jections, apparently identical, but yet from a mathematical point of view very different, which have here been associated under No. 12 (Bordone's oval projection), and also to Ptolemy's tangent, and Ruysch's intersecting conical projections, and to the remarkable pseudo-conical or pseudo-Werner projection adopted by Mercator for his map of Europe. On the other hand it would, perhaps, be most correct, with d'Avezac, to unite the homeoter projection of Ptolemy with that of Stobnicza, and to enter the cordiform projections (Nos. 9, 10, and 11) under a common number. This uncertainty arises from the difficulties connected with a strict limitation of the different kinds of early maps. It is an exception to find a mathematical description given of the net of graduation which has been employed, and the maps, especially when reproduced in wood-cut, are often of such inferior execution, that it is difficult to decide, even by careful measurements, what may have been the leading principles for the drawing. I hope, however, that the enumeration given above and illustrated by numerous facsimiles, will be sufficient for a general review of the early history of map-projections.

We learn from it that this chapter of mathematical geography had, at the end of the 16th century, already reached a very high development. It is true that no clear insight into the properties, advantages, and defects of the different projections had yet been obtained, nor was such knowledge then possible, owing to the deficiencies in mathematical resources. So that there could not be a critical inquiry into the conditions which it was possible to satisfy, in representing the spherical surface of the earth on a plane. But several of the most valuable methods of projection, for instance that of the development on an intersecting cone, the stereographic, the isogone-cylindrical, and the equidistant polar-projections, were then in use. Nor can it be said that any radical reform in cartography has been introduced owing to the complete mathematical analysis of the problem, on which the works of the modern cartographers can be based.

The merit of so early a development of the doctrine of projections must, in the first place, be ascribed to Ptolemy. It is true that he was unable to solve those analytical problems on which an exact theory of map-projections must be based. They were then insoluble, and are very difficult even in our days. Nevertheless he clearly understood the truth that the surface of a sphere cannot be exactly developed on a plane, and that consequently the problem must be solved by an approximation, for which he proposed not less than four different methods, two of them being practically applied by himself. At least two of these had already been employed or proposed by his predecessors, Hipparchus and Marinus. This important chapter of mathematical geography was further developed by Arabian writers, by Bacon and Nicolaus Germanus, by the authors of the maps in the Ptolemy edition Bononiæ 1462, by Ruysch, Bernardus Sylvanus, Bordone, Johannes Werner, Petrus Apianus, Glareanus, Orontius Finæus, Postel, and Mercator.

IX.

The end of the early period of cartography.

1520—1550.

Most of the printed maps, during these decennia, were still published as addenda to new editions of Ptolemy's geography. In eleven editions of this work, from 1520 to 1550, which were provided with maps, two hundred and sixty nine of the old maps and two hundred and forty four *tabulæ novæ* were printed, most of them in double folios, while the rest of the map-printing of the same period — if reprints in Münster's cosmography and the small wood-cuts in the works of Bordone and Apianus, are excepted — scarcely amount to one hundred. Thus the cartographical literature of these decennia is still very poor as well as regards its extent as with reference to the composition and execution. Yet the dawn of a new period might even then be discerned, partly from the appearance of new maps, founded on actual topographical investigations, in increasing numbers, partly from the attempts to employ improved methods of projection.

In another respect this period forms an epoch in the development of cartography. A couple of rough wood-cut maps had already been published at Lubeck in 1475, and two highly meritorious editions of Ptolemy, provided with large wood-cut maps, had been published at Ulm in 1482 and 1486, to which may be added some few other more or less important separate maps printed in Germany in the 15th or the first years of the 16th century. With these exceptions, almost all geographical maps had, until 1513, i. e. until the year when the large Strassburg edition of Ptolemy provided with 20 new maps was published, been printed in Italy, although often with the assistance of map-drawers and map-engravers from Gutenberg's fatherland. But from that year the principal seat of the industry of map-printing was transferred to the countries to the north of the Alps, although at first only for a short time. While only a few maps, generally of slight importance, were printed in Italy from 1513 to 1547, by far the greatest part of such works of the next period, 1548—1570, are of Italian origin. From 1570, i. e. from the year when the first edition of *Theatrum Orbis Terrarum* by Ortelius was published, the Netherlands became for a long time the principal seat of map-printing.

The first transfer of this industry to the countries north of the Alps was evidently effected at the expense of the finish of the execution. In this respect the maps of Mercator and Ortelius are the first that can be compared with the old copper-engraved maps from Rome and Venice. Hence the German maps were at first almost exclusively reproduced in a manner little adapted for large cartographical

works, namely in wood-cut, whereas for the same purpose copper-print was almost exclusively used in Italy.[1]

The first half of the 16th century is thus characterized by an apparent retrogression in the cartographical art. But if the maps of this period are more closely examined, real progress will nevertheless be discovered under an almost grotesque exterior. This arises from the early attempts of the German, Dutch, and French geographers to emancipate themselves from the classical authors formerly so anxiously followed, and to base their maps, as well of the ancient hemisphere as of the New World, on modern geographical data. The difficulties encountered by geographers, partly due to the slowness with which the accounts of the exploring expeditions to the New World and to the eastern Asiatic Archipelago reached Europe, and partly from want of reliable data for longitudes and latitudes, will be conceived, if the maps enumerated on the list below is examined and compared with the contemporary history of geographical discoveries.

62. Tabula moderna Indiæ Orientalis, from Ptolem. Argent. 1522. (Orig. size 436 × 281 m. m.).

Maps printed from 1520—1550.

1. *Tipus orbis universalis iuxta Ptolomei Cosmographi traditionem et Americi Vespucii Aliorumque lustrationes a Petro Apiano Leysnico elucubratus. An. Do. MDXX.* (N. T. XXXVIII). This map had probably been originally printed separately in Vienna, though it was afterwards inserted in:

Ioannis Camertis Minoritani, Artium et sacrae theologiae doctoris, in C. Iulii Solini πολυίστωρα enarrationes. . . . MDXX. Viennae Austriae, per Ioannem Singrenium; and in:

Pomponii Melae de Orbis Situ Libri Tres . . . . una cum commentariis Ioachimi Vadiani . . . Adiecta sunt praeterea loca aliquot ex Vadiani commentariis summatim repetita, et obiter explicata, in quibus aestimandis censendisque doctissimo viro Ioanni Camerti . . cum Ioachimo Vadiano, non admodum conuenit. Rursum, epistola Vadiani, ab eo pene adulescente ad Rudolphum Agricolam iuniorem scripta . . . Basileæ Apud Andream Cratandrum Anno MDXXII.

These two works, printed in different towns and in different years, are often bound in one volume, to which even the map of Apianus is added, but without being mentioned in the prefaces, in the numerous dedicatorial poems, or in the detailed commentaries, by which the works of Solinus and Mela are explained. The same monogram by *Lucas Alantse civis et bibliopola Viennensis*, however, ornaments the left corner at the foot of the map, the title-page, and the colophon in Solinus. The map is a wood-cut, badly drawn and badly engraved. It appears to be based on the same sources as Schöner's globe of 1515 (fig. 46 and 47), and the globe of which I found the printed gores in a Ptolemy of 1525 (comp. p. 76). What renders this map remarkable

[1] From the forty years between the publication of Ruysch's map of the world and Gastaldi's maps in Ptolemæus Venetiis 1548 I know only the following copper-printed maps:
1514: Mappemonde in gores by Boulanger d'Albi (N. T. XXXVII).
1538: Map of the world by Mercator (N. T. XLIII).
1537—41: Mercator's maps of Palestine, and Flanders, and his large mappemonde in gores.
To these some of Gastaldi's first works may be added, which I have not seen. The art of reproducing maps by means of copper-print was thus almost forgotten, when Mercator and Gastaldi began to publish their works.

from a cartographical point of view, and causes it to be much sought after by collectors, is its peculiar projection and the inscription, *America prouincia*, on the South American continent.

If various interruptions in the continuity of the meridian lines may be considered to have originated from the wood-cutter's want of skill, the whole globe, excepting the region in the vicinity of the South Pole, is here for the first time drawn on Ptolemy's homeoter projection. As to the inscription, the opinion long prevailed that this map must be the first published in print, on which the New World was designated by the name of *America*, a circumstance which caused it to be often reproduced,[1] much sought after by collectors of early books on America, and an object of careful bibliographical research. At least three globe-prints with the name of America are at present known, older than this map of Apianus, namely:

1. The copper-printed map in gores for Boulanger's globe of 1514 (N. T. XXXVII);

2. The wood-cut map in gores, reproduced in fac-simile on pl. XXXVII; and

3. Schöner's wood-cut and similarly printed globe of 1515 (N. fig. 46 and 47).

The name was used in a printed book a few years earlier, viz.

1. *Deodate 1507.* (Hylacomylus or Waldseemüller) *Cosmographiæ introductio, cum quibusdam geometriæ ac astronomiæ principiis ad eam rem necessariis. Insuper quatuor Americi Vespucii navigationes.* Fol. 15 verso is written: *Nunc vero et hae partes sunt latius lustratae, et alia quarta pars per Americum Vesputium... inventa est, quam non video cur quis jure vetet ab Americo inventore sagacis ingenii viro Amerigen quasi Americi terram, sive Americam dicendam: cum et Europa et Asia a mulieribus sua sortita sint nomina.* (Harrisse, *Bibl. Americ. Vetust.*, p. 94).

2. *Argentinæ 1509.* (Anon.) *Globus Mundi Declaratio etc.* (Harrisse, cit. work, p. 117). Even in this brochure it is occasionally spoken of: *Ipsa America Noviter reperta, quarta orbis pars.*

For a minute bibliographical description of these, in some respects, very remarkable brochures, I may refer to the above mentioned works of d'Avezac and Harrisse. According to d'Avezac six editions were published of Waldseemüller's *Cosmographiæ Introductio*: four in 1507 at Saint-Dié, one at Strassburg in 1509, and one, without date and place of printing, at Lyons. This work should not be confounded with: *Cosmographiæ introductio, cum quibusdam Geometriæ ac Astronomiæ principiis ad eam rem necessariis*, of which the first edition was printed in Ingolstadt 1529, and of which Petrus Apianus is regarded as the author. Several later editions are known.

3. *Cracoviæ 1512.* Stobnicza, *Introductio in Ptholomei Cosmographiam.* Tab. VII verso, is written: *Non solum prædicte tres partes nunc sunt lacius lustrate verum et alia quarta pars ab Americo vesputio sagacis ingenii viro, inventa est, quam ab ipso Americo eius inventore amerigem quasi a americi terram sive americam appellari volunt*, and in the margin: *Quarta pars Orbis America.* In some foreign libraries I have seen a variety of this edition of which the colophon does not contain the year of printing. It was probably printed before 1512.

4. *Nurembergæ 1512. Aristotelis Meteorologia* (comp. p. 40).

That the name »America» was already generally adopted in 1512, may be seen by *Ioachimi Vadiani Helvetii poetæ laureati ad Rudolphum Agricolam Rhetum epistola*, dated *Viennæ Austriæ 1512*, but published in print a few years later. »America» is here used as the name of the New World without any further explanation. In an edition of Ptolemy, this name was used for the first time in 1522 on the map of Laurentius Frisius, reproduced on pl. XXXIX.

2. *Ptolemaeus Argentorati 1520.* All the maps of this edition, with the exception of *Tabula Nova Eremi Helvetiorum*, are reprints from the blocks used for the maps in the edition of 1513.

3. Schöner's globe of 1523 (comp. p. 80). Schöner's large globe of 1520 was drawn by hand; his globe of 1523 appears to have been printed in gores.

4. A map of the world in: (Antoine de La Salle) *La salade nouvellement imprimee* etc.... (Colophon:) *Imprime en la Rue sainct iacques a lenseigne de la Rose blanche Et fut acheue le dixhuytiesme iour de januier.* s. l. et a. (Paris 1522 accord. to Brunet). Fig. 18 is a reproduction of this map from the original edition in the Royal Library at Stockholm. The map, which was already antiquated when published in print, is evidently a copy from an original of the 15th century. La Salle was born in about 1398 and died after 1461. His *La Salade* was written in about 1440. Considering the time at which it was written, it contains (on fol. 49 edit. 1522) some very remarkable notices about *Greenland*, *Iceland*, and *Mare congelatum*. A comparison of the fac-simile published by Santarem with the map in the edition of 1522,[2] shows some discrepancies. Thus the lands *(frise, insequi* and *nasque?)* in the southern hemisphere on Santarem's copy are omitted on the original map, whereas an inscription, *mina mons*, on the mountains in the equatorial part of western Africa is found on the copy of 1522, but not on the reproduction of Santarem. Perhaps the original followed by Santarem belonged to the edition of 1527. If the map, as seems probable, had been constructed before the middle of the 15th century, it is of no slight interest, from the connection of the Indian and Atlantic oceans, and from the peninsular form of Africa here (if we except the maps of the Macrobius type) for the first time adopted.

Among the legends, the name *Patalie regio*, by which the continuation of Asia occupying the south-eastern corner of the map has been designated, may be mentioned. The name is found in Pliny (*Historiæ Mundi* Lib. II. cap. 73 and Lib. VI cap. 20 and 21). In Roger Bacon's *Opus Majus* (Londoni 1723, p. 192; the passage is copied by d'Ailly in the 2d chap. of *Ymago Mundi*) this region is described in the following remarkable words: *Sed, quod plus est, invenimus per eum* (Plinium) *habitationem fieri sub tropico Capricorni ultra. Nam regio Pathalis in India dicitur habens portum, ut dicit, celeberrimum, ubi umbræ solum in meridie cadunt; ergo habitatores ejus habent semper solem ad Aquilonem.*

Accordingly, Pliny and Bacon place *Regio Patalis in India*, with its celebrated harbour, to the south of the southern tropic. The only land found here, and to which *in India* would be applicable, is Australia. It is also in this part of the globe that the *Patalie regio* is placed on La Salle's map On Behaim's globe (Ghillany's reproduction), a part of the East Indian peninsula is designated by that name.

5. The maps in Ptolemy's geography, edit. Argentorati 1522 and 1525, Lugduni 1535, and Lugduni-Viennæ 1541. I have already, pp. 20—24, given a brief account of these edi-

[1] Compare (d'Avezac) *Hylacomylus Waltzemüller*, Paris 1867; Humboldt, *Kritische Untersuch.*, II: p. 318 and other passages; Harrisse, *Bibl. Am. Vet.;* Carter-Brown, *Bibliogr. Notices*, Providence 1875. The map is completely reproduced in: A. E. Nordenskiöld, *Om en märklig globkarta från början af sextonde seklet*, in *Ymer* 1884, p. 167.

[2] The map fig. 18 in the Swedish edition of this atlas is a fac-simile of Santarem's reproduction.

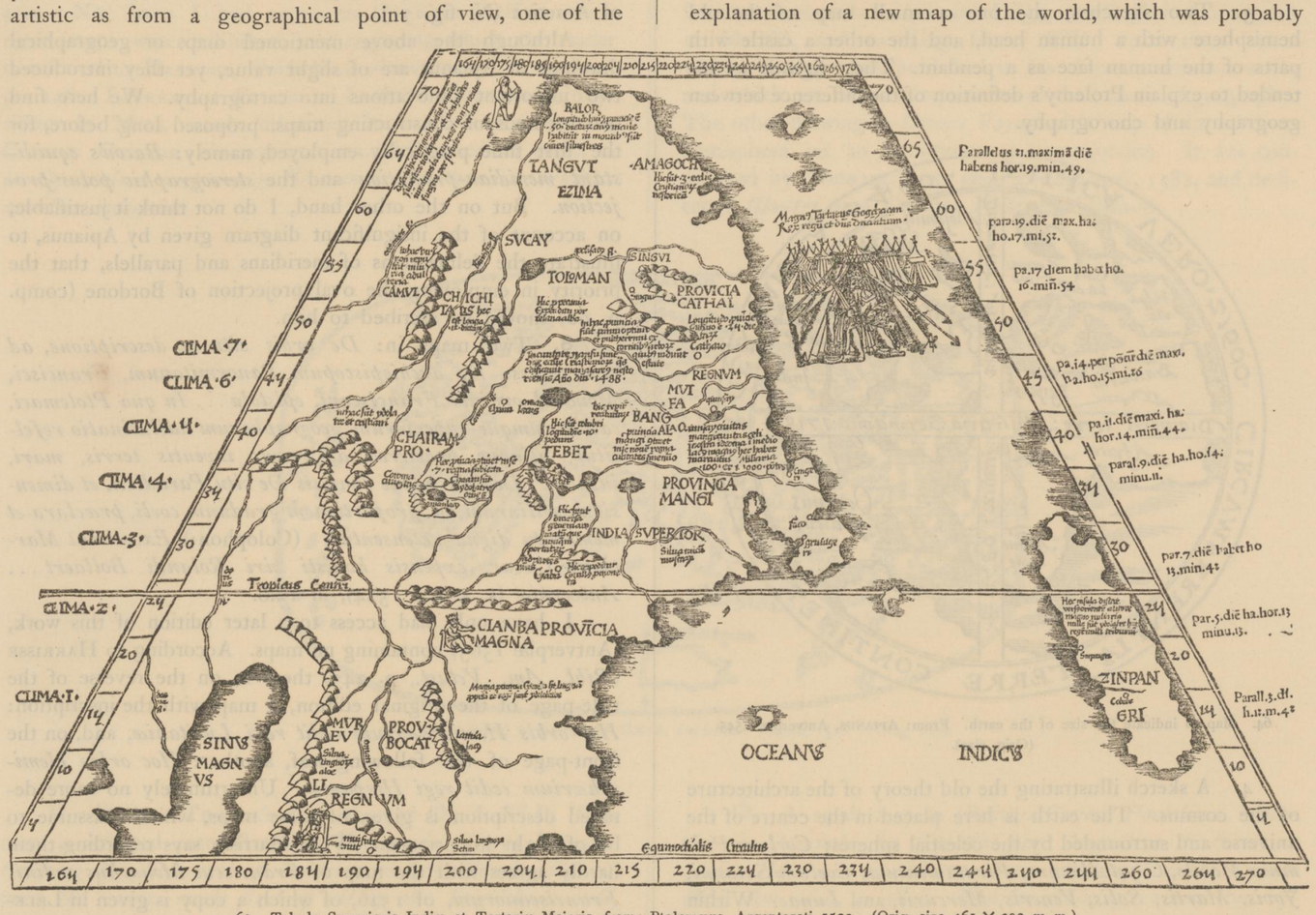
tions, whose maps are printed from the same blocks. Most of the maps are reduced copies of the maps in the edit. Argentinæ 1513. The reduction is made by Waldseemüller. Only three original maps, or maps not printed before, are added in these editions, namely,

Tabula moderna Indiæ Orientalis (N. fig. 62).

Tabula superioris Indiæ et Tartariæ majoris (N. fig. 63), and

Orbis typus universalis iuxta hydrographorum traditionem exactissime depicta 1522. L. F. (N. T. XXXIX).

The last mentioned map, by Laurentius Frisius, has obtained some notoriety, because it applies, for the first time in an edition of Ptolemy, the name of *America* to the southern part of the New World. For the rest it is, as well from an artistic as from a geographical point of view, one of the rudest and most imperfectly drawn maps of the age. Even parts of the old world, which had been well known since the time of the Romans, are here so distorted as to become scarcely recognizable. The North American continent, already laid down by several previous cartographers, is here entirely omitted; Iceland is placed among the Britannic Islands; Greenland close to the western coast of Norway, etc. Also the two new maps of Asia (N. fig. 62 & 63) are coarse wood-cuts and, from a geographical point of view, by no means comparable to Ruysch's map of 1508 (N. T. XXXII) or to the modern maps of Africa in the Ptolemy of 1513 (N. fig. 8 and 9). They are almost exclusively based on Marco Polo and Martin Behaim, and convey, if regarded as an original production of Waldseemüller, no favorable idea of the skill and geographical learning of the author.



63. Tabula Superioris Indiæ et Tartariæ Majoris, from: Ptolemæus, Argentorati 1522. (Orig. size 461 × 293 m. m.).

6. *Apianus c. 1522.* About this year Apianus published: *Isagoge In typum Cosmographicum seu mappam mundi (ut vocant) quam Apianus sub Illustrissimi Saxoniæ Ducis auspicio praelo nuper demandari curavit.* The lower part of the title-page is occupied by a small circular map of the old hemisphere. Colophon (above the printer's monogram:) *Impressum Landsshut per Ioannem Weyssenburger* (s. a.), four leaves in 4:o. After a »*Tetrastichon*» by *Joh. Aventinus*, printed on the reverse of the title-page, and an »*Elegidion*» by *Ioannes Dengkius*, follows a preface by *Petrus Apianus ex Leyssnigk,* where he speaks of a new map of the world in these words, *Terrestris convexitatis picturam nova quadam et vera magisque habitationi nostrae idonea imagine: quo Geographicæ picturæ usus intellectu facilior redderetur, elucubravi.* Then follow five pages of text: »*De diversis usibus hujus Mappae,*» divided into eleven »*propositiones.*» From this we may conclude that the brochure was destined to serve as an explanation of a new map of the world, which was probably identical with the above mentioned *Tipus Orbis Universalis* of 1520 by Apianus (N. T. XXXVIII), or with a new edition of it.

Another small tract by Apianus, which is evidently only a slightly enlarged edition of that before mentioned, was offered for sale in 1885 by B. Quaritch under No. 28131 of his catalogue 362. Its title is: *Declaratio et Usus Typi Cosmographici* (Landisutæ) 1522, eight leaves in 4:o. On the map of the title-page there is, to the east of Asia, an island indicated by the letters *A M.* I have not seen this edition, nor two others cited by Harrisse after Varnhagen, of which one was printed: *Ratisbonne per Paul Rhol 1522;* the other published without date or place of printing. These insignificant brochures are here mentioned on account of the information they give regarding earlier cartographical works of Apianus. They seem to indicate that his map of 1520, at present so rare, once had a wide circulation.

7. The maps in the cosmography of Petrus Apianus. Of this work, which for a long time served as a cosmogra-

phical manual at the universities, a number of editions in different languages[1] were published during the 16th century, the first at Landshut, in 1524, with the title: *Cosmographicus liber Petri Apiani Mathematici studiose collectus.* All the editions contain several small maps or geographical diagrams serving to illustrate the text. Of these the following are of a certain interest in the history of cartography:

1. A drawing of a terrestrial globe, printed on the title-page. A similar globe from the edition *Parisiis* 1551 is here reproduced on pl. XLIV.

2. A diagram (N. fig. 58) intended to illustrate the doctrine of antipodes, and a small map of one of the hemispheres on the equidistant meridian-projection of Bacon. America is here evidently recognized as the fourth part of the world.

3. Two sketches, the one a small map of the old hemisphere with a human head, and the other a castle with parts of the human face as a pendant. These figures are intended to explain Ptolemy's definition of the difference between geography and chorography.

64. Map to indicate the size of the earth. From: APIANUS, Antverpiæ 1545. (Orig. size).

4. A sketch illustrating the old theory of the architecture of the cosmos. The earth is here placed in the centre of the universe and surrounded by the celestial spheres: *Coelum Primum Mobile, Crystallinum; Firmamentum; Coelum Saturni, Jovis, Martis, Solis, Veneris, Mercurii*, and *Lunae*. Within the *Coelum Lunae* there are the spheres of fire and air, and finally, in the centre, the globe inhabited by man.

5. Various drawings illustrating the doctrines on climates, on latitude and longitude, and on map-projections.

6. The figure given above, illustrating the size of the earth.

7. The same wood-cut as that on the title of the above cited *Isagoge* by Apianus.

8. A small map of Greece.

9. A small map giving, quite correctly, the relative positions of various towns of central Europe.

10. The *Speculum cosmographicum*, a revolving geographical diagram of stiff paper, invented by Apianus to explain the fundamental doctrines of mathematical geography. Though long deemed insufficient for that purpose, this diagram merits a place in the history of cartography, because it is the first instance of a geographical map on the stereographic projection (N. fig. 57). Its net of graduation seems to have been copied from the drawing in Reisch's *Margarita philosophica* of 1512, of which I have given a reproduction on fig. 55.

11. A map of the world by Gemma Frisius (N. T. XLIV) which, after 1544 (?), was added to the different editions of Apianus' cosmography. Although very rude and void of details, this map was often reproduced during half a century. As to the outlines of the continents, it seems mainly to follow Münster's general map of 1540 (N. T. XLIV) and his map of America (N. fig. 71).

Although the above mentioned maps or geographical drawings of Apianus are of slight value, yet they introduced two important innovations into cartography. We here find two methods of constructing maps, proposed long before, for the first time practically employed, namely: *Bacon's equidistant meridian-projection* and the *stereographic polar-projection*. But on the other hand, I do not think it justifiable, on account of the insignificant diagram given by Apianus, to illustrate the delineations of meridians and parallels, that the priority in employing the oval projection of Bordone (comp. p. 90) should be ascribed to him.

8. Two maps in: *De orbis situ ac descriptione, ad reverendiss. D. archiepiscopum Panormitanum, Francisci, Monachi ordinis Franciscani, epistola ... In qua Ptolemaei, caeterorumque superiorum geographorum hallucinatio refellitur, aliaque praeterea de recens inventis terris, mari, insulis. Deditio papae Ioannis De situ Paradisii, et dimensione miliarum ad proportionem graduum coeli, præclara et memoratu digna recensentur.* (Colophon:) *Excudebat Martinus Cæsar, expensis honesti viri Rolandi Bollaert ... Antverpiæ* (s. a. sed 1524), in 12:o.

I have only had access to a later edition of this work, (Antverpiæ 1565) containing no maps. According to HARRISSE (*Bibl. Am. Vetust.*, p. 243) there is, on the reverse of the title-page of the original edition, a map with the inscription: *Hoc orbis Hemisphærium cedit regi Lusitaniæ*, and, on the front-page of the following leaf, another: *Hoc orbis Hemisphærium cedit regi Hispaniæ.* Unfortunately no more detailed description is given of these maps, which I assume to be of slight importance. What Harrisse says regarding them hardly agrees with the map of *Franciscus Monachus ordinis Franciscanorum*, of 1526, of which a copy is given in LELEWEL's Atlas, pl. XLVI.

9. *Præclara Ferdinandi Cortesii de Nova Maris Oceani Hispaniæ Narratio Sacratissimo ac Invictissimo Carolo Romanorum Imperatori ... Anno Domini MDXX transmissa.* (Colophon:) *... Impressa in Celebri Civitate Norimberga ... MDXXIIII.*

This edition of the celebrated letters of Cortes contains, like the two editions of Venetiæ 1524, a plan of the city of Mexico which, to judge from the description of Harrisse, is not found in the Spanish editions of Sevilla 1522 and Saragossa 1523. This and analogous plans of the famous city have often been copied in the 16th century. It is of interest to compare them with an original drawing by ALONZO DE SANTA

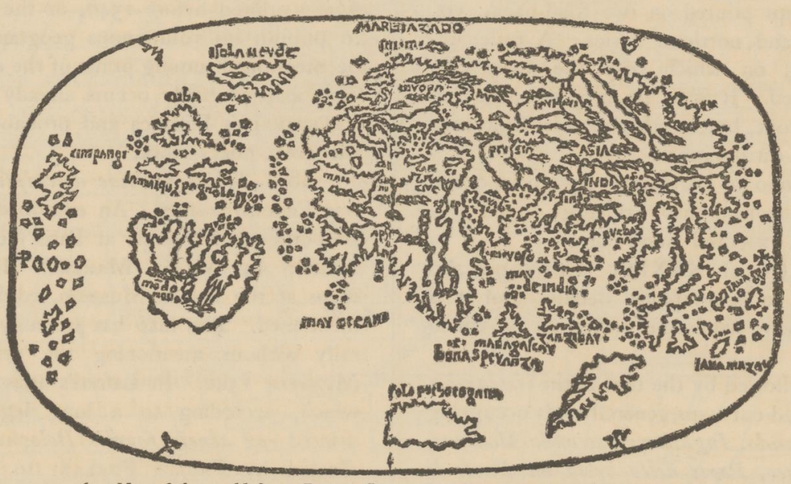
[1] The following editions, printed before 1550, are cited by HARRISSE: In Latin: Landshutae 1524*; Antverpiae 1529*; Antverpiae 1533*; Parisiis 1533; Antverpiae 1539; Antverpiae 1540; Norimbergae 1541; Antverpiae 1545*; and Antverpiae 1550. In French: Anvers 1544. In Spanish: Enveres 1548. Still, after 1550, editions were, according to SIEGMUND GÜNTHER (*Peter und Philip Apian*, Prague 1882) published at Antverp in 1553, 1564*, and two in 1584*. To these may further be added a French edition, Parisiis 1551, and one Dutch: *tot Amstelredam* 1598. The editions designated by an * exist in Swedish collections. This work of Apianus seems often to have been confounded with (Apianus) *Cosmographiae introductio cum quibusdam Geometriae ac Astronomiae principiis ad eam rem necessariis*, of which the first edition was published at Ingolstadt in 1529. This geographical compendium, which, in its turn, is not to be confounded with Waldseemüller's work with the same title, also contains, besides a number of cosmographical figures, of which one (in the 8th chapter) illustrates the variation of the compass, drawings of globes, and a small map of Greece.

Cruz of the Mexican capital and its environs, of which I have given a short account above and of which fig. 69 is a much reduced fac-simile.

10. (Laurentius Frisius:) *Vslegung der Mercarthen oder Cartha Marina, Darin man seken mag, wa einer in der welt sey, und wa ein ietlick Land, Wasser und Stat gelegen ist. Das als in den bucklin zefinden.* (Colophon:) *... Strassburg, Johannes Grieninger 1525.* This work, of which new editions were published at Strassburg in 1527 and 1530, contains two maps. The first of these: *Tabula prima Navigationis Aloisii Cadamusti Mediram versus*, is a rudely drawn chart of the coasts of the southern part of the Pyrenean peninsula and northern Africa with the Atlantic ocean as far as Madeira; the second I have not seen. Nor have I had access to the work itself in which these maps were published, and regarding which the reader is referred to Harrisse, *Bibliotheca Americana Vetustissima*, p. 246. Laurentius Frisius or Laurens Fries was a physician at Metz, much interested in mathematical studies. Conrad Gessner characterizes one of his medical works as an *Opusculum ineptum, mille mendis refertum, ac eruditis auribus indignum.*

the map shows real progress. It is, also, specially interesting from the illustration here given of the controversies between the Spaniards and the Portuguese respecting the proper place of the famous Papal line of demarcation.

The map has previously been reproduced in the *Works issued by the Hakluyt Society*, London 1850. The fac-simile given on T. XLI is from a photograph of the original at the British Museum. Thorne was one of those wealthy, intelligent, and enterprising merchants who energetically contributed to the development of England's commercial predominance at sea. In order to make it possible for English tradesmen to compete with those of Spain and Portugal, he was eager for the discovery of a northern passage to China, Japan, and India, and to promote voyages of discovery to achieve such a passage he sent memorials to Edward Leigh, the English Ambassador in Madrid, and to King Henry VIII. It is these letters which Hakluyt has published in his above mentioned work, and which are of such importance to the history of geography. The other drawing in *Divers Voyages* is a map of the northern hemisphere on an equidistant polar-projection. It was constructed by Michael Lok, *civis Londinensis*, 1582, and dedicated *Illustri viro Domino Philippo Sidnaeo.*



65. Map of the world from: Pietro Coppo, *Portolano*, Venetia 1528. (Orig. size).

11. Robert Thorne's map of 1527 (N. T. XLI). This map is inserted into Richard Hakluyt's *Divers Voyages touching the discouerie of America and the Ilands adiacent vnto the same, made first of all by our Englishmen and afterwards by the Frenchmen and Britons ... with two mappes annexed heereunto for the plainer understanding of the whole matter...* London 1582; reprinted in 1850 with a valuable introduction and illustrative notes by John Winter Jones, in *Works issued by the Hakluyt Society.*

A long inscription on the right side of this map says that it was sent from Seville by the merchant Master Robert Thorne to *Doctor Ley, Embassadour for king Henry the 8. to Charles the Emperour.* Harrisse (*Cabot*, p. 176) supposes it to be based on the prototype of the planispheres in Weimar and on the map of Nuño Garcia de Torrena. This can only be the case as to the delineation of the New World, the work of Thorne being, as regards the Old World, so exact a copy of the map in Reisch's Margarita Philosophica of 1515 (N. T. XXXVIII), that no doubt is possible as to the principal source of Thorne's geographical knowledge of that part of the globe. But for the New World, he evidently had access to other sources, probably consisting of hand-drawn Spanish maps. As regards the delineation of South America and the Isthmus of Panama,

12. A small map in (Pietro Coppo) *Portolano*, (colophon:) *Stampata in Venetia per Augustino di Bindoni. 1528. Adi. 14. de Marzo;* very small quarto (Harrisse, *Bibl. Am. Vet.*, p. 264). The fac-simile given here (fig. 65) is a reproduction of the map in the copy at the British Museum. Its principal interest consists in its affording a proof of the erroneous notions of the New World still entertained, even in Venice, at the time when the map was printed. If any projection could be spoken of, with reference to a map so awkwardly drawn as this, we should here have the first map drawn on the oval equidistant projection of Bordone. The first edition of Bordone's work is dated a few months later than Coppo's Portolano. Besides the map of the world, this work is said to contain, on the reverse of the title-page, another probably still more insignificant map. Coppo's Portolano is also mentioned by Zurla in: *Di Marco Polo et degli altri viaggiatori Veneziani con Appendice sulle antiche mappe idrogeographice lavorate in Venezia*, Venezia 1818, II: p. 363. But the copy he describes contained seven wood-cut maps.

In Lafreri's Atlas there is a large map *Disegno dell' Istria di M. Pietro Copo,* engraved in copper by Ferrando Bertelli in 1569 and dedicated to Aldus Manutius.

13. The maps in: *Libro di Benedetto Bordone, Nel qual si ragiona de tutte l'Isole del mondo con li lor nomi*

antichi & moderni, historie, fauole, & modi del loro uiuere ... Con il Breve di Papa Leone. Et gratia & priuilegio della Illustrissima Signoria com' in quelli appare. MDXXVIII. As there has been some difference of opinion about the real date of this work, it may here be remarked, that the letter of privilege of the Pope, printed on the verso of the title-page and dated 1521, does not specially refer to this book of Bordone, but to all works which the printer, Nicolo d'Aristotele, detto Zoppino, with the permission of the Pope, had published or might hereafter publish. Another letter from the Signoria of Venice, inserted immediately after the patent of the Pope, and issued exclusively for »*Benedetto Bordone Miniator*,» is dated 1526. But even then the work seems not to have been finished, although the author declares himself to have been employed on it for many years, night and day. Lelewel's antedating of Bordone's maps to 1521 (comp. Lelewel's Atlas, pl. 46) does not, therefore, appear to me to be justifiable. Bordone's expression on fol. LXXIII: *Quando lo vescovo di Racoscia scrive a Leone Summo pontifice, haver veduto, tutto quello che io ho della Norbegia, ragionato*, is only a proof that he had been occupied on the work previous to the year of the death of Leo X, 1521.

Bordone's work begins with an unpaged introduction containing three large maps printed on two folio-pages, viz.

A map of Europe and northern Africa. A rude, ungraduated wood-engraving, on which only the towns *Lisbona* and *Venetia* are noted. It is, as far as I know, the first printed special map of Europe, but in other respects it presents nothing of interest to the cartographer.

A map in double folio of the Greek Archipelago and surrounding lands. A portolano has evidently served as a model for this very badly executed wood-cut.

A map of the world (N. pl. XXXIX). This map is also a coarse wood-cut, poor in geographical details. But it is of interest owing to the new, handsome projection on which it is constructed.

This introduction is followed by the text of the »*isolario*,» containing the following wood-cut maps, generally only occupying ⅓ of a page: *Islanda, Irlanda, Inghilterra secondo Moderni, Inghilterra secondo tolemeo, Parte della bretagna, Parte de hispagna, Norbegia* (from Ptolemaeus Ulmæ 1482), *Terra de lavoratore, La gran citta di Temistitan*, the northern coast of South America with adjacent islands, *Spagnola, Iamaiqua, Cuba*, other West-Indian islands, *Guadalupe, Matinina;* five maps of groups of islands on the western coast of Africa; *Gades;* seven maps of islands in the western part of the Mediterranean; *Venetia* (large map in double folio); three other views of cities; 64 maps of islands etc. in the Adriatic Sea and the Archipelago; the Sea of Marmora with Constantinople; the Crimea and Sea of Azof; Cyprus; 8 maps of islands off the eastern coast of Asia, and in the Indian Ocean. This enumeration shows that Bordone's work contains a considerable number of maps, among which there are 9 relating to the New World and 8 of islands on the eastern coasts of Asia and in the Indian Ocean. But unfortunately all these maps, with a few exceptions (e. g. the map of *La gran citta di Temistitan* and *Venetia*), are almost worthless.

Owing to the small number of modern geographical works published in the beginning of the 16th century, Bordone's book became very popular, as may be judged from the many editions of it published under the title of *Isolario di Benedetto Bordone*. Harrisse cites the editions 1532, 1534, 1537, 1547. I have compared the maps of the editions Venetia 1534 and 1547 with the edition of 1528. They are all printed from the same blocks. Even the text appears to be unaltered, excepting an addition to the later editions: *Copia delle lettere del Prefetto della India la nova Spagna detta, alla Cesarea Maesta rescritte*, which is wanting in the original. The statement (Harrisse, *Additions*, p. 113) that the edition of 1534 was only a title-edition of Vinegia 1528 is not correct.

I have not had an opportunity of comparing the maps of Bordone's Isolario with those in the *Isolario di Bartolomeo da li Sonetti*, Venetia 1477 (comp. p. 36), but I suppose that several of Dali Sonetti's maps are copied by Bordone. Bordone was a renowned miniature-painter; which one would not have suspected from the way his maps are drawn. A few years after the issue of the last edition of the Isolario, an atlas of the same kind was published by Tomasso Porcacchi under the title of *l'Isole piu famose del Mondo*, of which several editions were published in Italy from 1572 until late in the 17th century. I give a fac-simile of one of these maps on pl. XLIX. They are engraved in copper by Girolamo Porro, and are incomparably better than the wood-cuts of Bordone.

14. A map of the region of Avignon in: *Il Petrarcha con l'espositione d'Allessandro Vellutello* ... s. l. 1528. 4:o. The map occupies two pages. It is executed in wood-cut, and renders in a clear and doubtless in a tolerably correct manner the topography of the ancient Papal residence. On account of the small number of special maps or »*chorographiae*» printed before 1540, or the year when Münster began to publish his voluminous geographical works, it deserves to be mentioned among prints of the early period of cartography. This map probably occurs already in the edition of 1525 of Vellutello's Petrarca and probably also in other editions of the great poet's work.

15. *Totius Galliae descriptio O. F. Delphinato* (Orontius Finæus) *autore.* An edition of 1525 is preserved in the Bibliothèque Nationale at Paris (according to private communication by M. G. Marcel). In the catalogue of printed maps at the British Museum, editions of 1561 and 1563 are mentioned. The map has probably been often reprinted, generally without mentioning the printer's name, e. g. by Seb. Münster 1540. In Lafreri's atlas there is a fine reproduction, which, according to a long legend in the right corner, is printed »*ex aeneis formis Bolognini Zalterii 1566*,» and dedicated by Paulus Furlani to *Magnifico ac insigni viro Marco Antonio Radici.*

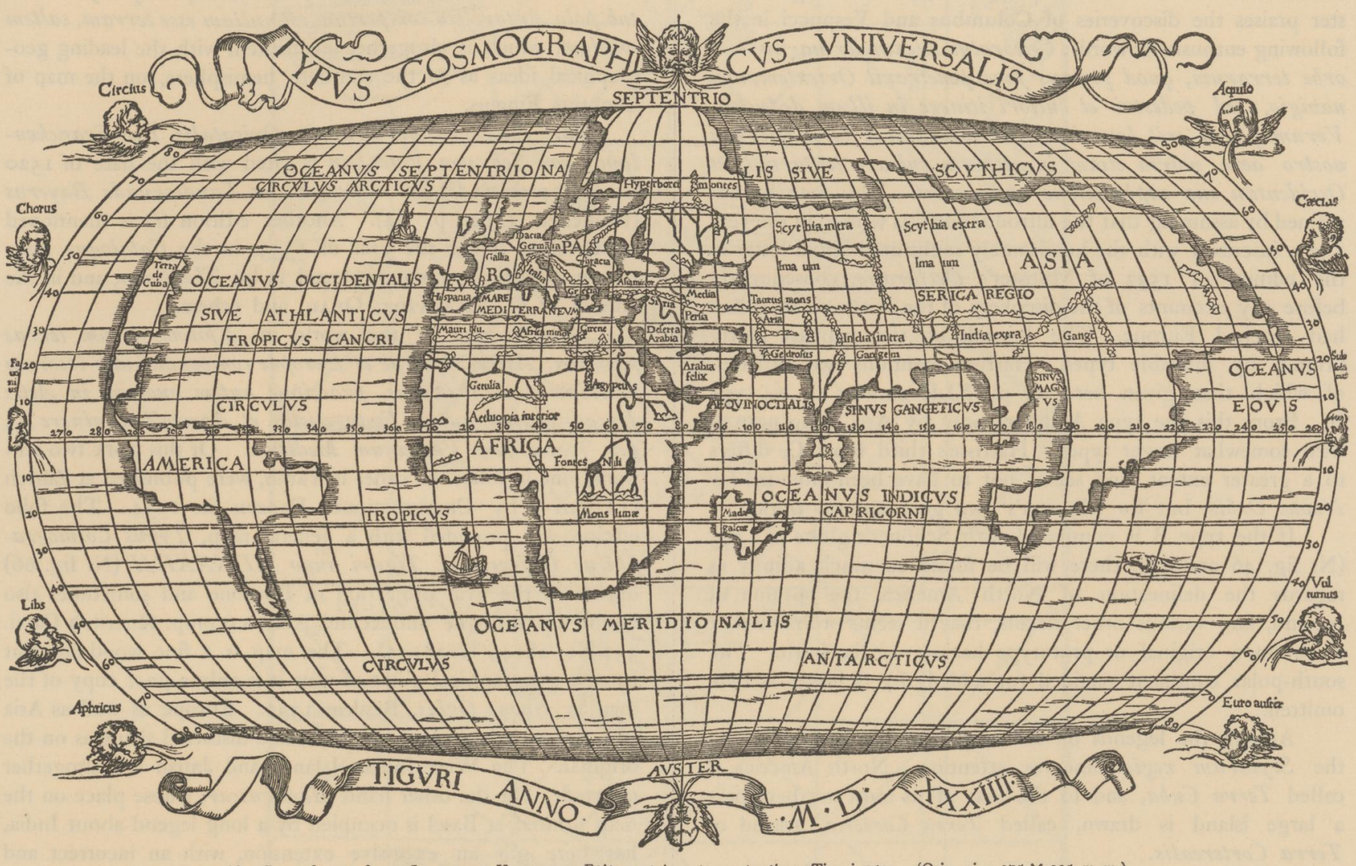
16. *Apianus 1530.* This map was, in 1885, offered for sale, for £ 40 by Quaritch (Catal. 362, No. 28142) under the rubric: »*Apiani Universalior Cogniti Orbis tabula* 21¾ × 15½ *inches* (= 552 × 394 m. m.) (*Ingolstadii*) 1530. *Unique*». It seems to be a reproduction on a larger scale of the map of Apianus of 1520. The map is dedicated to Leonardus ab Eck. At its upper part there are two small maps of the world: *Observatio Ptolem.*, and *Observatio Vespu.*

17. *Figura e scrittura insomma di tutto lo abitato* from *Isolario di Bartolomeo Dalli Sonetti*, Venezia 1532 (2d edition, fol.) An interesting map of the world, on Bordone's oval projection. The size of the oval is 295 × 155 m. m. North America forms a continuation of Asia, being separated from »*Terra S. Crucis sive Mundus Novus*» (South America) by a broad strait, in which »*Zinpagu*» is placed. The draughtsman of the map has not taken any notice of Magellan's voyage. I have seen this map in the Biblioteca Marciana.

18. Eandavi's edition of Ptolemy, *Argentorati Apud Petrum Opilionem 1532.* This edition, which I have never seen and which I have in vain asked for in several of the large libraries of Europe, is said to contain eight maps, of which, to judge from the legends communicated by Harrisse *(Terra Bacalaos, ulteriora incognita, Gronlandia, Hvitsargh Promont.)*, at least one seems to be of a certain interest from a geographical point of view. But I suppose these maps to be identical with the eight maps in another work of Ziegler

cited below, which was published by the same printer, in the same year, and at the same town as the edition of Eandavi.

19. Maps in Jacobus Ziegler's *Quæ intus continentur Syria* etc., *Argentorati per Petrum Opilionem*, 1532. Fol. This book contains eight maps in double folio. I have before (p. 60, fig. 30) given an account of one of them (the map of Scandinavia). The remaining seven are maps of lands situated about the south-eastern part of the Mediterranean, from Marmarica, across Egypt, Suez, Syria with Palestine to Cilicia. These maps are also clumsy wood-cuts of no special interest from a cartographical point of view, if I except the fifth map, *Universalis Palestinæ*, which affords the first instance of the variation of the compass being indicated on a printed map or chart. On the same map the azimuths and the distances from Jerusalem to Rome, Venice, Reginospurgum, Carræ, Ekbatana, Ninus, Babylon, and Susa are indicated. We here find an illustration of the way the lands and seas had been mapped on the portolanos. Ziegler's work was reprinted Argentorati 1536. The new edition contains the same maps printed from the same blocks as those of the editio princeps.



66. General map from: Joachimus Vadianus, *Epitome trium terræ partium*, Tiguri 1534. (Orig. size 375 × 235 m. m.).

20. Map in: (Simon Grynaeus and Ioan. Huttichius) *Novus Orbis Regionum ac Insularum veteribus incognitarum, una cum tabula cosmographica, et aliquot alijs consimilis argumenti libellis, quorum omnium catalogus sequenti patebit pagina ... Basileae apud Io. Hervagium, Mense Martio, anno MDXXXII.* (N. T. XLII.) The contents of the work are given on the reverse of the title-page: *Catalogus eorum quae hoc volumine continentur. Praefatio Simonis Grynaei ad Collimitium; In tabulam cosmographiae introductio per Sebastianum Munsterum; Aloysij Cadamusti navigatio ad terras ignotas, Archangelo Madrignano interprete; Christophori Columbi navigatio ex iussu Hispaniæ regis, ad multas insulas hactenus incognitas, eodem Madrignano interprete; Petri Alonsi navigatio, eodem interprete; Pinzoni navigatio, eodem interprete; Alberici Vesputij navigationum epitome; Petri Aliaris navigationis & epistolarum quorundam mercatorum opusculum; Iosephi Indi navigationes; Americi Vesputij navigationes IIII; Epistola Emanuelis regis Portugalliae ad Leonem X. Pont. Max. de victorijs habitis in India & Malacha etc.; Ludovici Rom. patritij navigationum Æthiopiæ, Ægypti, utriusque Arabiae, Persidis, Syriae, Indiae, intra & extra Gangem, libri VII. Archangelo Madrignano interprete; Locorum terrae sanctæ exactissima descriptio, autore F. Brocardo monacho; M. Pauli Veneti de regionibus Orientalibus libri III; Haithoni Armeni ordinis Praemonstrat. de Tartaris liber; Mathiæ a Michou de Sarmatia Asiana atque Europea lib. II; Pauli Iovij Novocomensis de Moschovitarum legatione liber; Petri Martyris de insulis nuper repertis liber; Erasmi Stellae de Borussiae antiquitatibus lib. II.*

The name of the compiler of this valuable collection of voyages, of which, however, the majority had been previously published, is neither recorded on the title-page nor in the prefaces. The work is usually cited under the name of Grynæus, on account of his preface written in the florid style of the age, and containing scarcely anything of interest to geography. It is addressed to *Georgius Collimitus Danstetterus Artis Medicae et disciplinarum Mathematicarum omnium facile princeps.* At the end of it Grynæus says that the editor, Hervagius, got the pamphlets here reprinted from *Ioan. Hutichius, vir doctus et antiquitatis mire studiosus.* The work is therefore sometimes cited under the name of *Collectio Huttichii-Grynaei-Hervagii.* Sebastian Münster has also contributed to this publication by a long introduction entitled: *Typi Cosmographici et declaratio et usus*, from which it has been concluded that he was the author of the map inserted in the editio princeps, Basileæ MDXXXII (N. T. XLII). But this seems scarcely admissible. For there is

very little in common between this map and the general map in Münster's Ptolemaeus, Basileæ 1540. The inscriptions, the distribution of land, the method of drawing the meridians on the oval projection — all are different. The general character of the wood-cuts alone is the same, proving that these maps have issued from the same school of engravers.

This map of 1532 and Münster's *declaratio* were already quite antiquated when they were printed in *Novus Orbis*. The author of the map did not know e. g. of the first circumnavigation of the globe, as may be concluded from the omission of the south-polar continent, the discovery of which had been foretold by several cosmographers, while its existence was considered to have been confirmed by Magellan. Neither is there to be found, in Seb. Münster's introduction, any passage alluding to this memorable event, although Münster discusses the influence the voyages of the Portuguese were likely to exercise on the Indian trade of the Venetians via Suez, and although Münster praises the discoveries of Columbus and Vespucci in the following enthusiastic words: *Celebratur Alexander magnus toto orbe terrarum, quod primus fere penetrarit Orientem, non navigio, sed pedestri et tutiori itinere in illum deductus. Verum parva erit laus illius, si comparetur viris illis qui nostro aevo maria etiam incomperta sulcare tentarunt, et Occidentem sua exploratione aperuerunt.* This may be explained by assuming that the introduction was written in the year 1520, inscribed with the handsomely sculptured initial letter in the edition of 1532 of Münster's *Declaratio*, consequently before any accounts of the discovery of the straits of Magellan had reached Europe. The legends on the map are partly printed by movable types. Harrisse mentions two varieties, of which that given here on pl. XLII answers to his type B. From this the type A differs only by Asia being printed with somewhat larger types. Harrisse's third type, C, differs to a greater extent, and seems not to have been intended for *Novus Orbis*, but for Münster's own geographical works.

If the type B is compared with Schöner's globe of 1515 (N. fig. 46 and 47), there will be found so much affinity as regards the delineation of North America, the position of Iceland, and various other details, that it seems probable that a common original or prototype has served for both. The south-polar continent retained (or added) by Schöner is here omitted.

Among the legends on the map, the long inscription on the *Scytarum regio* deserves attention. North America is called *Terra Cuba*, and to the east of its most northern part a large island is drawn, called *Terra Cortesia*, instead of *Terra Corterealis*.

21. The map in: (Grynaeus-Huttichius) *Novus Orbis* etc. *Parisiis apud Joannem Parvum.* (Colophon:) *Impressum Parisiis apud Antonium Augerellum MDXXXII. VIII Calen. Novembris* (N. T. XLI). We have here an unmodified reprint in Paris of the edition of »Novus Orbis» published some months earlier at Basel. The original map is here replaced by a new one engraved in 1531 by Orontius Finæus, at the expense of Christian Wechel. I have above described the projection employed for it and also a later reprint on which the name of Orontius is suppressed and only Wechel mentioned on the title-legend, printed with moveable types. Another reprint, probably from the same block, but with a new modification of the title-legend, is employed for the: Pomponius Mela, *Parisiis apud Christianum Wechelum. MDXL.* (Comp. Harrisse, *Bibl. Am. Vetustissima, Addenda*, p. 133). In a geographical point of view this map far surpasses that of the Basel edition, as well in its greater richness of names and topographical details, as in due attention being here paid to the latest geographical discoveries. The islands in the Polar-basin are here copied from Ruysch; Greenland is drawn as a large island; North America forms, in accordance with the conception of Columbus, a mere continuation of Asia, which, by a narrow isthmus, is connected with South »*America.*» In the south this part of the New World is separated by a narrow strait from a large south-polar continent: *Terra Australis recenter inventa sed nondum plene cognita*, on which the names *Regio Patalis* (comp. p. 100) and *Brasielie regio* are inscribed. No name is placed at the Straits of Magellan, but the sea to the west of it is called *Mare Magellanicum*, which as far as I know is the first time that the name of this discoverer occurs on a printed map of unquestioned date. On the isthmus connecting South America with *Parias* and *Teniscumatan*, is written *Furna* (Tierra) *Dariena.*

There is no reference to the map in the text. In the introduction Münster, on the contrary, expressly says: *Nam sub polo Antarctico compertum est nullam esse terram, saltem solidam*, which is altogether inconsistent with the leading geographical ideas as to the southern hemisphere, on the map of Orontius Finæus.

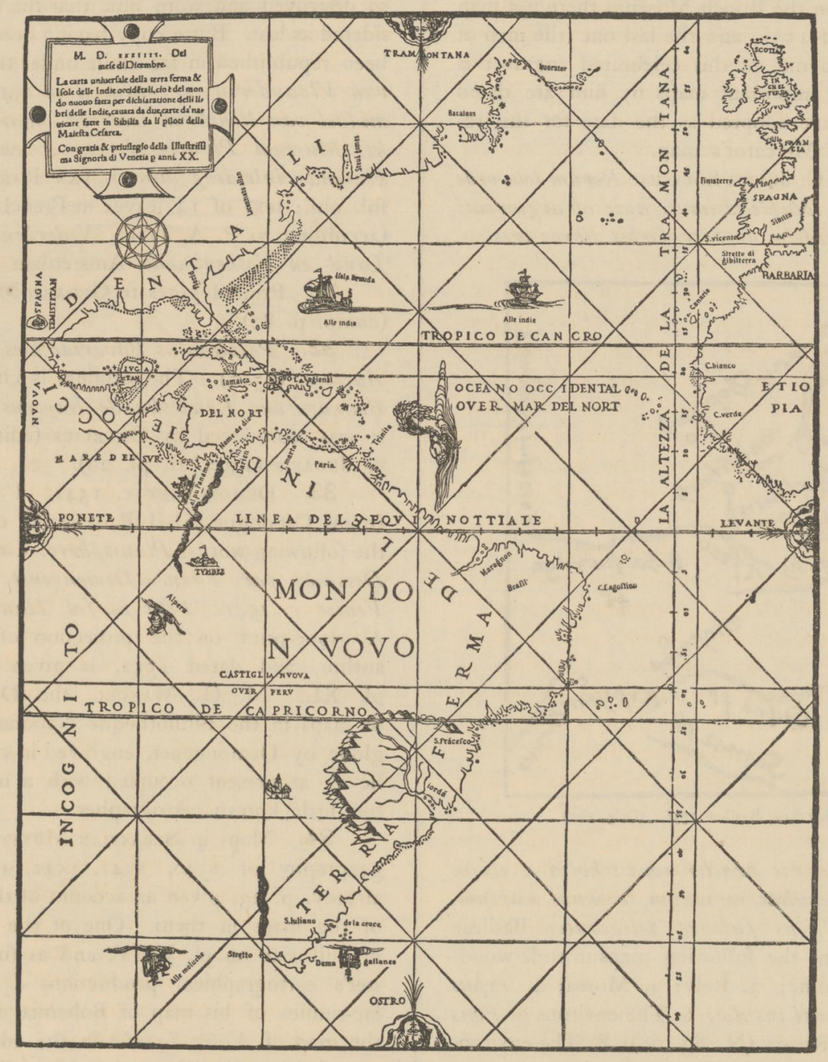
22. *Chorographia Franciae Orientalis. Das Franckenlandt von Seb. von Rotenhan* is cited with the date of 1520 (as still preserved?) in: *Beiträge zur Landeskunde Bayerns* (München 1884, p. 84). Another edition (?) is mentioned by Ortelius, under the year of 1533, in the *Catalogus Auctorum.* Later it was reproduced in his *Theatrum*, and in the Atlases of G. Mercator, Quad, and others.

23. A map of the world in: *Epitome trium terrae partium, Asiae, Africae et Europae compendiariam locorum descriptionem continens, praecipue autem quorum in Actis Lucas, passim autem Evangelistae et Apostoli meminere . . . per Joachimum Vadianum Medicum.* Of this work two editions, one in folio, the other in 12mo, were published at Zürich (»Tiguri») by Christophorus Frosch in 1534. The folio edition was provided with a general map, *Typus Cosmographicus Universalis, Tiguri anno MDXXXIIII* (N. fig. 66) drawn on the oval projection of Bordone and sometimes also bound up with the duodecimo edition (comp. Quaritch Catal. 352 No. 28144 & 28145). The map is a fine wood-cut, but from a geographical point of view it is only a poor copy of the map in *Novus Orbis*, Basileæ 1532. Europe as well as Asia and America have here got the same distorted shape as on the original. The West Indian Islands and Japan are altogether omitted. On the other hand *Madagascar*, whose place on the map printed at Basel is occupied by a long legend about India, has here got an excessive extension, with an incorrect and distorted form, and a too westerly position, all in conformity with the representation on Schöner's globe of 1515. The south-polar continent is omitted, a proof that no notices or at least no exact information about the circumnavigation of the world had, in 1534, penetrated to the learned humanist at St. Gallen. The work for which the map was drawn is a voluminous cosmography and geography on 274 pages in folio, or 564 pages in 12mo, ending with a long chapter on »*Insulae oceani praecipuae.*» But it only contains the following references to the New World (folio edition p. 267, 12:o edition p. 551): *et in Africae parte quae ad occasum spectat, maxima insularum America cognominata obtenditur. Deinde longissimo ab occasu Continentis intervallo, Spagnolia, et ultra eam Isabella, dein Parias dicta, nuperrimis exploratoribus!*

24. A map in: Petrus Martyr & Oviedo, *Historia de l'Indie occidentali*, Vinegia MDXXXIIII.[1] Of this book only one copy containing the map is known. It belongs to the

[1] Concerning the complicated title of this work see Harrisse, *Bibliot.*, p. 313. I have given the dimension of the map from E. Uricoechea, *Mapoteca Colombiana*, Londres 1860, p. 2.

collection of Mr. James Lenox. A reduced copy of the map was published by Mr. Henry Stevens, in his *Historical and geographical notes*, New Haven 1869. I have only had access to this reproduction, of which fig. 67 is a fac-simile on a still more reduced scale. As to the projection and the manner of drawing, the map much resembles the charts of Medina (N. fig. 75), with which it also agrees as to the outlines of the New World. On the map of 1534 the New World is designated by a long legend, *Terra Firma de le Indie occidentali*, running along the whole coast from the Straits of Magellan to Labrador. South America is called *Mondo Nuovo*. The West Indies are here laid down more correctly than on any map previously printed. It is also of derable differences will be discovered. Finæus assumes North America to be a continuation of Asia; Mercator divides these parts of the world by a broad strait. The latter places a large continent in the vicinity of the North-pole; Finæus makes, in conformity with Ruysch's delineation, various large islands occupy this part of the earth's surface, a conception of the geography of the polar regions afterwards adhered to by Mercator himself. On Mercator's map we find one of the earliest indications of the river-system of La Plata. On the northern part of the American mainland, separated from a large polar-continent by a strait, *Fretum arcticum*, we read »*Hispania Major capta anno 1530.*» Its north-eastern portion is designated as *Baccalearum regio*, eastward of which a very



67. Map of America in Petrus Martyr, *Historia de l'Indie occidentali*, Vinegia 1534. (Orig. size 530 × 425 m. m.).

interest as being one of the few specimens preserved of the early cartographical works of the Spaniards.

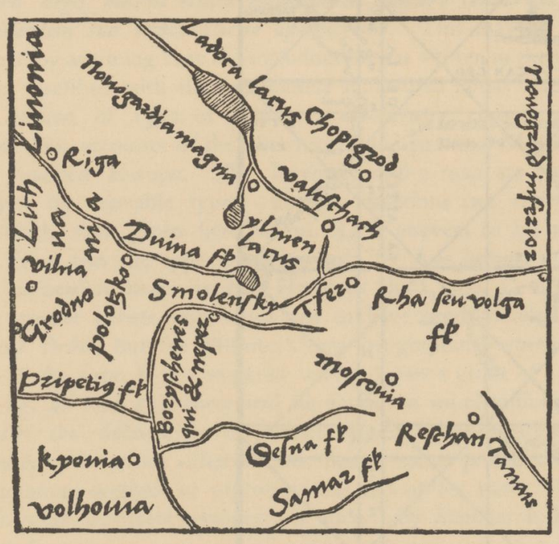
25. A new edition of Reisch's *Margarita Philosophica* was published in 1535, which is sometimes said to contain the »Zoana Mela» map of the world (N. T. XXXVIII and p. 70) first inserted in the edition of 1515. But to judge from the many copies of the edition of 1535 which I had occasion to examine, it generally contains no other maps than some geographical diagrams printed in the text, and the map of the world originally drawn for the edition of 1503 (N. T. XXXI, p. 30).

26. Mercator's double cordiform map of 1538 (N. T. XLIII). This map is not enumerated by Ghymmius among the works of the great geographer. Superficially examined, it seems to be almost identical with the map of 1531 by Orontius Finæus (N. T. XLI), but on a closer examination consi- large and several smaller islands, *Insulæ Corterealis*, are placed. Between Hispania and Terra Florida there is a large island, *Insula 7 civitatum*. Another mythical group of islands is laid down, under the name of *Losroccos insula*, between the south-polar continent and the Moluccas. On the south-polar continent we read: *Terras hic esse certum est, sed quantas quibusque limitibus finitas incertum.* This inscription reminds us of Mercator's design, in a large cosmographical work, of which the last book was to deal with geography, to divide the lands of the earth into three parts, viz. the *Old World* (Asia, Europe, and Africa), *India occidentalis* (America), and *Continens Australis*. Ghymmius thus sums up Mercator's opinion of the last named parts of the globe: *Tertiam etsi adhuc latentem et incognitam esse non ignoraverit, solidis tamen rationibus atque argumentis demonstrare ac evincere*

se posse affirmabat, illam in sua proportione geometrica, magnitudine et pondere ac gravitate, ex duabus reliquis nulli cedere aut inferiorem vel minorem esse posse, alioquin mundi constitutionem in suo centro non posse consistere. Mercator here adopts or gives form to an old cosmographical theory, which, during centuries, exerted no slight influence on the voyages of discovery in the Pacific. It was founded on the supposition that the main part of the globe formed an hydrosphere, in which the earth-crust was freely floating, according to the laws of hydrostatics.

As mentioned above (p. 90), Mercator's cordiform map was reproduced with the utmost exactness and in full size by a fine copper-print (N. fig. 54), signed *Ant. Lafreri exc. Romae,* but not dated. In the British Museum there is a map of Malta by Lafreri dated 1551, and the last one (the map of Olaus Magnus), known to me, of this celebrated engraver is dated 1572. Some other important maps by him are dated about 1560, which I have adopted as the date for this remarkable reproduction of Mercator's map.

27. Some maps in C. Julius Solinus: *Rerum toto orbe memorabilium thesaurus locupletissimus, huic ob argumenti similitudinem Pomponii Melæ de Situ Orbis libros tres . . .*



68. Moscovia from Solinus, Basileæ 1538. (Orig. size).

adjunximus. Accesserunt hic praeter nova scholia . . . etiam tabulae geographicae permultae, regionum, locorum, marium, sinuumque diversorum situs pulchre deliniantes, Basileae 1538. This work contains the following maps in rude woodcut: 1. The ancient Rome; 2. Italy; 3. Morea; 4. *Typus Graeciae;* 5. *Figura Rhodi insulæ;* 6. The environs of *Fons Danubii;* 7. A map of Russia (N. fig. 68); 8. The environs of *Mare Hircanum seu Caspium;* 9. The Mediterranean and Black Seas; 10. *Helvetia;* 11. *Anglia;* 12. *Africa;* 13. *Palestina;* 14. *Asia Minor;* 15. Asia and parts of Europe, Africa, and America; 16. Europe with parts of Africa and Asia; 17. Europe; 18. *Palus Mæotica;* 19. Greece and a portion of the Balkan countries; 20. Sicily and southern Italy.

With the exception of 4, 12, 15, and 17, all these woodcuts are small and insignificant. The majority of them are remarkably poor, from a cartographical standpoint. Yet the maps 7 and 15 are of a certain interest, the former on account of the river-system of Russia being here for the first time represented with tolerable accuracy — even more correct than on the maps of Ant. Wied and Herberstein — the latter, on account of the delineation of the Pacific with a portion of the western coast of America. The map of Russia has already been reproduced in the Journal of the Swedish Geographical Society (*Ymer*, 1885, p. 262). It appears to be founded on communications from Herberstein and from the learned canon in Cracow, Mathias a Michou. This edition by Solinus-Mela was reprinted, with the maps from the old blocks, at Basel in 1543.

28. A map of La Maine by Matheus Ogerius, printed *In urbe Cenomanorum* in 1539. A copy of the original map is preserved in the Bibliothèque Nationale at Paris (according to M. G. Marcel). Reproduced by Ortelius, ed. 1595, pl. 22.

29. The map of Scandinavia by Olaus Magnus (comp. p. 60) printed on 9 large folios at Venice in 1539 and reproduced by Ant. Lafreri at Rome in 1572.

30. Gerard Mercator's large map of Flanders of 1540. The copies of this excellent, and for a long time unsurpassed and unrivalled map, which once had a wide circulation, have been so destroyed and worn out, that the map until lately was considered as lost. But a copy having been newly discovered, it has been republished in fac-simile under the title: *De groote kaart van Vlaanderen vervaardigd in 1540 door G. Mercator, bij middel van lichtdruk weergeg. naar het ex. behoorende aan het Museum Plantin-Moretus . . . en voorzien met eene verklarende inleiding door* J. van Raemdonck, Antwerp 1882, fol. obl.; text of 14 leaves in French and Dutch with 9 maps (according to P. A. Tiele, *Nederlandsche Bibliographie van Land- en Volkenkunde,* Amsterdam 1884, p. 168).

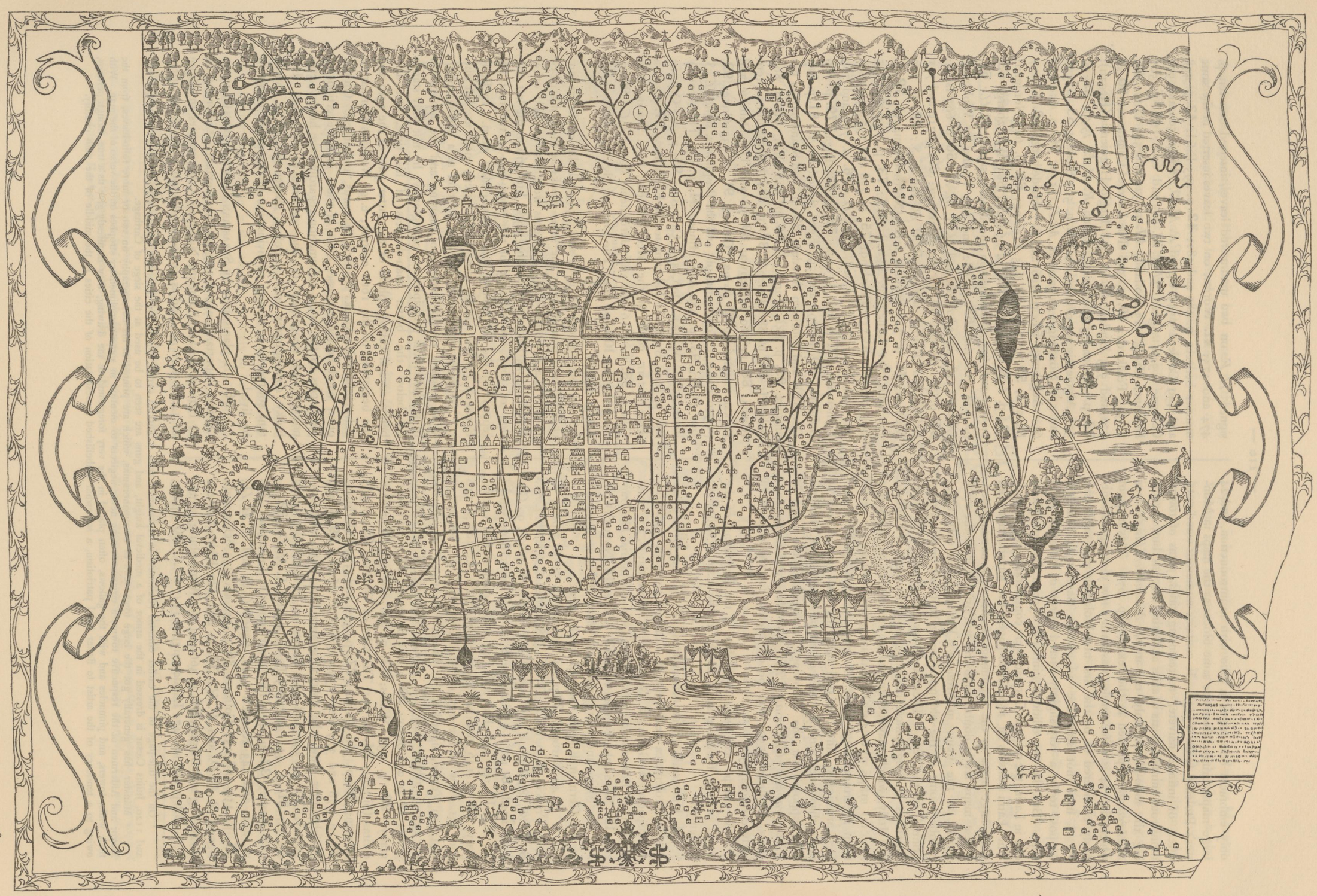
31. Printed gores to Gerard Mercator's globe of 1541 (comp. p. 82).

32. *Palatinatus Bavariae Descriptio. Erhardo Reich Auctore* (1540). The original is cited (as still existing?) in *Beiträge zur Landeskunde Bayerns,* München 1884, p. 84. It was reproduced by Ortelius (edit. 1570, pl. 30), and by de Judaeis (1593, II, pl. 26).

33. Demongenet c. 1541. I have not seen this map. In his Catalogue XLII Rosenthal cites it under No. 133 in the following words: *Planisphère. Carte de deux hémisphères. Dessinée par Franc. Demongenet et gravée par E. Vico. Venise c. 1541. Petit in fol. Haut. 145, Larg 263 m. m.* A globe-print on the projection of Glareanus by the same author, and dated 1552, is given in fac-simile by me on pl. XL. M. G. Marcel, the Director of the collection of maps in the Bibliothèque Nationale at Paris, has found a globe by Demongenet, engraved in copper but not dated, and he is at present occupied with a memoir on this deserving but little known cartographer.

34. Maps in Sebastian Münster's editions of Ptolemy's geography of 1540, 1541, 1542, 1545, and 1552. I have already, p. 23, given an account of these different editions and of the maps in them. One of the maps is here reproduced in full size on pl. XLIV, and as further examples of Münster's cartographical productions I give on fig. 70 and 73 fac-similes of his map of Bohemia in the edit. 1545, and of the map of *Novæ Insulæ* in the edit. 1540. The former is remarkable as the first printed map illustrating the distribution of different religions, and may as such be regarded as the first statistical map. The latter seems chiefly to be based on the portolanos of Battista Agnese. It is of interest as being the first general map of the American continent, but it imparts no higher opinion of Münster's talent as a map-draughtsman, than his corresponding maps of *Europa*, *Ethiopia* (Africa), and *India Extrema* (Asia with the exception of its western-most part).

35. Maps in various editions of Sebastian Münster's cosmography, for the first time printed in German at Basel by Henricus Petri in 1544, and often reprinted with considerable additions in several different languages. Of these editions I have examined those in German printed at Basel in 1544, 1567, 1578, 1592, 1628; those in Latin of 1550, 1552, 1559, also printed at Basel, and that in French published by François de Belle-Forest, Paris 1575. The first edition



69. Map of the city of Mexico with environs, by Alonzo de Santa Cruz, about 1550. (Orig. size 1140 × 780 m. m.).

only embraces 600 pages in folio with an introduction, and 24 large maps, printed from the same blocks as the maps in Münster's Ptolemy (edit. 1545). It contains numerous wood-cuts, often of infinite naivete,[1] representing cities, plans of towns, monstrous animals, coats of arms and other marvels, but, excepting the folio-plates, only one map, »*Moscoviter lands neue beschreibung*,» printed in the text (on p. 67). This map, of which fig. 74 is a fac-simile, was until a few years ago erroneously considered to be the first non-Ptolemaic map of Russia.

I have not seen the 2d edition, Basel 1545, which I suppose to be a very slightly altered reprint of the editio princeps. But the two editions printed in 1550 at the same place, one in Latin, the other in German, were considerably augmented. The Latin consists of 1164 folio-pages, the introduction and some large maps in the beginning of the work not included. These maps are in double folio and still printed from the same blocks as the maps in Münster's Ptolemy, but only 14 in number, some of the old maps being replaced by wood-cuts, printed in the text. These are very coarse and often quite worthless as geographical drawings, e. g. the maps of England and Italy, which may be quoted as examples of the worst special maps ever published in print. Others are better from a cartographical point of view, although equally imperfect artistically, and we find here the first printed map of more than one country, based on actual observations. I therefore suppose that the following catalogue of the maps in *Cosmographiæ Universalis Lib. VI. Autore Sebast. Munstero*, Basileae 1550, will be of interest for the student of early cartography.

A. Maps occupying two folios in the beginning of the work, printed from the same blocks as the maps in Münster's Ptolemy:

1. Universalis typus orbis terreni; **2**. Terreni Orbis generalis et Ptolemaica descriptio; **3**. Europae generalis descriptio; **4**. Hispania; **5**. Gallia; **6**. Germania; **7**. Helvetia; **8**. Svevia et Bavaria; **9**. Bohemici regnum; **10**. Polonia et Ungaria; **11**. Graecia; **12**. Nova tabula Indiæ etc.; **13**. Africa; **14**. Novus Orbis.

B. Maps and more important plans of towns especially of the German Empire, printed in the text:

1. p. 40 Europe; **2**. p. 42 Britain; **3**. p. 56 Spain; **4**. p. 75 France; **5**. p. 82, 83 Trier 1548, signed *C. S.* and *D. K.;* **6**. p. 88, 89 Paris 1543, signed *HR. MD.;* **7**. p. 98, 99 Geneva 1548; **8**. p. 115 Flanders; **9**. p. 129 Amsterdam, signed *H. H.;* **10**. p. 137 Italy; **11**. p. 138 northern and central Italy; **12**. p. 146 and 147 Rome, signed *H. H.;* **13**. p. 150 and 151 View of the city of Rome, signed *C. S.;* **14**. p. 158 and 159 Venice, signed *C. S.;* **15**. p. 192, 193 Florence; **16**. p. 233 Southern Italy; **17**. p. 243 Sardinia; **18**. p. 248 Cagliari; **19**. p. 252 Sicily; **20**. p. 255 Syracuse; **21**. p. 261 Germany; **22**. p. 331 Wallis; **23**. p. 338 and 339 Sedunensis civitas (Sitten); **24**. p. 351 The lake of Geneva; **25**. p. 367 Luzern; **26**. p. 369 Zurich; **27**. p. 372 and 373 Solothurn; **28**. p. 378 and 379 Bern 1549, signed *R. M. D.;* **29**. p. 382 Wifelspurger Göw (the district between Biel, Thun, and Lausanne); **30**. p. 390 and 391 Baden (in Switzerland), signed *D. K.;* **31**. p. 402 and 403 Basel, signed *R. M. D.;* **32**. p. 428 Alsace; **33**. p. 433 The silver mines at Leberthal; **34**. p. 442 and 443 Russach 1548, signed *C. S.* and *R. M. D.;* **35**. p. 450 and 451 Colmar; **36**. p. 454 and 455 Schletstadt, signed *R. M. D.* and *H. H.;* **37**. p. 461 The Rhine between Strassburg and Bingen; **38**. p. 466 and 467 Weissenburg, signed *C. S.;* **39**. p. 470 and 471 Landau, signed *1547 W. S.;* **40**. Speier, signed *H. F.* on two unnumered leaves, inserted between p. 474 and 475; **41**. Worms, on two leaves inserted in the same manner between p. 480 and 481; **42**. p. 495 Eifel; **43**. p. 498 and 499 Coblenz 1549, signed *R. M. D.;* **44**. p. 502 and 503 Cologne 1548, signed *H. R. M. D.* and *C. S.;* **45**. p. 507 Brabant; **46**. p. 513 Holland; **47**. p. 522 and 523 Chur; **48**. p. 525 Feldkirch; **49**. p. 528 The Lake of Constance; **50**. p. 532 and 533 Lindau; **51**. p. 538 Regio Hegoiensis (Hegau); **52**. p. 548 and 549 Friburg, signed *R. M. D. 1549;* **53**. p. 556 Algoiensis regio (Algau); **54**. p. 567 Suabia; **55**. p. 576 and 577 Nördlingen, signed *R. M. D. 1549;* **56**. p. 610 and 611 Augsburg; **57**. p. 616 and 617 Heidelberg; **58**. p. 627 Bavaria; **59**. p. 644 and 645 Freising; **60**. p. 647 Nordgau; **61**. p. 650 Franconia; **62**. p. 662 and 663 Würtzburg; **63**. p. 674 and 675 Frankfort on the Maine, signed *M. H.;* **64**. p. 678 Austria; **65**. p. 682 and 683 Vienna by Wolfgang Lazius 1548, signed *H. H.* and *H. R. M. D.;* **66**. p. 693 Istria; **67**. p. 701 Hesse; **68**. p. 702 Marburg; **69**. p. 710 and 711 Erfurt and Fulda, signed *R. M. D.* and *C. S.;* **70**. p. 713 Meissen; **71**. p. 717 Saxonia vetus (North Germany); **72**. p. 730 and 731 Lüneburg, signed *C. S.;* **73**. p. 734 and 735 Lubeck; **74**. p. 752 Friesland; **75**. p. 756 and 757 Frankfort on the Oder 1548, signed *R. M. D.;* **76**. p. 768 and 769 Pomerania; **77**. p. 776 Prussia; **78**. p. 788 Riga; **79**. p. 789 Bohemia; **80**. p. 796 and 797 Eger, signed *H. K.;* **81**. p. 813 Denmark and southern Sweden; **82**. p. 830 Scandinavian peninsula; **83**. p. 856 Hungaria; **84**. p. 868 Ofen; **85**. p. 869 Belgrad; **86**. p. 886 Poland; **87**. p. 887 Poland and western Russia; **88**. p. 910 Moscovia; **89**. p. 918 The Danube and Balkan countries; **90**. p. 921 Greece; **91**. p. 933 Crete; **92**. p. 940 and 941 Constantinople and the Bosphorus, signed *C. S.* and *D. K.;* **93**. p. 980 Asia Minor; **94**. p. 994 The territory between the Wolga, Don, and Caucasus; **95**. p. 997 Cyprus; **96**. p. 1001 Syria and Palestine to the Euphrates; **97**. p. 1002 The eastern coast of the Mediterranean, from Damiette to Cilicia; **98**. p. 1016 and 1017 Jerusalem; signed *I. C.*; **99**. p. 1113 Africa; **100**. p. 1122 The town of Algiers; **101**. p. 1127 Lower Egypt.

In the editions of 1552 and 1559 all the maps are unchanged and printed from the same blocks as those described above. Later some new wood-cuts were inserted and other modifications introduced in the work, but still in the last edition of 1628 the majority of the wood-cuts in the text are reprints of the old blocks, now considerably worn. In Belle Foreste's French edition most of Münster's maps are left out.

Münster occupies a peculiar position as a cartographer. With regard to the manner of drawing and the application of mathematical principles to cartography, he not only stands far below the better map-drawers of his time, but also below several cartographers of the latter part of the 15th and the beginning of the 16th century, e. g. Nicolaus Germanus, Schweinheim-Buckinck, Ruysch, Sylvanus, and others. On the other hand he far surpasses most of them in his exertions to get access to the latest information regarding the history, ethnology and geography of the countries he describes. His bulky cosmography will therefore always remain an important source for a history of civilisation of the period in which he lived.

36. A planisphere by Sebastian Cabot, Anvers (?) 1544. Of this important map a single copy is extant. It is preserved at Paris in the »Bibliothèque Nationale.» It occupies an ellipse of 1,48 × 1,11 m., and is consequently too large to be repro-

[1] On the title-page of the earlier editions »Sultanus» is represented with a Turkish sword, but in the dress of a Roman warrior. In edit. 1559, p. 207 and 1120, Julius Cæsar is dressed in the armor of a medieval knight, and guns are seen to be used at the siege of Carthage.

[2] Münster has generally got the large town-views or town-panoramas, which are printed in his cosmography on two or more folio-leaves, from the Mayor and Aldermen of the respective towns, a circumstance he never neglects to mention in some complimentary strophes on the verso of the map. With their walls, towers, and pinnacles and with the gallows, often placed in the very foreground of the drawing, they manifestly give us a true, though perhaps, owing to a tendency of the artist to flatter local patriotism, a somewhat embellished representation of the cities in the middle of the 16th century.

duced here, especially as I have only had access to the very incomplete copy published by Jomard (*Monuments de la Géographie*, pl. 20,1—20,4.). Interesting notices of this map are found in Harrisse, *Jean et Sébastien Cabot*, Paris 1882.

37. A map of *Lacus Benacus* (the Garda-lake) in: Georgii Jodoci Bergani *Benacus*, Veronæ MDXLVI. 4:o. The wood-cut map occupies one folio-page.

38. A map in Pedro de Medina's *Arte de Navegar*, Sevilla 1545, afterwards translated into French by Nicolas de Nicolay 1554, into Italian by Fra Vicenze Paletino da Corsula 1554 (1555), into German by Michael Coignet 1576, and into English by J. Frampton 1581 (Harrisse, *Biblioth. Amer. Vetust.*, p. 413). The map in the Spanish edition is reprinted, probably from the original block, in P. de Medina's *Libro de grandezas y cosas memorables de Espagna*, s. l., first edit. 1548.[1] As may be perceived by the fac-simile given on fig. 75, this map, the only one to illustrate a manual of navigation which was once very popular, was very insignificant. The author commits on it the blunder, scarcely to be excused in a navigator of the middle of the 16th century, of marking a general scale on a map with equidistant rectilinear meridians stretching from pole to pole. This map, however, has the merit of rendering, with tolerable correctness, the outlines of the Isthmus of Panama and of the eastern coast of America. In this respect, it has a predecessor in the drawing in Petrus Martyr, Venetia 1534 (compare above p. 106, fig. 67), which is also based on Spanish originals. Medina's map is further of interest as one of the few maps printed in Spain during the early period of cartography. The plate in the Italian edition is a faithful, somewhat reduced copy of the Spanish original, nicely cut in wood. Besides this map the *Arte de Navegar* (Italian edition) contains several geometrical figures and a small hemisphere surrounded by wind-heads. A map of Spain in Pedro de Medina's above cited *Cosas memorables de Espagna* is in Ortelius' *Catalogus auctorum* deservedly characterized as *valde rudis*. It is only of interest as a proof of the low stage of the art of map-printing in Spain in the middle of the 16th century.

70. Map of Bohemia from: *Ptolemaeus*, Basileæ 1545. (Orig. size 357 × 254 m. m.).

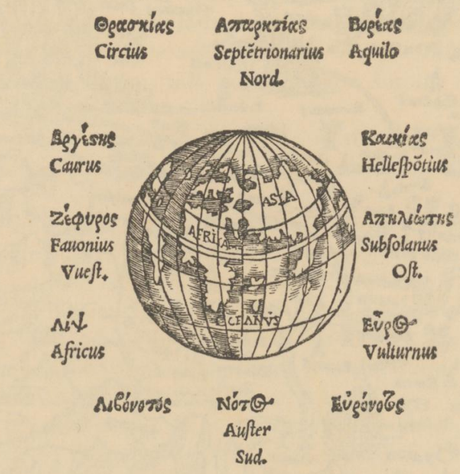
39. Map in: (Joannis Honteri Coronensis) *Rudimenta Cosmographica*, Tiguri 1546, in-12:o, afterwards reprinted of the same size, under a somewhat different title, but with maps from the same blocks, Tiguri 1548[2] and 1549, Antverpiæ 1552,[2] s. l. 1583, Tiguri 1597. This small compendium, written in Latin hexameters, contains three geographical figures in the text intended to illustrate the »circles and zones of the sphere;» the distribution of the different celestial spheres around the earth, which is placed in the centre of the world; and (N. fig. 71) the names and positions of the winds. The

[1] Of these works I have only had access to the Italian edition of *Arte de Navegar* and an edition of *Cosas memorables de Espagna*, the title-page of which is dated 1548, but the last leaf: *Alcala de Henares, en casa de Pedro de Robles y Iuan de Villanueua, Año del Señor de 1566.* The map of Spain is here printed on the title-page, the sea-chart on the leaf lxiiij.

[2] Cited from Harrisse.

text is followed by a small atlas, which seems to have, in the middle of the 16th century, filled the same place in literature as the *Epitome Theatri Orteliani*, Langenes' *Caert-Thresoor* etc. held, a few decennia later. It consists of a general map, here reproduced on pl. XLIV, and of 12 maps in the Ptolemaic style, though more or less modified, of Spain, France, Germany, Poland and a part of European Russia, Hungary, the Danube and Balkan countries, Greece, Italy, Syria, Asia Minor, Central Asia and India, Africa, as far as the country was known by Ptolemy, and Sicily. The general map is only a reduced copy of the map of Apianus (N. T. XXXVIII). Of the others, those of central Europe are, due regard being taken to the time when they were printed and to their small size, tolerably good. None of the special maps embrace any portion of the New World, and, as far as I have been able to ascertain, not a single name from the New World is to be found among the thousand names of countries, towns, and peoples enumerated in the text. The following passage contains the only allusion to the newly discovered lands:

Est etiam ulterius non visa prioribus annis
Insula, dives opum cultuque immanis agresti,
Quam lucri studium, rerumque cupido novarum
Prima sub extremo conspexit sole cadente.



71. From: J. Honterus, *Rudimenta Cosmographica*, Tiguri 1546. (Orig. size).

Even in the description of Africa, which contains about 100 verses, I have in vain sought for a word referring to the Portuguese discoveries.

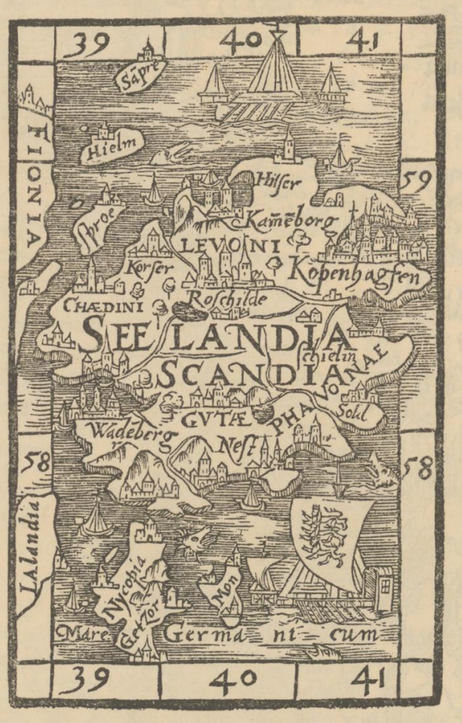
This pamphlet in hexameters, of which the editio princeps was printed in 1546, should not, as has often been the case, be confounded with:

Ioannis Honter Coronensis Rudimentorum Cosmographiae libri duo. Quorum prior Astronomiae, posterior Geographiae principia, brevissime complectitur. (Colophon:) *Cracoviae Mathias Scharfenbergius excudebat MDXXX.*

This work is not versified. It does not contain any collection of maps, but only an insignificant map of the Old World within a circle of 43 m. m. diameter, and the text only occupies 16 leaves in 12mo. In the chapter: *Nomina Insularum Oceani et Maris* we meet the following passage: *In Occiduo* (oceano) *Dorcades, Hesperides, Fortunatae, America, Parias, Isabella, Spagnolla et Gades.* Four unidentified names is all the student of this compendium will learn of the New World. This opusculum of Honter in prose, was again printed without any modifications, in: *Dionysii Aphri de totius Orbis situ ... Iohannis praeterea Coronensis de Cosmographiae rudimentis Libri duo.* (Colophon:) *Basileae ex aedibus Henrici Petri MDXXXIIII.*

Both works, the metrical, as well as the unrhymed, are published together in:

Procli de sphaera liber I; Cleomedis de Mundo ... libri II; Arati Solensis phaenomena ... Dionysii Afri descriptio orbis habitabilis ... una cum Io. Honteri Coronensis de Cosmographiae rudimentis duplici editione, ligata scilicet & soluta. (Colophon:) *Basilea Per Henricum Petri MDLXI.* Here the maps are printed from other blocks than those in edit. Tiguri 1546. Those of Poland and western Russia, of the Danube and Balkan countries and of Asia Minor are left out, whereas maps of Ireland, Majorca, England, Zealand, Euboea, Cyprus, »India intra Gangem,» »Iava Maior,» »India extra Gangem,» »Taprobana,» »Mædera,» South Africa, Malta, and Cuba are added. The general map, a fac-simile of which I give on fig. 76, is a copy of *Universale novo*, in Gastaldi's Ptolemy of 1548, redrawn on the cordiform projection of Apianus, and the copper-engravings in the same edition of Ptolemy have also served as types for several of the other maps, which, however, are very inferior



72. Seelandia from: J. Honterus, *De cosmographiæ rudimentis*, Basileæ 1561. (Orig. size).

to their Italian models. Some of them represent parts of the earth, of which no special maps seem to have been published before, for instance (p. 908) the map of *Seelandia*, of which a fac-simile is given on fig. 72. The blocks to the woodcuts in this small quasi-atlas were also used for other works published by the great Basel firm, with a rock blazing under the stroke of the hammer, as printer's mark, e. g. in an edition of Pomponius Mela and Solinus published by Sebastian Henricpetri in 1595.

40. Sixty maps engraved in copper in Mattiolo-Gastaldi's Ptolemy of 1548, of which two are reproduced on T. XLV. I have above (p. 25) given the full title and enumerated the maps of this handsome octavo-volume. Its 34 *tavole moderne*, and the new maps in the editions 1561, 1562, and 1564 copied from them on an enlarged scale, form the most complete collections of maps published in print between 1513 and 1570. On the title-page is written: *Con alcuni comenti et aggiunte fattevi da Sebastiano Munstero Alamanno*, but this evidently refers to the text, not to the maps,

which, from a geographical point of view as well as in their technical execution, are immensely superior to those of the learned geographer and Hebrew professor at Basel. The work is dedicated by Iacobo Gastaldi to Leone Strozzi, *dignissimo Signore di Capua*, whereupon follows an *A li lettori*, where the publisher, Giovanbatista Pedrezano, is highly complimented, for not having spared any expense in getting the maps as finely and well executed as possible, and for having reduced their size so as to allow of anybody, without difficulty, carrying the work »*nella manica.*« We thus have here the first atlas expressly said to be published in a pocket form.

41. Maps in Sigismund v. Herberstein's celebrated work on Moscovia or Russia, of which the editio princeps, *Rerum*

73. Map of America from *Ptolemaeus*, Basileæ 1540. (Orig. size 257 × 348 m. m.).

Moscoviticarum comentarii, was published at Vienna in 1549. This latin edition was reprinted *Basileæ* 1551, 1556; *Antverpiæ* 1557 (without maps); *Francofurti* 1560; *Basileæ* 1567, 1571, 1573, 1574; *Francofurti* 1600. An Italian version was published in *Venetia* 1550 and reprinted in the collection of Voyages of Ramusio; a German: *Wien* 1557; *Basel* 1563 and 1567; a Russian and a Bohemian in the previous century.[1] I have examined the rare original-edition, of which a copy with marginal notes by Glareanus is preserved in the Royal Library at Stockholm, the Italian edition, the Latin editions of 1551, 1556, and 1571, and the German edition of 1567. They contain the following maps:

1. A map in the first latin edition of Herberstein's work.[2] On its upper left corner is written: *Moscovia Sigismundi Liberi Baronis in Herberstein Neiperg et Gutnhag. Anno MDXLIX*, and at the right border: *Hanc tabulam absolvit Aug. Hirsvogel Viennæ Austriæ Cum gra. et privilegio imp.* This copper-print (N. fig. 77) is not inserted into any other edition. It is remarkable as being one of the first maps reproduced by copper-print in Germany, as the original of Herberstein's map of Russia, and finally as perhaps the only map still extant engraved in copper and signed by Hirschvogel. The editio princeps further contains two copper-prints of Russian costumes and one of the Czar Ivan Vasiljevitsch, signed *A. H. F. 1547*.

2. A wood-cut copy of the above mentioned map, inserted in the edition printed at Basel in 1551, and in several later ones. Here may also be read, at the upper left corner: *Moscovia Sigismundi Liberi Baronis in Herberstein, Neiperg et Gutenhag Anno MDXLIX.* That this date refers to the above mentioned original and not to the wood-cut copy of it, may be concluded from a letter of Wolfgang Lazius to the editor Ioannes Oporinus, printed on the reverse of the title-page of the edition *Basileæ* 1551.

3. A copy of the map No. 1, engraved in copper by Gastaldi for the edition *Venetia* 1550. Hirschvogel's original is not graduated; whereas the copy of Gastaldi is graduated

[1] A detailed description of these editions is given in Friedrich Adelung, *Siegmund Freiherr von Herberstein, mit besonderer Rücksicht auf seine Reisen in Russland*, St. Petersburg 1818, containing an excellent lithographic copy of the map in *editio princeps*.

[2] According to the Catalogue of printed maps in the British Museum, p. 1820, this map of Hirschvogel had already been printed separately in 1546.

on the Donis projection, but under the evidently incorrect supposition that the original had been drawn on the equidistant cylindrical projection of Marinus. There are, besides, so many additions and essential improvements made in Gastaldi's map, that it may be considered as an almost independent work. It is reproduced in the 2d part of *The Voyage of the Vega round Asia and Europe*, London 1881.

4. A large map of the forests of Russia, first inserted into the edition of 1556.

5. A plan of Moscow first inserted into the same edition.

The principal map (No. 1) of Herberstein embraces the major part of Poland and European Russia, with a portion of western Siberia. That this map was the first by which an approximate geographical knowledge of European Russia was spread in western Europe, is shown by the following

Catalogue of maps of European Russia down to 1550.

1. 2d century. Ptolemy's *Tabula quarta et octava Europæ* and *secunda Asiæ*. These maps serve to illustrate the scarcity and insufficiency of the notices which had in Ptolemy's time penetrated to the Greeks and Romans, of the lands situated to the north of the Black and Caspian Seas.

2. 14th century. Portolanos of these regions. They are generally copies of the previous ones, with inconsiderable additions and corrections, founded on modern information collected from travellers and merchant-adventurers.

3. 1493. A wood-cut map of central Europe in Schedel's Chronica Nurembergensis 1493 (N. fig. 5). This map also embraces Poland and the most western part of European Russia.

4. 1507. A map (N. fig. 13) engraved on copper for the edition of Ptolemy's geography published at Rome in 1507 and 1508. This map agrees, in its main features, with the preceeding one, but is of better execution and more rich in detail. We here for the first time, on a printed map, meet the names of *Moskva*, *Smolensko*, *Kowno*, *Grodno*, *Wylno*, *Neper*, *Kyow*, *Cerkaszy*, *Bratslav*, *Chmelnik* etc. This and the preceding one are evidently founded on the same original, but in the works in which they were published, we look in vain for any information as to its author. As will be shown in a subsequent chapter, giving an analysis of the *Catalogus auctorum* of Ortelius, this map is probably a reproduction of the map of Nicolaus a Cusa of the middle of the 15th century (comp. Addenda).

5. 1513. *Tabula moderna Sarmatie Eur. sive Hungarie, Polonie, Russie, Prussie et Walachie,* first published in Ptolemaeus 1513, then reproduced from the same block in the edition of 1520. A rough and but little modified copy of the map in Schedel's chronicle. A reduced, poor and defective copy of this map was also published in the Ptolemy editions of 1522, 1525, 1535 and Viennæ 1541.

6. 1525. A map, drawn by Paulus Jovius (or Paulo Giovio) in Rome from communications by the ambassador, Dmitri Gerassimow, sent by the Grand-duke of Russia to the Pope. Of this map, mentioned in Petrus Iovius, *Libellus de legatione Basilii magni Principis Moschoviae ad Clementem VII,* Romæ 1525, no printed copy is known, and it seems doubtful if the original was ever published in print. But an early hand-drawn copy by Battista Agnese still exists, which has recently been reproduced by Theob. Fischer and H. Michow in their works.

7. 1528. A map mentioned in the *Catalogus auctorum* of Ortelius (edit. 1584) in these words: *Florianus tabulam* (edidit) *Sarmatiae, Regni Poloniae et Hungariae, utriusque Valachiae, necnon Turciae, Tartariae, Moscoviae et Lithuaniae partem comprehendentem, Cracoviae 1525.* This map appears to be lost; I have not found it mentioned by any one but Ortelius. Its author is probably identical with Florianus Unglerius, who, in 1512, at Cracow printed Stobnicza's *Introductio in Ptholomei Cosmographiam* (compare p. 68), and should not be confounded with the artist *Antonius Florianus*, who constructed the map reproduced on fig. 48.

8. 1532. The map in Ziegler's *Schondia* (comp. p. 60 and fig. 31) is extended over a part of Russia. But this part of the map is extremely incorrect. Moscow, for instance, is placed due south of Hangö; Boristhenes and Tanais commence from *Lacus albus,* which communicates with the Baltic by another river. As this map is founded on information from four learned bishops, who had taken a leading part in the public affairs of the Scandinavian countries, it may serve as a proof of the confused ideas respecting the large dominion of the Czar still prevailing among their countrymen.

9. 1538. The rough, but correct map based on actual observations, in Solinus, Basileæ 1538 (N. fig. 68).

10. 1540—44. Various maps in Münster's editions of Ptolemy and in his cosmography. The most remarkable are Tab. XV in Ptolemaeus 1540 called »*Polonia et Ungaria, nova tabula,*» but embracing a great portion of European Russia, and the map of Russia reproduced on fig. 74 and inserted between the pages 656 and 657 of the first edition of the cosmography of 1544.

11. 1545. A map, very rich in details, of *Moscovia* by Antonius Wied. Of this map there is only extant a copper-engraving of 1570 by Franciscus Hogenberg, of which only two copies are known, one belonging to the British Museum and the other to Dr. Michow in Hamburg, who has given a fac-simile of the map and described it in a memoir: *Die ältesten Karten von Russland*, Hamburg 1884. Hogenberg's copper-engraving was probably originally intended for the *Theatrum Orbis terrarum* of Ortelius. High up, in the left corner, we read: *Franciscus Hogenb. ex vero sculpsit 1570.* Two long legends beneath are dated 1555. By means of an analysis of various details, and a comparison with Münster's map of 1544, Dr. Michow finds it probable that Ant. Wied's map was constructed between 1537 and 1544.

12. The above mentioned map of Herberstein engraved in copper by Hirschvogel, first printed separately in 1546, and then inserted in the editio princeps of Herberstein's Moscovia.

42. Maps by Gastaldi. Besides the above cited maps in Gastaldi-Mattiolo's edition of Ptolemy of 1548, this distinguished cosmographer, to whose works I shall return in the succeeding chapter, had already, before 1550, published various other maps generally printed separately, and, like all early cartographical productions of that kind, they are at present extremely rare or entirely lost.

Of these maps I have seen, or found mentioned in literature, the following:

1544. *La vera descrittione de tutta la Spagna* (*Br. Mus. Cat. of printed maps,* I: 1497).

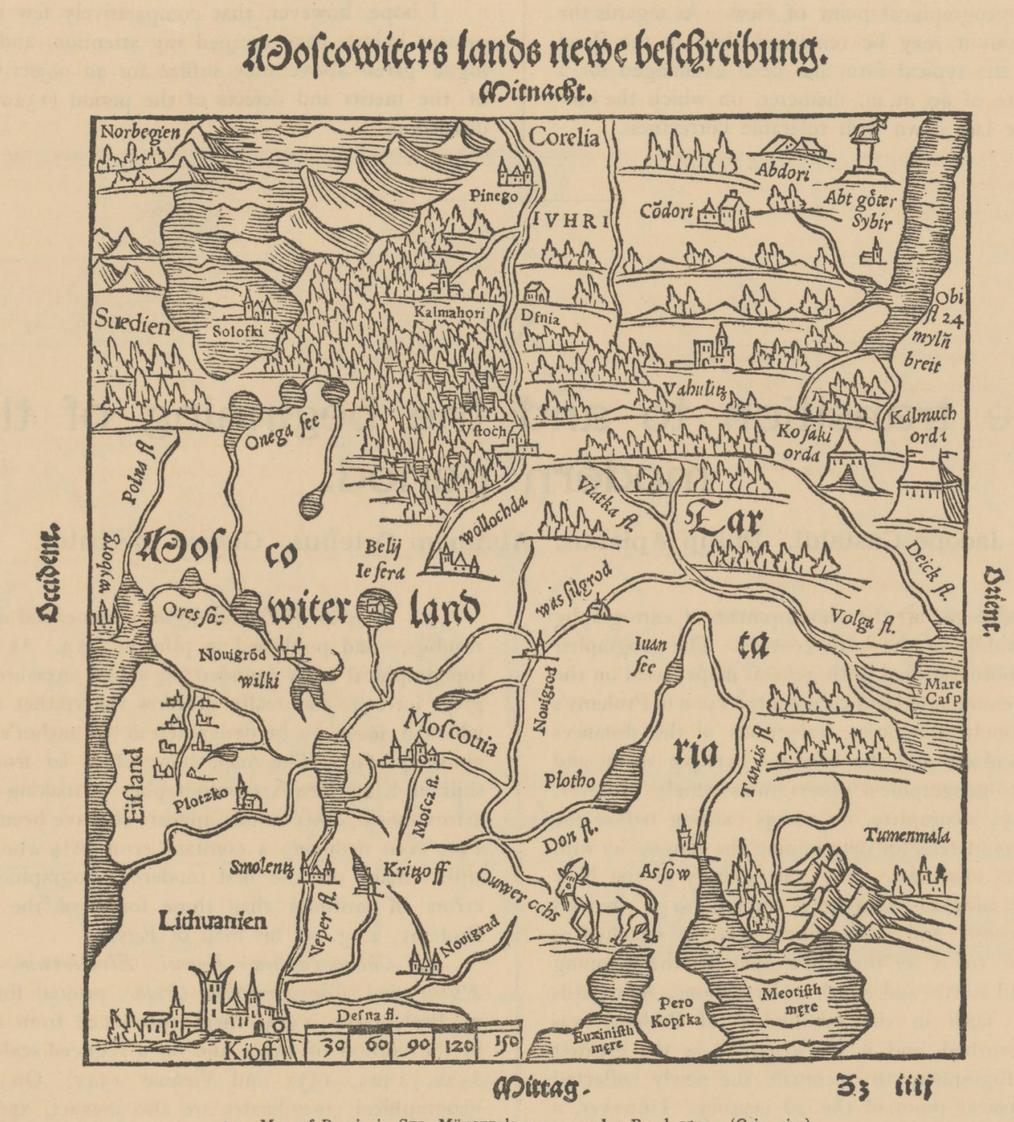
1546. »*Universale,*» signed: *Giacomo Cosmographo in Venetia MDXXXXVI.* 380 x 640 m.m. (Castellani's catalogue, p. 248. *Br. Mus. Cat. of printed maps*, II: 4544). A general map on Bordone's oval projection, probably agreeing, except in size, with Gastaldi's »*Universale Novo,*» of 1548 (N. T. XLV).

1545. *La Sicilia per Giacomo Gastaldo Piemontese Cosmographo in Venetia 1545.* 370×530 m.m. (Castellani's catalogue, p. 249). Reproduced by Ortelius in 1570, pl. 38, and probably several times in Italy.

1550. *Descriptione de la Moscovia per Giacomo Gastaldo piamontese Cosmographo in Venetia MDL*, mentioned above.

c. 1550. Some maps of Gastaldi, which were first inserted in the third volume of Ramusio's known collection of voyages printed in 1556. The maps are considered to have been finished before 1550.[1] In the *Discorso di M. Gio. Battista Ramusio sopra il terzo volume delle Navigationi & Viaggi nella parte del Mondo Nuovo all' eccellente M. Hieronymo Fracastoro*, dated the 20th of June 1553 and forming the introduction to the third volume of Ramusio's work, he says that, on Fracastero's repeated request to have four or five maps of the newly discovered lands made in the Ptolemaic style, he had asked the distinguished cosmographer Giacomo Gastaldi to construct a general and four special maps of those parts of the earth. In Vol. III there are five maps, corresponding to the above communication, viz. *Nuova Francia* (a part of Labrador, New Foundland and Canada); *Brasil; Parte de l'Africa; Taprobana* and *Universale della parte del Mondo nuovamente ritrovata.* The maps are reproduced by wood-cut. The first mentioned four are so imperfect, and so different from all other maps of Gastaldi which I have seen, that they can scarcely be considered as original works of this distinguished cosmographer. They seem rather to be copies ornamented in Münster's style by some ignorant wood-cutter, from originals of Gastaldi. The map of Nova Francia is reproduced in several modern works on America, for which I may refer to Harrisse, *Cabot*, p. 236; Kohl, *Discovery of Maine*, p. 226; and Winsor, *Critical History*.

As most of the maps of Gastaldi were published after 1550, I shall have occasion to return to them in the next chapter.



74. Map of Russia in Seb. Münster's cosmography, Basel 1544. (Orig. size).

43. A map of Britain printed by Gourmont, Paris 1548. One copy of this map is, according to a private communication by M. G. Marcel, preserved in the Bibliothèque Nationale at Paris.

I have excluded from the above catalogue of maps printed between 1520 and 1550, several maps drawn in the

[1] In a note at the end of *Nomi de gli Autori* in the first volume Ramusio says: »To the year MDL, *when the first volume of this work was laid under the press*, answers Hegira's year of DCCCCLVII.» The third volume was printed in 1556, before the second, which was laid under the press in 1559, or two years after the death of Ramusio (comp. Thomasso Giunti's preface to the 2d volume). All the volumes have since been reprinted several times, partly with addenda.

Ptolemaic style, inserted in editions of Julius Cæsar, Justinus' Trogus Pompeius, and other classical authors; maps printed in theological works or books of devotion, of Palestine, Egypt, Sinai etc., founded on older prototypes or only invented at the writing-table; general maps similar to those reproduced on T. XXXII from Macrobius and Sacrobosco and still employed without any modifications in editions of these authors during the whole of the 16th century; small schematical maps in such geographical compendia as *De geographia liber unus* by Henricus Glareanus, of which a number of editions were published in Basel, Friburg, Venice, and Paris, after 1527, or *Cosmographiae introductio* (by Apianus), the first edition of which was printed at Ingolstadt in 1529 etc. All these appear to be worthless from a geographical point of view. As regards the maps in Macrobius it may be remarked that, in the Basel edition of 1535, the typical form has been exchanged for a circular planisphere of 89 m. m. diameter, on which the outlines of Africa are laid down with tolerable correctness.

No copies are at present known of a number of maps belonging to this period, especially of those published separately. But it is to be hoped that several of them, as lately happened with the important map of Olaus Magnus, may hereafter be exhumed from the dust of the libraries, and I should feel it to be a great success, if this fac-simile atlas should be the cause of at least some discoveries of that kind. As examples of lost maps mentioned in literature may be cited: the Sarmatia by Florianus, the map of Hungaria by Lazarus, Cratander's reproduction printed at Basel in 1530 of Nicolaus a Cusa's Germania, Gerard Mercator's map of Palestine printed in 1537, and a number of other maps mentioned in the *Catalogus auctorum* by Ortelius.

I hope, however, that comparatively few of the maps at present known have escaped my attention, and that the catalogue given above may suffice for an objective appreciation of the merits and defects of the period (1520—1550) under discussion.

X.

The transition to and the beginning of the modern period.

Jacopo Gastaldi. Philip Apianus. Abraham Ortelius. Gerard Mercator.

A decided change in the development of cartography occured in the middle of the 16th century. The geographer had, until then, been satisfied with general maps based on the geographical data enumerated and commented upon in Ptolemy's cosmography, namely itineraries, valuations of the distances between different places and the bearings between them, and finally a few astro-geographical observations which, however, were almost always incomplete, no means existing before the discovery of chronometers, for determining the longitudes with even approximate exactness. The cartography of the New World was still almost exclusively limited to a general outline of the coast, and geographers scarcely attached as much importance to it as they now give to the mapping of the uninhabited north and south polar regions. As regards the Old World, faith in the infallibility of Ptolemy was yet almost undisturbed, and it was regarded as the greatest merit for a cartographer, to reconcile the newly collected data with the classical types of the 2d century. However, a few chorographical or topographical maps, perhaps directly called forth by the first chapter of Ptolemy's geography, were already published in print, and from the middle of the 16th century such special maps, founded upon actual surveys, became more and more common. They then reacted on the general maps, and communicated to these, even when their technical execution was defective, a completeness which is wanting in the productions of the time which may be called the period of incunabula of cartography. It was this breaking with classical authorities that formed the real source and cause of the modern period introduced by the works of Gastaldi, Philip Apianus, Ortelius, and Mercator.

The following chorographies or detailed maps of smaller districts were already published in print before the middle of the 16th century:

1. A map of *Lotharingia*, commenced in 1507 »Vosagi rupibus,» and published in print in 1513. As the first printed topographical map founded on actual measurements, it is of great interest, and really deserves the epithet *nobile opus*, by which it seems to be designated in the author's preface (comp. above p. 69). The map, however, is far from exact. The skill of King René's cosmographer in making and calculating astronomical observations appears to have been very defective. For, even deducing a constant error of a whole degree, there still remain on the first modern topographical map greater errors of latitudes than those found on the better maps of Ptolemy, e. g. on his map of Egypt.

2. *Chorographia Eremi Elvetiorum*, *Chorographia Rheni* and *Chorographia Cretae*, printed for the first time in Ptolemaeus 1513, then reproduced from the same block in the edition of 1520, and on a reduced scale in the editions 1522, 1525, 1535 and Viennæ 1541. On these maps the geographical co-ordinates are also inexact, and the drawing is so rough, and so different from the style as well on modern maps as on the first printed maps of Ptolemy, that it requires some time to become conversant with them. But they are rich in details and have the unmistakable character of having been drawn by cartographers well acquainted with the countries. The map of Crete seems to be copied from a portolano, or at least to be founded on a Venetian original. I have not succeeded in obtaining any information as to the author of *Chorographia Provinciæ Rheni*. The third map, *Chorographia Eremi Elvetiorum*, is a tolerably accurate copy of the map of Switzerland constructed in 1496 by Conrad Tyrst. Some of the legends of the Tyrst map, however, are here omitted, evidently on account of the technical difficulty of rendering all the inscriptions on a wood-cut. A manuscript copy of the original on vellum is still preserved in the Imperial