both dangerous sand banks which are already mentioned in the *Seebuch*. Whether the aforesaid models are similar to the earliest known North European sea charts of the end of the 15th century cannot be said, as there are no opportunities of comparison <sup>(3)</sup>.

#### NORTH EUROPEAN MARINERS, CREATING A NEW TYPE OF MAP

While the southern Europeans, with a few exceptions, continued to cling to their cartographic beliefs which matured around 1350, while in the educated circles of the Occident the rediscovery of Ptolemy was a sensational event and the enthusiastic Renaissance for a whole century believed it had found in his *Geographia* the true picture of the world, seamen in Northern Europe, by unostentatious work, created the foundations for a new cartographic picture of the continental North Sea coast, which was far superior to that held by the scholars and the Southern European hydrographers. Not later than the middle of the 15th century, the progress in knowledge of the true facts about the continental North Sea coast passes from the Italians and the Catalans and also from the humanists and prominent scholars to simple, scarcely educated North European mariners. By and by they put down in writing the experience of their daily nautical trade, which had been gathered for many generations and originally transmitted mostly by word of mouth in their professional organization, the guilds of the long-range sailors. On the basis of their knowledge they created the first true sailing directions which in turn led to the first sea charts of our coast. Their origin is obscure and no originals of both types have come down to us. Still, a few phases of the development of those early North European nautical aids can be more or less satisfactorily traced with the aid of a few extant contemporary nautical and cartographic representations from Southern Europe and Nuremberg. We refer to the South European portolan charts of Valsecha, Bianco and Roselli and their followers, the first Flemish-Hanseatic sea book, the earliest globe, two old Central European pilgrim maps and finally the map of Juan de la Cosa <sup>(4)</sup>. They all show that since the first half of the 15th century the initiative in the further development of the cartography of our coasts passed to North European mariners. This decisive phase of development of the Northern European hydrography and cartography reached its climax with the "Carte van der Oosterscher zee" by Jan van Hoirne (1596) and the "Caerte van oostlant" (1543) by Cornelis Anthonisz and in the first printed detailed sailing directions of 1532 and 1540-41. With their appearance, the scholars commenced to adopt the delineation of the continental coasts from Flanders to Cape Skagen, which for about 100 years had been officially known among sea-going people.

<sup>(1)</sup> For reproduction see A. W. LANG, *loc.cit.*, Plates 3 and 4; B. van't Hoff and L. J. NOORDHOFF, Een kaart van de Nederlanden en de "Oosterscherzee" . . . *Het Boek*, XXXI, Den Haag, Table; *Imago Mundi* XI, p. 136.

<sup>(2)</sup> Cf. reproduction C. O. PAULLIN, *Atlas of the Historical Geography of the United States of America*, New York 1932, Table 10.

<sup>(3)</sup> J. KEUNING, XVIth Century Cartography in the Netherlands, *Imago Mundi* IX, Leiden, p. 37.

<sup>(4)</sup> It is in no wise impossible that in addition to these sources others will be found in some outlying places.