

THE UNIVERSITY OF MANITOBA
MERCATOR'S CHANGING CONCEPT OF THE
NATURE OF THE NORTH POLE

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INTRODUCTION

Gerhard Mercator (1512-1594) was the greatest cartographer of the Renaissance. Indeed, his contemporaries believed him to be the 'Ptolemy' of his age.¹ Unquestionably, his attempt to represent the earth's surface in the most accurate way possible and his studies in geomagnetism had an abiding impact upon the development of cartography. It is not surprising, therefore, that his life, his beliefs and his work have been extensively studied by both historians and geographers.² But the emphasis has remained on Mercator, the cartographer, without paying much attention to Mercator, the humanist.³

This study will attempt to answer the question whether Mercator can be considered a representative of

¹A. L. Humphreys, Decorative Printed Maps of the 15th to 18th Centuries, a revised edition by R. A. Skelton (London, 1967), p. 3, and L. Bagrow, "Abraham Ortelii Catalogus Cartographorum", Petermanns Mitteilungen, Supplement 199 (Gotha, 1928), 23.

²R. Kirmse wrote a detailed review of the more recent studies on Mercator: "Neue Arbeiten ueber Mercator, seinen Sohn Arnold und Christian Sgroten. Eine Betrachtung der Mitteilungen von 1945 bis 1960", Duisburger Forschungen, V (1961), 52-80.

³Kirmse, too, indicated the necessity to view Mercator, the humanist, cf. "Die grosse Flandernkarte Gerhard Mercators (1540)--ein Politikum?" Duisburger Forschungen, I (1957), 4.

the Northern Renaissance,⁴ and if so, to what degree his life and work are representative of a particular humanist trend in the sixteenth century. His changing concept of the nature of the North Pole has been chosen to illustrate the practical-cartographical as well as the theoretical and humanist considerations which influenced his work. The relationship between Mercator's representation of the North and voyages of exploration in northern latitudes will receive attention; it should clarify the question whether Mercator was interested more in the usefulness of his geographical and cartographical theories or in the humanist value of his endeavors.

When Gerhard Mercator started his career as cartographer during the first half of the sixteenth century the knowledge of the earth's surface had considerably expanded. Europeans could no longer conceive of their world as one immense island comfortably enclosed and protected by an all-surrounding ocean. That ocean had been conquered.

⁴It seems necessary to differentiate between the "Italian" and the "Northern Renaissance". They are not only separated in time but they also differ in characteristics. Growing in and adapting itself to its environment, the "Northern Renaissance" found an earlier foothold at princely courts and at some universities than in the cities, almost reversing the development in Italy; cf. L. W. Spitz (ed.), The Northern Renaissance (Englewood Cliffs, N. J., 1972), pp. 1-12. A further characteristic of northern humanists appears to be their pre-occupation with theological reform, cf. H. Hornik, "Three Interpretations of the French Renaissance", French Humanism. 1470-1600 (W. L. Gundersheimer, ed.) (New York, 1970), p. 41.

Africa, long thought-of in terms of one of the possible land-routes⁵ to oriental spices and as the seat of that fabulous kingdom of Prester John, had been circumnavigated. Among other results, this feat had unlocked the springs for even more adventurous enterprises which in turn resulted in the encircling of a previously believed limitless ocean.

Although one may be tempted to ascribe this release of energy to a so-called "enterprising spirit of the Renaissance", to a shaking off of the shackles of the Middle Ages, the underlying impulses were in great part of a different nature, namely economic. The spices and luxury articles which the Orient could offer were much sought after and the desire to obtain them was a spur to the more daring minds of the time.⁶ Here, monarch, merchant, and mariner combined played together into each others' hand. Portugal took the lead in the quest for new routes to the spice-markets of the Orient; Spain followed

⁵Africa as a land-route naturally has to be understood as referring solely to the caravan routes through the north African deserts.

⁶Altered political situations in the Near East and Levant had hampered the continual flow of oriental spices into western Europe. Venice and Genoa still were important trading ports for the luxuries of the East, but Portugal had begun to wrest that monopoly from the Mediterranean ports, aiming not only at the profit from the spice trade but also at replenishing its cash-resources with gold from the African west-coast. Cf. F. Braudel, La Méditerranée et le Monde Méditerranéen à l'Époque de Philippe II (Paris, 1966), pp. 422-433.

close on her heels. By the end of the fifteenth century, the competition had reached a stage where only an official agreement could keep the contenders in check. The Treaty of Tordesillas of 1494 tried to answer this need: Portugal and Spain agreed henceforth not to invade each other's assigned sphere.⁷

The possibility of demarcation over the ocean had become available after the revival of the works of Ptolemy and their widespread propagation during the second half of the fifteenth century.⁸ Cartographers again used a grid on their maps according to the examples in Ptolemy's Geographia.

Yet, in signing the Treaty of Tordesillas Spain and Portugal had not counted on the growing interest in overseas territories which also stirred France and England. Both countries were as eager as Portugal and Spain to find a way to the riches of Cathay and were not deterred by either cost or danger. But since they had not signed the Treaty of Tordesillas and were thus excluded from the spoils to be found in southern latitudes, France and England had to look for their fortune in more northern regions.

⁷The Treaty of Tordesillas officially acknowledged the discoveries of both Portugal and Spain and laid down a line of demarcation, thus trying to avoid possible conflicts originating in future discoveries. For the details of the Treaty of Tordesillas and the exact line of demarcation see: J. H. Parry, The Age of Reconnaissance (New York, 1964), p. 168.

⁸G. R. Crone, Maps and their Makers (London, 1966), chapt. V, pp. 68-76.

Hence it happened that the cold, unfriendly North now suddenly had its attraction, too.⁹

English merchants were particularly quick to recognize their chance: advancing to the East by a northern route would not only bring them to their goal but would also be the means of establishing on their way thither markets for their wool products.¹⁰ Thus, the theories of either a north-east or a north-west passage in high northern latitudes gained in favour and importance. It became important to know whether the Arctic was a solid land-mass or a penetrable sea. And both cartographers and

⁹This "looking north" was probably not exclusively a result of honouring a treaty. At the onset of European overseas expansion either their economic situation or their current political interests did not allow them to divide their forces. France was occupied in embarrassing Spain (i.e., Charles V) along its eastern border, stirring up and supporting dissatisfaction in the Netherlands and in German territories; it still hoped to regain the Genoese, Milanese and south Italian lands which it had lost to Spain. Added to these "continental" ambitions were the difficulties the crown encountered with the religious problems shaking Europe at this time. England, relatively untroubled by that latter problem, was not yet ready to contest Spanish sea-power openly and contented herself, for the moment, with tapping the Spanish silver-fleets arriving from the Americas.

¹⁰Richard Hakluyt the Elder always stressed this aspect of English enterprise in the search for a north-east passage to China. Cf. R. Hakluyt, The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation. Made by Sea or Over-land to the Remote and Farthest Distant Quarters of the Earth at any time within the compasse of these 1600 yeeres. 1589 (ed. New York, 1965), Preface to the Reader.

cosmographers¹¹ were drawn into the disputes.

No less significant in an evaluation of the quest through the North during the sixteenth century was the re-discovery of ancient texts. These contributed noticeably to a revival of geographical theories. The writings of Ptolemy especially were eagerly studied. But, in a century characterized not only by "rebirth", "revival", and "reform", it was inevitable that his authority, too, would come under careful investigation. Gerhard Mercator was not the only one to voice his criticism of Ptolemy, although he always viewed the great cosmographer with deep respect.

The North, then, was a touch-stone of interest not only in regard to possible political influence over territories to be discovered there or concerning the economic ambitions of merchants: it also challenged the geographical theorist of the sixteenth century. Their idea of the nature of the Arctic varied considerably. Since there existed no accurate or scientific accounts or maps, geographers were able to give free play to their own ideas. Imaginary islands willingly filled empty spaces on the maps. Fantastic animals, sea-monsters, and legendary people enlivened the emptiness of unexplored lands, their existence

¹¹In this essay, cartographer will always designate the map-maker in the pure sense of the word: the designer and engraver of maps. The cosmographer, however, will be he who also attempts to contribute to geographical theories and to the knowledge of the universe.

being based upon travel-accounts, tales, and geographical treatises like, for example, Sir John Mandeville's well-known Travels and Olaus Magnus' Historia de Gentibus Septentrionalibus of 1555.

Among the known works of Mercator there are at least four maps and one globe depicting the Polar Regions. His Double Cordiform World Chart, published in 1538, is his earliest map with a representation of the areas of interest for this study. In 1541 followed his Terrestrial Globe, much praised by his contemporaries. The well-known World-Chart, presenting for the first time the new projection named after Mercator, appeared in 1569; it carries an inserted small drawing of the North Pole. Almost twenty-five years later, Mercator published another map, exclusively devoted to the representation of the Septentrional Regions. And finally, there appeared the map of the Polar Regions in Mercator's Atlas, published posthumously in 1595 by his son Rumold Mercator.¹²

These four maps and the globe are indeed not only beautiful examples of Gerhard Mercator's craftsmanship but also clearly reflect his critical evaluation of the geographical knowledge of his time. There is no want of descriptions of the material under consideration; every

¹²Detailed references to publications and reproductions of these maps and the globe will be cited below in Chapter III.

major study in the history of cartography mentions and briefly discusses Mercator's work. Attempts have even been made to trace Mercator's possible sources.¹³ But no one has undertaken to evaluate Mercator's representations of the Polar Regions in terms of the clearly manifested differences among them, the causes or reasons behind these differences, and their probable relationship to commercial interests and philosophical theories.

Gerhard Mercator's life spanned almost the entire sixteenth century--he was born in 1512 and died in 1594. He thus was born into the spiritual revival of the Northern Renaissance, a circumstance which left its marks on his education and development. He grew up in an atmosphere of deep and sincere devotion and respect for the established religion, Catholicism. And yet, his higher education at Louvain and the all-pervading influence of Erasmus of Rotterdam trained him thoroughly to approach even the most revered authority with a critical eye. Not surprisingly, therefore, he confronted many contemporary conflicts or issues with an open mind, researched "problem areas" (i.e., religious disputes) and defended his ideas once he had proved to himself their correctness. Notwithstanding a life restricted first to Louvain and then to Duisburg,

¹³F. van Ortroy, "Les Sources Scientifiques de la Cartographie Mercatorienne", Mélanges d'Histoire offerts à Henri Pirenne (Bruxelles, 1926), Vol. II.

Mercator enjoyed the friendship of numerous well-known and influential personalities and kept a large correspondence, thus keeping abreast of the political, economic, religious and philosophical developments of his time.

His work, therefore, should be seen not only in geographical or cartographical terms but also as a mirror of a mind maturing during a troubled epoch. Some of the variations in his maps of the Arctic undoubtedly may be traced to northern explorations, sponsored in particular by England. But there occur other fundamental differences in Mercator's outline of the Polar Cap which cannot be explained in the same way. They seem, rather, to have their origin in changes of concept, in new evaluations of existing theories regarding the far North.

It is imperative, therefore, to analyse, in chronological order, every variation in Mercator's changing concept of the North Pole. Date and dedication may provide necessary clues for a probable interpretation of each map and the globe. An attempt must be made, too, to distinguish between possible geographical knowledge accessible to Mercator and any theoretical considerations which might have influenced his work.

Accordingly, the materials made use of in this study can be roughly grouped into three major categories. Mercator's own work, that is his maps with representations of the Arctic and his globe of 1541, his theoretical

treatises and his philosophical-theological writings (his Genesis, which forms the first part of his Atlas) together with his preserved correspondence, form the main nucleus of primary material. Also included in this first group is Walter Ghim's Vita celeberrimi clarrissimique viri Gerardi Mercatoris Rupelmundani . . .,¹⁴ which, written at the end of the sixteenth century by Mercator's friend, provides illuminating insights into Mercator's career. A second category comprises all "indirect-primary" sources: cartographical, literary and oral information Mercator was able to rely on. And finally, secondary accounts were consulted for a general understanding of the sixteenth century, its political as well as its social, economic and religious problems.¹⁵

A short biography of Mercator precedes the description and analysis of the maps and the globe. The nature of his environment, his education, the circle of his friends and the choice of his benefactors will receive special attention, being significant factors in the formation of the future cosmographer. A detailed description of the four maps and the globe will then follow. A

¹⁴Walter Ghim (1530-1611) was a neighbour of Mercator's at Duisburg; he wrote the Vita based on private talks with his friend and on what he could gather from other informants. The biography was first published as part of the Atlas in 1595. For further details see: H.-H. Geske, "Die Vita Mercatoris des Walter Ghim", Duisburger Forschungen, VI (1962), 244-272.

¹⁵See Bibliography for a list of those authors.

separate chapter will be dedicated to the analysis of his changing concept of the North Pole. Here, some attention will be given to probable channels of communication of geographical knowledge and the time it required for new facts to be accepted and incorporated into prevailing geographical concepts. Did Mercator change or adjust his representations of the North Pole because of a new hypothesis concerning the Arctic? Was his adaptation of a specific text¹⁶ based on its mythical implications or on his respect for the authority of a certain old source so great that he refrained here from a critical evaluation of its content? Or even, were his friendship with the English theorist John Dee¹⁷ and his connection with the merchants of London¹⁸ so intimate that their interests, philosophical or economic, induced him to adapt his representation of Northern Regions to their special needs? These are some

¹⁶The text here referred to is the description of the Arctic written by a certain James Cnoyen and adapted by Mercator in his representation of the area in 1569. For a discussion of the identity of James Cnoyen and the importance attributed to him by Mercator, see below Chapter IV.

¹⁷John Dee (1527-1608) met Mercator at Louvain in 1547 while studying mathematics under Gemma Frisius. His interest in a possible north-east passage to China was spurred by his wish to obtain from the Far East precious occult knowledge. As geographical theorist he gave his advice to the London "Merchant Adventurours" and their principal navigator-explorers.

¹⁸Attested to by means of his correspondence with Richard Hakluyt the Younger.

of the more pressing questions to be attacked during the discussion.

Mercator's Genesis, finally, will cast an altogether different light upon the cartographer. Here, the humanist cosmographer will step into the foreground. Here, too, one will be able to evaluate to what degree Gerhard Mercator, the "Ptolemy of his age", imbued with the cross-currents of philosophical and religious controversies of the sixteenth century, can be called a "Man of the Northern Renaissance".

CHAPTER I

MERCATOR AT LOUVAIN

(His education and first successes)

"Gerard Mercator, the exceedingly experienced cartographer of the illustrious prince of Julich, Cleves, Berg, etc., was born in the year 1512, on the fifth of March, towards six o'clock in the morning . . ." ¹ With these words Walter Ghim ² introduced to posterity his long-time friend and co-citizen of Duisburg. His biography of Gerhard Mercator was first published as part of Mercator's Atlas in 1595 and thereafter was included in all Latin editions. Since their friendship dated from the years after 1552--the year when Mercator moved to Duisburg--Ghim's information about earlier happenings and events in Mercator's life depended solely on the

¹Gualtero Ghymnio, "Vita celeberrimi clarissimique viri Gerardi Mercatoris Rupelmundani", ed. and trans. H. H. Geske, "Die Vita Mercatoris des Walter Ghim", Duisburger Forschungen, VI (1962), 244-272; cited hereafter as Vita.

²Walter Ghim was not an unknown personality in the city of Duisburg: he occupied the office of mayor of that city twelve times. As far as can be concluded from the existing files in the archives of Duisburg, he might be the son of Johann Ghim, believed to have been one of the main promoters of a university at Duisburg. Cf. H. H. Geske, op. cit., p. 244.

recollections of his friend and his willingness to communicate them. The biography is therefore not consistently detailed for the entire life of the cartographer. Yet, it still represents, together with his cartographical work and his extant correspondence, one of the major sources for our knowledge of Gerhard Mercator.³

Gerhard Mercator was born in Rupelmonde, in the duchy of Flanders. He received his earliest schooling at his birthplace. At the age of fifteen he was sent to Herzogenbusch where he attended the classes given by the 'Brothers of the Common Life'.⁴ There he studied grammar

³The main biographical studies on Mercator are: Jan van Raemdonck, Gérard Mercator. Sa Vie et ses Oeuvres. (St. Nicolas, 1869), cited hereafter as: van Raemdonck, Mercator; Arthur Breusing, Gerhard Kremer genannt Mercator, der deutsche Kartograph (Duisburg, 1869); Heinrich Averdunk und Joseph Mueller-Reinhard, "Gerhard Mercator und die Geographen unter seinen Nachkommen", Petermanns Mitteilungen, Supplement 182 (Gotha, 1914), cited hereafter as: Averdunk, G. Mercator.

⁴The communities and schools of the 'Brothers of Brethren of the Common Life' grew in response to a growing need for a reformed religious life. Founded at the end of the fourteenth century by Geert Groote of Deventer, they soon became known also as the 'devotio moderna'. They mainly stressed sincerity, industry in work, modesty in behaviour, simplicity of mind, and they strove for a special ardour in religious feeling and thought, very much along the guide-lines of Thomas à Kempis' work, the Imitatio Christi. (Cf. J. Huizinga, Erasmus and the Age of Reformation (New York, 1957), pp. 3 and 4.) At an early stage in his development, Mercator was therefore exposed, even if not "trained", in a very simple and sincere approach to religion. This seems to be a point to remember in evaluating his future behaviour in questions of faith and religion.

and dialectic; his tutor in the sciences was George Macropedius, well-known in his time for his Latin studies and writings. Then, in the autumn of 1530, Mercator registered himself at the University of Louvain in the 'Paedagogium Castri'.⁵

The University of Louvain had been founded in 1425-1426 by duke John IV of Brabant.⁶ In all probability it was intended to provide a certain balance to the University of Paris. At the turn of the century, it had gained widespread recognition and was considered ". . . one of the strongholds of theological tradition" ⁷ But classical studies were not neglected. In 1517, the 'Collegium Trilingue' opened its doors; here, classes were given in Latin, Greek and Hebrew, the curriculum having been greatly influenced by Erasmian ideas.⁸ Humanistic studies had taken root and were furthered. Nevertheless, the theological faculty of the University of Louvain was one of the first officially to condemn Luther's teachings in

⁵Vita, p. 247; Averdunk, G. Mercator, p. 4; Antoine de Smet, "Mercator à Louvain (1530-1552)", Duisburger Forschungen, VI (1962), 29, cited hereafter as: de Smet, Louvain.

⁶L. Noël, Louvain: 891-1914 (Oxford, 1915), p. 111 and J. Huizinga, op. cit., p. 55.

⁷Loc. cit.

⁸G. R. Elton, Reformation Europe, 1517-1559 (New York, 1966), p. 121, n. 6.

1519.⁹ Indeed, it developed into one of the fiercest defenders of Catholicism, being suspicious of any criticism, even the most well-intentioned.

When Mercator arrived at Louvain in 1530, years of persecution of both Lutherans and Anabaptists¹⁰ had left their trace.¹¹ Harsh punishments for the so-called Melchiorites had given a frightening example to an anguished population.¹² An economic decline through over-taxation had contributed to a general unrest in the urban centres. Only Antwerp, since 1504 the centre for Northern Europe of the Portuguese spice-market, enjoyed a growing

⁹ Ibid., p. 121. In 1520, Luther's books were publicly burned under the surveillance of the papal legate to the Roman Empire, Hieronymo Aleandro, who once had been a close friend of Erasmus of Rotterdam. Cf. G. Faludy, Erasmus (New York, 1971), pp. 118, 187-188.

¹⁰ Founded by Conrad Grebel and George Blaurock, Anabaptism as a movement had started in Zuerich as a deviation from Zwingli's teachings. After its first violent persecution in 1526 it spread into Tyrol, Moravia, the Upper Rhine and also into the Low Countries where it took the form of "Melchiorite Anabaptism" (i.e., after the ". . . fanatical and extravagant Melchior Hoffmann"), cf. G. R. Elton, op. cit., pp. 94-99.

¹¹ Since the official condemnation of Luther's writings, persecution of "heretics" was encouraged by the administration of the Netherlands which used the suppression of sectarian movements not entirely in the name of "pure" Catholicism but also as a means to implement a stronger centralized authority of Charles V's government. Cf. G. R. Elton, op. cit., p. 43.

¹² "An imperial edict forbade rebaptism and decreed death by burning for men and live burial for women." On the persecution of radicals, cf. G. R. Elton, op. cit., pp. 100 and 102.

prosperity.¹³ Together with Brussels, the seat of the government, and Louvain, the stronghold of higher education, it formed a triangle within the province of Brabant from which Burgundian influence radiated into the other areas of the Low Countries. Malines was situated at the heart of this triangle, harbouring the imperial court. A few months after Mercator's arrival at Louvain, the Archduchess Margaret died and was replaced by Charles' sister Mary, Queen of Hungary, who came to Malines accompanied by many of her humanistically inclined friends and protégés.¹⁴ Mercator thus moved into an area where both conservatism and progressive humanism were living side by side, providing the eager student with the opportunity to learn from both, to appreciate their values, and to establish his own position in regard to them. Studying at Louvain had another advantage, too: situated near the centres of government, court, and commerce, it was an almost ideal place to meet potential benefactors.

Mercator attended classes at the University of Louvain for two years. During these years he was financially sustained by his great-uncle, the priest Gisbert Mercator of Rupelmonde. After having completed the courses

¹³Ibid., p. 41.

¹⁴K. Brandi, The Emperor Charles V. The Growth and Destiny of a Man and of a World Empire (London, 1949), p. 320.

required for a degree of 'magister', Mercator graduated in the autumn of 1532.¹⁵ To the surprise of his great-uncle who had foreseen a career in the priesthood for his great-grandson. Mercator did not show any interest in pursuing any special profession after his graduation. Rather, he decided to dedicate himself, as he said to his biographer, 'privatim' to the study of philosophy.¹⁶

In 1592, Mercator himself revealed some of the reasons which prompted him to abandon his formal education. In the dedication of his study Evangelicae historiae quadripartita Monas . . .,¹⁷ he confessed that he was rather disturbed at his discovery that Aristotle's theories of the origin of things did not completely coincide with Moses' account of the Genesis.¹⁸ For the sake of his own conscience he had to find the truth. He had started to doubt the truthfulness of all philosophers.

Mercator left Louvain. Life at the university had become fruitless for his purpose; student brawls and vain

¹⁵This date is not mentioned in Ghim's biography. However, a calculation undertaken by later biographers, based upon the arts curriculum and extant archives of the University of Louvain, established 1532 as the most probable year. Cf. van Raemdonck, Mercator, p. 16; Averdunk, G. Mercator, p. 4; de Smet, Louvain, p. 30.

¹⁶Vita, p. 247.

¹⁷Mercator dedicated his study to Henricus a Weze, then chancellor of the duke of Cleves. Cf. de Smet, Louvain, p. 30, n. 5.

¹⁸Ibid., p. 31, n. 7 bis.

discussions¹⁹ kept him from concentrating on his aim: to study the mysteries of nature.²⁰ He later explained that it was the problem of origins, the 'fabrica mundi', which particularly attracted his interest.²¹ He was convinced that he could recognize in Nature the most beautiful order ('ordinem pulcherrimum') and the most harmonious proportions ('proportionem convenientissimam').

He moved to Antwerp. Here he hoped to dedicate his days to the study of philosophy and of nature. His decision was to have far-reaching consequences. Leaving the conservative domain of Louvain's university to study philosophy made him suspect of deviating from the accepted norm, a dangerous undertaking in times of religious unrest.²² But his behaviour was not without precedent. Aided by new and enlarged translations of Latin and Greek texts, many students of the fifteenth and sixteenth centuries had started to question the infallibility of Aristotle and consequently of scholasticism. The greater availability of original texts had brought to light contradictions among the hitherto venerated philosophers themselves and in the Bible. They aroused confusion. Students turned to attack

¹⁹Loc. cit.

²⁰Loc. cit.

²¹Ibid., p. 31, n. 6.

²²His absence from Louvain was counted against him during his arrest by the Inquisition in 1544.

the problems at their root, to study the originals with the utmost precision and they tried to find answers in nature itself. This however did not always mean that they left the fold of the church; rather, their endeavours were mostly oriented to explain with their reason what they had been taught merely to believe.

Mercator's desire to study nature and philosophy also resulted in deepening his knowledge of mathematics. Through the influence of Nicolas Cusanus²³ and his concept of 'visio intellectualis'²⁴ upon the philosophy of the Renaissance, mathematics had become a necessary tool of philosophy. Its ". . . exactness . . . [was] sought not for its own sake", as Cassirer pointed out, ". . . nor even as a foundation and deepening for knowledge of nature, but for the foundation and deepening of knowledge of God."²⁵ Mercator's study of philosophy and mathematics has to be understood along these lines. He wished to penetrate the mysteries of creation, the 'fabrica mundi', and he chose

²³Nicolas Cusanus (1401-1464) received his early education, like Mercator, from the Brethren of the Common Life at Deventer. Later he studied law and mathematics in Padua (where he met P. Toscanelli, renowned at his time as a great mathematician and physicist) and theology in Cologne. His work De docta ignorantia appeared in 1440.

²⁴E. Cassirer, The Individual and the Cosmos in Renaissance Philosophy, tr. by M. Domandi (Philadelphia, 1972), p. 14.

²⁵Ibid., pp. 52-53.

as a means his interpretation of the 'visio intellectualis' rather than scholastic logic.

Recollecting the thoughts of his youth, Mercator also mentioned that the order and the proportion of the creation pleased him very much. The recognition and appreciation of these two qualities are a characteristic trait of Renaissance "speculative-philosophical, technical-mathematical and artistic tendencies"²⁶ and identify Mercator as an heir to Italian Quattrocento thought. Manifesting themselves at the outset of his adult life, they accompanied Mercator through his entire career and deeply influenced his thought and work.

Mercator's choice of Antwerp as a "retreat" may have been influenced by the city's rather liberal attitude in religious matters.²⁷ During the first half of the sixteenth century Antwerp still enjoyed its privileged position as the spice-market for northern Europe. Representatives of the great trading-companies of the Mediterranean were established in the city. Important bankers had gathered within its walls, always ready to profit from the incoming American gold and silver.²⁸ But commerce

²⁶ Ibid., p. 51.

²⁷ The New Cambridge Modern History, G. R. Elton (ed.) (Cambridge, 1958), Vol. II: The Reformation, 1520-1559, p. 57.

²⁸ During the first half of the sixteenth century, the American gold and silver earmarked for the sustenance

and banking did not only bring riches to Antwerp, they also brought a great variety of available information. Together with the important universities, the great trading and banking cities of the Renaissance were centres for the exchange and discussion of new ideas, of books, of learning.²⁹

We do not know exactly for how long Mercator stayed in Antwerp in pursuit of his private philosophical studies or by what means he supported himself. We cannot even be sure whether he remained at Antwerp all the time. It is possible, as de Smet suggests, that Mercator visited the house of the Franciscan 'Minor Brothers' in Malines.³⁰ He supports his theory with the fact that an exchange of letters between Mercator and the 'Minor Brothers' of Malines was part of the Inquisition's indictment against Mercator. But since those letters never could be brought to light then or later, it cannot be proven that his connection with the Franciscans goes back to a visit to Malines prior to 1535, the year of his return to Louvain. De Smet further argues that the beginning of Mercator's

of the Burgundian possessions and the Empire were shipped directly from Seville to Antwerp. Cf. F. Braudel, La Méditerranée et le Monde Méditerranéen à l'Epoque de Philippe II (Paris, 1966), Vol. I, p. 433.

²⁹For the cultural and intellectual life of the Netherlands in general: cf. P. Geyl, The Revolt of the Netherlands. 1555-1609 (London, 1966), pp. 41, 44, 46.

³⁰De Smet, Louvain, p. 32.

interest in cartography and cosmography could be dated to such a visit, since Malines seems at that time to have been a centre of map-making.³¹ This conclusion, however, seems arbitrary. Mercator was definitely interested in the 'fabrica mundi' when he left Louvain; taking up the profession of cartographer may simply have been a means to support himself without separating himself too much from his cosmographical preoccupations.

On his return to Louvain, Mercator dedicated himself exclusively to the study of mathematics. He had realized that he could not yet sustain a family as a "professor" of philosophy.³² He attended the private lectures of Gemma Frisius³³ and, under his direction and

³¹Loc. cit.

³²Vita, p. 247.

³³Gemma Frisius (1508-1555), known particularly for his inventing and perfecting mathematical instruments (i.e., astronomical rings) and for his research in topographical measurement, graduated in 1528 from the arts faculty at Louvain; in 1541 he received his doctorate in medicine at the same university and in 1543 he began to give lectures on mathematics and astronomy at the same institution. Because of his outstanding knowledge and reputation he was called several times as a consultant to the court of Charles V. (A. De Smet, "Notes sur Gemma Frisius", Bulletin de la Société Royale de Géographie, 80 ième année, Fasc. 3-4 [1956], 81-83.) H. E. Wauwermans (Histoire de l'École cartographique Belge et Anversoise du XVIe Siècle [Bruxelles, 1895], Vol. II, pp. 8-15) contends that Gemma arrived at Louvain as "substitute" for his teacher, the mathematician and astronomer Peter Apian of Ingolstadt whom Charles V had called to the Netherlands. And Haasbroek (Gemma Frisius, Tycho Brahe and Snellius and their Triangulations [Delft, 1968], p. 15) uncovered

tutorship, studied J. Vogelin's booklet on Elementale Geometricum and Euclid's first six books.³⁴ He was successful and soon gave private classes to students. At the same time he learned the manufacture of mathematical instruments and engraving. His progress must have been extraordinary³⁵ since in 1535-1536 he was already employed as engraver, together with Gaspar a Myrica, for the second edition of Gemma Frisius' Terrestrial Globe.³⁶

In 1536 Mercator's economic situation was improving. He had enough income to settle down and sustain a family. In the autumn of that year Mercator married Barbara Schellekens, a citizen of Louvain.³⁷

However, instrument-making, tutoring and mapping did not prevent Mercator from following-up his central preoccupation: the Holy Scripture. Yet, he did not again retire to study in private; rather, he chose to profit from this preoccupation with the Scripture in a more tangible way: he drew and engraved a map of the Holy Land. It was

connections between T. Brahe and members of Gemma's family. In 1529 Gemma published a revised edition of Peter Apian's Cosmographia (Cosmographicus Liber Petri Apiani Mathematici, studiose correctus, ac erroribus vindicatus per Gemmam Phrysiium. Antverpiae, 1529.)

³⁴Van Raemdonck, Mercator, pp. 26-27; Averdunk, G. Mercator, p. 5; de Smet, Louvain, p. 36.

³⁵Vita, p. 247.

³⁶De Smet, Louvain, p. 38, n. 31.

³⁷Vita, p. 248.

published in 1537 under the title Amplissima Terrae Sanctae descriptio ad utriusque Testamenti intelligentiam.³⁸ The map was well received. Mercator had chosen an opportune moment for publishing a map of the holy places. Interest in and the study of the Bible was widespread. In contrast to their predecessors and to some of their contemporaries in Italy, northern humanists paid more attention to the Bible and, in Erasmian terms, to theological questions.³⁹ Outside the learned circles, too, the interest in the Scripture had been freshly nourished by the Reformation. To be able to trace the wanderings of Christ and of the Apostles on a map was indeed very attractive.

Yet, even taking this fact into consideration, the timely dedication of the map to Franciscus Craneveld may have played a role in the success of the map.⁴⁰ The "very honoured counsellor of Charles V",⁴¹ F. Craneveld (1485-1564) had been a member of the magistracy of Bruges since 1515; in 1522 he was nominated to the Great Council at Malines by the Emperor. A jurist by profession, he was

³⁸R. Almagià, "Una serie di preziose carte di Mercator conservate a Perugia", L'Universo, VII (1926), 801-811.

³⁹W. L. Gundersheimer (ed.), French Humanism. 1470-1600 (New York, 1970), p. 41.

⁴⁰"Ornatissimo viro D. Francisco Craneveldio Caesaris invictissimi Consiliario dedicatum". Quoted in de Smet, Louvain, p. 41.

⁴¹Vita, p. 248.

also known for his love of humanistic studies which prompted him to learn Greek in his old age. His interest brought him into connection with most of the leading minds of the Renaissance in the Netherlands.⁴² By dedicating his first map to Craneveld, then, Mercator secured for himself the good-will of an important benefactor and brought his name to the attention of not only the general educated public but also to one of the main circles of humanistic studies in the Low Countries.

Mercator's second map appeared in 1538 and is known as the Double Cordiform World Chart or Orbis Imago.⁴³ This map is dedicated to Ioannus Drosius.⁴⁴ As the style indicates, the dedication of this work seems to have been intended as a kind gesture to a friend. It is unpretentious and lacks references to titles or positions. Drosius is not known to have been a public figure. Dedicating the map to him could therefore hardly have yielded any major advantages to Mercator, either in economic or social terms. Also, it is not a very original map, as will be demonstrated below,⁴⁵ presenting nothing particularly new which could

⁴²Biographie Nationale de l'Académie Royale des Sciences, des Lettres et des Beaux-arts de Belgique, Vol. IV (Bruxelles, 1873), 484-486.

⁴³A description will be given in Chapter III.

⁴⁴"Ioanni Drosio suo Gerardus Mercator Rupelmundanus dedicabat." Text of the original, in the possession of the American Geographical Society, New York.

⁴⁵In Chapter III and IV.

have attracted the attention of the learned or of benefactors. What makes this map and the dedication interesting is that they give us a small indication of Mercator's friends of that period. Van Raemdonck first suggested,⁴⁶ and it has later been substantiated,⁴⁷ that Drosius was a student at the University of Louvain at the same time as Mercator. In 1543-1544 he was one of the forty-three burghers of Louvain accused of heresy and arrested by the authorities. It was during the same year that the Inquisition held also Mercator on the charge of maintaining relations with people suspected of heresy. Though the main accusation was based upon some letters, as mentioned above, Mercator's friendship with other suspects certainly was not advantageous to his position. Unfortunately, too little is known of Mercator's thoughts and beliefs during that period to ascertain that he adhered to a "heretic" teaching, even if only temporarily.

Both Ghim's biography and Mercator's own correspondence throw a better light upon the cartographer's work and thought during the following year or so.⁴⁸ In the

⁴⁶Van Raemdonck, Orbis Imago. Mappemonde de Gérard Mercator de 1538 (St. Nicolas, 1886), pp. 5-6.

⁴⁷De Smet, Louvain, p. 45.

⁴⁸Vita, p. 249; M. van Durme, Correspondance Mercatorienne (Anvers, 1959), cited hereafter as van Durme, Correspondance.

autumn of 1539 Mercator wrote to Antoine Perrenot de Granvelle about his occupation and his troubles.⁴⁹ The way in which he relates his problems to the Bishop of Arras suggests that Mercator had known him for some time. Probably it was Franciscus Craneveld who had introduced Mercator to Nicolas and Antoine Perrenot de Granvelle. It certainly seems unlikely that Mercator would talk about his financial troubles in a letter of introduction. Lack of money and of reliable sources had limited Mercator in purchasing materials necessary for the completion of various projects. A map of Europe remained half finished. To overcome his financial difficulties, Mercator wrote,

⁴⁹Van Durme, Correspondance, no. 3, pp. 15-16; van Durme gave as possible date 1540 which was revised by de Smet (Louvain, p. 46) to 1539. Antoine Perrenot de Granvelle (1517-1586), son of Nicolas Perrenot de Granvelle, attended for some years the University of Padua where he started a friendship with Cardinal Bembo. At Louvain he was connected with the faculty of theology. In 1538 he was nominated Bishop of Arras. From 1530, the date of Charles V's advisor M. Gattinara's death, when he succeeded his father as seal-bearer to Charles V, he was closely connected with the Emperor, rising steadily in favor and importance as his councillor. He retained his position after Charles V's abdication; in 1561 he became archbishop of Maline and in the same year the Pope created the cardinalate of "Saint Bartholomy en l'Isle" for him. Philip II named him viceroy of Naples in 1571 in which position he remained until 1575. After a few years in disfavor he was recalled to Madrid in 1579. Granvelle is known not only as one of the great diplomats of the Habsburgs and for his participation in the Council of Trent but also as an enthusiastic collector of books and art and as a humanist in his own right and generous Maecenas to a number of humanists, artists and printers. Cf. Biographie Nationale de l'Academie Royale, op. cit., Vol. VIII, 197-237.

he decided to occupy himself with "spherical geography" (i.e., the construction of globes).⁵⁰ He decided, in other words, to invest his time and efforts in something which would increase his income and, at the same time, make him known as a competent craftsman. Terrestrial globes were in demand, probably more so than a large map of Europe. On a globe one could engrave the newly discovered islands and continents, visualizing their position in relation to Europe. Explorers and sailors often preferred globes to charts because it was easier to trace a loxodromic course on a sphere than on a flat surface.⁵¹ Mercator therefore could expect a ready market consisting of explorer-merchants, educated bankers and rich burghers and of scholars and students. Particularly for the advantage of the latter he planned to correct mistakes, include more place-names, yet nevertheless keep the size of the globe manageable.⁵²

Apart from revealing some details of the cartographer's financial situation and his plans to overcome them, this letter also provides us with some indication of Mercator's method of working and his sources. First he

⁵⁰Van Durme, Correspondance, no. 3, pp. 15-16.

⁵¹The New Cambridge Modern History, R. B. Wernham (ed.), (Cambridge, 1968), Vol. III, p. 469.

⁵²Van Durme, Correspondance, no. 3, p. 16.

related to Granvelle that he studied and compared the writings of Ptolemaeus, Strabo and M. Paulus Venetus (i.e., Marco Polo).⁵³ The result of his research enabled him to make some corrections to previous cartographical works. Later on in the letter Mercator referred to a nautical chart lent to him by Granvelle. He took notes which were helpful to him when designing his own map. These remarks make it clear that Mercator relied on geographical texts of Hellenistic, Roman and late medieval times as well as on such charts and maps as he could get hold of. It was therefore very important for his success that he should form as many connections as possible with potential benefactors and with highly educated persons who possessed or had access to libraries and collections of maps or travel-accounts. Although the invention of printing had made books accessible to a wider readership and the use of copper-plates for the duplication of maps had facilitated a wider circulation of reliable charts, they still were expensive articles which only the well-to-do could afford to buy in great numbers.

Mercator could not rely upon personal or family riches. To sustain his growing family he had to earn his living by either producing enough mathematical instruments

⁵³Loc. cit.

and publishing maps or globes or by receiving money from benefactors or contracts from clients. In those first years of his career as cartographer he hardly had much spare time to pursue in depth his favorite interests, the study of the mysteries of nature, philosophy and mathematics. But he was fortunate, nevertheless, to have secured for himself the friendship of important benefactors. Both Craneveld and Granvelle were not only renowned for their connections with the imperial court and their friendship with leading humanists, they also were esteemed for their own studies and knowledge. Apart from rendering Mercator financial assistance, they also were friends who could assist him with their knowledge in his research and his intellectual questioning. They reassured him in his endeavour to correct mistakes or misconceptions of previous cartographers so that he might provide his contemporaries with a more truthful representation of the earth's surface. Cartography seems to have represented for Mercator, at that moment, both a means to earn his living and a "stepping-stone" in his study of nature, of the 'fabrica mundi'. To know and to depict the earth's surface in its true shape was one starting point from which to go on to understand the mysteries of creation.

But Mercator had more "worldly" patrons, too. In his biography it is related that some merchants pressed

Mercator to engrave a large map of Flanders.⁵⁴ It was completed in a short time and dedicated to Charles V in 1540.⁵⁵ Today it is almost certain that Mercator did not do the primary research of mapping and measuring for this map; he only engraved it.⁵⁶ Yet, though it did not fulfill its political purpose, as R. Kirmse maintains,⁵⁷ the commission provided Mercator with a further opportunity to demonstrate his skill.

Shortly after the publication of this map of Flanders, there appeared Mercator's treatise on 'italic' writing, the Literarum Latinarum, quas Italicas, cursoriasque vocant, scribendarum ratio.⁵⁸ Mercator, so inclined to order and harmony, had "developed" a form of writing which allowed the engraver of maps to present a clear and easily readable map. Aided by the use of

⁵⁴Vita, p. 249. R. Kirmse, "Die grosse Flandernkarte Gerhard Mercator's (1540)--ein Politikum?" Duisburger Forschungen, I (1957), 1-44.

⁵⁵"Carolo V Romanorum Imperatori semper augusto Gerardus Mercator Rupelmundanus devotissime dedicabat." Cf. R. Kirmse, op. cit., p. 25.

⁵⁶Ibid., p. 25.

⁵⁷Ibid., pp. 38-41.

⁵⁸A. S. Osley, Mercator. A Monograph on the Lettering of Maps, etc., in the 16th Century Netherlands with a Facsimile and Translation of his Treatise on the Italic Hands and Translation of Ghim's "Vita Mercatoris" (London, 1969).

copper-engraving which had recently come into vogue,⁵⁹ he provided cartographers with an attractive flowing type and explained carefully its execution in the booklet. This again seems to prove that Mercator had a more encompassing view of his profession than mere map-making. He liked to communicate his experience, he was inclined towards teaching; he worked not only for his personal betterment but also for the improvement of cartography.

In 1541, then, appeared the terrestrial globe which Mercator had announced in his letter to Antoine Perrenot de Granvelle two years before. He dedicated it to Charles V's advisor, Nicolas Perrenot de Granvelle.⁶⁰ And, as the inscription stated, he had obtained a "patent from his Imperial Majesty",⁶¹ a privilege hard to come by. Mercator profited for many years from the sale of this and his celestial globe--it appeared ten years later in 1551--as the accounts of his distributor Plantin confirm.⁶²

⁵⁹Both woodcut and copper-plate engravings for maps had been in use for some time. Woodcuts were preferred when the maps appeared as illustrations in books. But with a growing demand for decorative, single-sheet maps, copper- engravings became more popular. Cf. Humphreys-Skelton, Decorative Printed Maps of the 15th to 18th Centuries (London, 1967), p. 2.

⁶⁰Cf. E. L. Stevenson, Terrestrial and Celestial Globes, their History and their Construction (New Haven, 1921), Vol. I, p. 129.

⁶¹Ibid., p. 129.

⁶²L. Voet, "Les relations commerciales entre Gérard Mercator et la maison Plantinienne à Anvers",

Probably it figured among those globes which were purchased to ". . . beautify . . . Halls, Parlors, Chambers, Galleries, Studies, or libraries . . ." as John Dee remarked.⁶³

Mercator did not publish any further general maps for several years. After 1541 he was mainly occupied with constructing 'scientific instruments' for Charles V.⁶⁴ He had been recommended to the Emperor by Nicolas Perrenot de Granvelle. Charles V is known to have been fond of "mechanical devices"⁶⁵ and, when his instruments were lost during his campaign against the Schmalkaldic League in 1546, he promptly ordered their replacement by Mercator.⁶⁶

No letter, no remark in his biography, not even indirect information throws light upon Mercator's life during the years 1542-1544. One probably may assume that he earned his living by manufacturing instruments and by measuring and mapping private estates, using as much as

Duisburger Forschungen, VI (1962), 171-229, statistics no. 1, 2, 3 and especially no. 4 which gives details of the buyers.

⁶³Quoted in Humphreys-Skelton, op. cit., p. 1.
On John Dee see below, pp. 49 ff.

⁶⁴Vita, p. 249.

⁶⁵In 1537: ". . . the Emperor amused himself by discussing astrology and astronomy . . .; he wished to know all the particularities of the philosophy of nature and of the stars. . . . He wanted to understand every kind of mechanical device . . . and how they were made." Related by Charles V's biographer Santa Cruz and quoted in Brandi, op. cit., p. 383.

⁶⁶Vita, pp. 249-250.

possible his skills acquired under the tutorship of Gemma Frisius.

And then, in February 1544, came Mercator's surprising arrest by the Inquisition.⁶⁷ That it was a surprise even to his contemporaries was attested by the letters written on his behalf to the authorities by his priest, Pierre de Corte⁶⁸, and by Pierre Was, abbot of Sainte Gertrude and official of the University of Louvain.⁶⁹ They affirmed Mercator's innocence and strongly defended his Catholicism. Their protestations were of no avail. Mercator was kept prisoner until the autumn of that year.

In 1520-1522 Charles V had introduced the Inquisition into the Netherlands.⁷⁰ It differed from the Spanish Inquisition in that it was first under the sole control of the Emperor until, in 1523, Pope Adrian VI, Charles V's previous tutor from Utrecht, appointed two Inquisitors. But Charles V never permitted the Church completely to dominate the Inquisition of the Low Countries; in some areas of the country, the institution was even represented

⁶⁷Van Durme, Correspondance, no. 6, p. 18 and Francisco de Enzinas, Collections de Mémoires relatifs à l'Histoire de Belgique, ed. and tr. Ch.-A. Campan (Bruxelles, 1862), Vol. XIII, p. 299.

⁶⁸Van Durme, Correspondance, no. 8, p. 20.

⁶⁹Ibid., no. 10, p. 24.

⁷⁰C. J. Cadoux, Philip of Spain and the Netherlands (Archon Books, 1969), p. 70.

by the local government and its authorities. This fact explains why the letters, written on Mercator's behalf, were directed to Charles V's regent, Mary of Hungary.⁷¹ Irritated by his lack of success in suppressing the teachings of Luther in the Empire, Charles V insisted in rooting them out, at least in his hereditary lands. The Netherlands were to be an example to the others.⁷² Severe edicts were published to that purpose. In 1525 secret meetings for the reading of the Bible, or the discussion or preaching of it, were forbidden; any form of religious discussion was suppressed other than those officially recognized at centres of learning for the furtherance of the catholic faith; in 1529, even the possession of "Lutheran" books was to be punished with death; printing suffered under severe censorship from 1544.⁷³

Suspicion was rather indiscriminate. Erasmus, defender of traditional Catholicism, preferred to leave Louvain where he had helped to set up the 'Collegium Trilingue'. And, though Charles V was surrounded at his court by humanists who were profoundly influenced by Erasmian thought⁷⁴, the work of Erasmus was attacked from

⁷¹Van Durme, Correspondance, no. 10, p. 24.

⁷²P. Geyl, op. cit., p. 55.

⁷³C. J. Cadoux, op. cit., pp. 70-71.

⁷⁴M. Bataillon, Erasmus et L'Espagne. Recherches sur l'Histoire Spirituelle du XVI^e Siècle (Paris, 1937),

many quarters, including that of the Inquisition.

Mercator's arrest and charge, therefore, have to be understood within the mental climate of 1544 in the Netherlands, the hereditary domain of Charles V. The accusation was vague enough: that the Franciscans of Malines had in their possession some "suspicious letters" written by Gerhard Mercator.⁷⁵ A letter to the lieutenant of the Rupelmonde fortress, where Mercator was held captive, is more specific: it explains the charge to be 'lutterye'.⁷⁶ But "Lutheran" could indeed mean anything which provoked the slightest suspicion among the orthodox. During those years of religious fanaticism it even could occur that an envious person would easily use an allegation of heresy or Lutheranism to harm his enemy. Thus, neither the charge of heresy nor the accusation of Lutheranism tells us anything specific about Mercator's beliefs in 1544. They cannot really be used as evidence for the hypothesis that

p. 167; Bataillon points out that Erasmian ideas flourished especially during the regency of Francisco Ximenez de Cisneros, archbishop of Toledo, Primate of Spain and Inquisitor General since 1507. J. Lynch (Spain under the Habsburgs (New York, 1965), Vol. I, p. 67), writes that "By 1538 overt expression of Erasmianism was on its way to extinction in Spain."

⁷⁵Francisco de Enzinas, op. cit., p. 299; "M^e Gérard Scellekens [i.e., Mercator, husband of B. Schellekens] demeurant derrière les Augustines. Les frères mineurs de Malines ont de lui des lettres suspectes."

⁷⁶Van Durme, Correspondance, no. 6, p. 18.

Mercator was secretly a Protestant, as Averdunk maintained.⁷⁷ Averdunk tried to substantiate his claim by referring to Mercator's move to Duisburg in 1552, then a centre of free thought, and to the subsequent listing on the Index of two of Mercator's works.⁷⁸ Mercator's long delay in leaving Louvain, namely eight years, may be used as a valid counter-argument; and the inclusion of two of Mercator's works in the Index may be explained if one remembers that even some of Erasmus' writings were considered dangerous enough to be officially suppressed. Peter Opladen undertook a careful study of Mercator's treatise and of his correspondence in order to unravel this problem.⁷⁹ He could not verify Averdunk's theory. Rather, his research confirmed that Mercator firmly adhered to the text of the Bible as accepted by the Church. Neither could he uncover indications that Mercator disagreed significantly with the basic teachings of the Catholic Church.

⁷⁷Averdunk, G. Mercator, p. 41 writes: "Dass die Religion fuer Mercator in allen Dingen von groesster Wichtigkeit war, und zwar im Sinne der Reformation, geht aus seiner ganzen Lebensgeschichte hervor." (Italics added.)

⁷⁸The works put on the Index under the heading of "nisi emendetur" were the Chronologia of 1569 and the Atlas, prohibited since 1603.

⁷⁹Peter Opladen, "Gerhard Mercators religioese Haltung", Annalen des Historischen Vereins fuer den Niederrhein, Insbesondere das Alte Erzbistum Koeln, CXXXIII (1938), 77-90.

No valid answer has yet been found as to why Mercator was accused. Possibly, he had made himself vulnerable by temporarily leaving Louvain in order to philosophize 'privatim'. He had stepped outside the prescribed path. His expressed wish "to go to the sources", to study nature, to learn more about the mysteries of Creation may have sounded preposterous, even heretical, to the narrow-minded. An already existing misunderstanding of his ambitions may have been deepened by his open friendship with others suspect of heresy like Joannus Drosius. Only his humanist benefactors may have understood his aims, his intellectual restlessness, always directed toward the betterment of knowledge. But what is so surprising is that they did not intervene on his behalf when he needed their help. There exists no evidence that his release, after eight months' imprisonment, was brought about by an intervention either by Charles V, so fond of Mercator's work, or by either of the Granvelles. Rather, it seems likely that the charge was dropped because those suspicious letters could not be discovered.

Mercator's arrest by the Inquisition did not strain his relations with either Nicolas or Antoine Perrenot de Granvelle nor did it terminate his favour at the imperial court. On the contrary, after his release he immediately picked up his correspondence with Antoine Perrenot de Granvelle and he was honoured with the appointment as

'Imperatoris domesticus', as member of the Emperor's court.⁸⁰

Indeed, Mercator had done well in his career. Born into a humble family, he had made the most of his education and his talent. Through his marriage into the Louvain burgher-class, he had acquired an acceptable social standing, a foundation which, combined with his ability as craftsman and his mental capacity, made his rising and acceptance into higher circles and the court only a matter of time.⁸¹ Once he had attracted the attention of the imperial court by means of his dedications, he could be assured of their interest. His education by the 'Brothers of the Common Life', his studying at the University of Louvain and his training under Gemma Frisius had well prepared him for an intellectual exchange with humanists. His inclination toward philological research and study of the sources, one aspect of humanism, facilitated his humanistic progress.

⁸⁰Van Durme, Correspondance, no. 14, p. 29. Averdunk, G. Mercator, p. 32; van Raemdonck, Mercator, p. 74.

⁸¹During the first half of the sixteenth century, social mobility was quite widespread. The rich peasant, attracted by the economic possibilities of the town, tried to become a burgher; the burgher hoped to rise into the aristocracy. Scholars and humanists went where they found Maecenases. F. Braudel has demonstrated (op. cit., Vol. I, p. 479) that merchants' buying land was not only caused because of their wish to enter the higher social status of the landed nobility but also because they simply tried to circumvent a spiraling inflation by investing their money in real-estate. He noted, moreover, that social mobility started to slow down after 1555 (Vol. II, pp. 49-68).

On the other hand, his capacity as a craftsman of mathematical instruments and as a cartographer made Mercator a "valuable asset" to an imperial court. Charles V was very pleased with Mercator's work because he enjoyed knowing and handling instruments for their own sake; he also may have realized that a cartographer of Mercator's ability at his court would be a great advantage for the charting of his dominions. It could only help his navigators and merchants if seaways as well as land-routes were mapped as accurately as possible. In Seville, the 'Casa da Contratacion'⁸² had been founded for the purpose of training pilots as well as map-makers; by favouring and supporting Gemma Frisius and Mercator, Charles V may have had in mind some kind of an equivalent for the Netherlands.

Though it is not documented, one may safely assume that Mercator received some kind of remuneration as 'Imperatoris domesticus'. Other sources of income were the sale of his maps (Palestine, Orbis Imago and Flanders) and of his terrestrial globe. He did not publish any further works until 1551 when his celestial globe appeared.

Yet, he was not idle during those years. Mercator's letter to Antoine Perrenot de Granvelle, written in February of 1546, gives evidence of his endeavors as

⁸²This centre of hydrographic studies was founded in 1503. Cf. Ch. S. Singleton (ed.), Art, Science and History in the Renaissance (Baltimore, 1967), pp. 232, 235.

scientific cartographer.⁸³ He had been preoccupied with the problem of magnetism, researching its effects and its location. He had attacked this problem, so he explained, because he had been unable to use nautical charts as sources for correcting geographical errors; they had proven to be too contradictory because of an ". . . ignorance of the nature of the magnet."⁸⁴ After studious research and upon mature consideration, Mercator reached the conclusion that the magnetic pole must be situated on the surface of the earth, contrary to the traditional belief which located it somewhere in the heavens. Since experience had demonstrated that at one given place the magnetic needle always indicated true north, the point to which it is attracted could not be

⁸³Van Durme, Correspondance, no. 18, pp. 32-34; H. D. Harradon, "Some early Contributions to the History of Geomagnetism--IV," Terrestrial Magnetism and Atmospheric Electricity, XLVIII, No. 4, 200-202. For a detailed bibliography on this letter see: de Smet, Louvain, p. 81, n. 161.

⁸⁴"Whenever I examined nautical charts, . . . , I had to wonder, how it could be that ship-courses, when the distances of the places were exactly measured, at times show their difference of latitude greater than it really is, and at other times on the contrary, smaller, and again frequently hit upon a correct difference of latitude for the places in question. Since this matter caused me anxiety for a long time, because I saw that all nautical charts, by which I was hoping especially to correct geographical errors, would not serve the purpose, I began to investigate carefully the cause of their errors, and found them chiefly to rest on an ignorance of the nature of the magnet." Tr. by Harradon, op. cit., p. 33.

in the heavens, because, since every point in the heavens, except the poles, is subject to a rotational motion, the needle, owing to the diurnal rotation of such a point in the heavens, would necessarily wander now this way now that, and hence decline alternately to the east and to the west, which is contrary to experience. On the earth, therefore, which remains fixed, this point is to be sought.⁸⁵

His calculations had led him to locate the magnetic pole at the intersection of 168° longitude and 79° latitude in the northern hemisphere.⁸⁶

William Gilbert's De Magnete⁸⁷ was published fifty-four years after Mercator wrote his letter to Antoine Perrenot de Granvelle. But the difference between them is not just one of years. Whereas Mercator seems to approach the problem in purely scientific terms, Gilbert philosophizes about it. Mercator investigated the effects, Gilbert the nature of the magnetic forces.⁸⁸ Though Mercator had been attracted towards philosophy, or rather

⁸⁵Ibid., p. 33. Italics added.

⁸⁶Ibid., p. 33. On the history of declination-observations until G. Mercator cf. S. Chapman and J. Bartels, Geomagnetism (Oxford, 1940), Vol. II, pp. 901-909.

⁸⁷G. Guillielmi Gilberti Colcestrensis, medici Londinensis, De Magnete, magnetisque corporibus, et de magno magnete tellure physiologia nova. London, 1600. Gilbert (1544-1603) studied at Cambridge from which he graduated in 1569 with a medical degree. After extensive travel through Europe he returned to England and settled at London. His work was characterized by his belief in the absolute value and necessity of investigation by experimenting and not solely theorizing.

⁸⁸Gilbert stated that "the magnetic force is animate, or imitates the soul; in many respects it surpasses the human soul while that is united to an organic

philological theology, when he temporarily left Louvain in 1532, he had turned afterwards to the study of mathematics and cartography. The intellectual circle he frequented was not as inclined towards philosophical speculation as were Gilbert's acquaintances and friends.⁸⁹ Compared to Gilbert, the Mercator of 1544 discussing the problem of geomagnetism almost appears as a sober, realistic, utilitarian scientist.

This letter to Antoine Perrenot de Granvelle provides us also with a first reference to Mercator's conception of the universe. While expanding on his reasons for locating the magnetic pole on the earth's surface, he had stated that ". . . every point in the heavens, except the poles, is subject to a rotational motion . . ." and that ". . . the Earth remains fixed."⁹⁰ Mercator's statement is an unequivocal rendering, in crystallized form, of the then generally accepted geocentric concept of the universe: the earth fixed at the centre of concentric spheres, first eight and later nine, which were supposed

body." Quoted in A. Koyré, From the Closed World to the Infinite Universe (Baltimore, 1970), p. 292, n. 11.

⁸⁹ Humanists though Gemma Frisius or Antoine Perrenot de Granvelle may have been, they certainly did not pursue philosophy as did English scholars of Gilbert's circle under the influence of Marsilio Ficino, Pico della Mirandola and Giordano Bruno and his teachings of an infinite universe, based on the philosophical writings of Nicolas of Cusa and the corpus hermeticus supposed to have been written by the legendary high-priest Hermes Trismegistos.

⁹⁰ See above, p. 43.

to rotate around an axis. It was basically an Aristotelian universe, adapted by the Fathers of the Church to the Scriptures and Christian dogma.⁹¹ It is rather surprising that Mercator accepted Aristotle's modified universe without openly questioning it, particularly since he had opposed Aristotle's account of the Genesis. There can hardly be a doubt that Mercator knew about the alternative: Copernicus' De Orbium Coelestium Revolutionibus Libri VI had been published in 1543. Unquestionably, the heliocentric system was discussed at Louvain. Gemma Frisius, his tutor and teacher, is believed to have accepted it because of its usefulness in calculating more correct chronological tables.⁹²

However, like many of his learned contemporaries, Mercator did not recognize the validity of the Copernican concept. Its implications demanded too radical a change of mind so that it was often rejected not so much in terms of scientific astronomy but rather in regards to Christian beliefs. As A. O. Lovejoy and A. Koyré have pointed out⁹³

⁹¹Th. S. Kuhn, The Copernican Revolution. Planetary Astronomy in the Development of Western Thought. (Cambridge, 1966), p. 110.

⁹²R. Taton (ed.), The Beginnings of Modern Science. From 1450-1800 (New York, 1964), p. 67.

⁹³A. O. Lovejoy, The Great Chain of Being. A Study of the History of an Idea (New York, 1960), pp. 99-143; A. Koyré, op. cit., pp. 28-57. E. Cassirer also pointed out that it was necessary for the people of the sixteenth century to first undertake a change in their mode

the dismissal of Copernicus' heliocentric universe as an impossibility was mainly based on a religious argument: the earth, believed to be the abode of imperfection and sin, the point farthest removed from God because of its imperfections, could not be moved nearer to the sphere of God. This arbitrary elevation of the earth into the sphere of the nobler planets (in terms of the Chain of Being) seemed to many like a provocation of God's anger. The medieval belief in a sinful, imperfect mankind in need of redemption ran counter to the Copernican world view. Mercator stood firmly in that medieval tradition. All his desire to correct errors based on ignorance, all his humanistic studying of the sources, all his 'contemplatio naturae' receded into the background when confronted with such a radical alternative. It could be objected that Mercator could not but adhere to the teachings of the Church since his letter was addressed to the bishop of Arras, Antoine Perrenot de Granvelle; after having been suspected once by the Inquisition, he probably did not dare to risk his life a second time.

On the other hand, Mercator may have been conscious of some of the scientific reasons which spoke against

of thinking before they would be able to accept a heliocentric universe and the possibility of its infinity; as he said: ". . . a new logic of the conception of nature had to be formed", cf. E. Cassirer, op. cit., p. 102.

Copernicus' system. Aristotle's physics had not yet been replaced by a different explanation for physical motion.⁹⁴ It was believed that earthly bodies fell to the ground because the earth was at the centre of the universe. The moment the earth was removed from that position, the traditional physical and mechanical explanations lost their value. Unfortunately, Copernicus did not accompany his astronomical proposals with a refutation of Aristotelian laws of physics and he therefore encountered much opposition.⁹⁵ Later in the century, Tycho Brahe⁹⁶ added to this criticism his own observation that the Copernican system arbitrarily opened an immense space between Saturn and the sphere of the stars ". . . merely to account for the

⁹⁴This was only provided in 1632 when Galileo proposed a new explanation in accordance with the earth's rotational movement. The New Cambridge Modern History, G. R. Elton (ed.), op. cit., p. 399.

⁹⁵G. R. Elton, op. cit., pp. 398-400. Elton further points out that ". . . the Copernican and Ptolemaic geometries are interchangeable, that is, the relative positions of the heavenly bodies as seen from the earth are the same at any moment, no matter which system is used to calculate them." (p. 398)

⁹⁶Tycho Brahe (1546-1601), son of a noble family, studied at the University of Copenhagen, then at Leipzig. From 1566 to 1570 he moved from Rostock to Wittenberg, to Basel and to Augsburg. In 1575 he journeyed to Venice. On his return to Denmark, king Frederick II placed the island of Hvenin at Brahe's disposal together with funds for the construction of an observatory. Having fallen into disfavour with the new king, Christian IV, Brahe left for Prague (1597) and entered the court of Rudolf II. Another of his benefactors was Heinrich von Rantzau with whom Mercator corresponded, too. For discussion of Tycho Brahe's system see below, pp. 88 ff.

absence of observable parallactic motion."⁹⁷ Mercator was no astronomer. His rejection of Copernicus' heliocentric universe was either based upon religious considerations or physical-mechanical arguments and objections. Although some years afterwards he accepted Tycho Brahe's modified system,⁹⁸ Mercator never wavered in his belief in a geocentric universe.

Unfortunately, our knowledge is rather scarce about the remaining years Mercator spent in Louvain. There is hardly any evidence for his undertakings during that period or information concerning his intellectual development. In his biography it is mentioned only that in 1551 he finished and published a celestial globe which he dedicated to George of Austria,⁹⁹ bishop of Luettich.¹⁰⁰ At the same time he wrote for Charles V a treatise on the use of globes and one on the use of an astronomical ring.¹⁰¹ Charles V stayed in the Netherlands from September 1548 until May 1550; probably Mercator was so occupied as

⁹⁷Kuhn, op. cit., p. 201.

⁹⁸He discussed his concept in a letter; see below, pp. 86 ff.

⁹⁹George of Austria was the natural son of Emperor Maximilian and thus uncle of Charles V. He was also bishop of Valencia. Cf. K. Brandi, op. cit., p. 468.

¹⁰⁰Vita, p. 250.

¹⁰¹Ibid., p. 250.

'Imperatoris domesticus' that he had not much time to work on projects other than those mentioned above.

Indirectly, however, one may catch some glimpses of Mercator's life during these years. It was in 1547 or 1548 that Mercator met John Dee.¹⁰² They started a friendship which was to endure for the rest of their lives.¹⁰³ Dee had come to Louvain ". . . convinced that there lived and taught the most progressive navigators and mathematicians in Europe."¹⁰⁴ That Mercator was already then known as a mathematician is attested in Dee's "memoirs" where he recalled that he intended especially ". . . to speake and conferr with some learned men, and chiefly Mathematicians, as Gemma Frisius, Gerardus Mercator, Gaspar a Mirica, Antonius Gogava &c."¹⁰⁵ But Dee was not only interested in

¹⁰²John Dee (1527-1608) visited Louvain in 1547. In 1548 he registered as a student at the University of Louvain. Ch. Fell-Smith, John Dee, 1527-1608 (London, 1909); R. Deacon, John Dee, Scientist, Geographer, Astrologer and Secret Agent to Elizabeth I (London, 1968); Frances Yates, Theatre of the World (Univ. of Chicago Press, 1969), pp.1-41.

¹⁰³In his letter of July 20, 1558 (van Durme, Correspondance, no. 25, pp. 36-39) John Dee reminded his friend ("Clarissimo viro D. Gerardo Mercatori, Rupelmundano, Philosopho et Mathematico illustri, ac amico suo longe charissimo, Joannes Dee, . . .") of the happy hours spent together in discussion while he attended the University of Louvain. He is still grateful to Mercator for having advised him in many a question and of having counseled him so well in his studies. Knowing about Mercator's inquietudes, Dee calls him: "Tu ergo qui NATURAE observantissimus esse CULTOR soles . . .".

¹⁰⁴R. Deacon, op. cit., p. 18.

¹⁰⁵R. A. Skelton, "Mercator and English Geography in the 16th Century", Duisburger Forschungen, VI (1962), 158-159.

pure mathematics, he also wished to purchase the most advanced mathematical and astronomical instruments.¹⁰⁶ Like Mercator, Dee hoped to assist with his knowledge in the advancement of navigation. Unfortunately, it is not known whether their relationship was limited to mathematics and cartography. Considering Dee's inclination toward occult sciences and Hermetic Neoplatonism as a means for acquiring broader and deeper knowledge of and power over the mysteries of Nature and of Creation, one cannot but suspect that the two friends also discussed that topic. The De Occulta Philosophia of Cornelius Agrippa¹⁰⁷ was ". . . keenly studied in the university . . ." ¹⁰⁸ and, as Dee himself admitted in later years, Agrippa's book was always lying open in his study.¹⁰⁹ Mercator never mentioned any special interest in Hermeticism or Neoplatonism of

¹⁰⁶ Dee also recalled: ". . . I returned home, and brought with me . . . the two great Globes of Gerardus Mercator's making . . ." quoted by Skelton, op. cit., p. 159.

¹⁰⁷ Henricus Cornelius Agrippa of Nettesheim (1486-1535) had become secretary of Margaret of Parma, Governess of the Netherlands, to whom he had dedicated a little treatise, full of Cabalistic references, on the value and beauties of women (cf. J. R. Hale, op. cit., p. 128). The De Occulta Philosophia, a compendium of all Renaissance magic, particularly of Hermeticism and Cabala, appeared in 1553, three years after his work on "the vanity of science" (De Vanitate Scientiarum). On Agrippa and the influence of his de Occulta Philosophia see: Frances A. Yates, Giordano Bruno and the Hermetic Tradition (New York, 1969), Chap. VII, pp. 130-143.

¹⁰⁸ R. Deacon, op. cit., p. 22.

¹⁰⁹ F. A. Yates, op. cit., p. 149, n. 2.

Ficino's or Pico della Mirandola's type, but his long discussion of "Platonism" in the introduction of his Genesis attests to his knowledge of the subject. However, one cannot affirm that this knowledge originated in discussions with John Dee; the topic was never mentioned in their correspondence.

Another of Mercator's close friends was the cartographer Ortelius.¹¹⁰ Even after Mercator's move to Duisburg they remained in close contact, exchanging their views on progress in cartography. Ortelius, who travelled often to England and through Europe in search of new geographical information, repeatedly provided Mercator with valuable research material. In contrast to Mercator, he was not involved in the more academic aspects of cartography; he collected the best examples of maps available and engraved them anew on an equal scale. The most famous of his map collections, the Orbis Terrarum, appeared in 1570 and it is said that Mercator withheld the publication of

¹¹⁰Abraham Ortelius (1527-1598) had learned engraving and was probably also involved in the jewellery-trade (cf. Door Bert van t'Hoff, "Gerard Mercator (1512-1594) en de kartografie van de 16de eeuw", Duisburger Forschungen, VI (1962), 18). He was an avid collector of coins and medallions. During his extensive travels he met many scholars with whom he remained in contact. In England he visited John Dee at Mortlake to confer about English voyages in the North. For a discussion of the roles played by Ortelius, Dee and Mercator in the preparation and interpretation of northern voyages see below, Chapter IV.

his Atlas in order not to interfere with the acceptance and the success of his friend's work.¹¹¹

Mercator's relationship with Plantin¹¹² may also date back to his days in Louvain, just as did his connection with Andreas Masius¹¹³ and George Cassander.¹¹⁴ They all

¹¹¹Vita, p. 254.

¹¹²Christophe Plantin (1514-1583) figured among the leading printer-publishers of the sixteenth century. Apart from distributing the books printed in his office, he also handled those of other printers, almost as a regular book-dealer. After printing and publishing a book which was considered "heretical", Plantin had to flee to Paris although Antoine Perrenot de Granvelle and Gabriel de Cayas, Philip II's secretaire, had tried to protect him. During and after the Netherlands' revolt against Spanish rule, Plantin's business suffered losses and his relations with Mercator never again attained their previous cordiality. Cf. L. Voet, op. cit., pp. 171-176.

¹¹³Andreas Masius or Maes (1514-1573) studied at the 'Collegium Trilingue' at Louvain. Later on he carried the title of 'doctoris in utroque jure'. First he was secretary of Juan de Weze; then he became agent and in 1558 councillor of William of Cleves. He traveled extensively and twice resided for a few years in Rome. To study more profoundly the history of Palestine and the Bible he even learned Syrian. Himself an outstanding humanist, he entertained a large correspondence with other leading scholars, for example with Arias Montanus. Cf. Biographie Nationale de l'Academie Royale de Belgique, op. cit., Vol. XIII, 120-125.

¹¹⁴George Cassander (1515-1566), a theologian, left the Netherlands and lived afterwards at Cologne. He is best known for his attempts to reconcile and reunite the Protestant with the Catholic Church. In his endeavor he leaned so much toward the Lutheran side and accepted so many of Luther's teachings that he was denounced as a heretic and had officially to retract his views. His writings were nevertheless condemned by the Council of Trent. Cf. Biographie des Hommes Remarquables de la Flandre Occidentale, Vol. I (1843), 65.

were involved in the furthering of humanistic studies, the first as publisher, the second as teacher and the third as author. Except for Plantin, who remained most of the time at Antwerp, they left the Netherlands and, like Mercator, were later connected with the court of duke William of Cleves.

Mercator left Louvain sometime in 1552. Unfortunately, Mercator has never explained this move, neither to his biographer nor in his extant correspondence. In consequence, a controversy, still unsettled today, has arisen as to the main reason behind his decision. Those scholars who defend Mercator's inclination toward Lutheranism advanced the view that religious intolerance in the Netherlands and the fear of the Inquisition induced Mercator to leave the country.¹¹⁵ His hopes of receiving a chair at the planned University of Duisburg have been interpreted as another factor bringing about his decision to leave Louvain.¹¹⁶ It is unlikely, however, that any single

¹¹⁵ van Raemdonck, Mercator, pp. 68-69 writes: "Non seulement l'Inquisition ne sévissait donc pas à Duisburg, mais la tolérance la plus illimitée y régnait en matière religieuse, et Mercator était sûr de n'y être jamais inquiété ni pour ses croyances ni pour ses doctrines." Averdunk, G. Mercator, p. 41 comments: "Hier [Duisburg] herrschte Gewissensfreiheit . . . Regierung und Magistrat waren erasmisch gesinnt . . ."

¹¹⁶ A. S. Osley, op. cit., p. 23 suggests that ". . . another [reason], perhaps even stronger, was an appointment as 'court Cosmographer' to duke William of Cleves and the possibility of becoming professor in the university that the duke was planing to found at Duisburg."

reason induced Mercator to leave Louvain. Had he been afraid of the Inquisition, he would have left after his arrest and not waited so many years. On the other side, would he abandon a well-established clientele and a valuable connection with the imperial court for the sake of a promised chair at a yet to be founded university?

Mercator's decision and its timing may appear more understandable if one takes into consideration the general atmosphere in the Low Countries, its political, religious, economic and social situation. The country was kept in a kind of dangerous suspense. Charles V had left the Netherlands in the autumn of 1550 without reassuring a very disturbed population. Though he had modified his latest and severest edict against heretics--by this time Calvinism had spread in the Netherlands¹¹⁷--people still lived in fear and suppressed hatred against the central government. Many opted to leave the country. Some of them moved to Frankfurt or Cologne where Dutch colonies had arisen.¹¹⁸

R. Kirmse, "Zu Mercators Taetigkeit als Landmesser in seiner Duisburger Zeit", Duisburger Forschungen, VI (1962), 91-109, says (p. 94): "Seiner Uebersiedlung lag wohl vornehmlich die Absicht zugrunde, an der Duisburger Universitaet, auf deren Einrichtung . . . seit 1545 eine Reihe von Massnahmen des juelisch-klevischen Hofes hinauslief, die mathematische Professur einzunehmen"

¹¹⁷G. R. Elton, Reformation Europe, p. 122.

¹¹⁸P. Geyl, op. cit., p. 56.

They saw little hope that the "invasion of Spanish rule" would slacken since the Low Countries had been officially connected to the Spanish possessions in 1548.¹¹⁹ They particularly feared the introduction of the Spanish form of Inquisition into their country. Border skirmishes with France in 1552 did not help to calm the population and, further to aggravate an already tense situation, the Emperor needed more money for his campaigns in Germany and against Henry II of France. Charles V was little disposed to alleviate the situation; he was not only troubled by disagreements in his own family about the question of succession in the Empire, he was not only deserted by his allies (i.e., Maurice of Saxony), he even had to flee over the Alps in order to escape his Protestant enemies. Thus, in 1551-1552, every major event seemed to announce troublesome, restless times.¹²⁰

Mercator was a scholar, a humanist. He needed a quiet atmosphere, relatively secure, to work, to research and to live. He was not a "political" man; he had never shown any disposition to get involved in either open or

¹¹⁹G. R. Elton, Reformation Europe, p. 254.

¹²⁰F. Braudel described (op. cit., Vol. II, p. 242), the European situation of 1552 very aptly as: "C'est l'année suivante, en 1552, que se résout en une vaste incendie cette lente accumulation d'explosifs; un seul et même incendie, mais qui, du Nord au Sud, allume successivement ou simultanément, tant de foyers divers qu'on ne s'est pas toujours aperçu qu'il n'était qu'un. Partout ou presque partout en Europe, cette année 1552 déchaîne une série de guerres."

secret revolt against an unwanted government. Free exchange of ideas was important to him, but also his connections with his Maecenas. He could not develop his capacities or realize his projects in a political vacuum or in an explosive situation. In 1550 his benefactor Nicolas Perrenot de Granvelle had died and his son Antoine was all but completely absorbed in personal as well as "state affairs" on behalf of the Emperor. There is no evidence of more commissions by Charles V for Mercator. Probably, Mercator's position in Louvain was precarious. On the other side, religious tolerance was growing in some principalities and free cities outside the Netherlands. There was growing interest in creating new centres of learning independent of the old established universities. Mercator may well have contemplated for some time the idea of leaving Louvain, of exchanging the restless, intolerant and suppressed Netherlands for a "progressive" open-minded princely court or a free city. But he had a family to sustain and could not just leave like other independent men. Then, in 1551-1552 Mercator received an invitation to come to Duisburg, to help with his knowledge in the creation of a university and to occupy the chair of mathematics in it.

Mercator did not flee to Duisburg. He moved there in a rather orderly fashion, taking advantage of an opportune invitation. He took with him all his belongings

and his unfinished work. The possibility of teaching, of transmitting his findings, must have been tempting and welcome to anyone interested in a free approach to science and philosophy, unencumbered by tradition and doctrine. He did not sever his relations with his humanist friends but kept up his correspondence with them through all the coming years. His life, his education, and his first undertakings in Louvain had been decisive for his career; Mercator never denied their value. His upbringing by the 'Brethren of the Common Life' had laid the foundation for his sincere, undogmatic religiosity; it also may have imbued him with a desire to teach, to transmit his knowledge. His insistence on going to the sources, to correct errors, to free the mind from ignorance, is very much in line with Erasmian thought and teachings. Unknowingly, by his criticism of discrepancies in Genesis and by his subsequent philosophizing 'privatim' in order to unravel them, he had become part of a movement or group of scholars, the biblical humanists.¹²¹ That cartography was not his exclusive career Mercator had already indicated by some of his work in Louvain; to what extent biblical exegesis was his intent will be seen through an examination of the writings done at Duisburg.

¹²¹P. Geyl, op. cit., p. 51.

CHAPTER II

MERCATOR AT DUISBURG

(His major cartographical work, his humanist writings, his correspondence)

The duchy of Cleves was situated in the east of the Netherlands, bordering mainly upon the Habsburg possessions of Limburg and Guelders (Gelderland) and only partly upon Liège. Since the accession of William of Cleves in 1539, the duchy had been considerably enlarged by his inheritance of Juelich and Berg. The duke even held a claim on Guelders which had been recognized by the local Estates.¹ The existence of a powerful principality adjoining his hereditary domain and crossing the route of direct communication with his southern possessions did not please Charles V. This strategic inconvenience was aggravated by the duke's liberal domestic policy. It provided the neighbouring Netherlands with an example that endangered Charles V's policy of persecuting heretics.

¹G. R. Elton, Reformation Europe. 1517-1559 (New York, 1966), p. 167. After 1539 the duke's possessions included Juelich, Cleves, Berg, Mark and Ravensburg. He also was pretender to Guelders and Zutphen, cf. K. Brandt, The Emperor Charles V. The Growth and Destiny of a Man and of a World Empire (London, 1949), p. 433.

The Church of Cleves was not openly Lutheran, but neither was it traditionally Catholic; its highest authority was the duke himself. Imbued with Erasmian thought, he professed tolerance and sought a solution to the religious problem through a reform of the Catholic Church along Lutheran lines without, however, breaking entirely with Rome. Latent and open differences² between William of Cleves and Charles V lead to a military confrontation in 1543 which ended with the duke's defeat. In signing the treaty of Venloo, William of Cleves abandoned his claim to Guelders, renounced his alliances with Charles V's enemies, and promised to restore the traditional faith in his duchy.³ Finally, in 1546 the reconciliation between Emperor and duke was consolidated by William's marriage to Mary of Austria, Charles V's niece.⁴

But not all the stipulations of the treaty of Venloo could be put into effect. The duchy of Cleves remained an area where religious tolerance prevailed. Within the duchy, the free imperial city of Duisburg, at

²William had not only aroused Charles V's suspicion by marrying his sister Anne to Henry VIII of England thus building up ties with a Protestant country, but he also stood in close contact with his brother-in-law John of Saxony and other members of the Schmalkaldic League; he even had connections with France.

³G. R. Elton, op. cit., p. 168 and 242; K. Brandi, op. cit., pp. 502-503.

⁴K. Brandi, op. cit., p. 548.

the confluence of the rivers Rhine and Ruhr, was known for its open-minded and progressive atmosphere. In 1545 negotiations had started, at first secretly, to receive the necessary patents and privileges for the opening of a university.⁵ Most probably, Mercator was aware of all these opportunities before he decided to move to Duisburg to accept an unofficial invitation to teach in that city.

All available evidence points to George Cassander⁶ as having suggested the idea to Mercator. At the time in question, Cassander was duke William's advisor in religious and educational matters and thus had firsthand information about any progress in the planning of the university. It is quite understandable that he should have thought first of capable friends to fill vacant positions and have them brought to the attention of William of Cleves. And since the animosity between Charles V and William of Cleves had been cleared up, there was nothing to prevent Mercator from accepting such a promising opportunity. Cassander also presented Mercator to his friend Heinrich Bars or Olisleger who then was the duke's chancellor. Mercator

⁵R. Kirmse, "Zu Mercators Taetigkeit als Landmesser in seiner Duisburger Zeit", Duisburger Forschungen, VI (1962), 94.

⁶For biographical details, cf. Neue Deutsche Biographie, ed. by: Historische Kommission, Bayrische Akademie der Wissenschaften (Berlin, 1956), Vol. III, 166.

was very grateful for this kind intervention because Olisleger soon became his friend and protector in Duisburg.⁷

Soon after he had settled at Duisburg, Mercator finished a special commission for Charles V: a terrestrial and a celestial globe of very small size, one on a wooden core, the other cut in blown crystal and inlaid with precious stones representing the stars.⁸ In his biography it is emphasized that Mercator himself presented these globes together with some other mathematical instruments to Charles V while at Brussels.⁹ This evidence, it might be noted, contradicts Averdunk's claim¹⁰ that Mercator had to flee from the Netherlands; he hardly would have returned to Brussels had he had something to fear or had there existed the possibility of another arrest by the Inquisition. No exact date is noted for Mercator's visit to Brussels. We only know that Mercator had moved to Duisburg sometime in 1552 and that a short time afterwards the globes were ready to be delivered to the Emperor. In the spring of 1552, Charles V campaigned along the border between France and the Low Countries before he went to

⁷R. Kirmse, op. cit., p. 95.

⁸H.-H. Geske, "Die Vita Mercatoris des Walter Ghim", Duisburger Forschungen, VI (1962), 250-251; cited hereafter as Vita.

⁹Vita, p. 251.

¹⁰See above, Chapter I, pp. 37-38.

Augsburg and then in May to Innsbruck from where he had to cross the Alps in flight from Maurice of Saxony. It was only in January, 1553, that the Emperor returned to the Netherlands. The probable date, therefore, of Mercator's visiting the imperial court with Charles V present seems to be the spring of 1553.

In the autumn of 1554, Mercator finally published his long announced map of Europe.¹¹ He dedicated it to Antoine Perrenot de Granvelle.¹² The bishop of Arras must have been pleased with the map and the dedication since he presented Mercator with a very liberal honorarium.¹³ This map was a great success for Mercator. Plantin alone sold 642 copies between 1566 and 1572.¹⁴ Plantin's ledgers indicate that Mercator received approximately 940 florins for the sale of these maps. Add to this amount the "liberal honorarium" received from Antoine Perrenot de Granvelle, and one can see that Mercator's profit was considerable.¹⁵

¹¹As Mercator's letter to Antoine Perrenot de Granvelle indicated (cf. van Durme, Correspondance Mercatorienne (Anvers, 1959), no. 3, p. 16; cited hereafter as: van Durme, Correspondance), he had begun to work on this map as early as 1539. Before leaving Louvain, he had finished three or four plates of the total of fifteen; cf. Vita, p. 251.

¹²Loc. cit.

¹³Loc. cit.

¹⁴Léon Voet, "Les relations commerciales entre Gérard Mercator et la maison Plantinienne à Anvers," Duisburger Forschungen, VI (1962), statistic no. 4, 201-207.

¹⁵Plantin paid his specialized printers 105 florins to 150 florins per annum. Cf. L. Voet, op. cit., p. 177, n. 26.

For the next several years Mercator did not publish any maps. We are able to follow his activities, however, on the basis of references to Mercator preserved in the archives of Duisburg.¹⁶ In collaboration with George Cassander, he was actively involved in the preparatory work for the opening of a gymnasium. Since no imperial 'privilegium' had been granted, it had been decided that at least a new centre of humanistic studies should be built up instead of a university. The 'Novum Linguarum et Philosophiae Gymnasium' opened its doors in the spring of 1559.

It was a great opportunity for Mercator. He had been entrusted with the responsibility of elaborating a plan of studies taking into consideration old knowledge and new findings. The curriculum he submitted testifies that he was allowed to carry out his own ideas of an ideal curriculum for a future mathematician-cartographer-cosmographer. Mercator divided the three-year course in mathematics into three major areas to be studied progressively. To introduce the student to the order of Creation Mercator intended to teach first cosmography. The following year mathematics was to be studied, followed by arithmetic in the last year of the course. As basic textbooks Mercator suggested for cosmography, astronomy, and

¹⁶R. Kirmse, op. cit., p. 95, n. 20.

geography Sacrobosco's De Sphaera¹⁷ and the writings of Pomponius Mela.¹⁸ Mathematics was to be studied with the help of Ioannes Vogelin's¹⁹ and Euclid's books on geometry. For the study of arithmetic, finally, Mercator proposed Gemma Frisius' work²⁰ on that subject as the most appropriate. This more theoretical part of the course was to be supplemented with practical instruction. Students were to be taught how to measure and map land-areas, how to engrave maps and calculate the construction of globes. For practical instruction Mercator suggested Gemma Frisius' De usu globi et locorum describendorum ratione and Orontius Finaeus' De linearum, superficierum et corporum

¹⁷Sacrobosco or John Holywood of Halifax (c. 1250) wrote compendiums or textbooks in mathematics and astronomy of which the best known one is the Tractatus de sphaera mundi (c. 1233). It became very popular for teaching purposes and went through many editions after the invention of printing.

¹⁸Pomponius Mela (first cent. A. D.) had written a description of the earth in three volumes, the De Chorographia of which a new edition had appeared in 1540.

¹⁹Mercator himself had studied mathematics with Vogelin's Elementale Geometricum as "textbook"; see above, chapter I, p. 26.

²⁰In 1540 Gemma Frisius had published a treatise on Arithmeticae practicae methodus. He also had prepared a revised edition of Peter Apian's work under the title of Cosmographia. Petri Apiani, per Gemmam Frisium apud Lovanienses Medicum & Mathematicum insignem, iam demum ab omnibus vindicata mendis, ac nonnullis quoque locis aucta. Additis eiusdem argumenti libellis ipsius Gemma Frisii.

dimensionibus.²¹

Mercator himself taught the first three-year course in mathematics at Duisburg. He emphasized the philosophical-theoretical part²² although the course had been intended to train land-surveyors and cartographers. This, however, should not be surprising. Mercator had long been interested in the philosophical implications of cosmography. For him it seemed to be one of many possible ways to admire and to understand the "beautiful and harmonious order" in Nature. He even had hoped that he would be able to penetrate to the mysteries of Creation by occupying himself with cosmography and the related study of mathematics. Mercator was not satisfied with teaching the basics of cartographical craftsmanship only, he also wanted to introduce his students to the more embracing field of cosmography. When he was a student himself, he had experienced the frustrations and

²¹Orontius Finaeus (1494-1555) was a French cartographer. He is particularly renowned for his small world-map in a cordiform projection which first appeared in manuscript form (1519) and later was printed (1534). It is quite possible that Mercator was influenced by this cordiform world-chart when he engraved his own double cordiform map of 1538. Cf. L. Bagrow, History of Cartography, rev. by R. A. Skelton (Cambridge, Mass., 1964), p. 132; R. V. Tooley, Maps and Map-Makers (New York, 1970), p. 38.

²²This has been deduced from the content of the notes taken during that course by Mercator's son Bartholomeus. He published them in 1563 under the title Breves in sphaeram meditatiunculae, includentes methodum et isagogem in universam cosmographiam, hoc est geographiae pariter atque astronomiae initia ac rudimenta suggerentes, cf. R. Kirmse, op. cit., pp. 96-97 and n. 27.

insecurity of an unguided confrontation with contradictory points of view; he probably hoped to prevent such a situation for his students by carefully introducing them to the difficult problem of understanding cosmology and cosmography. His choice of Pomponius Mela's De Chorographia as textbook shows him as the humanist who does not present old texts with a "slight irony" as Kirmse suggested²³ but rather with a reverence for the knowledge of times long past. His choice of Gemma Frisius' work for the instruction of arithmetic, the use of globes and topography demonstrates that Mercator was well aware of the best texts available.

Mercator resigned from the teaching-staff of the 'Novum Linguarum et Philosophiae Gymnasium' in 1562; his son Bartholomeus succeeded him in the position. It is possible that Mercator had taught the first course because he was personally very much interested in the topic and wanted to give it "a good start". There is no evidence that he was officially employed as a full professor.²⁴

²³R. Kirmse (op. cit., p. 96, n. 23) wrote: "Man beachte den feinen Spott Mercators ueber diese rhetorisch aufgeputzte aelteste erhaltene lateinische Erdbeschreibung." (Italics added) Ridiculing ancient texts was not characteristic of Mercator or of other humanists. On the contrary, there possibly existed too little serious criticism of ancient knowledge which sometimes even hindered the acceptance of new ideas.

²⁴The remuneration he received (three Taler or seven Gulden for the three-year course) was more like a token gift rather than a full pay; cf. R. Kirmse, op. cit., p. 97.

On the other hand, Mercator may have been short of free time adequately to fulfill his teaching duties. Existing evidence points to the fact that Mercator had entered the service of William of Cleves in the winter of 1559 to 1560.²⁵ He assisted the duke as surveyor in land disputes and in determining questionable borderlines with adjoining estates.²⁶ The duke's dispute with the archbishop of Cologne over their common border was particularly time consuming for Mercator; he visited several of the most disputed areas and measured and charted them in order to serve as documents in the planned conferences. But it was only in 1563 that Mercator was once more honoured with an official appointment to a princely court:²⁷ he was named the duke's 'cosmographus' and in that capacity received an annual

²⁵ Ibid., p. 99.

²⁶ Ibid., p. 98.

²⁷ His first nomination had been the one as 'domesticus' to the imperial court of Charles V. But Charles V had abdicated in 1556 and Philip II had not extended his father's patronship to Mercator. Mercator's move to Duisburg had removed him somewhat from the sphere of the imperial court at Brussels. Particularly after the death of Charles V in 1558 and the development of a growing resistance in the Netherlands, Philip II concentrated his patronship almost entirely upon Spain. Mercator slowly but steadily looked to England which was succeeding Spain and Portugal in the quest for new lands and exploration. It is hardly a coincidence that Mercator's correspondence with Englishmen increased after the middle of the century, as will be demonstrated below.

pension.²⁸

Mercator's correspondence of the years between his arrival at Duisburg and 1563 also indicates that his occupation as teacher of mathematics and as surveyor did not leave him much spare time to prepare new maps.²⁹ Only one of the eight preserved letters refers to Mercator's work as cartographer.³⁰ The remaining seven letters are of a more private nature, throwing light upon Mercator, the humanist.

The earliest of them (1558) is the letter written by John Dee.³¹ Dee recalls in a rather "nostalgic" manner the days spent together with Mercator at the University of Louvain. He remembers his friend fondly, full of gratitude and admiration for his understanding of philosophical problems. He recognizes Mercator as one of the great "observers of Nature". Dee sends Mercator a list of his books³² and works and informs him that he had named Pedro

²⁸Jan van Raemdonck, Gérard Mercator. Sa Vie et ses Oeuvres (St. Nicolas, 1869), p. 90; cited hereafter as: van Raemdonck, Mercator.

²⁹van Durme, Correspondance, no. 25, 27, 29-31, 33, 35, 39.

³⁰Ibid., n. 39.

³¹Ibid., no. 25 and see above, p. 49 ff.

³²Though it is unlikely that Dee's library was already complete in 1558, it seems important to note that he possessed one of the largest private collection of books in Elizabethan England; cf. Frances A. Yates, Theatre of the World (Chicago, 1969), pp. 4, 9.

Nuñez³³ as executer of his last will in literary matters. In view of their friendship and out of reverence for Mercator's knowledge, Dee accompanied his letter with a copy of his 'Propaedeumata Aphoristica'³⁴ which he had dedicated to him. Dee, at that moment, paid respect to Mercator's humanist inclinations and endeavors rather than to his capacity as cartographer.

The other letters were all written to Mercator by his future son-in-law Johannes Molanus. Molanus, also called Jean van der Meulen or Vermeulen, was a recognized pedagogue and humanist. Known as a Lutheran, he had to flee from Louvain and, since 1553, had settled at Bremen. There he taught at a private school.³⁵ Mercator had contacted Molanus to invite him to join him in Duisburg. He proposed that Molanus teach at the newly opened 'Gymnasium'. Molanus hesitated. He was uncertain whether he could leave his position at Bremen and whether his religious beliefs

³³The Portuguese Pedro Nuñez (1502-1577) was a mathematician and cosmographer. Like Mercator, he had observed the variations of the magnetic needle and had therefore improved existing instruments for the determination of sun altitudes and of latitudes; cf. S. Chapman and J. Bartels, Geomagnetism (Oxford, 1940), Vol. II, pp. 907-908.

³⁴This treatise on the powers of nature appeared in 1558; cf. Ch. Fell-Smith, John Dee. 1527-1608 (London, 1909), p. 29; L. Thorndike, A History of Magic and Experimental Science (New York, 1951), Vol. VI, p. 26.

³⁵van Durme, Correspondance, p. 41; Biographie Nationale de Belgique (Bruxelles, 1899), Vol. XV, 47-48.

would be embarrassing to Mercator. But Mercator knew about Molanus' convictions before he extended the invitation. They had not appeared to Mercator as a deterrent. Molanus' capacity as a teacher and his broad knowledge were of more value than his religion. Mercator was tolerant; he did not mistake dogma for religious truthfulness; piety based on the Holy Scripture was more important to him than a partisan affiliation to one of the recently grown "sects". Especially when education and the transmission of knowledge was involved, Mercator seems to have separated rather consciously the private sphere of religious beliefs from the person's abilities, as long as they did not interfere with or contradict accepted customs. He even had entrusted Molanus with the education of his own son Bartholomeus. Indeed, Mercator respected other religious opinions opposed to his own if they were substantiated by valid arguments taken from the Bible; he discussed them carefully and knowingly but remained constant in his personal conviction, in that almost mystical piety taught and lived by the 'Brethren of the Common Life'.

In his tolerant readiness for religious discussion in which respect for old or holy texts prevailed, Mercator reminds one of the great representatives of Christian humanism. Erudition, knowledge, was seen as a means to

understand, to interpret the Scriptures.³⁶ Texts of Greek and Roman antiquity were studied to elucidate Christian teachings; all human knowledge was to be embraced in one great Christian rebirth.³⁷ Elated and stimulated by their high ideal, many of those humanists dared to penetrate into unexplored fields, unaware of the dangers put in their way by narrow-minded dogmatism. This genuine interest in a new, in a direct look at the Bible and the interpretations of it brought forth, on the one hand, the publication of multi-lingual editions of the Scriptures like the well-known 'Polyglotta' of Alcala under the leadership of Cardinal Cisneros.³⁸ On the other hand, it could lead to a quasi-christianization of Greek philosophers, their hellenistic interpreters and texts believed to be of great antiquity³⁹ and even of the Cabala.⁴⁰ It

³⁶J. W. Aldridge, The Hermeneutic of Erasmus (Richmond, Virginia, 1966), pp. 58-59.

³⁷L. Bouyer, Autour d'Erasmus. Etudes sur le Christianisme des Humanistes Catholiques (Paris, 1955), p. 190.

³⁸M. Bataillon, Erasmus et l'Espagne. Recherches sur l'Histoire Spirituelle du XVII^e Siècle (Paris, 1937), pp. 24, 167.

³⁹The influence of the Corpus Hermeticum upon Renaissance thought was particularly great because it was believed that its author, Hermes or Mercurius Trismegistus, was either identical with Moses or his prophetic predecessor; cf. Frances A. Yates, Giordano Bruno and the Hermetic Tradition (New York, 1969), p. 26. Marsilio Ficino, for example, believed in a chronological sequence of theological teaching which, starting with Hermes

is interesting, indeed, that some of the renowned exponents of that Christian humanism had been educated by the 'Brethren of the Common Life'.⁴¹

But Mercator did not dedicate all his time to the pursuit of theological-philosophical discussion. In 1564 he went to Lorraine, commissioned to survey and map the duchy.⁴² No copy of this map is extant; it is even questionable whether it was ever published. Ghim only mentions that Mercator presented a hand-drawn map at Nancy. We further read that this trip, Mercator's only documented one outside the duchy of Cleves, was attended by danger and illness.⁴³

Trismegistus, was carried on by Orpheus, Pythagoras and Plato until it found its culmination in Christ; cf. P. O. Kristeller, The Philosophy of Marsilio Ficino (Gloucester, Mass., 1964), pp. 25-27.

⁴⁰J. L. Blau, The Christian Interpretation of the Cabala in the Renaissance (New York, 1944), p. 64 writes: "In the hands of Reuchlin, cabalism almost became a Christian philosophy."

⁴¹So, for example Nicolas of Cusa, Erasmus of Rotterdam and also Johannes Reuchlin; cf. Emile G. Léonard, A History of Protestantism, ed. by H. H. Rowley (New York, 1968), Vol. I, pp. 22-32.

⁴²Vita, p. 252. Unfortunately, we do not know exactly why Mercator was asked to survey and map the duchy. There may be, however, a possibility that Antoine Perrenot de Granvelle "recommended" Mercator to the duke of Lorraine, brother of the Cardinal of Lorraine (of the house of Guise) with whom he spent some time in 1558-1559 to prepare the peace treaty of Cateau-Cambresis. On Granvelle's meetings with Charles of Guise see: J. H. Elliott, Europe Divided. 1559-1598 (London, 1968), p. 12.

⁴³Vita, p. 252.

In the same year Mercator published a large map of the British Isles.⁴⁴ The question of its historical background demonstrates Mercator's increased connections with England. A close friend of his had sent him a carefully drawn map of England with the request to engrave it in copper.⁴⁵ The friend is not named either in Mercator's biography, his correspondence or the text accompanying the engraved map. The provenance of the original map is therefore still unsolved. John Dee has been suggested⁴⁶ since his friendship with Mercator is well-known. He esteemed Mercator's cartographical ability; he had taken with him two globes of Mercator's best making on his return to England in 1548. He was indeed interested in the furtherance of cartography in England. But his interest was upon the cartography of newly explored areas or those to be discovered, particularly those in connection with a possible north-east or north-west passage to China.⁴⁷ Dee probably visited Mercator in the spring of 1564 when he traveled from Antwerp to Pressburg;⁴⁸ but there exists no

⁴⁴It appeared under the title of Angliae, Scotiae et Hiberniae nova descriptio.

⁴⁵Vita, pp. 251-252.

⁴⁶van Durme, Correspondance, no. 42, 44.

⁴⁷E. G. R. Taylor, Tudor Geography, 1485-1583 (New York, 1968), pp. 33, 76.

⁴⁸R. A. Skelton, "Mercator and English Geography in the 16th Century", Duisburger Forschungen, VI (1962), 160.

indication that he either handed Mercator material for the map or that he received the finished work.

But Mercator's connections were not limited to John Dee alone. His reputation as a very capable engraver and cartographer had spread over Central Europe and the British Isles where Ortelius was both his "promoter" and middle-man.⁴⁹ Three other names have thus been proposed as possible "friends" who could have asked Mercator to engrave the map: John Elder, Humphrey Lhuyd and Laurence Nowell.⁵⁰ All three were interested in the history and topography of different parts of the British Isles. John Elder⁵¹ is known to have made a map of Scotland, dedicated to King Edward VI. Humphrey Lhuyd⁵² concentrated his efforts especially in Wales. The philologist Laurence

⁴⁹Ortelius had entered the circle of English scholars interested in cartography through his relative Daniel Rogers; cf. E. G. R. Taylor, op. cit., p. 33.

⁵⁰van Durme suggested, beside Dee, Humphrey Lhuyd; Skelton proposed John Elder but agrees with Taylor that Laurence Nowell is the more likely source. van Durme, Correspondance, n. 42.

⁵¹John Elder worked during the first half of the sixteenth century. Cf. Skelton, op. cit., p. 167; Dictionary of National Biography (L. Stephen and S. Lee eds.) (London, 1908), 589.

⁵²Humphrey Lhuyd of Denbigh (1527-1568) was interested in the history and topography of the English kingdom. He stood in contact with Ortelius to whom he had been referred to by a Denbigh merchant living at Antwerp. Cf. E. G. R. Taylor, op. cit., pp. 30-31; G. R. Crone (ed.), Early Maps of the British Isles. A. D. 1000 - A. D. 1579 (London, 1961), p. 28.

Nowell,⁵³ on the other hand, took a broader approach; his study of the history of England included linguistic, historical and geographical research. Preserved maps drawn by Nowell show some affinities with Mercator's map of England. Therefore it appears that either it was Nowell who sent Mercator the primary material for the map or that they both had a common prototype on which they based their work.⁵⁴ Though it would be rather interesting to know who really was Mercator's friend, the important fact, nevertheless, seems to be Mercator's widespread connections and his growing reputation as cartographer. It also may be an indication that England could not yet produce a cartographer of Mercator's standing.⁵⁵

⁵³Laurence Nowell carried on the collecting, editing and illustrating of itineraries through England, started by John Leland. He also wanted to edit the English chroniclers and tried to interest Sir William Cecil in his plan; cf. G. R. Crone, Early Maps . . ., p. 10.

⁵⁴Skelton (op. cit., p. 167) reached this conclusion and also points out that it is not known altogether whether Mercator's friend was English.

⁵⁵Another possibility which has not yet been proposed could be that Mercator's friend was Ortelius. Mercator himself only said that the material was sent to him from England, and Ghim does not specify that the friend was an Englishman. Though Skelton mentions this fact, he nevertheless goes on to suggest English scholars, and Crone writes: "It is strange that Mercator, Nowell and Lhuyd should all have been engaged on maps of England and Wales at more or less the same time, without it being possible to establish any relationship between them." (Crone, Early Maps . . ., p. 10) Ortelius, on the other hand, frequently visited England and entertained connections with that circle of English scholars and humanists. He thus could have had access to the material of Lhuyd and Nowell. Furthermore, it was Mercator's map of 1564 he chose, though on a reduced scale, for his Orbis

Yet Mercator did not work on commission only. Since 1564 he had delegated to his son Arnold all the surveying and charting commissions he received.⁵⁶ Presumably, Mercator had dedicated himself entirely to the research and execution of his great map of the world⁵⁷ and to the Chronologia,⁵⁸ both of which appeared in 1569. Many years before, Mercator explained in the preface, he had conceived the idea of writing a comprehensive study of cosmography. His plan was to divide the treatise into five major parts, describing successively the "genesis of the world", the creation of the skies, the formation of lands and seas, and including a Genealogicon and finally a Chronologia. Quite obviously Mercator had structured his study as an imitation of the sequence of Creation as related in the Bible. His sources were to be the Holy Scriptures in the first place and secondly the writings of old and "new" philosophers, critically revised. The

Terrarum of 1570.

⁵⁶R. Kirmse, op. cit., p. 107.

⁵⁷The full title of the map runs Nova et aucta Orbis Terrae descriptio ad usum navigantium emendate accomodata. For a discussion of this map see below pp. 115-123.

⁵⁸Chronologia, hoc est temporum demonstratio exactissima ab initio mundi usque ad annum domini 1568 ex eclipsibus et observationibus astronomicis omnium temporum, sacris quoque bibliis et optimis quibusque scriptoribus summa fide concinnata. Cologne: Haeredes Arnoldi Birckmanni, 1569. According to Ghim, Mercator published the treatise in 1568. But he probably refers here to the year when it went into print; cf. Vita, p. 252.

work was to be accompanied by a collection of maps, including, besides his own, twenty-seven maps of Claudius Ptolemaeus,⁵⁹ the historical cosmography of Sebastian Münster⁶⁰ and the mathematical-astronomical work of Peter Apian.⁶¹

Mercator dedicated the remaining years of his life to this grandiose plan. But he never could complete it. The field of research was too vast to be covered, particularly since he did not limit himself to a "scientific" description of the earth and the skies but attempted at the

⁵⁹Mercator probably thought of publishing Ptolemy's Geographia, edited and revised by himself. It appeared in 1578 under the title Tabulae geographicae Cl. Ptolemaei ad mentem auctoris restitutae et emendatae.

⁶⁰Sebastian Münster (1489-1552) taught Hebrew at the University of Heidelberg from where he moved to Basel in 1530. Like Mercator Münster combined cartography with interpreting the Bible. Thus he believed that Paradise had been located in the farthest east but had been wiped out completely by the Great Flood. Cf. J. G. Leithäuser, Mappae Mundi. Die Geistige Eroberung der Welt (Berlin, 1958), p. 252. In 1540 Münster published at Basel a new edition of Ptolemy's maps and in 1550, also at Basel, appeared his Cosmographia, a collection of wood-cut maps which were not all of his making. Cf. G. R. Crone, Maps and their Makers (London, 1966), pp. 76 and 110.

⁶¹Peter Apian (1495-1552) studied mathematics and astronomy at the University of Vienna and later taught the two subjects at Ingolstadt. Although he also worked as cartographer (for example his heart-shaped world-map of 1530), his fame is based upon his research and work in astronomy. He improved a number of mathematical instruments and, for practical purposes and more precision, he suggested the determination of longitudes by measuring lunar distances. Cf. G. R. Crone, Maps and their Makers, p. 104.

same time to revise, to analyse, and to interpret almost everything written on the origin and the history of the world. Mercator tried to philosophize, this time not 'privatim' but 'in publico', on the mysteries of Creation and explain its beauty, harmony and order with the help of cartographical illustrations.

The Chronologia was intended to form the conclusion of the entire work. It appeared first and was dedicated to Henricus B. Oliferius, chancellor of William of Cleves. Mercator had tried to compute the age of the world. He based his research on biblical texts and on his own critical analysis of all available astronomical computations, eclipses, etc. Time-calculations and the drawing up of computation-tables were quite common among mathematicians of the period.⁶² Mercator, however, was not satisfied with a purely mathematical computation for he had set out to prove the basic correspondence of Roman, Egyptian, Greek and Jewish accounts concerning the age of the earth. What Pico della Mirandola had attempted to accomplish in demonstrating the intrinsic concurrence of biblical texts with the writings of old philosophers and ancient religious cults, Mercator tried to do with regard to the knowledge

⁶²To name only a few: Gregorius Reisch, Gemma Frisius, Christophorus Clavius, Tycho Brahe; cf. R. Taton (ed.), The Beginnings of Modern Science. From 1450-1800 (New York, 1964), pp. 31, 42, 74-79.

of astronomy. He compared natural history (i.e., eclipses and accounts of other astronomical occurrences) with ancient accounts from Egypt and those texts of Cabalist literature related to it. His research led Mercator to the conclusion that the earth was created when the sun was in the sign of the Lion. On this basis he calculated an age of 5544 years for the earth until 1568. After bringing this conclusion in accord with the prophecy of Heli, Mercator declared that his time formed part of the third age, the first having terminated with Abraham, the second with the Passion of Christ.⁶³

Unfortunately, we do not know the precise nature of Mercator's sources in his research for the Chronologia. Works relating astronomical occurrences were available especially because of the handing down and circulation of Arabic texts. It should be noted, however, that in Mercator's time a reference to "Egyptian Texts" in most cases meant the Corpus Hermeticum of Hermes Trismegistus which enjoyed a widespread circulation among European humanists. Mercator's connection with some of these humanists may have been a channel through which he gained knowledge of the "Egyptian texts". What seems more difficult is to trace his Cabalistic sources.⁶⁴ Only one of his friends

⁶³van Raemdonck, Mercator, pp. 102-108.

⁶⁴"Cabala" denotes a trend in Jewish occultism. Originally, the word meant "tradition". Before

and acquaintances is known to have had a definite interest in the Cabala: Andreas Masius.⁶⁵ Writing to Christophe Plantin Masius expressed his wish to find more texts relating to the Zohâr.⁶⁶ Mercator corresponded with Masius because they were of different opinions concerning the location of certain places on Mercator's map of the Holy Lands.⁶⁷ In one of his letters to Masius, Mercator expressed his gratitude for the assistance extended to him as regards his research for the Chronologia.⁶⁸ Although it remains only a probability, Mercator's connection with Masius, particularly during the years 1566 and 1567, could represent the channel through which the cartographer gained

approximately 1300, three major trends can be recognized: the followers of (a) Isaac the Blind (fl. 1190-1210) in the South of France and Spain, (b) Eleazar of Worms (approximately 1220), characterized by number and letter symbolism and practical cabala and (c) Abraham ben Samuel Abulafia (1240 - c.1292) who professed a combination of the doctrines of Isaac the Blind and Eleazar of Worms. Cf. J. L. Blau, op. cit., pp. 7-8. G. G. Scholem, On the Kabbalah and its Symbolism (New York, 1965), pp. 1, 19-21.

⁶⁵For biographical outline see above chapter I,

⁶⁶E. Secret, Le Zohâr chez les Kabbalistes Chretiens de la Renaissance (Paris, 1964), p. 79. The 'Zohâr' was a collection of texts related to Cabalism. Cf. W. J. Bouwsma, "Postel and the significance of Renaissance Cabalism", Renaissance Essays, ed. by P. O. Kristeller and Ph. P. Wiener (New York, 1968), p. 252.

⁶⁷Mercator discussed with Masius the correctness of various existing maps of Palestine and the variations for the location of various cities and the distances between them; cf. van Durme, Correspondance, no. 57, pp. 74-78.

⁶⁸Loc. cit.

knowledge of specific Cabalistic sources and possibly obtained some texts necessary to his treatise on chronology.

Apart from throwing some light upon the flow of information, Mercator's correspondence is also an indication of a close-knit web of friends and benefactors.⁶⁹ That it was characterized by mutual assistance for the furtherance of exact knowledge and by a concern for the close relationship between theory and practice, is not surprising considering the intellectual climate of the period. The very nature of Mercator's approach to cartography appears like a reflection of the scholarly, humanistic atmosphere in which he lived. He perceived the study of cosmography in an all-inclusive manner. In his ideal view of it, natural and political history were as much to be included as astronomy, mathematics, theology and philosophy. Like a number of humanists⁷⁰ who did not envision translation as

⁶⁹We have already indicated that Ortelius personally kept up the connection with England; Mercator corresponded with Dee and Hakluyt. Both stood in close relationship with Christophe Plantin who, in turn, knew and dealt with Antoine Perrenot de Granvelle, Cassander, Olisleger, Vivian and Masius among others. Granvelle's position opened ways in numerous directions; Masius' travels to Rome and his function as intermediary between the court of Cleves and the prince Elector Frederic II had introduced him to a large number of learned men. It seems as if Mercator stood at a point from which many connections went out over Europe, crossing their paths, but always functioning as a "feedback" to Mercator.

⁷⁰Erasmus is probably the best example of this concept of erudition as a tool, a means, for interpretation and understanding; cf. J. W. Aldridge, op. cit., chapters I

an end in itself but wanted to absorb the meaning of the texts before them, Mercator was not solely interested in an exact visual representation of physical actuality but wished to comprehend its structure and underlying laws. His urge for understanding was not satisfied before he had exhausted all sources available to him. Knowledge obtained through critical analysis and comparison seemed to be for him, in Erasmian terms,⁷¹ a means to understand the Holy Scriptures. His contemporaries apparently recognized the aim of his endeavors. Ghim relates that Mercator was much praised for the publication of his Chronologia and the service he had therewith rendered to scholarship.⁷² His esteem was thus based not only upon his cartographical work but also upon his more humanistic writings.

Mercator directed even his cartographical work more and more towards the learned community of his time. His

and II. Lefèvre d'Étaples can be regarded as a representative of the same trend among French humanists (cf. W. L. Gundersheimer (ed.), French Humanism. 1470-1600 [New York, 1970], pp. 163-180) in the same way as Guillaume Budé (cf. L. W. Spitz (ed.), The Northern Renaissance (Englewood Cliffs, New Jersey, 1972), pp. 48-56.

⁷¹As explained in Aldridge's book (op. cit., pp. 58-59, 94-95, 111), Erasmus emphasized scientific erudition and 'bonae litterae' rather than reason as a means to interpret the Scriptures. Interpretation should depend more, or even solely, on a scientific approach and not on inspiration. Erasmus highly valued the analytical value of comparing the sources for the possibility of thereby obtaining correctness and a historical perspective, too.

⁷²Vita, p. 257.

large map of the world of 1569, though expressedly done for the use of navigation (ad usum navigantium), appears to be a diligent demonstration not only of a new method of projecting a sphere onto a flat surface⁷³ but also of all available geographical knowledge. The size of the map alone seems to contradict its practical use by navigators. In a long inscription Mercator explained the general method of his new projection, he did not, however, accompany it with the mathematical principles on which it was constructed.⁷⁴ The map was more a scholarly introduction to the possibilities made available by the new projection than an outline for its application. Mercator stated that he aimed at representing on a flat surface the true position of places without distortion of direction and distances, at depicting the true form and location of land-masses, and at demonstrating the extent of ancient geographical knowledge.⁷⁵ As a short

⁷³ Ibid., p. 253.

⁷⁴ It was only in 1599 that the mathematical principle and necessary calculations of the new projection were explained by Edward Wright in his treatise on The Correction of Certain Errors in Navigation detected and corrected. Ch. S. Singleton (Art, Science and History in the Renaissance (Baltimore, 1967), p. 230) has pointed out that "as a matter of historical accuracy, Mercator was not the originator of augmented or increasing degrees of latitude." There are two compass-sundials (1511 and 1514) by the Nurnberg watch-maker Erhard Etzlaub with representations of Europe and North Africa executed on "Mercator's" projection.

⁷⁵ B. van T'Hoff, Gerard Mercator's Map of the World. In the Form of an Atlas in the Maritiem Museum "Prins Hendrik" at Rotterdam (Rotterdam, 1961), p. 46.

review of the explanatory texts accompanying the map indicates, Mercator was as much intent on the practical application of his work as on its humanistic background.⁷⁶ He hoped to contribute to the general knowledge and understanding of the nature of the earth's surface by providing navigators with a projection ultimately to improve their sailing but in the first place to better chart their discoveries.

Little is known about Mercator's life between the years of 1570 and 1594. He did not leave Duisburg where he had bought a house in 1558.⁷⁷ Only very occasionally did he render services to the magistracy of the city. His sons had taken over all charting commissions. He lost his wife in 1586 but remarried soon after in 1587.⁷⁸ Then, in 1590, Mercator suffered a stroke which paralysed his left arm and leg and temporarily affected his speech.⁷⁹ He recovered only partially. Three years afterwards, a cerebral apoplexy left him completely unable to work. No medical attention available alleviated his situation which deteriorated gradually until he died on December 2, 1594.⁸⁰

⁷⁶The majority of explanations are references to his sources, statements of historical background and the naming of discoverers and explorers.

⁷⁷Averdunk, G. Mercator, p. 44.

⁷⁸Vita, p. 269.

⁷⁹Ibid., pp. 269-270.

⁸⁰Ibid., pp. 271-272.

During all these years he covered his expenses with the income from the sale of his maps, globes, mathematical instruments and treatise, his pension as court-cosmographer and mathematician of the duke of Cleves and the honorariums he received from his patrons. It is not known how much all this amounted to but one may suppose that he could comfortably sustain his wife and himself; it left him even enough regularly to buy books, paper and other materials necessary for his work.⁸¹

We are more fortunate in regard to documents concerning Mercator's intellectual development. His extant correspondence together with his theological and cosmological treatises reflect his constantly intensifying preoccupation with both religious and philosophical problems. Although he did not leave Duisburg he kept abreast of political, religious and scientific developments. His observations permit us to discern Mercator as the humanist scholar, tolerant, conscientious, eager to learn as much as possible, to evaluate and understand every new development, be it scientific or religious. But his eagerness did not lead him to inconsistency. He remained constant in his fundamental beliefs and opinions. He accepted only what appeared reasonable, and rejected every new proposition

⁸¹Plantin's ledgers also refer to the material and book acquisitions by Mercator; cf. L. Voet, op. cit., table no. 9, pp. 221-222.

which was contradictory to his basic concepts.

Mercator's point of view concerning scientific advances in astronomy is clearly reflected in his correspondence of 1573 with J. Vivianus.⁸² Upon Vivian's request Mercator explained in detail his concept of the universe.⁸³ He obviously had not changed his position from that of 1546;⁸⁴ he had not accepted the Copernican system. He expressed himself firmly against what he thought to be false theories of heliocentricity. Yet contrary to his earlier position he now proposed two separate centres of circular movement enclosed by the sphere of the fixed stars (Fig. 1). In Mercator's system the earth is at the centre of everything; it is motionless and therefore cannot even be considered a planet.⁸⁵ The moon, lowest among the planets, the sun, Mars, Jupiter, Saturn and the sphere of the fixed stars circulate around the earth. Venus and

⁸²Jean Vivian de Valenciennes was a friend of several cartographers, particularly of Ortelius. He intended to publish a 'catalogus' of outstanding geographers and therefore had requested from Mercator an explanation of his concept of the universe; cf. van Durme, Correspondance, p. 109.

⁸³The letter in which Mercator gave his explanation is accompanied with a detailed diagram: van Durme, Correspondance, no. 92, 107-108; Averdunk, G. Mercator, pp. 108-109, and plate XX.

⁸⁴See above, chapter I, pp. 44-46.

⁸⁵In this Mercator followed the Aristotelian concept that, in astronomy, only those celestial bodies which demonstrated some kind of movement, could be considered planets or stars; cf. Th. S. Kuhn, The Copernican Revolution. Planetary Astronomy in the Development of Western Thought (Cambridge, Mass., 1966), p. 81.

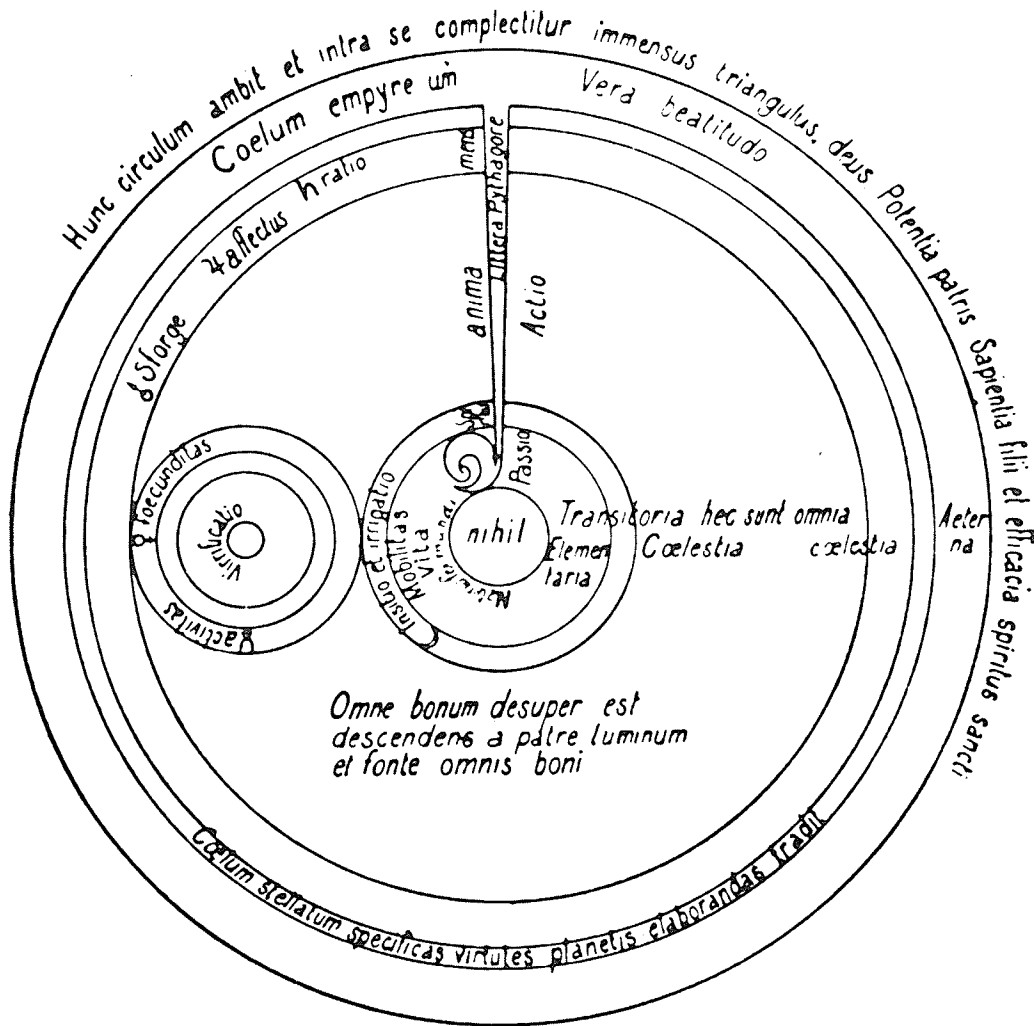


Fig. 1: Mercator's system of the universe

Mercury, however, revolve around the sun. It is possible that advances in astronomical observation, made by his contemporaries, influenced Mercator to thus modify the heliocentric system.

The rather interesting question arises here concerning the proliferation of astronomical discussion around Mercator. How many years before Brahe's treatise was privately printed in 1588⁸⁶ did some knowledge of it spread over Europe? The similarities between Mercator's model and Brahe's are astonishing (Fig. 2). Did other astronomers propose the same thing (which is really a combination of an Aristotelian-Ptolemaic systems with elements of Heraclides' universe⁸⁷) without us having any evidence of it? Unfortunately, it is not clear whether Mercator had independently developed his system of the universe or whether he simply expressed one aspect of current astronomical discussion.

Mercator was an astronomer in a rather limited sense only. Though he had studied mathematics and astronomy, he applied both predominantly to cartography. The inscriptions in his diagram of the universe (Fig. 1)

⁸⁶ Tycho Brahe's De Mundi aetherii recentioribus phaenomenis was first printed at Uranienborg in 1588. In 1602-1603 Kepler published and edited Brahe's entire writings, in two volumes, under the title Astronomiae instauratae Progymnasmata.

⁸⁷ On Heraclides (fourth century B. C.) probable influence upon the Tychonic system see Th. S. Kuhn, op. cit., p. 202.

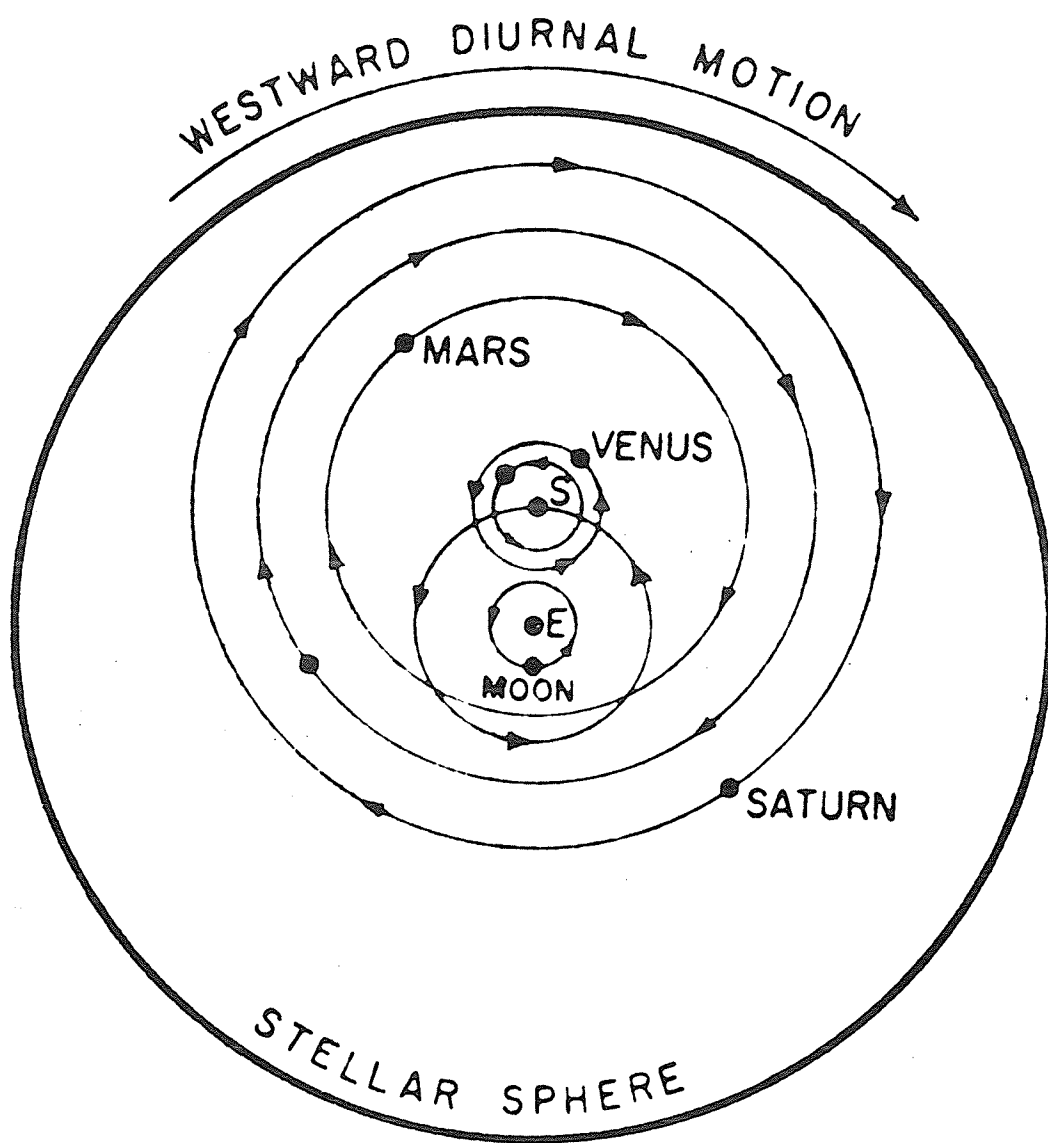


Fig. 2: Tycho Brahe's system of the universe

seem to indicate that he approached the problem more as a "philosopher" than as an astronomer. The earth is 'nihil', surrounded by a sphere of 'materia fex mundi' in which all elements are subject to transition. The sun, 'verificatio', is surrounded by the orbits of 'activitas' and 'foecunditas', Mars and Venus. Will-power, sentiment and reason ('sforge, affectus, ratio'), all form part of the mind ('mens') which embraces and reigns over the lower spheres. They are all connected by 'anima' and 'actio', by the 'littera Pythagore', with the sphere of "true happiness and beatitude", the abode of all good in the trinity of God, Son and Spirit.⁸⁸ In terms of philosophical terminology, Mercator's concept of the universe is thus related to the "principle of continuity".⁸⁹ It had its roots in an Aristotelian tradition which was the basis of much of late Medieval theological philosophy. In Mercator's interpretation it assumes a hierarchical character, too, from 'nihil' to 'vera beatitudo', connected by his "chain of ascending beings". 'Anima' and 'actio' are the intermediaries. Moreover, Mercator combines the "principle of continuity" with the "principle of mediation",⁹⁰ symbolized by the descending

⁸⁸Van Durme, Correspondance, no. 92, pp. 107-108.

⁸⁹A. O. Lovejoy, The Great Chain of Being. A Study of the History of an Idea (New York, 1960), p. 55.

⁹⁰Marsilio Ficino applied this "principle of mediation" to astronomy as a ". . . necessary element in the perfect order of the universe", complementing the

and ascending 'littera Pythagore'.⁹¹ Hierarchical order was paramount. But it became less suffocating, more easily acceptable for the human mind, if "mediation" was allowed to play a role. And, although the principle mediators were enshrined in planetary capacities, man himself was permitted to use his capacity of 'anima' and 'actio' to enter the mediatory process. Mercator's hierarchy of the universe is further characterized by his grouping together similar or inter-related capacities. Again, it is in Ficino's philosophy that one encounters clearly expressed what has been termed the "principle of affinity".⁹²

One principle, however, which was to revolutionize the concept of the universe during the later sixteenth century, namely the "principle of plenitude" was either not known to Mercator or was entirely rejected by him.⁹³ Mercator still believed in a self-contained universe in which a perfect hierarchical order reigned, undisturbed by a plenitude or multiplicity of created beings. It gave a certain peace of mind to mankind, assuring it of its

⁹¹No claim is thereby made that Mercator had any direct knowledge of either Ficino's writings or the teachings of the Florentine neoplatonic school. Rather, it may be an indication in what degree philosophical concepts discussed during the Renaissance entered unconsciously the thought-patterns of scholars and humanists.

⁹²Kristeller, op. cit., p. 109.

⁹³Lovejoy, op. cit., p. 52.

position, limitations and also possibilities. Mercator's concept of the universe was still embedded in medieval theology and cosmology.

As the discussion of Mercator's system of the universe may have clarified, he was in the first place the humanist. He was imbued with a deep respect for the authority of the past and the knowledge and wisdom of Antiquity. His critical approach and humanistic analysis of old works were not intended to demonstrate, by comparison, the greater knowledge of his own time but to restore old wisdom in its purity and to emend it where necessary. Although his later work sometimes may appear therefore rather theoretical, even academic, it was nevertheless intrinsically related to contemporary geographical problems or theological uncertainties which agitated the minds of the sixteenth century.

When he discussed theological questions such as the "infidelity of God"⁹⁴ or the possibility of transsubstantiation during the Last Supper⁹⁵ or the basic problem of "free will",⁹⁶ Mercator always demonstrated that he had carefully reflected over all of them and taken into consideration all

⁹⁴van Durme, Correspondance, no. 103, pp. 117-122. This letter was written to Molanus on July 20, 1575.

⁹⁵Ibid., no. 109, pp 128-130.

⁹⁶Ibid., no. 103.

their implications. His discussions were not vain, they were not performed in a vacuum. All his arguments were based upon the Scriptures. He cited the words of the Apostles, preferring their explanations over later theological interpretations.

But his conviction that the Bible was the sole fountain of religious wisdom did not induce Mercator to leave the fold of the Catholic Church. He hoped for a purified church, revitalized in terms of the practices of the original Christian congregations; he did not advocate a splitting-up of the Christian community. Although Mercator accepted the validity of certain precepts of Lutheran, Zwinglian and Calvinist teachings, he did not declare himself openly in favour of their doctrines. Fear of being denounced may have kept him from doing so.⁹⁷ He was irenic by nature and may have been disturbed by the political and social consequences of religious disputes.⁹⁸

Mercator wrote three major treatises in which he dealt with theological questions. They reflect not only his own intellectual preoccupations but also the religious

⁹⁷In his letter to Molanus of July 27, 1576, Mercator asked his son-in-law not to talk about the content of his letter (i.e., discussion of religious questions) but to keep it secret.

⁹⁸Mercator regretted the extent of disturbances related to the uprisings in his native Netherlands and congratulated himself on living in peaceful Duisburg.

uncertainties of his time, the early Counter-Reformation. His Commentary on Saint Paul's Epistle to the Romans remained unpublished.⁹⁹ The Harmonia evangelica was printed in 1592 to be presented at the autumn book-fair, probably of Frankfurt.¹⁰⁰ His Genesis, finally, appeared only after his death as part of the Atlas of 1595.¹⁰¹

Only the Commentary can be classified as a treatise on dogma. As the long title indicates, Mercator concerned himself deeply with the central problems which divided the Church: free will, predestination, faith and grace. He used the Latin translation of the Bible by Erasmus as his basic text, which he corrected, however, when he felt the necessity for it, or even changed it entirely.¹⁰² His

⁹⁹ It is preserved as a manuscript, in the library of the University of Leyden (BPL 191 Br.). In priorem partem Epistolae ad Romanos quae est doctrina fidei, videlicet undecim prima capita commentarius. In quo de viribus humanis, de electione et praedestinatione, plenissime, planissime, verissimeque tractatur. Per Gerardum Mercatorem Illustrissimorum Principum, Ducum Juliae Cliviae, Montis & Patris filiorum cosmographum.

¹⁰⁰ It appeared under the full title of Evangelicae historiae quadripartita Monas, sive Harmonia quatuor Evangelistarum, in qua singuli integri, inconfusi, impermixti et soli legi possunt, et rursus ex omnibus una universalis et continua historia ex tempore formari. Digesta et demonstrata per Gerardum Mercatorem Illustrissimi Ducis Juliae Cosmographum.

¹⁰¹ The Genesis was intended as an introduction to his collection of maps, the Atlas. Since it will be discussed in detail later on, no specific references will be given at this point.

¹⁰² C. de Clercq, "Le commentaire de Gérard Mercator sur l'Épître aux Romains de saint Paul", Duisburger Forschungen, VI (1962), 233.

approach is that of a humanist, even philologist: he compares texts and refers to other parts of the Old and New Testament to substantiate his revisions or changes. In his commentaries on the text, Mercator firmly takes the position that not everything is dependent on predestination. He expresses his disapproval of Zwingli's and Calvin's position, arguing that God's benevolence and goodness cannot be reconciled with a concept of predestination.¹⁰² It is especially God's justice, in Mercator's opinion, which contradicts predestination. This divine justice finds another expression in the possibility of free will given to man since Creation and renewed through the Passion of Christ. According to Mercator, man is free to choose his salvation by means of a graduated regeneration in which the Church can be of assistance but has not necessarily to intervene. He does not deny the burden of original sin but emphasizes more the power of God's grace.

In explaining St. Paul's Epistle to the Romans, however, Mercator did not limit himself to a commentary on dogma. He also attempted to discuss the Epistle against its historical background.¹⁰³ He is deeply concerned about what he believed to be the correct understanding of the

¹⁰²De Clercq, op. cit., p. 234, n. 5.

¹⁰³Erasmus had always stressed the necessity of considering the historical setting when analysing and interpreting the Scriptures.

Epistle: a detailed message to man about man's free will in obtaining salvation, aided by his own repentance and good works. This last need not be via sacraments established by the official Church; they were, for Mercator, aids only for those in need of them.

Mercator's Harmonia quatuor Evangelistarum is less pervaded with theological discussion. As Ghim wrote, Mercator intended to be helpful to students of theology.¹⁰⁴ He wished to provide a book in which everyone could read the texts of each of the evangelists side by side so that comparison would be easier and the sequence in which they were written would be better discernable.

Mercator's humanistic desire to present the sources in purified form, easy to read and ready to be compared, was not limited to biblical texts. He attempted the same in his revised edition of Ptolemy's Geographia which appeared in 1578 and was dedicated to the duke of Cleves.¹⁰⁵ In 1584 he presented the public with another, further revised, Ptolemy, augmented this time with the eight books of texts originally accompanying the plates.¹⁰⁶

¹⁰⁴Vita, p. 256.

¹⁰⁵Tabulae geographicae Cl. Ptolemaei ad mentem auctoris restitutae et emendatae Per Gerardum Mercatorem Illustriss: Ducis Cliviae, etc. Cosmographum.

¹⁰⁶Cl. Ptolemaei Alexandrini Geographiae libri octo, recogniti iam et diligenter emendati cum tabulis geographicis ad mentem auctoris restitutis ac emendatis, per Gerardum Mercatorem, Illust. Ducis Clivensis etc. Cosmographum.

Mercator's endeavor may appear an antiquarian pre-occupation. But on the contrary, Mercator believed in, even fought for, the practical implications resulting from the re-establishing of all the geographical knowledge of Antiquity. He revised and published not only Ptolemy's work but also collected all other geographical knowledge and engraved maps with the help of such material so that his contemporaries should have a firm basis on which to improve. He was convinced that much wisdom was enshrined in old texts, and that this could further new exploration. Natural phenomena which puzzled his contemporaries could find unexpected explanations through a careful study of ancient wisdom.¹⁰⁷ His Atlas is thus the work of a humanist cosmographer. As much as he was interested in new explorations and kept himself informed of new discoveries, Mercator's contribution to the "expansion of the world" consisted less in direct practical advice to navigators than in providing them with as accurate as possible a picture of the earth's surface compiled from ancient and contemporary knowledge.

¹⁰⁷ van Raemdonck, Mercator, pp. 152-153.

CHAPTER III

MERCATOR'S REPRESENTATION OF THE ARCTIC

(Description of three maps and one globe)

The interest in the North and the search for a sea-route in northern latitudes was intensified during the second half of the sixteenth century. The still existing uncertainty concerning the nature and extension of the Arctic is reflected in Mercator's cartographical work. In it he depicted areas bounded by the Arctic Circle. Since his work was executed over a span of almost fifty years, it provides us with the opportunity closely to follow Mercator's acceptance of new geographical theories and his treatment of the advances made in actual exploration of the North. The three maps and globe which embody this work enable us to detect his working methods. His humanist interest in the preservation of old geographical sources as well as his desire to be of practical help to the navigators of his time are displayed in these maps and globe. A detailed description of this material will therefore precede the discussion and analysis of Mercator's concept of the North.

During the first half of the sixteenth century new discoveries in Africa, the Indian Ocean, and the Americas

were gradually integrated into the existing world picture. Cartographers were still uncertain of the correct limits of the newly found countries. The precise form and borders of northern lands in particular were subject to much speculation. Insufficient information was the reason. Moreover, the wishful theory that America was a part of Asia had not yet been convincingly refuted.

The all important search for a sea-passage in northern latitudes to the spice markets of the Far East went through three stages. The first one followed immediately the discovery of America and its circumnavigation in southern latitudes. After Bartholomew Dias and Magellan had demonstrated that neither climate nor geographical barriers impeded access to southern areas, northern regions, likewise, were believed to be accessible as well. The Cabots, Jacques Cartier, and Verrazzano are representatives of that first stage of northern exploration. They pursued their task under the sponsorship of England and France, countries which had been excluded from the southern hemisphere by the treaty of Tordesillas.

The second stage can be characterized by the role which commercial interests played in it. It coincided with England's need for new wool markets, and English navigators took the lead. A north-east passage was thought to yield more opportunities and it was in that direction, therefore,

that voyages of exploration were undertaken.

The third stage, again under English auspices, occurred during the last quarter of the sixteenth century and was directed toward the exploration of a north-west passage to China.

A steady increase in cartographical material about the North reflected the growing interest in the Arctic, its nature, and extension. Particularly globes seemed to be most appropriate in discussions of probable northern routes. Actual knowledge of the North was supplemented by geographical theories intended to present the possibility of northern circumnavigation in more acceptable terms. Geographical concepts of Antiquity, available in greater quantity since the invention of printing, had to be brought into accord with the results of explorations. This process was not always characterized by logic. At times, geographical theories or humanist respect for the authority of Antiquity overruled reasonable considerations of the practical navigator. Mercator's cartographical work with representations of the Arctic provides us with an example of the details in that process and it should be evaluated in relation to ongoing northern exploration and to his humanistic interest in the preservation of old geographical texts.

Mercator's Double Cordiform World Chart¹ (Fig. 3) was published almost immediately after the publication of his map of Palestine. It was important for his future career that his first independent undertakings should be well received. Unfortunately, there exists no exact documentation of the immediate reception of this map or for the amount of early sales of the 'Orbis Imago'. We do know, however, that it continued to be sold at the book-fair in Frankfurt almost thirty years after it was first published. It must, therefore, have enjoyed widespread acceptance.²

Smaller than his first map, Mercator's Double Cordiform World-Chart measures only 21.75" by 13" (20.4" by 12.8" without the engraved decorative border). Neither of the known copies is illuminated. Mercator chose for his 'Orbis Imago' the so-called heart-shape projection previously developed and used by both Peter Apian and Orontius

¹It appeared in 1538 and was dedicated to Ioannus Drosius. Only two copies of this map are known today. One belongs to the American Geographical Society in New York, the other one is part of the map collection of the New York Public Library. They differ slightly from each other in regard to the text of the dedication. The copy of the Amer. Geogr. Soc. is the older one, carrying the original dedication to Drosius. Mercator's 'Orbis Imago' was copied by Antonius Lafreri (approx. 1560); it is reproduced in Nordensciöld, Facsimile Atlas (Stockholm, 1889), p. 91, fig. 54 (cited hereafter as Nordensciöld, I).

²A. de Smet, "Mercator à Louvain (1530-1552)", Duisburger Forschungen, VI (1962), 46. Cited hereafter as de Smet, Louvain.

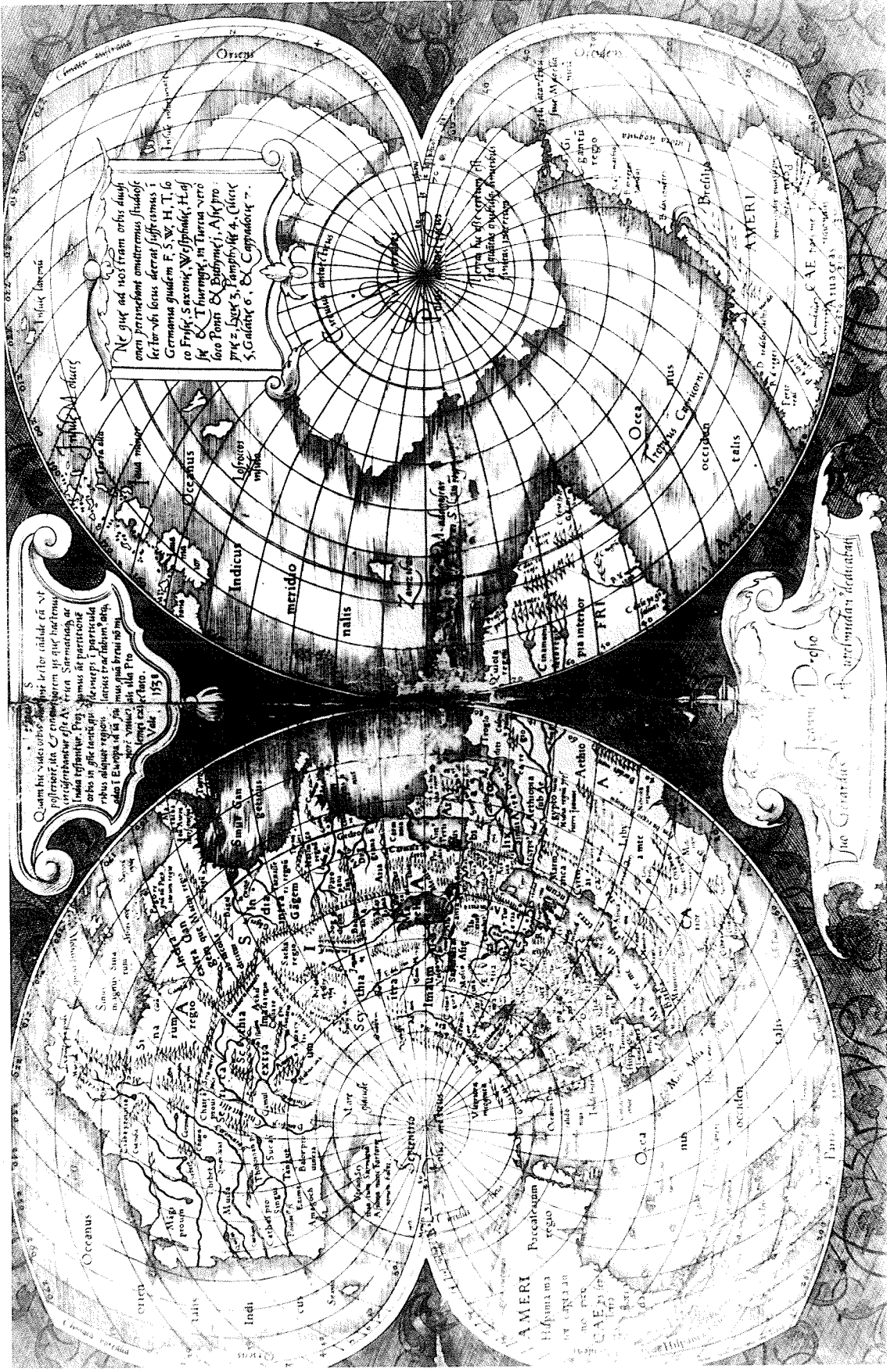


Fig. 3: Mercator's Orbis Imago, 1538

Finæus.³ The heart-shaped hemispheres are set upon a background of a carefully executed floral pattern, a fact which enhances the impression of plasticity evoked by the curved grid. The map is further enlivened by the contrast between the floral pattern and the stark symmetry of a rhombus which is adhered to in the placing of the two vignettes and the poles. The lettering, in three different types, is carefully executed. The earth's surface is divided into 360 degrees of longitude and 80 degrees of latitude. Mercator drew every tenth degree of longitude, starting with the tenth one running through Ireland. He made no distinction between longitude east or west. In the outward margins of each hemisphere seven climatic zones are indicated in the upper part whereas the hours of the days are registered in the lower one.

In engraving his map, Mercator clearly differentiated between known coast-lines and theoretical ones by tracing only the first with a continuous dark line. Unexplored areas he left empty, indicating their limits by marking their borders with short interrupted strokes.

³For biographical notes on Peter Apian and Orontius Finæus see above pp. 53, 77, and L. Bagrow, "A. Ortelii Catalogus Cartographorum", Petermanns Mitteilungen, Supplement 199 (1928), 30-35. In 1530 Apian published a world-chart based on a heart-shaped projection. One year later Finæus modified his previous manuscript cordiform world-map and published an elaborated double cordiform world-chart on which the southern and northern hemispheres are represented separately, connected only at the equator.

No sea-monsters or other fabulous creatures fill this map.

Mercator thus restricted himself to giving only the most necessary information and that in the clearest form possible. By plainly differentiating the actual from the supposed, he presented his geographical theories rather in the form of suggestion than as a fact. In consequence, not only his theory of three continents (Asia together with Europe, the two Americas⁴ and the Antarctic) could be represented on this world-chart of 1538 but also his concept of the arctic regions is displayed.

The North Pole ('Septentrio Polus arcticus') is located at the meeting-point of all the longitudinal lines of the northern hemisphere (Fig. 4). It is surrounded by an extensive land-mass whose borders are drawn in a continuous line between 325° longitude and 75° longitude. In drawing it Mercator indicated that the remaining coastline of the Arctic (namely between 75° and 325° longitude) had not yet been explored and should therefore be interpreted as a theoretical one. The polar cap is not an island on this map. It is connected with the Asian continent by means of a land-bridge extending from 75° to 120° longitude.

⁴Mercator most probably was the first cartographer to differentiate between North America ('Americae ps. Sep:') and South America ('Americae pars meridionalis'), and the world-chart of 1538 is the earliest example; cf. R. A. Skelton, Explorers' Maps. Chapters in the Cartographic Record of Geographical Discovery (London, 1958), p. 58.

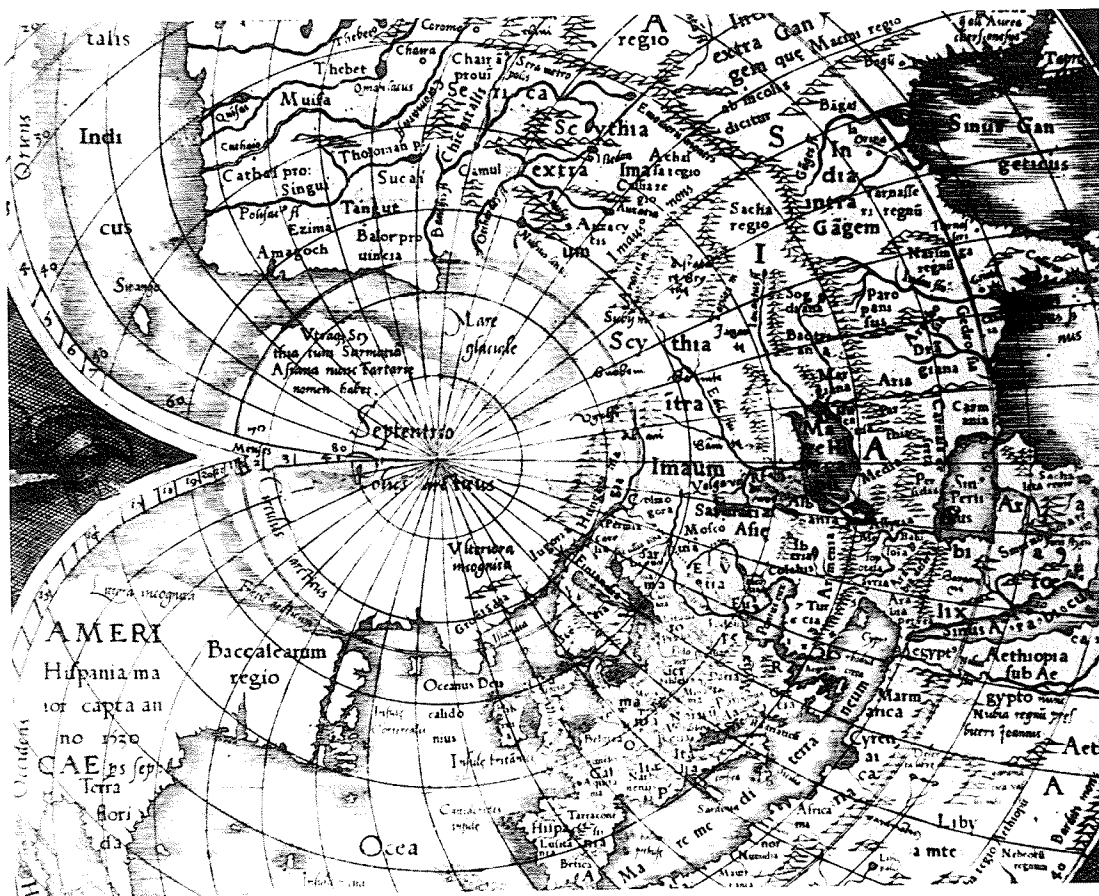


Fig. 4: The Arctic Regions of Mercator's
Orbis Imago, 1538

Only its western coastline is drawn with a continuous line. Greenland ('Groenlandia') is depicted as a peninsula connected with the polar land-mass. It is situated between 340° and 30° longitude and it appears to be limited in its northern extension by a mountain-range. Situated on the land-bridge connecting the polar cap with the Asian mainland, but still within the arctic circle, are the territories 'Jugoria' and 'Hungaria friagia' and the lands of the tribes called 'Ugolfi' and 'Suoboni'.⁵ A long mountain-range forms their northern border. Only two more inscriptions on the arctic land-mass give further information. One of them is engraved opposite the east Asian mainland and reads: "Both the Scythians together with Asiatic Sarmantia now carry the name Tartary." The other inscription, just north of Greenland, explains that the areas lying beyond that point are unknown ('Ultiora incognita').

The waters surrounding the polar cap are the 'Oceanus Deunius calido' which is the northernmost part of the 'Oceanus occidentalis'; there is the 'Mare glaciale' which borders the northern coast of East-Asia and is connected by a broad strait with the 'Oceanus orientalis Indicus'; the 'Fretu arcticum' is situated between the North American mainland and the polar land-mass. Here

⁵A list of all the inscriptions and place-names of this and the following maps is provided in Appendix I.

again, Mercator carefully avoided demarcating categorically the extension of these waters. He only suggested their borders by marking them with little strokes. It almost appears as if he was convinced of the existence of certain straits, yet did not want to identify them before their nature and proportions had been explored and charted.

Various islands and peninsulas are located in these northern waters. Greenland has already been mentioned above. Stretched out in front of its east coast is Iceland ('Islandia'). Although the contour of the island is approximately correct, Mercator has it turned about 90 degrees from its true axis. East of Iceland is another small island, still within 60° latitude north. Its position directly north of Scotland suggests that either the Faroe or the Shetland Islands are here represented.⁶ Eastward of it the Scandinavian peninsula extends to almost 28° longitude and is identified as 'Scodia'. Separated from it by a largely exaggerated Gulf of Bothnia is 'Finlandia' to which 'Corelia' is immediately adjoined. A few unnamed islands fill the waterway between the Scandinavian peninsula and the polar land-mass. Several rivers flow into this waterway which rather resembles an extended fjord. It is interesting to note that one of these rivers almost cuts through the

⁶If the names of continents, oceans, countries, rivers, etc. do not appear in Latin and in parenthesis, their present English nomenclature has been used.

entire land-bridge connecting the polar cap with the Asian mainland. Further east, the 'Imaus mons' stretches out almost to touch the Arctic Circle. Between the mountains and the 'Oecharde fluuius' to the east the 'Nubius lacus' is located; it has an outflow into the 'Mare Glaciale'. The 'Barnyis fluuius', at 185° longitude, forms the border of the 'Balor provincia' which, together with 'Amagoch', represents the northernmost part of East Asia. Finally, the North American continent is depicted as almost extending to the Arctic Circle. The only identification given it is 'Baccalearum regio'. The 'Insule Corterealis', nine in total, are completely separated from the mainland by a strait which follows nearly exactly the 330° longitude. One island, just south of the Arctic Circle, is situated between the 'Insule Corterealis' and Greenland.

In 1538, then, Mercator believed that a rather extensive land-mass covered the northernmost part of the earth's surface. Yet, he was cautious enough not to commit himself to a precise outline or description of the area. By indicating some coasts or borderlines only with little strokes instead of with a continuous line, he left himself enough room eventually to incorporate either findings of actual explorations or new theoretical propositions about the nature of the arctic regions. The existence of a land-bridge connecting the polar cap with the Eurasian continent, on the other hand, may have to be

explained within the context of his concept of three continents. Mercator could hardly separate so large a land-mass, as he imagined the polar cap to be, from the Eurasian continent and still defend the existence of basically three continents, namely Eurasia, America and the Antarctic.

Three years later, however, his position changed somewhat. In 1541, Mercator published his first globe, dedicating it to Nicolaus Perrenot, Seigneur de Granvelle.⁷ This globe or terrestrial sphere was a great success for Mercator; so much so that he continued to sell copies of it until his death without undertaking major changes or correcting it to conform with new discoveries. The house of Plantin in Antwerp sold twenty-six copies between 1560 and 1595, sending them to London, to Bruxelles, to Antwerp, to Bruges and to Paris.⁸ Plantin's account-books and Mercator's correspondence give further interesting information on who some of the buyers were. Merchants,

⁷" . . . et amplissimo gravissimoque viro Domino Nicolao Perenotto Domino à Granvella praedicti Caesaris Caroli Quinti, secreti consilii consiliario longe dignissimo dedicavit." Cited in de Smet, Louvain, p. 62, n. 98. Several copies of this globe are still in existence. Van Raemdonck dedicated a special study to the globe: Sphère Terrestre et Sphère Céleste de Gérard Mercator, de Rupelmonde, Éditées à Louvain en 1541 et 1551 (Bruxelles, 1875).

⁸Léon Voet, "Les relations commerciales entre Gérard Mercator et la Maison Plantinienne à Anvers", Duisburger Forschungen VI (1962), 171-229, table 1 and 4.

members of the Spanish court both in Spain and in the Netherlands, and other personalities known for their humanist interests were eager to purchase copies of this globe.⁹ John Dee praised it highly, bought one and took it to England where he later presented it to Trinity College.¹⁰

Mercator had worked about two years on the drawing and engraving of the sheets for this terrestrial sphere. It consisted of five separate sheets, mounted on a core. Its circumference measures approximately 50.75 " (1.30 m). The engraving is very carefully executed. Contrary to his world-chart of 1538, the globe is covered with a grid in which only every fifteenth degree of longitude is marked. The prime meridian runs through the Canary Islands.¹¹ Unfortunately, it is not clear in the reproductions of the globe and the drawings made of it whether Mercator retained his system of marking theoretical coastlines only with little strokes. However, this fact does not significantly

⁹Ibid., table 1 and 4. M. van Durme, Correspondance Mercatorienne (Anvers, 1959), letters no. 39, 72, 81, 82, 94, 95, 104, 107, 118, 133. Cited hereafter as van Durme, Correspondance.

¹⁰R. Deacon, John Dee. Scientist, Geographer, Astrologer and Secret Agent to Elizabeth I. (London, 1968), p. 19.

¹¹Although de Smet states: "L'équateur a une graduation de dix en dix degrés." (Louvain, p. 63), I was not able to confirm this on the drawings made after the original by van Raemdonck.

obscure the changes made by Mercator in depicting the northernmost regions of the earth.

As in 1538, so in 1541, Mercator believed in an extensive polar land-mass (Fig. 5). But, in contrast to his previous view, on the globe of 1541 he connected the polar cap with the American continent and not with Asia. Greenland is now drawn with much more detail. About ten rivers, of which two are named ('Thor fluvius' and 'Bocer fluvius'), flow towards its southern coast. Three major mountain-ranges form its northern and eastern border. Even two cities are noted, namely 'Alba' and 'Solotobab'. An inscription just south of these two cities reads 'Pigmerrum' and might refer to the inhabitants as being Eskimos. Stretched out along Greenland's southern coast are a number of islands (in total about thirty-five) the largest of which is named 'Margaster'. No reference is made on the globe of 1541 to unknown areas or unexplored coasts. No explanation is given concerning the shift of the land-bridge connecting the polar cap with the continental mainland from Asia to America.

Even the outline of the European and Asian mainland has been altered. In 1538 Mercator outlined the north and north-east coast of Scandinavia as gradually running south; in 1541, however, the coast appears to turn southward rather steeply. It is bordered by the 'Graduicus sinus', a bay which separates Scandinavia from the 'Juhra regio'

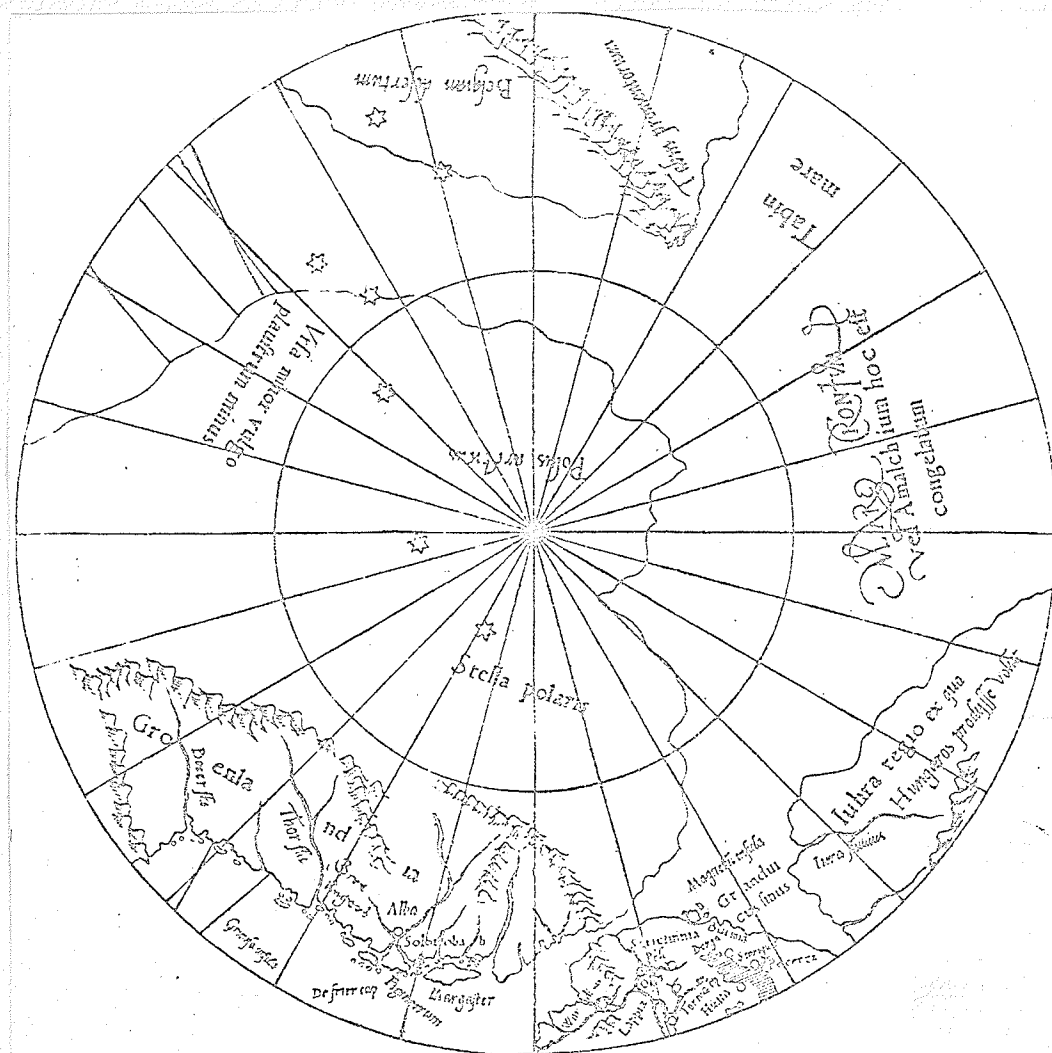


Fig. 5: The Arctic on Mercator's Globe, 1541

or North-Asia. The strait itself between the arctic land-mass and the northernmost extremity of Scandinavia remained unnamed. It connects the Atlantic Ocean with the 'Mare Cronuim vel Amalchium' which is characterized as being frozen. It therefore may be identified as the equivalent to the 'Mare Glaciale' on the 1538 world-chart. The 'Tabin mare' on the globe of 1541 is located where, in the world-chart of 1538, the 'Mare Glaciale' narrowed to form a strait before connecting with the 'Oceanus Indicus'. No other seas or straits are specifically identified on the globe.

Mercator undertook one further change which is of particular interest: it is on the globe of 1541 that he indicated for the first time in his cartographical work the possible location of a "magnetic island", calling it 'Magnetū insula'. It is located approximately on the 30° longitude east of North-Scandinavia and within the Arctic Circle. Indeed, it is the earliest indication of the cartographer's interest in the variations of the magnetic needle and the location of a magnetic pole on the earth's surface. His letter to Antoine Perrenot de Granvelle in which he discussed this problem and proposed a new theory was written only in 1546. In the five years between 1541 and 1546, therefore, Mercator must have dedicated at least some portion of his studies to the question of the magnetic pole's position. Intensified research and geographical

calculations may have induced him to rectify his theory of 1541 in locating the magnetic island east of Scandinavia since he described, in 1546, its position as being on ". . . the point of intersection of these circles . . . at about 168° longitude and 79° latitude".¹²

The continental land-masses, so far as they are included within 60° latitude north, also have undergone some changes. These are related to or were occasioned by the differences in the coastal outlines between the world-chart of 1538 and the globe of 1541. North-Scandinavia has received more detailed attention, in the same manner as Greenland. Rivers, fjords, mountain-ranges and settlements are named. Inland, at the juncture of what seems to be the beginning of a deep fjord and a large river, 'Wardi' (probably Wardhuys?) is inscribed. Northeast of it one recognizes the 'Scricfinnia emporium' and in the south-east 'Lappia' which borders on the 'Tornia emporium'. Situated clockwise around the Gulf of Bothnia are the cities 'Hiutta', 'Berga', 'Starigur' and 'Pecerra'. 'Biarmia' runs along the north-east coast, looking upon the 'Granduicus sinus'.

The comparisons made above concerning the nature of the arctic regions on the world-chart of 1538 and on the globe of 1541 give sufficient evidence of Mercator's

¹²H. D. Harradon, "Some early Contributions to the History of Geomagnetism--IV," Terrestrial Magnetism and Atmospheric Electricity, XLVIII, No. 4, p. 201.

changing concept of the North Pole and its surrounding areas. Though there still exists on the globe a massive land-bridge connecting the polar land-mass with the continental mainland, its location has been considerably moved (approximately 180° longitude) and it has been visibly enlarged. Furthermore, whereas the world-chart of 1538 excluded any possibility of a north-east passage to China by interpolating the land-bridge, the globe of 1541 does provide a basis for hopes of such an undertaking. This fact is little changed by the inscription that the waters around the polar cap are frozen. And finally, not so much a change but rather a new attribute to the concept of the Arctic is Mercator's placing a magnetic island in the seas north-north-east of Scandinavia.

Taking all these points into consideration, it is evident that despite his respect for the authority of the past Mercator was constantly preoccupied with reconsidering and refining his cartographical work based on new data and further research.

The great world-chart of 1569 demonstrates his open-mindedness in that Mercator therein gives up his concept of a massive polar land-mass connected with continental mainlands, one of his most fundamental conceptions of the polar regions.

In August 1569 Mercator published his long announced large map of the world, the "Nova et Aucta Orbis Terrae

descriptio ad usum navigantium emendate accomodata".¹³ Its success was immediate. In twenty-four years, Christophe Plantin sold about two hundred and fifty copies of the map.¹⁴ This is a large number considering that this map was composed of eighteen different sheets, large enough to decorate an entire wall. Nor was Plantin the sole distributor of Mercator's work. But on the basis of Plantin's bookkeeping we know that the map found its way into royal, ecclesiastical, and private libraries¹⁵. It is this cartographical work on which Mercator's fame predominantly rests because of the novel projection which it introduced. Already in Mercator's time it was recommended by theorists for the purpose of geographical as well as navigational studies.¹⁶

¹³This map which Mercator had dedicated to the Duke of Cleves was beautifully reproduced in approximately the original size by the International Hydrographic Bureau, Monaco in 1931, accompanied with the text of the original Latin inscriptions and their translation. B. van T'Hoff, Gerhard Mercator's Map of the World (1569). In the Form of an Atlas in the Maritiem Museum "Prins Hendrik" at Rotterdam (Rotterdam, 1961) differs slightly from the Monaco reproduction because they are based on two different original copies. Every major treatise on the history of cartography mentions the map, discusses it shortly, and almost always gives a reproduction.

¹⁴L. Voet, op. cit., table 1.

¹⁵Ibid., table 4.

¹⁶M. Blundevile, His Exercises, containing eight Treatises verie necessarie to be read and learned of all young Gentlemen, that are desirous to haue knowledge as well in Cosmographie, Astronomie, and Geographie, as also in the Arte of Navigation. Third edition (London, 1606).

But the very nature of the new projection prevented Mercator from representing either the Arctic or the Antarctic on the main chart. He solved the problem by inserting a small map of the Arctic in the lower left-hand corner of the main map, using a projection appropriate to his topic (Fig. 6).¹⁷ It is interesting, indeed even of some significance, that Mercator decided to give a special representation of the Arctic and did not couple it with one of the Antarctic. The inset of the Polar regions is carefully executed. An intricate frame and a long explanatory inscription attract immediate attention.¹⁸

The basic symmetry underlying the representation of the North Pole is the most remarkable feature in Mercator's changed concept of the area. One massive rock forms both the physical as well as the optical centre of the entire map. According to the inscription, it has a circumference of about thirty-three leagues and is very high and black.¹⁹ An open sea, into which four streams flow, surrounds the

¹⁷The projection chosen by Mercator is the so-called "Postel-Projection". Although it was already used by Giovanni Vespucci in 1524, it was named after the cartographer Postel who described it in 1541. Cf. H. Averdunk und Joseph Mueller-Reinhard, "Gerhard Mercator und die Geographen unter seinen Nachkommen", Petermanns Mitteilungen, Supplement 182 (Gotha, 1914), 139 (cited hereafter as Averdunk, G. Mercator); Nordensciöld, I, p. 94, no. D. 18.

¹⁸For the complete Latin text and its translation see Appendix I.

¹⁹Cf. van T'Hoff, op. cit., p. 61.

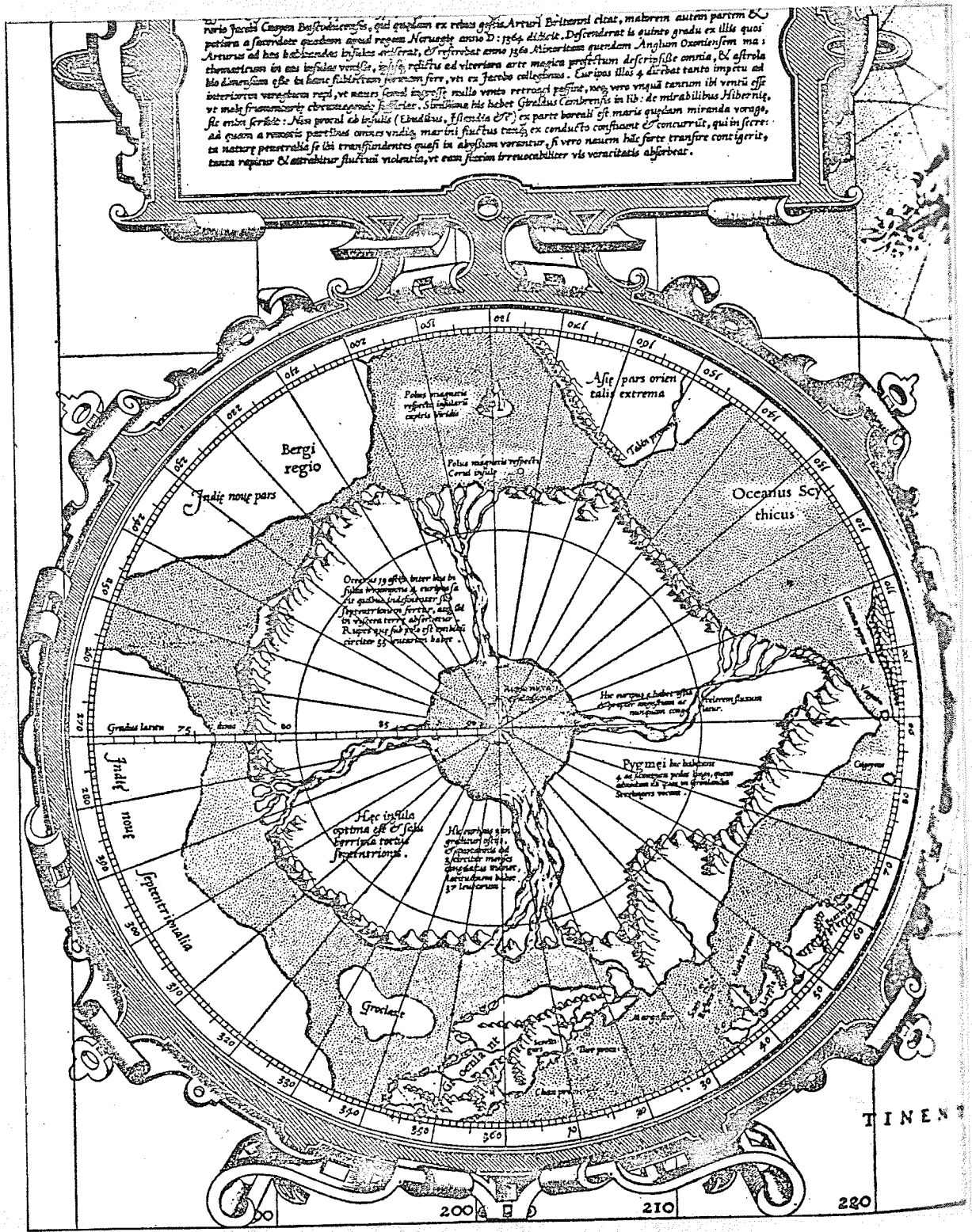


Fig. 6: The Arctic inset on Mercator's map of the world, 1569

rock. These four streams divide the arctic land-mass into four separate islands. They are grouped in almost perfect symmetry around a central polar sea. A massive mountain-range, interrupted only by the delta of each river, encircles them on their southern coasts. One of the islands is identified as being the home of the "Pygmies who do not grow taller than four feet and are like the Screlingers of Greenland".²⁰ Another island, namely the one situated north of the American continent, is characterized as "the best and most salubrious of the whole of Septentrion".²¹ The remaining inscriptions on the other of the four islands relate the nature and characteristics of the four streams. It is explained that they are really "four arms of the sea" originating in the "ocean breaking through by nineteen passages", that they are in constant flow northward and are "being absorbed into the bowels of the Earth".²² Two rivers in particular receive special attention. The one which carries the waters of the 'Oceanus Scythicus' to the polar sea is said never to freeze because of its "straightness and of the speed of the current" (which however contradicts the representation

²⁰ "Pygmaei hic habitant 4 ad summum pedes longi, quemadmodum illi quos in Gronlandia Screlingers vocant." Ibid., p. 62.

²¹ Loc. cit.

²² Ibid., p. 61.

since it is the most curved of the rivers).²³ Of the strait running north between the 10° and 20° longitude it is explained that it "enters through three passages and remains frozen about three months" and that "it has a width of thirty-seven leagues",²⁴ being the widest of the four arms of the oceans.

A number of small and large islands fill the waters surrounding the four Polar Islands. 'Groenlant' is the most prominent among them. Whereas it formed part of the polar land-mass on Mercator's representations of the Arctic in 1538 and 1541, it now (1569) is completely separated from it. A long mountain-range crosses the island from south-west to north-east, being the watershed of the island's river system. Though they are not named, eight rivers may be identified, three on the western part of the island and five on its eastern side. 'Screlingers' are said to inhabit Greenland. The only named city is 'Alba', situated approximately on the 13° longitude and 74 1/2° latitude north. Two promontories are identified as 'Ther prom' and 'Chan prom'. A chain of small islands almost encircles Greenland. As on the globe of 1541, the island 'Margaster' is again situated south of Greenland's eastern-most extremity. Between 30° and 40° longitude a group of small

²³Loc. cit.

²⁴Ibid., p. 62.

islands attracts attention. 'Sanit' and 'Rustene' are two of them. They are located north-west of Scandinavia's northern tip, the 'Mutka prom.' in the area of 'Lappia'. The only other specially identified part of Scandinavia is 'Biarmia'. Further east, at about 81° longitude, one finds an island named 'Colgoyeue' and 10° longitude east of it 'Vaigatz'. Of the Asian mainland only a range of mountains is visible, identified as the 'Camenoi poyas mons'. In this area the Polar Island reaches so far south that 'Vaigatz' seems to lie in a strait, very similar to its actual location between the Yugorskiy peninsula and Novaya Zemlya. Enclosed by the 'Camenoi poyas mons' and the 'Tabin promon.', at about 153° longitude, lies the 'Oceanus Scythicus'.

At the intersection of $73 \frac{1}{2}^{\circ}$ latitude north and 180° longitude the island with the magnetic pole dominates the space between Asia's extreme eastern part and the American west-coast, called the 'Bergi regio'. A second magnetic island is located where 77° latitude north and 174° longitude meet. Mercator explains the existence of two magnetic poles with the fact that one is located in respect to the prime meridian of the 'Corui insule', the other one in respect to 'insularum capitis Viridis'. They also differ in size: the magnetic island in relation to the prime meridian of 'insularum capitis Viridis' is the

larger one.²⁵ However, neither of the magnetic poles as indicated on the map of 1569 coincides with the specifications Mercator gave to Antoine Perrenot de Granvelle in 1546 when he reported to him that the magnetic pole most probably is located at 168° longitude and 79° latitude north.²⁶

A strait, about twenty degrees of longitude in extension, separates the North American continent (present day Alaska) from one of the Polar Islands. The direction of the North American coastline on this inset of the Arctic is somewhat misleading in that it gives the impression of the existence of two separate parts of North America. A look at the main map, however, makes it clear that the southward turning coastlines enclose a large bay. Finally, an island named 'Groclant' is located between the American continent in the west, Greenland in the east, and the "salubrious" Polar Island in the north.

Such are the main features of the inset of the Arctic on Mercator's world-map of 1569. The few explanatory inscriptions do not obscure the clear outline of the continental land-masses, islands, and waterways. Indeed, the representation of the polar regions resembles almost a

²⁵Though Mercator did not give any explanation to this fact, it probably could be related to a preference for that prime meridian over the other one.

²⁶van Durme, Correspondance, no. 18.

mathematical abstraction of a geographical concept. Mercator could not have presented his change of concept concerning the nature of the North in a more precise form. Its very simplicity and clearness attracts and leaves no doubt about Mercator's position. Every component of his new vision of the Arctic is depicted concisely and explained as far as he deemed it necessary. When and where possible, he preferred to give either geographical or historical details on the main map in order not to disturb, so it seems, a pure appreciation of his polar representation. Furthermore, by not indicating unexplored areas or unknown coastlines, Mercator gave his vision of the Septentrional Regions an appearance of finality. It was this map of the Arctic of 1569 which became the basis for his later representations of the polar regions. It impressed many of his contemporaries and influenced a number of cartographers who followed his "lead" in outlining the North.²⁷ Mercator's own representations of the Arctic in later years, particularly his map of the Septentrional Regions for his Atlas, are rather elaborations of the inset of the Arctic of 1569 than presentations of a newly changed concept. Once he had established his concept of the North he only adapted

²⁷ It found its way, for example, into such "geographical oddities" as Antonino Saliba's map with a representation of the Elements; cf. R. V. Tooley (ed.), Map Collectors' Circle. Map Collectors' Series, No. 1: Geographical Oddities (London, 1963), no. 26, plate X.

it by incorporating information stemming from new discoveries and explorations.

Mercator's 'Septentrionalium Terrarum descriptio' in the Atlas of 1595, then, is a detailed elaboration of his inset of the Arctic of 1569 (Fig. 7 a + b). The Atlas Major, of which the map depicting the Arctic forms part, was published by Rumold Mercator one year after his father's death.²⁸ It therefore has been questioned whether this map really is by Mercator although an inscription in the lower right-hand corner testifies to his authorship ('Per Gerardum Mercatorem Cum Privilegio'). Two passages in Ghim's biography are helpful in solving this question. First, Ghim relates that shortly after April 1590 Mercator had started the description of the northern countries, that he had achieved considerable progress, but that fate prevented him from bringing his work to conclusion.²⁹ It is unquestionable, therefore, that Mercator

²⁸Atlas sive cosmographicae meditationes de fabrica mundi et fabricati figura. Gerardo Mercatore Rupelmundano Illustrissimi Ducis Juliae Cliviae et Montis etc. Cosmographo auctore. Cum Privilegio. Duisburgi Clivorum. In this Atlas are combined all those maps which had previously been published by Mercator in form of shorter series (1585 and 1589) together with entirely new charts (i.e., the Septentrional Regions). The work was reprinted numerous times and, in the first half of the seventeenth century, its texts were translated into English, French and German. Cf. J. Keuning, "The history of an Atlas. Mercator-Hondius." Imago Mundi, IV (1947), 37-62.

²⁹Cf. H. H. Geske, "Die Vita Mercatoris des Walter Ghim", Duisburger Forschungen, VI (1962), 255.

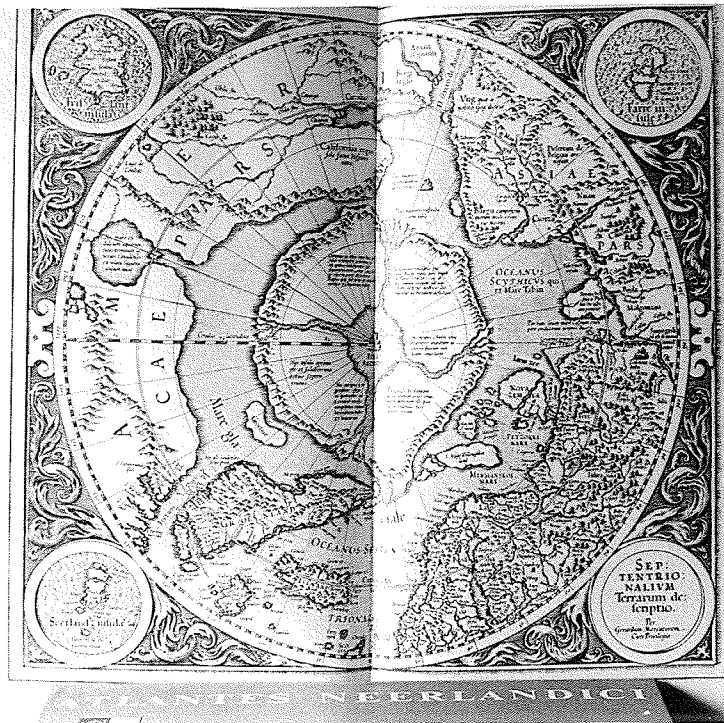


Fig.7a: The Septentrionalium Terrarum descriptio in Mercator's Atlas of 1595

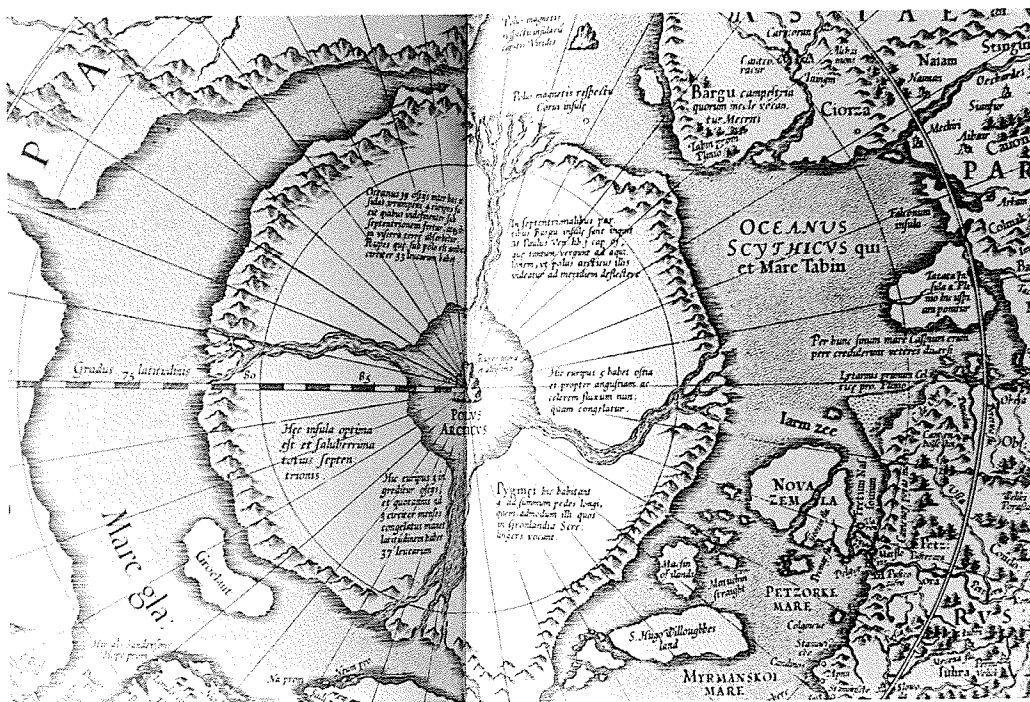


Fig.7b: The Polar Islands, detail of the Septentrio-
nalium Terrarum descriptio , 1595

had at least done some of the basic "ground-work" for the map before his death. Unfortunately, however, it is not clear from Ghim's text of what the "ground-work" consisted. It is not stated whether it was limited to merely literary research or whether it included a start on the actual engraving. The last seems doubtful since Ghim states that on May 5, 1590, Gerhard Mercator suffered a paralysis of his left side.³⁰ In all probability, then, Gerhard Mercator's authorship of the Septentrionalium Terrarum descriptio should be interpreted as restricted to the preliminary research and possibly to guidance during the engraving itself. Mercator was in correspondence with England and incorporated new discoveries and explorations in his maps. Thus, those explorations and discoveries undertaken before 1587 are traceable on this map of the Arctic.³¹ All these factors, therefore, indicate that one may accept as authentic Gerhard Mercator's authorship of the map depicting the Polar Regions in the Atlas of 1595. His inability personally to do the engraving seems to be less important than the fact that nothing impeded him from doing the necessary primary research so essential to the

³⁰Ibid., pp. 269-270.

³¹John Davis' third expedition to discover a north-west passage to China was undertaken in 1587. The names given by him to newly discovered areas as related in Richard Hakluyt's Principal Navigations are reflected on Mercator's map.

final description and representation.

As in 1569 so in 1595, Mercator depicted the North upon a grid constructed according to Postel's projection. He set the round map upon a rectangular background ornate with intertwined leaves and filled the corners with small round insets. The one in the lower right-hand corner carries the title and a reference to the author of the map; the one in the lower left-hand corner gives an enlarged view of the Shetland Islands. A representation of the imaginary Friesland Island occupies the upper left-hand corner and in the upper right-hand corner the Faroe Islands are illustrated.

On the whole, Mercator retained the basic outline of the polar regions as he had first proposed in 1569. But, whereas his representation of the Arctic of 1569 included only areas encircled by 70° latitude north, in 1595 he enlarged his map to encompass all the territories lying north of 60° latitude north. Aside from being more inclusive, the map of the Arctic of 1595 is further characterized by a multitude of details which were absent on the inset of 1569.³² Interestingly enough, some of this detailed information is not geographical in character and, as it will be later on explained, is an indication of Mercator's unlimited interest in not only the topography of a country

³²In view of the extensive number of place names, they are all listed in Appendix I.

but also in its history, religion and even sociology.

As on the Arctic inset of 1569, the high black rock forms the centre of the entire map (Fig. 7a). Likewise, the explanatory inscriptions on the four Polar Islands are the same and will therefore not be repeated here (Fig. 7b). Only one addition has been made in this small area. On the Polar Island opposite the 'Tabin' promontory, there is an inscription referring to the strong winds blowing in that direction.

One important change, however, has been undertaken. Mercator entirely revised the southern coastline of the Polar Island situated north of Russia (Fig. 8). Whereas in 1569 it extended almost as far south as 71° latitude north, in 1595 its coast follows approximately 78° latitude north. What had appeared in 1569 as two large promontories or peninsulas stretching out south from the Polar Island, is now, in 1595, a chain or concentration of small and large islands among which 'Sir Hugo Willoughbes land', 'Mae sin of ilands' and 'Nova Zemla' attract most attention. Although 'Nova Zemla' is depicted as two islands separated by an unidentified strait, the form of the inscription makes it clear that Mercator considered them as one entity. The waters between these islands are identified as the 'Myrmanskoi Mare', situated between 'Sir Hugo Willoughbes land' in the north and 'Lappia' in the



Fig. 8: Detail of the Septentrionalium Terrarum
descriptio, 1595

south, and as the 'Petzorke Mare', enclosed by 'Sir Hugo Willoughbes land' in the west, 'Matuchin straight' in the north, 'Nova Zemla' in the east and Russia in the south. The strait separating 'Nova Zemla' from the mainland is called 'Fretum Nassouium' and flows into the 'Iarm zee', east of 'Nova Zemla'.

A number of other changes, although less conspicuous, can be pointed out. They are particularly noticeable in the northern mainland coastlines. As has already been stated, Mercator extended the grid on his polar map of 1595 to include all areas lying north of 60° latitude north. Thus he was able to trace the coastlines further southward, to include many details concerning the nature of bays, the extension of waterways and mountain-ranges, and to depict newly acquired geographical knowledge. On the map of 1595, therefore, the entire north coast of Asia is represented (Figs. 8, 9a, 9b). Three major estuaries cut deep into the mainland and a number of other rivers also shed their waters into the 'Oceanus Scythicus'. One large island, the 'Tazata Insula', is situated off the coast of 'Baida', extending from about 115° to 125° longitude and from about $65 \frac{1}{2}^{\circ}$ to $70 \frac{1}{2}^{\circ}$ latitude north. Mercator did not alter the basic outline and location of the 'Tabin promontorium' on his map of 1595. But, where on the map of 1569 a river discharged its waters into the 'Oceanus Scythicus', there is, in 1595, a large estuary protected by an island

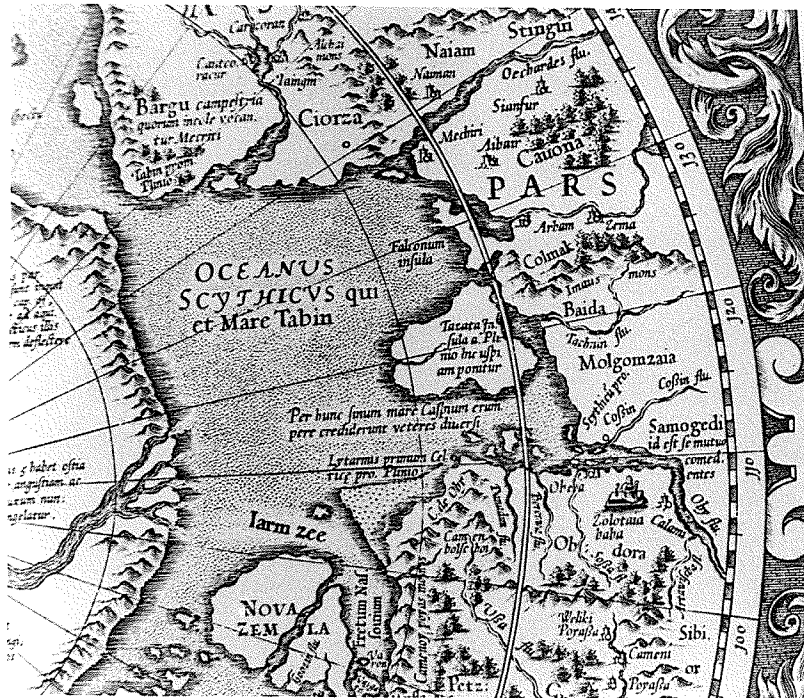


Fig.9a: Detail of the Septentrionalium
Terrarum descriptio, 1595



Fig.9b: Detail of the Septentrionalium
Terrarum descriptio, 1595

situated in its widest part. Another island which was missing on the map of 1569 stretches out in front of 'Tabin's' east coast.

As in 1569, Mercator again located the magnetic poles in the open waters between Asia and America (Fig. 10a). But in 1595 their exact position has slightly changed. The magnetic pole in respect to the 'Corui insule' lies now (1595) on the 172° longitude and the one in respect to the 'insularum capitis Viridis' on the 178° longitude.

The American west-coast has undergone some interesting changes (Fig. 10a). On the map of 1595, it is separated from Asia by a strait identified as 'El streto de Anian' into which a large estuary runs from east to west. It separates the 'Anian regnum' (on American soil) from the 'Bergi regio'. 'California regio' is situated north of these two regions and it is enclosed within the Arctic Circle. Mercator explained that only the Spaniards had knowledge of that region. Three large rivers, two of which have tributaries, shed their waters into a deep bay south of 'California regio'. The north coast of America, though basically unchanged from 1569, has moved southward for about 5° latitude thus enlarging the width of the 'Mare glaciale' (Fig. 10b). At approximately 270° longitude, there is a strait connecting the arctic sea with an extensive bay. Mercator here commented that the bay's

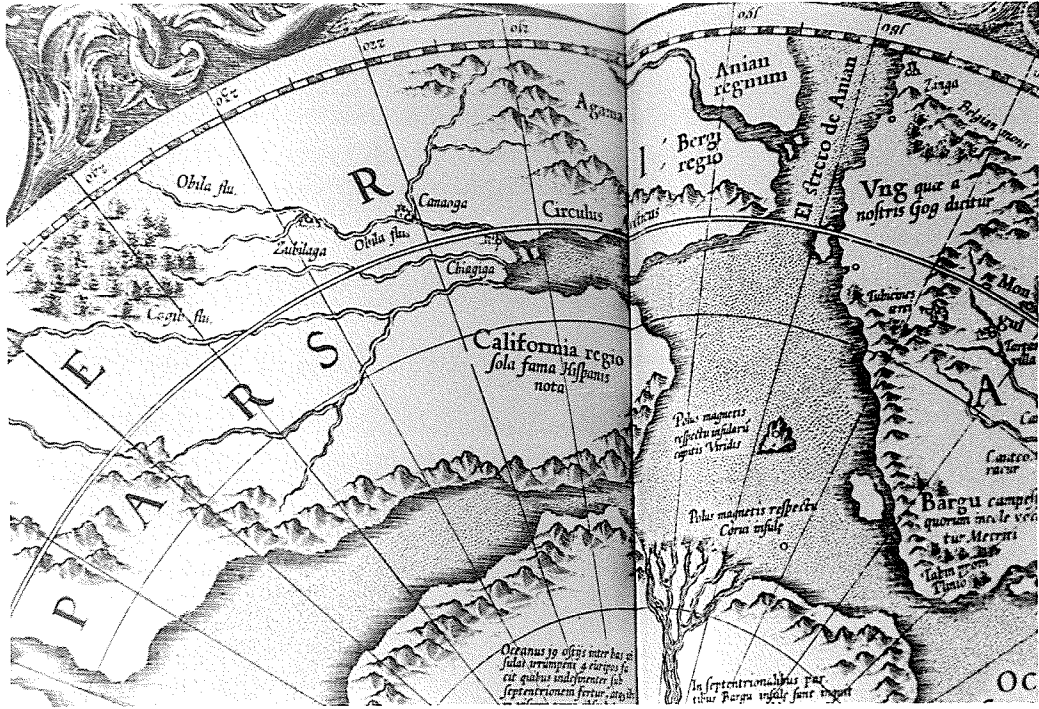


Fig.10a: Detail of the Septentrionalium Terrarum descriptio, 1595

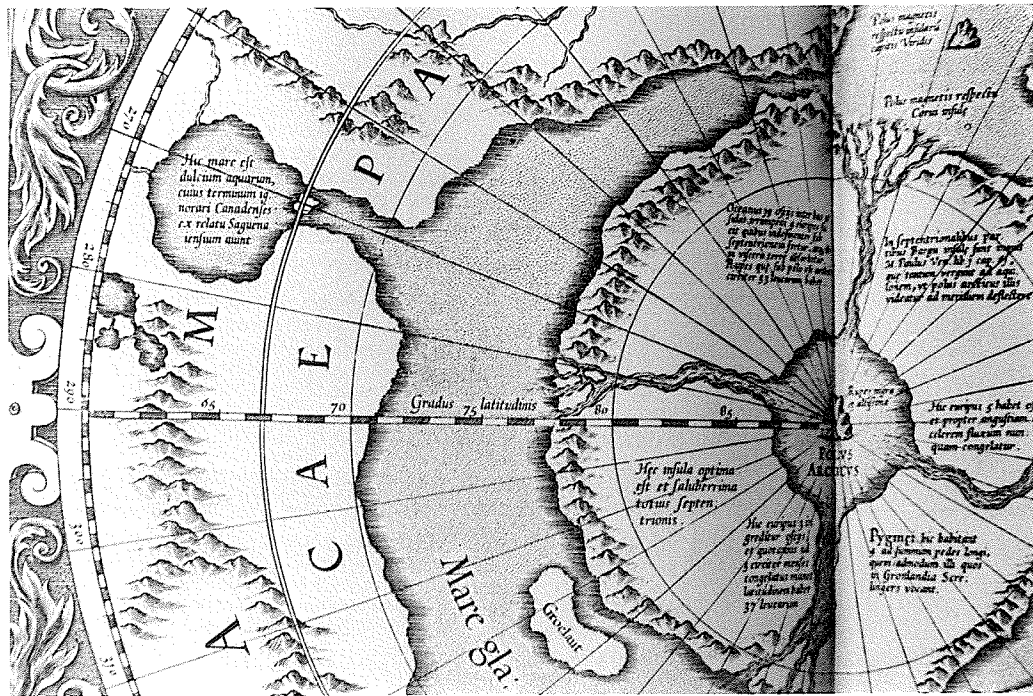


Fig.10b: Detail of the Septentrionalium Terrarum descriptio, 1595

waters are sweet and that the 'Canadians' do not know the limits of that bay. Three rather large lakes, each connected with the others by means of waterways or rivers, are to be found east of the "sweet-water bay"; they are not named.

It is only at the American east coast that Mercator again gave detailed information. Here the names show evidence of English exploration which Mercator has used in drawing this map of 1595 (Fig. 11). The 'Fretum Davis' stretches north-south between the American coast and Greenland whose southern extremity has been engraved according to the reports of Frobisher. East of 'Frobisher's strait' and south-west of Island is the imaginary island of 'Frisland', engraved with much care and detail. Iceland, traversed by the Arctic circle, is situated in the 'Oceanus Septentrionalis' between 354° and 13° longitude, approximately 15° to 18° longitude distant from the Scandinavian peninsula.

Mercator's Septentrional Regions in the Atlas of 1595, then, is fundamentally an elaboration of his 'Polar Regions' of 1569. Apart from the changed and refined outline of one of the Polar islands, he retained his basic concept of the North. As in 1569, he did not obstruct the outline of the polar lands by giving more than necessary explanatory inscriptions. The over-all symmetry on the map of 1595 has been further enhanced by enclosing the



Fig.11: Detail of the Septentrionalium Terrarum
descriptio, 1595

Polar Islands within an almost perfect circle. His extending the grid to 60^o latitude N. gave Mercator the opportunity not only to clarify the position of the northern continental land-masses in relation to the Polar Islands, but also provided him with the possibility of demonstrating his detailed knowledge of those areas. Numerous details fill especially the north European and north Asian lands in particular. Mountain-ranges, wooded areas, little towers, and, in two instances, even statues enliven the representation. The 1595 map of the Polar Regions is a testimony indeed to Mercator's relentless interest in providing the public with the most truthful representation of the earth's surface. It also is an example of his untiring search to uncover and use what he considered reliable information and of his endeavors in geographical theory which ended only at his death.³³

³³There exists another map of the Arctic which carries Gerhard Mercator's name. In my view, this identification is incorrect. In Appendix II the map will be discussed and the reasons for denying Mercator's authorship will be presented.

CHAPTER IV

MERCATOR'S CHANGING CONCEPT OF THE NORTH

(Analysis and discussion of Mercator's concept
of the nature of the North Pole)

As has been explained, Mercator three times revised his concept of the nature and extensions of the arctic regions. He assimilated as much as possible newly acquired knowledge about the North which had gradually become available because of exploration-voyages into northern latitudes. But not all the changes in his outlining of the Arctic were based upon geographical data. Current geographical theories and his humanistic respect for the authority of old texts also influenced his work. The following analysis and discussion of the three stages in Mercator's concept of the North will attempt to demonstrate the influence of actual geographical knowledge upon his cartographical work as contrasted with his endeavor to preserve the geographical knowledge of Antiquity.

The great discoveries of the fifteenth and sixteenth centuries had unforeseen consequences.¹ They gave

¹There exist several detailed studies not only of the discoveries but also of their impact upon the

not only an impulse to territorial expansion but also stimulated intellectual research and speculation. Originally undertaken for economic and commercial reasons, namely to avoid the costly land-route and to reach the highly valued spices and luxury articles of the Orient directly by sea,² they ultimately confronted Europeans with the necessity of revising their inherited world-view. Hitherto unknown oceans, islands, and continents had to be incorporated into the existing world-view and had to be reconciled with traditional theories and concepts.³ Recovered and newly edited texts of both Antiquity and the early Middle Ages

intellectual, social and economic consciousness of Europe. B. Penrose, Travel and Discovery in the Renaissance. 1420-1620 (Cambridge, Mass., 1952); J. N. L. Baker, A History of Geographical Discovery and Exploration (New York, 1967); G. R. Crone, The Discovery of America. Turning points in history (London, 1969); J. H. Elliott, The Old World and the New, 1492-1650 (Cambridge, 1970); J. H. Parry, The Age of Reconnaissance (New York, 1964).

²A very convenient side-effect was an evasion, though never complete, of the great Italian ports of transshipment, Venice and Genoa. Their Levant-trade temporarily slowed down but recuperated again because of their long established relations and refined diplomacy. For the development of Mediterranean trade during the sixteenth century see F. Braudel, La Méditerranée et le Monde Méditerranéen à L'Epoque de Philippe II (Paris, 1966), Vol. I, chap. III, pp. 493-516.

³Traditional theories and concepts were mainly based upon the teachings of the Church and on what had sparingly been transmitted from Antiquity. The habitable earth with Jerusalem at its middle was believed to be the centre of the whole universe. Around the biblical city were grouped all known lands, encircled by an "endless" ocean.

contributed no less to a re-evaluation of beliefs.⁴ In this way enlarged horizons prepared the way for a new consciousness. Though man and his abode, the earth, remained at first at the centre of the universe, it had expanded and had become the object of intense questioning.

The process of assimilation and revision of geographical knowledge was, however, slow. Europe had to come to terms not only with new oceans, continents, and unknown people, it also had to struggle simultaneously with new religious ideas, new political alternatives, a growing population and ensuing disturbances, and with the unintelligible phenomenon of a "price-revolution" or inflation.⁵ Added to this, sea-routes were jealously kept secret for their commercial value.

At first, newly discovered territories could still

⁴The writings of the second century A. D. Alexandrian geographer Claudius Ptolemaeus (i.e., the Geographia) had been rediscovered during the early fifteenth century. They were translated from Greek into Latin and, aided by the invention of printing, were circulated all over Europe. The editions, first unaltered texts with maps, later critical and augmented with additional charts, were highly regarded and almost served as textbooks in geography. A. L. Humphreys (R. A. Skelton, ed.), Decorative Printed Maps of the 15th to 18th Centuries (London, 1967), pp. 35-37.

⁵Literature on the sixteenth century is extensive. The foregoing and following conclusions are mainly based upon: J. R. Hale, Renaissance Europe. 1480-1520 (London, 1971); G. R. Elton, Reformation Europe. 1517-1559 (New York, 1966); J. H. Elliott, Europe Divided. 1559-1598 (London, 1968); F. Braudel, op. cit.; H. G. Koenigsberger and G. L. Mosse, Europe in the Sixteenth Century (London, 1969).

be incorporated without too much difficulty into existing geographical concepts. Trade with northern Africa, particularly the gold-trade,⁶ had introduced Europeans to the existence of not only strange people but also to the probability of southern countries. But once unsuspected lands were discovered and political competition played a role, the situation gradually changed. After the first surprise and awe at the news of Columbus' crossing the Atlantic and discovering unknown islands had subsided, a revision of geographical theories was unavoidable.

The ensuing questioning and research was not restricted to the old centres of learning, the universities and monasteries. Growing literacy among the population, aided by the invention of printing, and a noticeable advancement in craftsmanship⁷ had helped in the creation of various centres where practical knowledge worked together with theoretical research. Worldly and ecclesiastical princes almost competed in gathering the most educated scholars at their courts.⁸ They contributed to

⁶F. Braudel, op. cit., Vol. I, pp. 424-432.

⁷C. M. Cipolla, Clocks and Culture. 1300-1700 (London, 1967), p. 34 and pp. 50 ff.

⁸Both general surveys and special studies (biographies) relate this tendency of intellectual life in Renaissance Europe. Humanists were to be found in the entourage of kings, princes and prelates. S. Dresden, Humanism in the Renaissance (New York, 1968); M. Bataillon, Erasmus et l'Espagne (Paris, 1937); K. Brandi, The Emperor

the revival of intellectual speculation and scientific research not only with their vivid interest but also with their financial support of those endeavors. Sometimes, however, it is not clearly discernible to what extent their support was prompted by unselfish interest or by hopes of private gain. This distinction is particularly difficult in regard to the support provided to geographers and topographers.⁹ Geographical or cartographical commissions were utilitarian by nature. Princes, merchants, or merchant companies were primarily interested in the profit accruing from such research in the form of possible territorial gain or opening of new markets.¹⁰ Pure science and

Charles V. The Growth and Destiny of a Man and of a World Empire (London, 1949); W. L. Gundersheimer, French Humanism (New York, 1970); L. W. Spitz, The Northern Renaissance (Englewood Cliffs, N. J., 1972).

⁹ Revived knowledge of land-surveying, aided by new mathematical instruments developed during the late fifteenth and early sixteenth centuries, was eagerly used for the purpose of establishing borders not so much in international but rather in local disputes and land-claims. Thus, for example, Mercator was employed in the Netherlands and in the duchy of Cleves for that very purpose. Cf. R. Kirmse, "Zu Mercators Taetigkeit als Landmesser in seiner Duisburger Zeit", Duisburger Forschungen, VI (1962), 91-109.

¹⁰ A good example here is the English Moscovy Company. Founded in the middle of the sixteenth century by English merchants, its very name suggests the double interest in its enterprises: "The Merchant Adventurers of England for the Discovery of Lands, Territories, Isles, Dominions and Seignories Unknown." They employed not only experienced pilots but also geographers and cosmographers as, for example, John Dee and Sir Humphrey Gilbert. S. E. Morison, The European Discovery of America. The Northern

research, undertaken for its own sake, had not yet found many adherents. The search for a polar route to the Far East is no exception. Purely theoretical speculations concerning the nature of the Arctic were rather closely connected with actual exploration and attempts to penetrate into the remote North.

The intense interest in the Polar Regions coincided with the emergence of a growing competition among European powers in "over-seas expansion" (Fig. 12, p. 161). At first mainly motivated by search for convenient routes to eastern spice-markets, voyages of exploration gradually changed in character to establishing sovereignty over newly discovered lands with the possibility in mind that they would eventually serve as new markets and even for colonization. Once it had been demonstrated by the exploration of the African coast and by the discovery of America that not only areas, hitherto believed to be uninhabitable because of extreme heat, were populated, but also that land could be found beyond the "encircling" oceans, the fear of probing into the northern-most regions of the globe lessened.¹¹ Although adventurous Norse

Voyages, A. D. 500-1600 (New York, 1971), p. 483. T. S. Willan, The Early History of the Russia Company. 1553-1603 (New York, 1968).

¹¹Before discoveries and explorations gave evidence to the contrary, it was believed that the earth was divided into five basic climate-zones (climata); the Arctic zone,

settlers had dared voyages as far north and north-west as Greenland from the tenth century onwards,¹² and Bristol fishermen ventured into northern waters,¹³ their experience and knowledge had not penetrated noticeably into mainland European geographical awareness. John Cabot's discovery of Newfoundland (1497) and Cortereal's of Labrador (1500-1501) were the first to attract attention. Reports of Norse exploration and colonization of Iceland and Greenland now appeared in a different light and were incorporated into existing geographical concepts. Cartographers began to extend their maps to include northern areas. But unfortunately, they also filled empty spaces with imaginary islands of the north.¹⁴ Once these had appeared on a map,

uninhabitable because of the extreme cold; a northern temperate zone, extending theoretically as far south as the Tropic of Cancer; the third zone was located between the tropics and thought not to sustain any life because of the heat; and, symmetrical to the northern hemisphere, there were imagined two further climate-zones south of Capricorn, the southern temperate and the Antarctic zones. G. R. Crone, op. cit., p. 3; B. Penrose, op. cit., p. 2.

¹²" . . . discoveries of the Norsemen in Greenland, Markland and Vinland . . . awareness of them hardly existed outside Scandinavia, while by the fifteenth century even the bare memory of them was so faint that they may be said to have had no influence on Renaissance travel". Penrose, op. cit., p. 18; see also G. R. Crone, op. cit., pp. 17 ff.

¹³S. E. Morison, op. cit., pp. 161-166.

¹⁴The most notorious of these new islands in northern Atlantic waters is the "Friesland" island, an invention of the Zeno brothers; it first appeared on a printed map in 1558. Cf. Morison, op. cit., pp. 87-89; W. H. Babcock, Legendary Islands of the Atlantic. A Study in Medieval Geography (New York, 1922), pp. 124 ff.

thus "establishing" their existence, even the most conscientious cartographers hesitated to eliminate them.¹⁵

The assimilation of reports from northern discoveries, however, entailed the problem of reconciling the discrepancy between a generally accepted belief that mankind originated in Eurasia and the fact that Norse colonies of Greenland had reportedly been invaded from the North by a people said to be of Karelian origin.¹⁶ In pursuance of these astonishing reports, cartographers suggested as a solution the existence of a land-bridge connecting Eurasia with the arctic lands (i.e., Greenland). This seemed to them most logical since it provided an explanation for the migration of men to north-western areas from eastern lands (i.e., Carelia in Russia). Mercator accepted this suggestion as his representation of the Arctic on his Imago Mundi of 1538 proves.¹⁷

In 1538 Mercator stood at the beginning of his career; only his map of Palestine had been published before this date. As far as is known today, his experience in

¹⁵Mercator was among them. He even gave Friesland a prominent position in his view of the North by representing it in a separate inset on his map of the Septentrional Regions of 1595.

¹⁶E. G. R. Taylor, Tudor Geography, 1485-1583 (New York, 1968), pp. 79-80.

¹⁷E. G. R. Taylor discusses six different solutions to this problem, all of them suggested within several years.

planning, laying out and engraving world-charts was limited to his collaboration with Gaspar a Myrica in the preparation and engraving of Gemma Frisius' second globe (1535-1536).¹⁸ His experience was limited, in other words, to the practical part of cartography and did not include special training in geographical theory. Mercator's connection with Gemma Frisius was nevertheless of incalculable advantage for the young cartographer. It gave Mercator access to an important source of geographical information, namely, the imperial court of Charles V.¹⁹ It also represented a "safe" and recognized starting-point from which he could advance when the opportunity arose.

Mercator's indebtedness to Gemma Frisius cannot be denied. Not surprisingly, scholars have pointed out the similarities in geographical details between Mercator's 'Imago Mundi' and Frisius' globe.²⁰ The map has even been

¹⁸ Antoine de Smet, "Mercator à Louvain (1530-1552)", Duisburger Forschungen, VI (1962), 38.

¹⁹ It has already been pointed out (above, p.23, n.33) that Gemma Frisius was called to the imperial court on several occasions. His connection with the Emperor was in all likelihood one of the probable channels through which Mercator gained acceptance by the court and influential personalities around Charles V.

²⁰ W. F. Ganong, Crucial Maps in the Early Cartography and Place-Nomenclature of the Atlantic Coast of Canada (Toronto, 1964), p. 205; F. van Ortrøy, "Les Sources Scientifiques de la Cartographie Mercatorienne", Mélanges d'Histoire offerts à Henri Pirenne (Bruxelles, 1926), Vol. II, p. 641.

called ". . . a mere re-drawing of Gemma's globe upon a double cordiform grid."²¹ This statement, however, is only partially correct. Although Mercator accepted the general concept of an Arctic connected by means of a land-bridge to the Asian mainland, he did alter Frisius' outline of the North. Contrary to Frisius' view, Mercator did not believe in a land-locked 'Mare Glaciale'. Rather, he characterized it as an open sea, connecting it by means of a strait with his 'Oceanus Orientalis Indicus'. Furthermore, in consequence of his placing a water-way between the 'Mare Glaciale' and the 'Oceanus Orientalis Indicus', Mercator separated entirely the American continent from Asia. In doing so, he disengaged himself from a then current belief that America was the easternmost extension of Asia.²² It is possible that Mercator had knowledge of Vasco Nuñez de Balboa's crossing the Isthmus of Panama (1513). This, however, did not necessarily entail an absolute division of America from Asia, for the two continents could still be connected in the far north.

²¹Averdunk quoting W. Ruge: H. Averdunk and J. Mueller-Reinhard, "Gerhard Mercator und die Geographen unter seinen Nachkommen", Petermanns Mitteilungen, Supplement 182 (1914), 19.

²²This was Columbus' opinion when he first reached the Carribean Islands; it was thereafter (1524-1528) sustained by Verrazano's expedition along the American east coast, undertaken for the king of France in search for a passage to China. On Verrazano's landfall and the so-called "Sea of Verrazano" cf. S. E. Morison, op. cit., pp. 277-316.

On the other hand, Mercator's particular manner of differentiating explored from unknown coast-lines on this map of 1538 gives us an indication that he may have had access to further information. The inscription on the North American continent ('Hispania maior capta anno 1530') gives a date ante quem: Mercator included every discovery and exploration before 1530 of which he had knowledge. Taking into consideration his connection with Gemma Frisius and through him with the imperial court, it is quite possible that he knew not only of Balboa's reaching the Pacific and of Pizarro's advances along the Pacific coast southward, but also of the expeditions sent out by Cortez between 1522 and 1524 aiming at the exploration of the Pacific coast as far north as possible.²³ Mercator drew the American west coast in a continuous line almost as far north as 16° latitude north, thus indicating that he considered these coasts as explored. Reports from these explorations may have included an indication that the direction of the coast did not alter abruptly, but that it continued running north. Mercator's separation of the American from the Asian continent was thus not merely based upon theoretical considerations. It was the only

²³Both Pizarro and Cortez were in Spain during the year 1529 and reported their exploits to Charles V. In 1530 the Emperor visited the Netherlands (cf. K. Brandi, op. cit., p. 320). This could explain why Mercator chose to give 1530 as the date ante quem.

logical conclusion he could reach after evaluating expedition-reports and bringing them into accordance with Marco Polo's description of 'Cathaia'. He never wavered in this view; he corrected the outline of the Arctic according to his changing concept of the area, but he always defended his position that America was separate from Asia.²⁴

In depicting the American east-coast Mercator followed Gemma Frisius' globe rather meticulously.²⁵ No inscription on the mainland or along the coasts informs the viewer of the explorers' names or refers to any particular landmark. The entire area is identified only as the 'Baccalearum regio'. One large and some smaller islands, the 'Insule Corterealis', stretch out in front of it. Again, specific inscriptions have been omitted; the islands' outline and position is the same as on Frisius' globe. W. F. Ganong, however, suggests that Mercator based his representation of this area upon a sketch-drawing directly received from Sebastian Cabot.²⁶ This seems

²⁴As further evidence that Mercator did not believe America to be a part of Asia is his locating the island 'Sipango' (i.e., Japan) between America and Asia at approximately 256° longitude and 40° - 43° latitude north.

²⁵For a comparison of Frisius' globe with Mercator's map see: W. F. Ganong, op. cit., fig. 9 (p. 32) and fig. 62 (p. 200).

²⁶W. F. Ganong, op. cit., p. 32. Sebastian Cabot was not only in the pay of Henry VIII of England but also, since 1525, was an official pilot of Charles V. Cf. S. E. Morison, op. cit., p. 221.

rather unlikely. In 1538 Mercator stood at the beginning of his career, he was not yet a renowned cartographer and his connections were just starting to develop. There is no reason why Mercator should have asked Cabot for a drawing if he followed Frisius' outline of the islands.²⁷

All available evidence indicates that Mercator did not yet inquire directly from explorers about their findings and observations. Rather, he accepted his teacher's view of the North as far as it was reconcilable with his own research which was still limited to travel-accounts like Marco Polo's and to geographical sources of the imperial court. Mercator did not know about Jacques Cartier and French exploration on the American east coast. He did not represent either the Gulf of St. Lawrence or the river on his 'Imago Mundi'.²⁸ Neither did Frisius. Mercator also accepted Frisius' 'Fretu arcticum', a strait separating North America from the polar land-mass. He thus admitted the possibility of reaching the Far East by means of a north-west

²⁷Furthermore, had Mercator received a chart directly from Sebastian Cabot, he most probably would have referred to him on his map by means of some kind of inscription as he did for Spanish explorations.

²⁸Secrecy and poor communication may have played a role so that neither Frisius nor Mercator had any knowledge of Cartier's explorations. The only known map depicting the St. Lawrence and executed before 1538 is Jean Rotz's of approximately 1535. Since it was part of a collection of maps dedicated to Henry VIII of England in 1542, it is doubtful that Mercator could have obtained a copy of it for his preparation of the 'Imago Mundi'. Cf. W. F. Ganong, op. cit., pp. 221-222.

passage.

In 1538 Mercator's concept of the North was thus based in great part upon Frisius' view of that region. Mercator rectified it only where it seemed logical to him to do so, as substantiated by his research into literary sources²⁹ and probably available cartographical material.³⁰ He conceived the Arctic to be a vast unexplored territory of firm land, extending so far south as to be almost entirely encircled by the 'Circulus arcticus', and connected to the Asian mainland by means of a broad land-bridge located in the northern part of 'Scythia intra'. No particular attention was paid to probable sea-passages to China although his 'Mare glaciale' is connected with the 'Oceanus Orientalis Indicus' and the 'Fretu arcticum' north of 'Bacclearum regio' permits a northern circumnavigation of the American continent. It is a rather "conventional" view of the North, fitting well into current geographical theories even though presenting America as separate from Asia. Mercator had not yet entered into either geographical theories or cartographical disputes. Neither had he

²⁹ Available to Mercator could have been: Marco Polo's Travels, Strabo's descriptive geography, Pliny's Natural History and Pomponius Mela's treatise on geography, beside Ptolemy's Geography.

³⁰ For a list of maps depicting newly discovered lands and drawn before 1538 see: A. E. Nordenskiöld, Periplus. An Essay on the Early History of Charts and Sailing Directions (Stockholm, 1897), p. 100.

connections at that time which could have induced him to give particular attention to certain regions of the Arctic (i.e., sea-passages to China). One may have to interpret this map more as an exercise for Mercator than as the first product of a theoretician. He presented to the public a small-sized world-map, proving once more his craftsmanship, and using it to announce a number of other detailed maps of the known world which he intended to publish in the near future.

Several years passed before Mercator could carry out his promise. He first published a terrestrial globe in 1541 and dedicated it to Nicolas Perrenot de Granvelle.³¹ His situation had changed considerably during the three years which had passed since the publication of his 'Orbis Imago'. He had succeeded in establishing himself as a cartographer in his own right, independent of Gemma Frisius' workshop. He also had secured the patronage of members of the imperial court.³² His university education and his training in mathematical theory as well as in the practical application of it differentiated him from the simple map-engraver. Mercator's inclination towards philosophizing and questioning traditional concepts equally contributed

³¹E. L. Stevenson, Terrestrial and Celestial Globes, their history and construction (New Haven, 1921), Vol. I, pp. 129-130.

³²These "officials" of Charles V's court were his counsilors Craneveld and Nicolas and Antoine Perrenot de Granvelle.

to his very personal approach to cartography. Apparently, he attempted a fusion of philosopher, scholar, scientist-theoretician and practical advisor-craftsman. Sensitive to the needs of his contemporaries, he tried not only to portray their world on both sphere and plane surfaces, he also incorporated into his representations new or developing ideas about sailing directions and possible sea or land-routes to unexplored regions.

Mercator's terrestrial sphere of 1541 clearly exemplifies his twofold intention. To aid pilots in plotting their direction, he engraved loxodromes on the globe, a practice probably done for the first time upon a rounded surface.³³ The sphere seemed to be a well of information. Though Mercator retained most of the topography of his 'Orbis Imago', he augmented substantially his nomenclature. Thereby he provided not only more reference-points for the probable use of navigators, he also displayed the results of his extensive research. While he had been studying Ptolemy's Geographia and comparing it with other geographical and cartographical material, he had noticed several mistakes and misconceptions³⁴ which he rectified on the globe. For a more

³³Cf. de Smet, op. cit., p. 65.

³⁴Mercator announced these corrections in 1539 in a letter to Antoine Perrenot de Granvelle; cf. van Durme, Correspondance Mercatorienne (Anvers, 1959), no. 3, p. 16.

correct delineation of Scandinavia, he drew upon a new map of the North by Olaus Magnus which had recently been published.³⁵ In representing the northern coast of Russia he assimilated geographical reports received since 1538.³⁶ In depicting the American north-east coast, however, he retained the general features of his 'Orbis Imago' except for changing some of the place-names.³⁷ Surprisingly, Mercator still had no knowledge of Cartier's voyages. His corrections, as far as the North is concerned, concentrate upon Scandinavia and northern Russia.

Here, the absence of the broad land-bridge connecting the Asian mainland with the Arctic attracts immediate attention. On the globe, Mercator had shifted that land-bridge 180 degrees so that it now (1541) united the American continent with the polar land-mass. The arctic waters, previously called 'Mare Glaciale' but now 'Mare Cronthia vel Amalchium hoc est congelatum', had thus been opened entirely for a north-east passage; they also have been extended northward. The coastline of the polar land-mass bends sharply northward at approximately 70° longitude until it almost reaches the geographical Pole; it then

³⁵F. van Ortroj, op. cit., p. 644.

³⁶A. E. Nordenskiöld, Facsimile-Atlas to the Early History of Cartography with Reproductions of the Most Important Maps printed in the XV and XVI Centuries (Stockholm, 1889), p. 82.

³⁷W. F. Ganong, op. cit., p. 206.

gradually descends southward to about 240° longitude where it crosses the Arctic Circle and finally continues in the American north-west coast. Greenland thus becomes part of the American continent, blocking completely a north-west sea-passage to the Pacific Ocean. His shifting of the land-bridge from Asia to America also makes Mercator's previous position in the argument of the "Carelian invaders" untenable. On the other hand, the strait which separates the northernmost tip of Scandinavia from the easternmost part of Greenland is narrow enough to be easily crossed, the theory of "Carelians" invading Norse settlements in Greenland is thus not totally denied.

Mercator gave no explanation for the changes in his concept of the Arctic. It is unlikely, however, that he rectified the topography without having had sound reasons. Either he discovered during his research of literary and cartographical material indications which induced him to change his view of the North or he obtained information, be it of new explorations or simply merchants' or travellers' reports from those regions, which contradicted his earlier map of northern lands. His patrons provided him with some literary and cartographical material which he did not possess himself.³⁸ Did they direct his attention to rectify his northern topography

³⁸Cf. letter to Antoine Perrenot de Granvelle, van Durme, op. cit., no. 3, p. 16.

in order to give sustenance to planned trips into the north?³⁹ On the other hand, the proximity of Louvain to Antwerp makes it feasible that some information about northern parts of Europe and Russia reached Mercator by means of merchants' reports. The circumstances, though not too clear, under which he had engraved the map of Flanders⁴⁰ indicate that Mercator had at least some connection with the merchant-community of the Low Countries. During the first half of the sixteenth century Antwerp was still the centre of north European trade. English wool and cloth, German copper and metal goods, grain from the Baltic, spices and luxury articles from the East, silk from Italy, American raw-materials, silver and gold, all found their way into Antwerp.⁴¹ The geographical knowledge accumulated by sailors and pilots entering the harbour must have been considerable. Shortage of grain in Central Europe had raised the demand for grain from Eastern Europe and voyages to the Baltic

³⁹ Although no documents are preserved which would prove this point, discussion of northern exploration gained momentum in the second quarter of the sixteenth century.

⁴⁰ Cf. R. Kirmse, "Die grosse Flandernkarte Gerhard Mercators (1540)--ein Politikum?" Duisburger Forschungen, I (1957), pp. 1 ff.

⁴¹ On the rise and importance of Antwerp in European and over-seas trade, cf. Koenigsberger-Mosse, op. cit., pp. 48-52.

therefore became more numerous. Information about eastern lands could thus reach the West in much greater volume and with more detail and exactitude. It seems quite conceivable, therefore, that Mercator should have paid more attention to Scandinavia, the Baltic and western Russia on his globe of 1541. He probably also had heard some accounts that to the North Russia was entirely open to the sea, that no land-bridge connected it with the polar land-masses. On the other hand, however, there exists the possibility that Mercator opened the north-east sea-passage because of a mounting interest in northern harbours in reaching the East without running into conflict with Portuguese or Spanish interests. Though Mercator put much emphasis upon his self-imposed obligation of being a scholarly, scientific, cartographer, he nevertheless kept the needs and hopes of his contemporaries in mind. He corrected his concept of the nature of the North according to evidence collected in literary sources and geographical reports. Whether intentional or not, his opening the waters north of Russia by shifting the land-bridge to America provided merchants and navigators with a cartographical basis in their attempts at expanding their eastern markets and areas of influence. In 1541 Mercator's concept of the Arctic had not yet altered radically; he corrected and revised, but he did not present an altogether changed view.

This occurred in 1569 when Mercator published his large map of the world which carried a special inset of the Arctic. The special representation of the North became necessary, so he explained,⁴² because the new projection which he had used did not permit him to depict these areas on the main map. But this could hardly have been his only reason; he did not engrave a special inset for the Antarctic which also could not be represented on the main map. In all probability, therefore, Mercator's preference for the Arctic over the Antarctic reflects the intensified research and theoretical propositions about the nature of northern regions done by scholars and cosmographers, particularly by those living in England and involved in English enterprises.

England had slowly but steadily emerged on the scene of territorial and mercantile expansion and she was determined to obtain her fair share of the trading possibilities with the Far East. Legally excluded from the "American scene" by the Treaty of Tordesillas, she directed her hopes to more northern latitudes. Theorists and merchants worked hand in hand, trying to persuade their Tudor kings to patronize voyages of discovery, aimed at finding a northern route to China. Mercator most

⁴²The complete text accompanying the inset and explaining his reasons for its execution is to be found in Appendix I.

probably knew of these endeavors. Not only was his son Rumold an acquaintance or even a friend of Richard Hakluyt, but Ortelius, too, was in close contact with the English theorists, and Mercator himself corresponded with John Dee. Whether Mercator had information of Hakluyt's reports relating to northern voyages and discoveries already before 1569 is not known.⁴³ It is possible, however, that he discussed theories concerning the North with John Dee who was directly involved in the geographical and cartographical research undertaken for the Merchant Adventurers' 'Muscovy Company'.⁴⁴ Their frequent voyages to the

⁴³Richard Hakluyt, The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation. Made by Sea or Over-land to the Remote and Farthest Distant Quarters of the Earth at any time within the compasse of these 1600 yeeres. 1589 (ed.: New York, 1965); G. B. Parks, Richard Hakluyt and the English Voyages. J. A. Williamson, ed. (New York, 1961). A treatise of Robert Thorne (Hakluyt, op. cit., Vol. II, pp. 159-162), written in 1527, testifies to the early interest in an exploitation of the North by English merchants: "Now I considering this your noble courage and desire, and also perceiving that your Grace may at your pleasure, to your greater glory, by a godly meane, with little cost, perill, or labour to your Grace or any of your subjects, amplifie and inrich this your sayd Realme, I know it is my bounden duety to manifest this secret unto your Grace, which hitherto, as I suppose, hath beene hid: which is, that with a small number of ships there may be discovered divers New lands and kingdomes, in the which without doubt your Grace shall winne perpetuall glory, and your subjectes infinite profite. To which places there is left one way to discover, which is into the North . . ." (Italics added).

⁴⁴After repeated remonstrations with the Crown, which lacked the funds to further voyages of exploration, some two hundred English merchants joined their capital and founded the Muscovy Company. In 1553 and 1555 they obtained royal charters; cf. S. E. Morison, op. cit., p. 483.

Barent's Sea served not only to bring English woolen cloth to Russian markets⁴⁵ but also to gather information about the possibility of a northern sea-passage to China.

Already in 1541 Mercator believed in the possibility of reaching China by a north-east passage. He did not waver in this respect. On his inset of the Arctic of 1569 he even suggested a possible north-west passage to the Far East. His new concept of the nature of the North included the belief that both Asia and America could be circumnavigated in northern latitudes. No land-bridge barred a free passage either in the East nor in the West. He recognized, however, the difficulty of penetrating frozen waters and he warned sailors of the terrible danger they would risk if they approached, in a circumnavigation of the 'Tabin' promontory, too close to the magnetic islands situated between Asia and America: their ships would be attracted towards these islands and then carried into one of the four polar streams which would lead them, without possible return, into the bowels of the earth.

⁴⁵The English cloth-industry and merchants were in need of new markets. After an unexpected high sale of cloth in 1550 (a devaluation of English silver in that year gave the English cloth-merchants a great advantage on the Antwerp market), their export had slacked. Spanish merino wool was in more demand in the Netherlands than before. Added to this, English wool and cloth production had increased because of an easy availability of cheap labour, caused by an increase in population. The opening of new markets for their wool-products was therefore of supreme importance to English merchants.

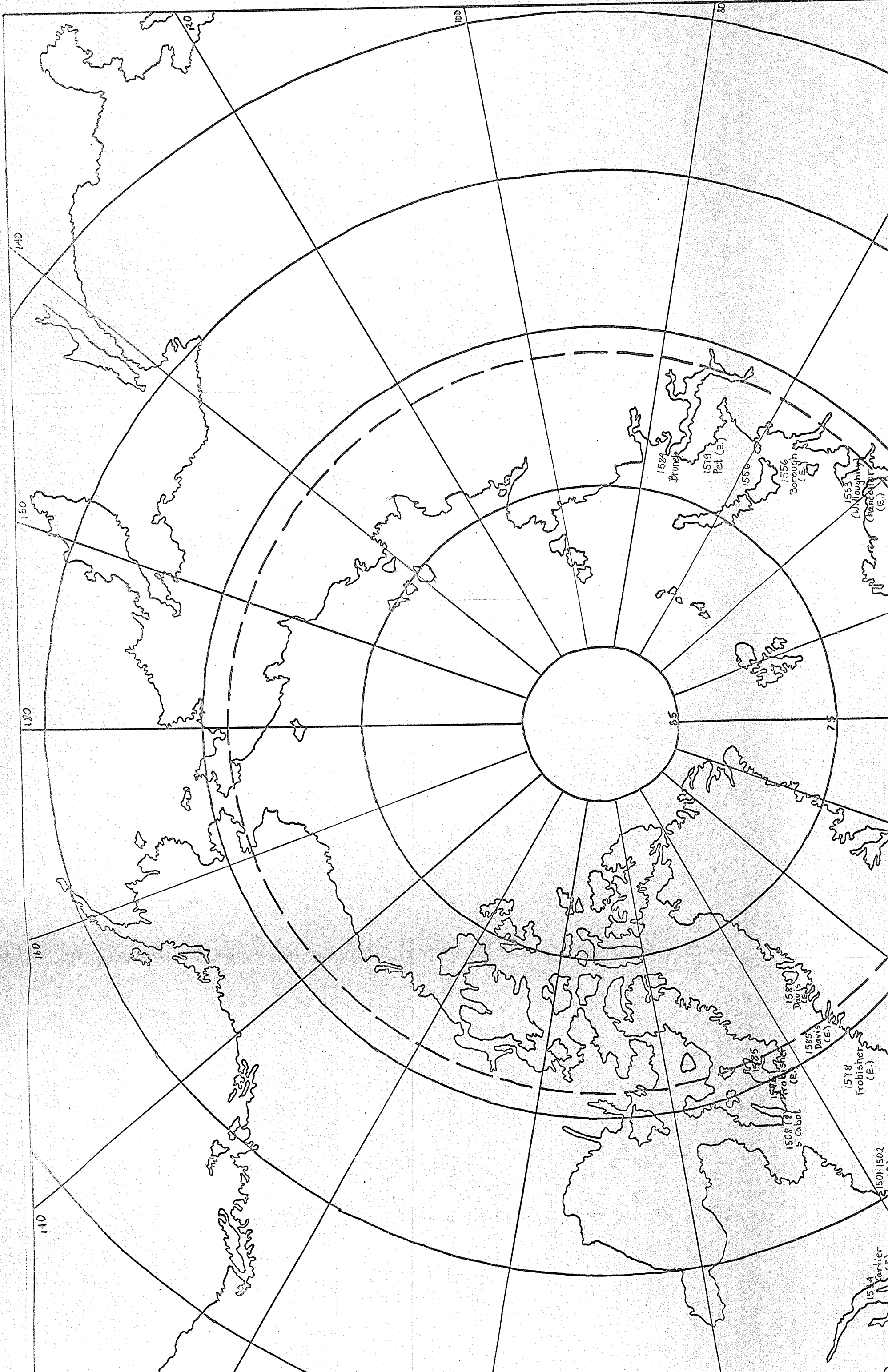
Instructions to sailors and warnings of this nature make it evident that Mercator was quite concerned about the possibility of northern voyages of exploration. His awareness of those plans and hopes of exploring the Far North by sea did not prevent him, however, from depicting the polar regions in a rather "abstract-mythological" manner. Whereas in 1538 and 1541 he had represented a massive polar land-mass, unexplored and daunting in its barrenness and coldness, in 1569 four Polar Islands, one even with a salubrious climate, surrounded an open sea at whose centre a large black rock rose on top of the geographical North Pole. In 1569 Mercator had entirely changed his concept of the nature of the Arctic.

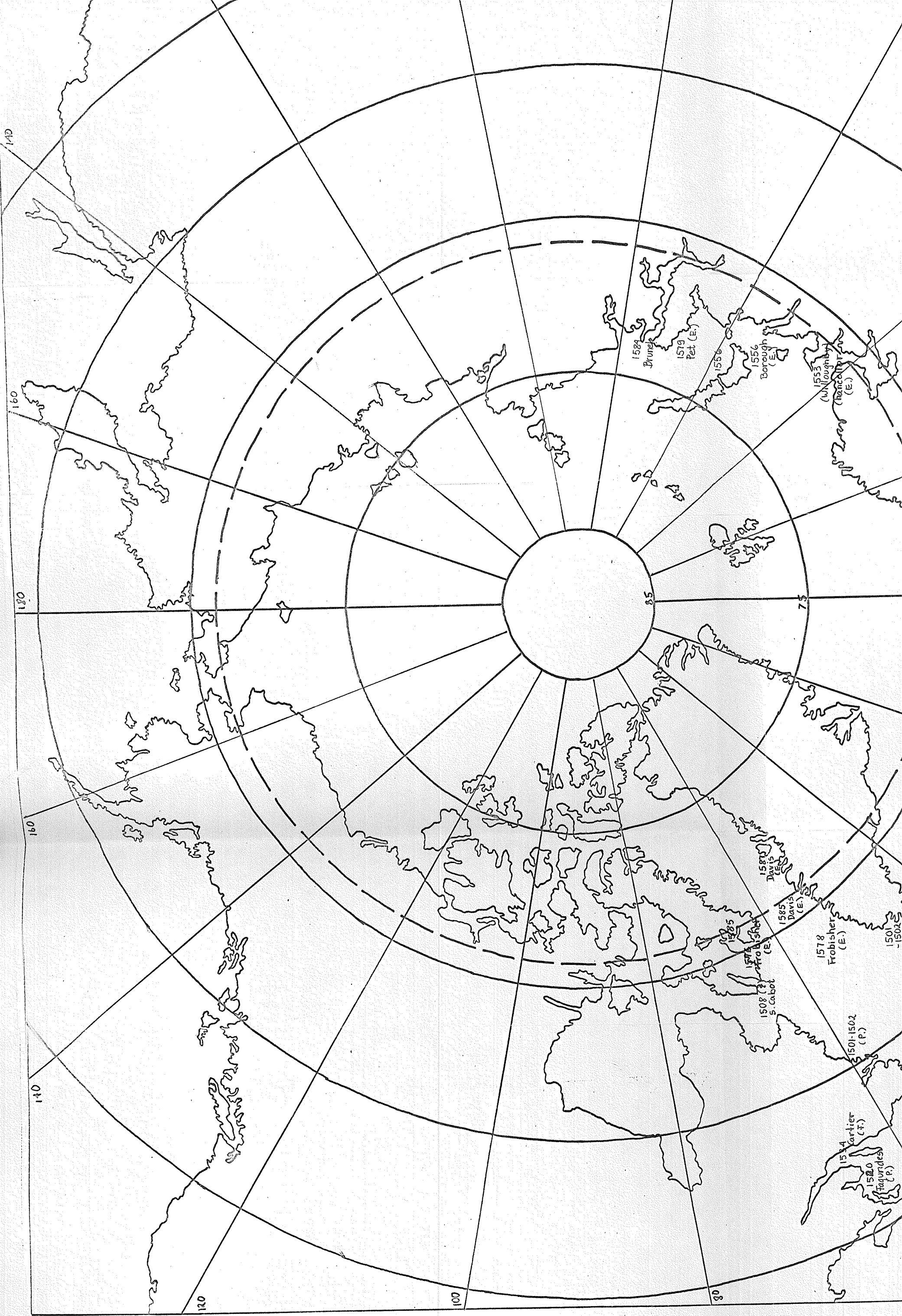
But, instead of basing this change in concept upon information of actual discovery and exploration (Fig. 12),⁴⁶ Mercator reached back into the past. He substantiated his decision to present a "new" outline of the North with a medieval geographical text, reprinted in James Cnoyen's Travels⁴⁷ and corroborated by Giraldus Cambrensis.⁴⁸ His

⁴⁶Until 1569, English ships had penetrated the Barent's Sea as far east as the eastern shore of Novaya Zemlya and the western extension of the Kara Sea. English expeditions to discover and explore the possibility of a north-west passage to China were furthered only after their attempts had failed in the east.

⁴⁷This work is now lost. The geographical text referred to by Mercator was the Inventio Fortunatae by Nicholas of Lynn. On the identity of Lynn cf. E. G. R. Taylor, op. cit., p. 3.

⁴⁸During the twelfth century Giraldus Cambrensis





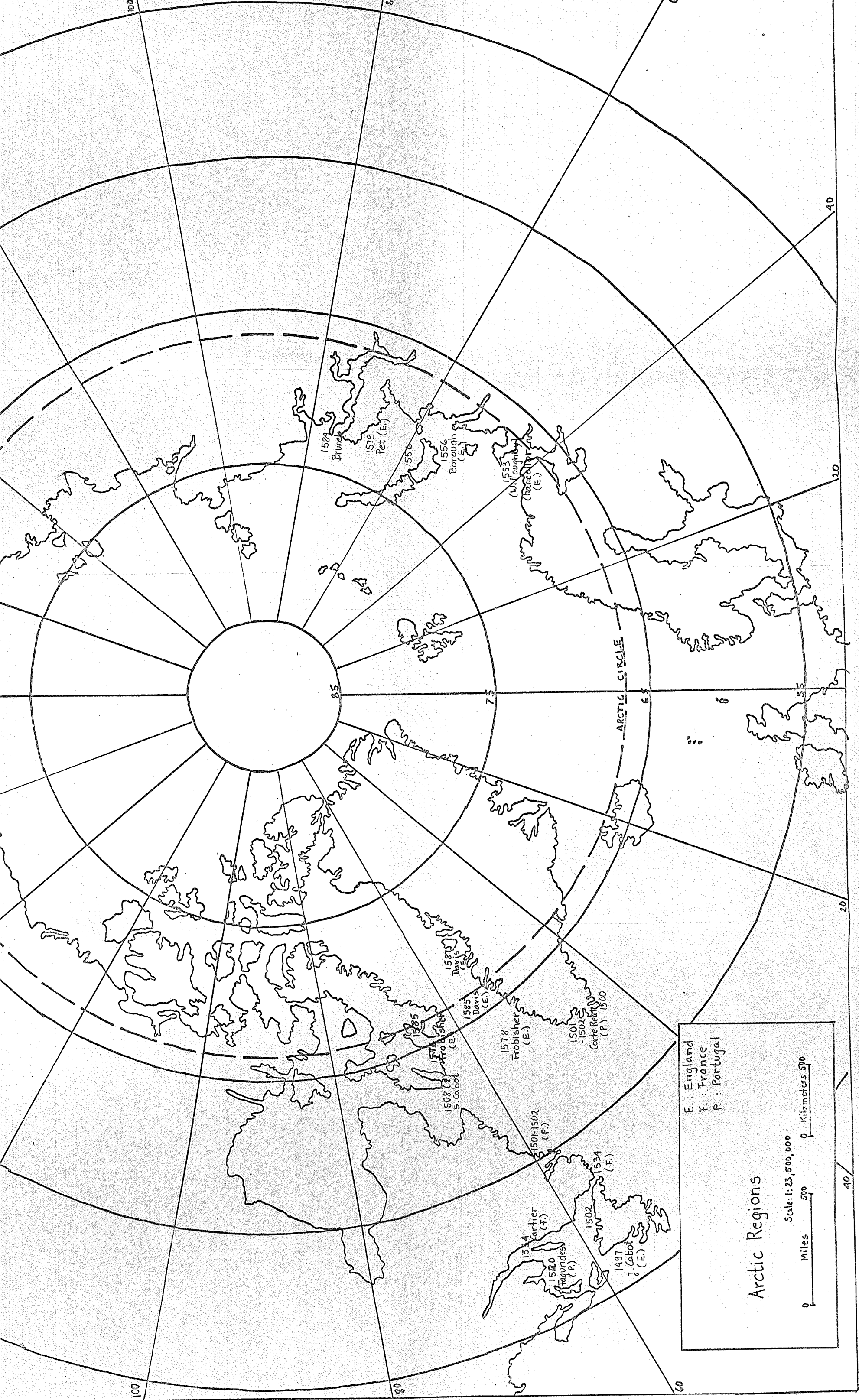


Fig.12: Northern voyages of exploration until 1595

almost scientific approach to cartography as illustrated on the main map by the use of a projection favorable to navigation stands in open contrast with his rather fantastic view of the Arctic. The motives which induced Mercator to change so radically his concept of the North may have to be sought not only in his ambition to be as correct as possible but also in his humanistic education.

Mercator's desire for correctness, for truthfulness in representing the earth's surface, led him to search for all probable geographical source material. He did not discount any possible explanation of geographical phenomena or unknown areas before he had critically analyzed and evaluated their contents. His humanistic respect for the authority of the past influenced his research in that he tended to credit old texts to a far greater extent than those of more recent times or of his contemporaries. Even if the revelations of old texts may have appeared incredible, he believed that they might hide some mystery not yet understood. Thus practical, utilitarian and critical minded as he was in some respects, he was convinced that

. . . it is very important that Antiquity, with all traditions of the old and especially in geography, should be preserved without alterations since quite often one discovers in it secrets of nature, revelations of mysteries, and true, curious and interesting explanations of phenomena or reports, which an ignorant

wrote several travel accounts and topographies in which fact and phantasy were mixed. Cf. Ch. H. Maskins, The Renaissance of the 12th Century (New York, 1968), pp. 314-316.

posterity by changing or correcting according to each one's idea, could easily cover with more obscurities, falsify or destroy . . .⁴⁹

Mercator's changing concept of the nature of the North Pole, therefore, may have to be understood against the background of his humanistic training. He preferred the symmetry and order of the four Polar Islands over a shapeless polar land-mass. He questioned no less the existence of land in northern regions than the existence of an Antarctica. Both areas had to be covered with land, in his belief, in order to assure the necessary equilibrium between solid areas and water on the earth's surface. An opening of the earth into which waters were drawn also provided a rather convincing explanation for the continuous emergence of rivers. Four islands and a high black rock "guarded" that entrance into the bowels of the earth. It was an almost "perfect" view of the North which displayed that order, symmetry, and harmony which he admired so much in creation.

⁴⁹"Multum refert cum in omnibus veterum traditionibus, tum maximè in Geographia, antiquitatem illaeram inuariatamq; seruare: quum enim plurima insint siue naturae mysteria, siue latentium rerum signaturae, siue habitudinum & proportionum certae & exquisitae quaedam, nec otiosae rationes, quae ignara posteritas pro suo cuiusque intellectu mutando emendandoq; facilè altioribus tenebris inuolueret, obscuraret, corrumperet & annihilaret, maximè facillimeq; . . ." In: Praefatio ad Lectorem, Tabulae Geographicae Cl. Ptolemei ad mentem Autoris restitutae & emendatae. Per Gerardum Mercatorem Illustriss. Ducis Clivie etc.: Cosmographū. Facsimile ed., Culture et Civilisation (Bruxelles, 1964).

Another statement in the explanatory inscription accompanying the inset exemplifies Mercator's dualistic approach to cosmography. On the one side he was so rational as to explain the existence of a magnetic pole on the earth's surface, calculating rather scientifically its location, and on the other side he gave credence to a report which has been obtained through magic.⁵⁰ Yet, in doing so, Mercator only followed the habit of many of his humanist contemporaries. Astrology was still respected and it exercised quite a considerable influence upon Renaissance minds.⁵¹ Neither was he the first cartographer to accept the veracity of Lynn's report: Ioannes Ruysch Germanus had published a world-chart in 1508 on which he depicted the four Polar Islands and, in an inscription, referred to the Inventio Fortunata⁵² (Fig. 13).

⁵⁰" . . . et referebat anno 1360 Minoritam quendam Anglum Oxoniensem mathematicum in eas insulas venisse, ipsisque relictis ad ulteriora arte magica profectum descripsisse omnia, et astrolabio dimensum esse in hanc subjectam formam fere uti ex Jacobo collegimus." Cf. van T'Hoff, Gerard Mercator's Map of the World (1569). In the Form of an Atlas in the Maritiem Museum "Prins Hendrik" at Rotterdam (Rotterdam, 1961), p. 61.

⁵¹On the importance of astrology, experimental magic, and practical Cabala, and their acceptance by Renaissance humanists see: P. Kristeller, The Philosophy of Marsilio Ficino (Gloucester, Mass., 1964); J. L. Blau, The Christian Interpretation of the Cabala in the Renaissance (New York, 1944); F. A. Yates, Giordano Bruno and the Hermetic Tradition (Chicago, 1969); L. Thorndike, A History of Magic and Experimental Science (New York, 1951), Vol. VI.

⁵²The Nova et universalior Orbis cogniti tabula ex recentibus confecta observacionibus was published in the

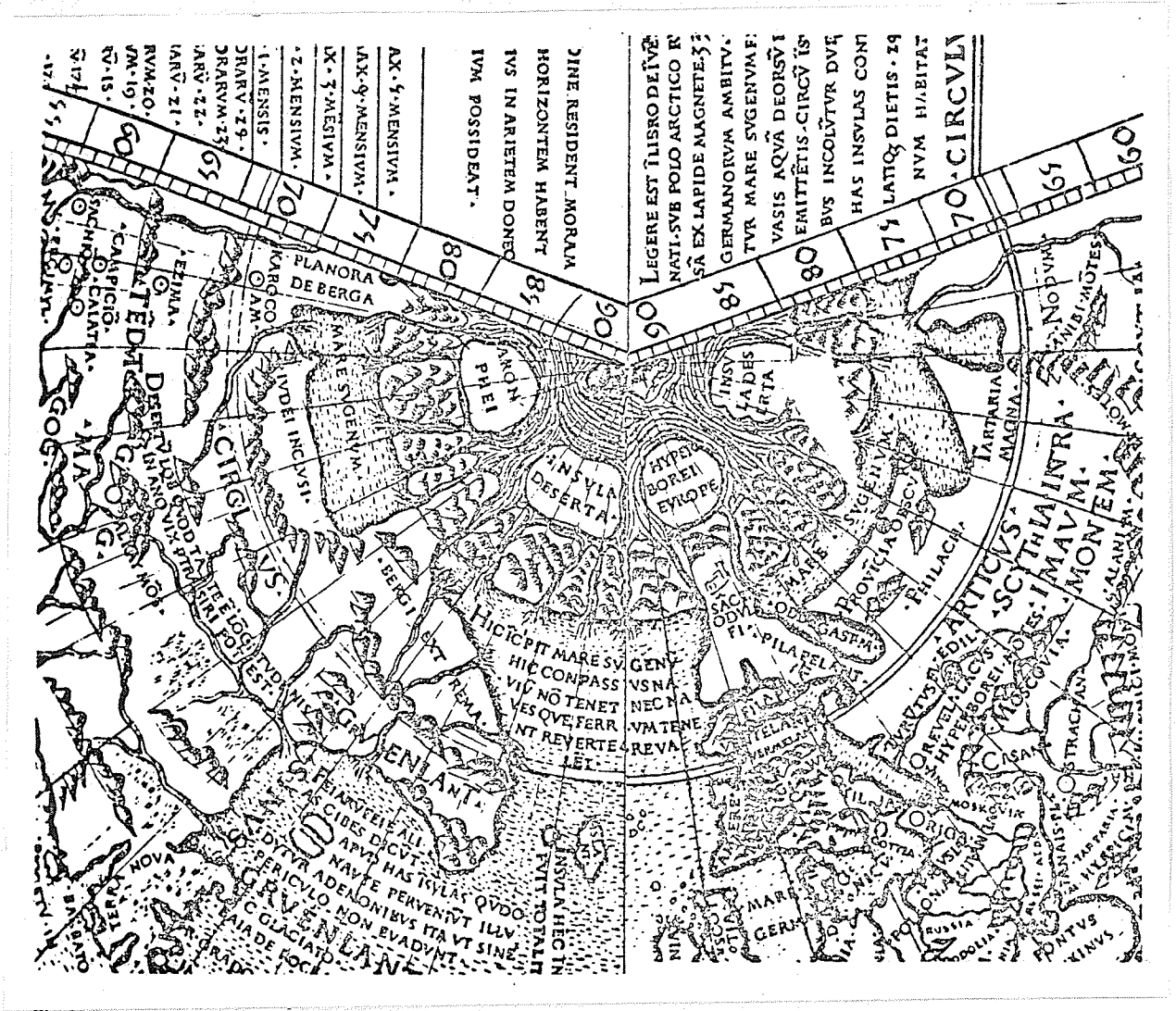


Fig.13: Detail of Joannes Ruysch's World Map, 1508

Mercator, however, did not copy Ruysch's inscription for his own map of 1569.⁵³ He either had access to a complete text of Cnoyen's writings or he possessed a copy himself. In 1577 he sent John Dee a transcript of those lines in Cnoyen's book which describe the situation and nature of arctic lands.⁵⁴ Both John Dee and Humphrey Gilbert based their defence of the possibility of polar circumnavigation in great part upon Mercator's inset of the Arctic of 1569 (Figure 14).⁵⁵

Mercator's correspondence with John Dee and also with Richard Hakluyt⁵⁶ thus attests to the influence of geographical theories, built upon humanist search, in the planning and preparation of English voyages in northern latitudes. It is unlikely that in 1569 Mercator changed

Rome edition of Ptolemaeus of 1508; cf. A. E. Nordenskiöld, op. cit., p. 29; E. D. Fite and A. Freeman (ed.), A Book of Old Maps (New York, 1969), p. 29, plate 9.

⁵³B. F. De Costa, "Arctic Exploration", Journal of the American Geographical Society, XII (1880), 178 gives Ruysch's text which does not coincide with Mercator's.

⁵⁴van Durme, op. cit., no. 114b, pp. 132-139.

⁵⁵A chart of the North drawn by Gilbert and published by Dee in 1583 ("Sir Humfray Gylbert knight his Charte") follows almost exactly the outline of Mercator's Polar Islands; cf. S. E. Morison, op. cit., p. 581 (with reproduction of the chart).

⁵⁶In 1580 Mercator wrote to R. Hakluyt who had requested Mercator's opinion in respect to the possibility of Arthur Pet's reaching his goal, the northern circumnavigation of Asia; cf. van Durme, op. cit., no. 143, pp. 157-160.

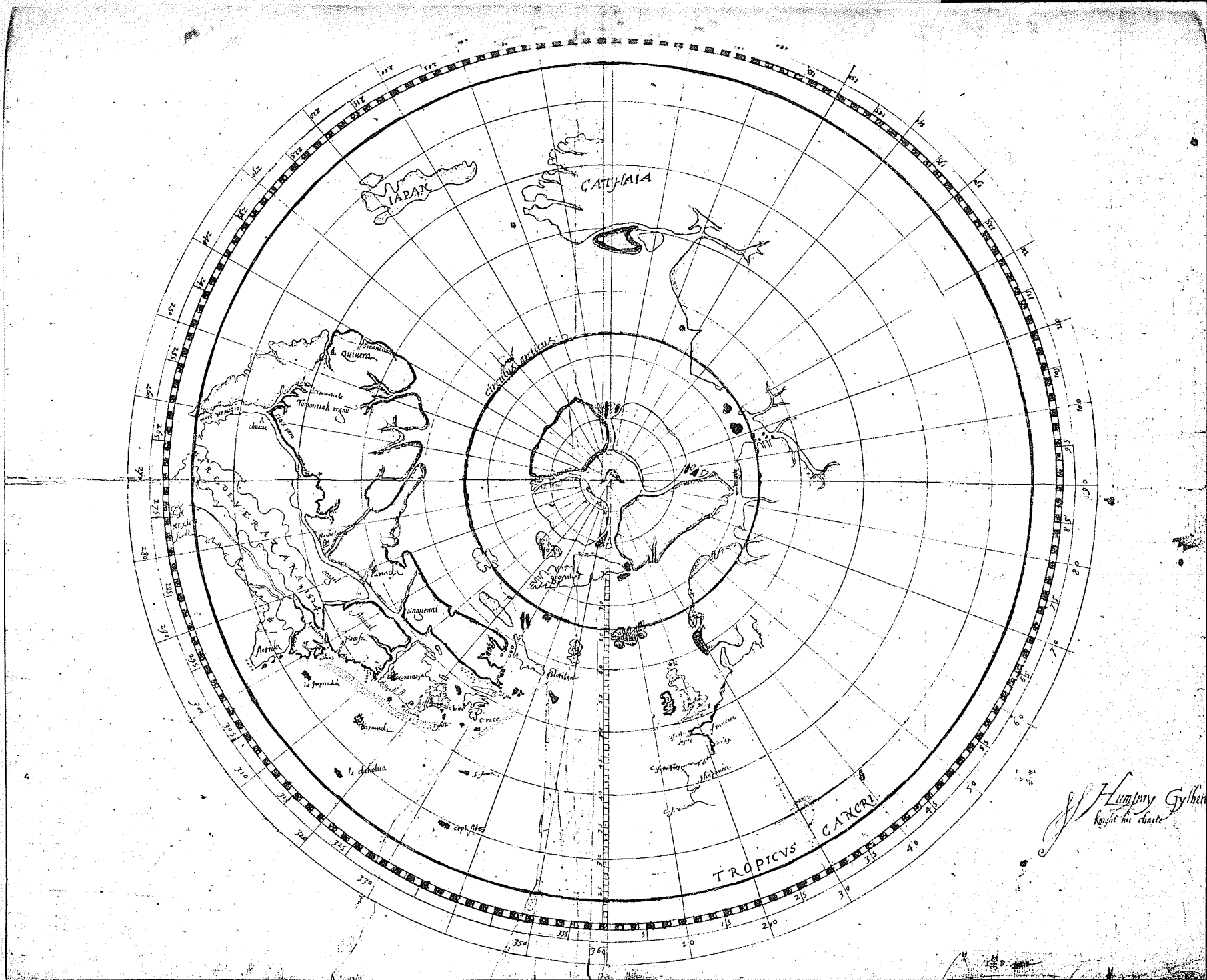


Fig. 14: The North Pole by H. Gilbert

his concept of the nature of the North in order to further northern exploration. His concern for the practical improvement of cartography and navigation was then limited to presenting a new projection. Rather, his hypothesis of four Polar Islands was welcomed by English theorists in their promotion of both north-east and north-west passages. It seems that Mercator had adopted the new concept of the North more because of the antiquity of its source and its aesthetic attractiveness than for practical considerations.

He did not rectify his position in later years. His map of the arctic regions in the Atlas of 1595 represents an emendment to his inset of 1569. It is more elaborate and detailed. The nomenclature is far more complete. The only change in outline occurs between 40° and 100° longitude and 70° and 80° latitude north. The Polar Island situated in this area has received a new coast-line. Exploration had proven that the land which Mercator had thought to be part of the Polar Island was in reality a series of separate islands. Mercator therefore assimilated this new knowledge into the general framework of his view of the Arctic. It did not induce him, however, to throw over his entire concept.

Mercator's concept of the nature of the North thus underwent three basic changes. The first and second stages (1538 and 1541) had in common an extensive of a solid polar land-mass; the difference was in the

location of the broad land-bridge which connected that polar land-mass with the continental mainland. In both the first and the second stages of his concept Mercator paid more attention to the areas situated south of approximately 70° latitude north than to the nature and topography of inland areas of the polar land-mass. The third stage (1569) was characterized by a complete reversal in his position. His final concept of the Arctic was based more upon literary research than upon newly acquired knowledge of actual explorations. The point of emphasis in each of the three stages of Mercator's changing concept of the North reflects, to some extent, his development from cartographer to cosmographer. First, he accepts existing cartographical material and corrects it only where Marco Polo's account seems to contradict it. Later in his career, he rectifies his representation and takes into account a mounting interest in north-east passages. But it is only after having earned recognition as an authority in geography, cartography, and as an accomplished mathematician and scholar that Mercator presents the public with an entirely different theory of the nature of the North. From 1569 onwards, Mercator believed in the existence of four Polar Islands grouped around an open sea with the North Pole at its centre. He defended this concept of the North until his death. Two possible answers offer themselves to explain Mercator's position:

either he did not alter his view of the nature of the North because he was not presented with new factual evidence which would have required him to do so, or he had based his concept upon literary sources which he hesitated to emend because of their supposed authority.

CHAPTER V

ANALYSIS AND DISCUSSION OF MERCATOR'S GENESIS

There is no doubt that Mercator's fame today rests particularly on his cartographical work. However, many of his contemporaries admired Mercator the humanist.¹ Moreover, it seems that for Mercator himself his endeavors as cosmographer, his humanistic research into the past and his theological inquiries were of almost greater importance than his cartographical contributions.

In the Preface to his Atlas Mercator clearly stated that all his research and work was ultimately motivated by his desire to follow in the footsteps of the mythical philosopher-king Atlas.

Hunc Atlantem tam insignem eruditione, humanitate ac sapientia virum mihi imitandum proposui, quo ad ingenium & vires suppetunt, Cosmographiam veluti ex alta animi specula contemplaturus, si forte aliquid veritatis in rebus nondum percognitis rimari possim, quod ad sapientiae studia conferas.²

¹Many references in Mercator's biography together with his correspondence give evidence to the support given to Mercator in his more philosophical and humanist endeavors. Cf. H. H. Geske, "Die Vita Mercatoris des Walter Ghim", Duisburger Forschungen, VI (1962), 244-272; van Durme, Correspondance Mercatorienne (Anvers, 1959).

²Atlas sive cosmographicae meditationes de fabrica mundi et fabricati figura Gerardo Mercatore Rupelmundano Illustrissimi Ducis Juliae Cliviae et Montis etc. Cosmographo autore (Duisburg, 1595), Praefatio in Atlantem, p. 1.

He strove to excell, like this Atlas, in knowledge, humanity, and wisdom. He wanted to survey cosmography in order possibly to discover things yet unknown which might further the study of wisdom. Mercator's geographical studies, then, based upon old sources and new reports and his cartographical achievements were not a goal in itself. If, while researching and studying, he discovered new methods and perspectives which aided the advancement of cartography or which could profitably be applied to navigation, that was a welcome gain, but not the aim as such. He tried to serve and enrich wisdom.

Pursuing his goal to further wisdom, Mercator dedicated himself, whenever possible, to the study of old texts and of the Bible. Over the years his preoccupation with penetrating the mysteries of creation matured into the great plan of writing a treatise on the earth's nature and history. Encouraged by his humanist friends and patrons who understood his intellectual restlessness, Mercator steadily worked at the realization of his plan. Yet he hesitated for a prolonged period to communicate the findings of his research. Only upon the persistent urging of his friends did he publish part of his non-cartographical work, as for example his Chronologia. Well aware of the religious and political uncertainties around him, Mercator may have refrained from publicizing his views, afraid of persecution. On the other hand, his plan was

too encompassing, too grand, to be realized in one lifetime.³

Mercator had become convinced that a systematic description of the process of becoming and of existence would in all probability lead to the discovery and explanation of some of the laws and mysteries of nature.

Et ut Cosmus omnium rerum numerum, species, ordinem, harmoniam, proportionem, virtutes & effectus continet, ita à creatione incipiens, partes eius omnes, quatenus methodica ratio postulat, iuxta creationis ordinem enumerabo, & physicè contemplantur, quò causae rerum innotescant, ex quibus scientia constat, ex scientia, sapientia, quae ad bonos omnia fines dirigit, ex sapientia prouidentia quae finibus facilem viam praestruit:⁴

Mercator, then, attempted to disclose the causes of things by studying them 'physically'. To reach wisdom, for him the science of sciences, was his measure of success. He had set out to enumerate and describe methodically each and every part of creation, convinced that the world contained the number, species, order, harmony, proportion, virtues, and effects of all things. He believed that an

³In this light, Mercator's unselfish encouragement of and contribution to the publication of Ortelius' Orbis Terrarum may appear different: it was not just an expression of a sincere friendship as has hitherto been suggested. Mercator really had no need to compete. His Atlas was to fulfill a quite different aim; it was to be only one part in a much greater scheme. His maps were to represent not only geographical reality as clearly and as truthfully as possible, they also were to illustrate the order, the harmony and the beauty of creation.

⁴Atlas sive cosmographicae, Praefatio, p. 1.

analysis of the process of creation would bring to light the causes, laws and reasons inherent in everything created.⁵ His primary research material was not, however, nature alone, but mainly Moses' account of the Genesis.

Yet, before he could proceed to relate the ". . . science of real things [as revealed] by sense and in certain history . . .",⁶ Mercator felt obliged to free his object of inquiry from all the layers of accumulated speculation about it. For Mercator some philosophical doctrines were mere ". . . opinions of which there is no science . . .";⁷ they were not to obscure or distort the revealed truth of the Scripture. Platonism, as he understood it, appeared to him especially damaging, enticing minds to misinterpret or falsify truth. He therefore concentrated upon a refutation of those Platonic teachings which were related to the genesis of things.

The Platonic concept of The One received Mercator's particular attention. A correct understanding of the

⁵In his approach to find answers to some laws of nature, Mercator followed Aristotelian principles of inquiry. It thus becomes clear that he rejected Aristotle only in so far as his Metaphysics contradicted Mosaic texts related to creation.

⁶". . . à rebus aut sensu, aut certa historia notis, rerum verarum scientiam petere, . . ." Atlas sive cosmographicae, De Mundi Creatione Ac Fabrica Liber, Prolegomenon Fabricae mundi, chapt. 1, p. 3 (quoted hereafter as Atlas Fabricae Mundi).

⁷". . . opinabilium, quorum non est scientia, . . .", loc. cit.

essence of The One in Christian terms seemed to him a fundamental prerequisite for comprehending the design and aim of creation. Mercator readily recognized the valuable contribution of Platonists for having reached a concept of a One as the origin of everything.⁸ What he attacked were their explanations of the nature and characteristics of that One.

Verum cum ab Uno illo ad opera ipsa descendere vellent, in modo & ordine creationis hallucinati sunt.⁹

Mercator objected to a separation and differentiation of the ". . . intellect and spirit of the fabricator of the world . . ." ¹⁰ from The One. He contended that neither in essence nor in time was the Creator separated from The One. In strong terms Mercator spoke out against the Platonic concept of qualitative distinction between The One, the Intellect and the Soul.¹¹ It was for him entirely erroneous and undermined the truth of Mosaic tradition.

Sed cum horum insania sua fatuitate exhiberetur, ad Platoniorum potius theologiam & mundi originem respiciendum est, quae, quod prae omnium gentilium

⁸"Pulcherrime Platonici ex communione specierum, quae in rebus perspicitur, & ordine earum ad Vnum ipsum primum omnium principium ascenderunt, ..." Prolegomenon, chapt. 2, p. 3.

⁹Loc. cit.

¹⁰"Primum quod ponant intellectum sive mentem mundi fabricatorem, extra ipsum Vnum, & plane ab hoc distinctum atque aliud." Loc. cit.

¹¹Ibid., p. 4.

philosophia divina sit, & maxime ad veritatem Mosaicae traditionis accedere videatur, facilius abducere à recta & sacra philosophia potest.¹²

His respect for the authority of Antiquity did not lead Mercator uncritically to accept precepts of old philosophy concerning questions of religion. Against the qualitative differentiation in the Platonic concept of a tripartite God Mercator stated that

Sunt autem Pater, Logos siue Filius, & Spiritus sanctus, ideo vnum existentes, non quia vnus sunt essentiae ut homo homini, sed quia vna numero sunt essentia, quippe cum à se mutuo sint inseparabiles, totaque essentia Patris latens, velut aeterna generatione in Logon eradiet, ita vt Logos sit lucidus character & expressa Patris essentia, eademque essentia à Patre per Logon in vniuersum mundum splendeat, qui splendor Spiritus sanctus existit, una est omnium trium deitas, omnipotentia, virtus, sapientia, bonitas, voluntas, nec modo tria vllo modo dici possunt, quum vna numero sit omnium vis & potestas, & actio . . .¹³

Evidently Mercator believed in the essential oneness of the Christian concept of the Trinity in terms of Catholic dogma.

There is no evidence that Mercator studied the past in order to reconcile Catholic dogma with philosophical concepts of Greek, Roman or Hellenistic times. He did not follow in the path of the Florentine neoplatonists; he did not strive for reconciliation. Rather, Mercator's non-cartographical research seems to have been primarily

¹²Loc. cit.

¹³Prolegomena, chapt. 3, p. 5.

directed toward a return to and purification of the original teachings of the early Church. Like the great representatives of this humanist endeavor, Lorenzo Valla and Desiderius Erasmus, Mercator worked in his own way at divesting the Scriptures of later interpolations and the inaccuracies accumulated during the centuries. A knowledge of the philosophies of Antiquity was therefore essential to him so that he might separate them from the original core of Christian beliefs.

Unfortunately, it is not known upon which texts or versions of Greek, Roman or Hellenistic philosophers Mercator relied in his studies. In his refutation of Platonism he referred to Plato, the Platonic school, Parmenides and Pythagoras. It would seem that he had no knowledge of the chronological sequence of their work; but in any case this was not of great importance to him since he only intended to prove, as he repeatedly insisted,

Philosophorum veterum errores circa principia rerum & circa naturas facile deprehendemus & conuincemus, vt veritas inconcussa stabiliatur in hominum animis, & non amplius fluctuent opinionum veritate, & ambiguis rationibus quoquo modo persuasibilibus seducantur.¹⁴

Mercator clearly differentiated between the philosophical concepts of Antiquity, of which he was suspicious, and the scientific knowledge of the past which he admired and

¹⁴Atlas, Fabricae Mundi, chapt. 1, p. 6.

adopted. He was certain that, once all scientific sources of past times had been collected and diligently evaluated, many remaining problems could be resolved. One would be able to discover solutions to questions like the ". . . increase, and decrease of the Moon, the admirable flowing and ebbing of the Sea, . . ." and thus further ". . . the search of things which concern the Art of Navigation . . ." ¹⁴ Though Mercator did not primarily aim at solving technological problems he was nevertheless aware that his research could be of practical use.

This combination of theoretical considerations with practical application always reappears as an underlying theme in Mercator's work. Though at times one seems to dominate the other, they always exist side by side. His interpretation of the Genesis is no exception. It is marked by his self-imposed religious-intellectual obligation to re-affirm revealed truth at a moment of intense and widespread speculation and by his quasi-scientific search for the discovery of laws of nature which he believed were hidden in the text of the Scripture. Mercator's account of the Creation is therefore not a simple re-statement of the Christian version of beginning; it is rather an attempt at a critical analysis of a revered text. It reflects the as yet unresolved conflict

¹⁴Ibid., p. 5.

between the purely scientific and the mythological or philosophical explanations of natural phenomena.

Mercator's approach and his method of inquiry exemplify how far his thought had been molded by the teaching of Aristotelian physics. He seems to follow almost literally Aristotelian precepts regarding the study of natural phenomena.¹⁵ It is in Aristotelian terms that Mercator explained the motion of things as occasioned by their immanent desire that

gravia omnia deorsum ferri, leuia sursum, nullum motum in rectum infinitum esse. Ex crasso quod subtilius est, euaporare, vnde in centrum colligi grauia, mundum sphaericum esse¹⁶

In like manner, Mercator's concept of matter appears as a restatement of its Aristotelian explanation, phrased in Christian terminology. Aristotle's "form" and "plan of structure" which exist potentially in matter and directs it to actualize that "form" has been transformed, in Mercator's terminology, into the creative command, implanted by God by an act of will. Matter does not exist without or separate from this "form" or "seminal virtue": Aristotle saw it inherent in matter from the beginning, Mercator believed in the formative virtue

¹⁵For Aristotelian precepts and definitions, cf. W. D. Ross, Aristotle (London, 1930), chapt. III, pp. 63, 79.

¹⁶Atlas, Fabricae Mundi, chapt. 1, p. 6.

having been implanted in matter at the moment of its creation.¹⁷

Limus igitur erat & fusilis materia moles illa primum à Deo creata, non diuersarum naturarum, sed vnus simplicis indiuisae substantiae & formae, habens in se virtutem seminariam terrestris formae & aquae & caelestis, omniumque, quae ex ea massa formaturus erat Deus.¹⁸

Throughout his exposition of the Creation Mercator tried to conduct his inquiry as objectively as possible. But he could not entirely free himself from all preconceived ideas so as to express the answers which seemed logically to emerge. Thus, he encountered some difficulty in reconciling his explanation of the earth's position at the centre of created spheres with his description of the sun's characteristic of being the central source of heat and life. He had to resort to a compromise by stating

credibile est, mundum quoque solem tanquam suum cor habere, veluti principium omnis vitae, & à principio, cum lux crearetur, initium habuisse & idem officium in mundo, intra conuexitatem firmamenti praestare, quod cor in homine, omnia sursum & deorsum suo calore & lumine fouendo, & propterea in medio illius mundi (paulo altius ut cor in homine) constitutum esse.¹⁹

He had to recognize that it would be quite reasonable if the sun as a life-spending planet were situated in the middle of the macrocosmos in the same way as the heart

¹⁷Ibid., chapt. 2, pp. 7-8; and Ross, op. cit., pp. 73-74.

¹⁸Atlas, Fabricae Mundi, chapt. 2, p. 8.

¹⁹Ibid., chapt. 12, p. 25.

is located at the centre of the human body, the microcosmos. Yet, Mercator could not unambiguously subscribe to heliocentricity although he had to concede its possibility.

Also typical of Mercator's reasoning was his retreat into quasi-animistic explanations of astronomical and physical phenomena. It was the heat and life-sustaining light of the sun that inclined him conditionally to accept a central position for the sun, not astronomical calculations. Likewise, Mercator defended his system of the universe in which the planets Mars and Venus circle around the sun and not around the earth with the contention that the masculine and feminine principles have to be joined to the life-giving source:

Sic in coelo solis, praecipuum spiritalis substantiae robur in globum solis collectum est, addito illi in subsidium generationis, Mercurio & Venere.²⁰

His belief in such inherent capacities of the planets, however, did not induce Mercator to subscribe to the quite commonly accepted practice of astrology. Rather, he clearly expressed himself against certain aspects of it by stating, for example, that in his opinion, astrologers persuade themselves of the malice of Saturn and of Mars which he thought quite absurd.²¹

Mercator ascribed to the planets only such

²⁰Ibid., chapt. 8, p. 17.

²¹Ibid., pp. 18-19.

characteristics as he contended were implanted in them by God during the process of creation. Like everything else they had been formed out of the primary matter. They were not created to harm or to do malice but to serve man. Primary matter, which Mercator also identified as clay, Chaos, or APHAR, did carry not only the prototypes of everything existing, it also had received God's command to serve a special purpose:

chaos omnes rerum formas, substantias, & qualitates, latenter cundum potentiam seminariam & radicalem in suis visceribus intimaque essentia complexum fuisse, quae inde à creatore eductae, perfectae & in species distributae actu egrediente homini seruiunt.²²

Mercator based his entire interpretation of the process and aim of creation upon this basic assumption. It is not only a reformulation of the Aristotelian concept of matter, it also indicates a certain teleology which is not unlike Aristotle's. In Mercator's opinion it was an essential necessity that God had implanted in matter both a potentiality for a variety of forms and the reason for their actualization. Only upon such a basis could be explained the order and harmony which Mercator recognized in everything created. It provided him with an understandable explanation for the sympathy which he detected as connecting everything created. And it gave him an insight, too, into one law of nature which he had

²²

Ibid., chapt. 4, p. 12.

sought: that every seed, like that primary matter, always carried within itself the 'idea' of its perfect form.

Mercator's "idea of the perfect form", inseparable from matter, is comparable with Aristotle's "permanence of types",²³ also intrinsically inherent in matter.

The lengthy and detailed discussion of this concept indicates that Mercator believed he had discovered at least one answer to his many questions concerning the mysteries of creation. Yet, as mentioned before, the theoretical as well as the practical were always present in Mercator's work. Once he had satisfied his religious-intellectual inquisitiveness, he attended to the other aspect of the question at hand. Thus, his interpretation of particular characteristics of primary matter provided him also with the foundation upon which he could build his explanations of physical and geographical phenomena. Order and sympathy he recognized as the predominant principles. Harmony, as an integral part of order, underlay the sequence of creation and its final appearance. Man had only to observe reality carefully in order to find harmony everywhere. Through observation he would also reach an understanding of its continual working. Sympathy was the connecting link between the various stages of creation, being at work as long as life existed ". . . so

²³W. D. Ross, op. cit., p. 78.

that there is a natural inclination and sympathy, of the Superior world, to the Inferior and a respect and desire of the Inferior to the Superior. "24

Once he had established order and sympathy as the moving forces in creation, Mercator could present almost every physical phenomenon as an effect of these principles. He demonstrated ". . . everything from the fountain itself and out of the causes . . . because exact science proceeds by this way."25 But his "solid science" he based upon rather un-scientific precepts. His logic did not recognize objective observation and analysis as the criteria, but was guided by the supposed workings of an ethical concept.

Thus Mercator explained the spherical nature of the earth as being the most appropriate one ". . . for the help of generation . . .",26 evoking his principle of sympathy. Neither mathematical calculations nor considerations of the circle as a perfect form entered his reasoning; he dismissed them as being purely accidental.27 The

24"... ut sit superioris mundi ad inferiorem naturalis inclinatio & sympathia, & inferioris ad superiorem respectus & desiderium ...", ibid., chapt. 17, p. 30.

25"... praeclarius multo est ex ipso fonte, ex causis, ..., hoc enim tramite solida scientia incedit:" ibid., chapt. 3, p. 9.

26"... generationis causa ...", loc. cit.

27Mercator explained the sphericity of the earth as being founded in the equal distance of the heavy element at the centre from the circumference of the universe, much

distribution of land-masses upon the earth's surface, too, is explained in terms of the principle of order and sympathy. Since land was created to serve as the abode of man (i.e., sympathy) it had to be conserved in place through a well-distributed balance of weight (i.e., order). A vast continental land-mass therefore had to exist, in Mercator's opinion, in antarctic waters in order to provide the adequate counter-pressure to all the lands on the northern hemisphere, known or to be discovered.

In connection with his discussion of land-distribution on the earth's surface Mercator also touched upon the question of the nature of the seas and their possible inter-connection. Basing himself again on his principle of sympathy he maintained that the waters were created for the service of man. And since

At cum usus & officium marium postularet, eorum inter se communionem, propter necessariam circumnavigationem, ...²⁸

Mercator separated on his maps the American continent from Asia. Thus it was not only because he could have had access to geographical information that indicated such a separation, but mainly because the possibility of circumnavigation was a necessary ingredient in his view of a

alike some of the answers Aristotle gave to the same problem when he stated that the earth's form ". . . is due to the movement of its parts towards its centre." Cf. W. D. Ross, op. cit., p. 96.

²⁸Atlas, Fabricae Mundi, chapt. 10, p. 21.

perfectly harmonious creation. If a sea-passage in northern latitudes would be of evident service to men, then there existed little doubt in Mercator's mind that such a passage had been created.

Also closely related to Mercator's concept of the North was his understanding of the structure of the earth. He took the text of the Scripture quite literally and accepted the statement that ". . . God hath established the earth upon the waters."²⁹ All land-masses were therefore floating on top of a fluid watery core. The visible waters, the seas and rivers, were connected with that fluid core of the earth by means of an opening into the "bowels of the earth". This never ceasing flow served a two-fold purpose: it helped to keep the balance between water and land (i.e., principle of order) and it constantly restored the salubrity of the waters through motion for fish and man alike (i.e., principle of sympathy); as he put it,

Quamobrem stat sententia machinam terrae in se ipsa aequilibrem esse, & ex consequenti etiam mare, quod illius sinibus continetur, tum etiam hoc continuo moueri, ne corrumpatur & inficiat aërem, ac pisces interficiat. Quin etiam terram intus ac foris diluit, ut munda & salubria sint omnia, corruptione omni, motu & attritione consumpta ac difflata.³⁰

²⁹" . . . firmavit Deus terram super aquas, . . ."
loc. cit.

³⁰Ibid., p. 22.

Mercator's concept of the North Pole thus finds an explanation in his interpretation of certain laws of nature established during the process of creation. What had appeared as an uncritical acceptance of old texts was really a confirmation of a preconceived idea.

CONCLUSION

As the preceding analysis and discussion of Mercator's life and work has shown, he certainly may be considered a "Man of the Northern Renaissance". Almost every stage in his career was marked with one or more characteristics which have been attributed to the Renaissance in general and to its manifestations in Europe north of the Alps in particular. The preoccupation with religious questions or theological problems, so representative of this Northern Renaissance, was one of the main impulses in Mercator's life. The movement of the 'devotio moderna' together with the communities and schools of the Brethren of the Common Life contributed immensely to the heightened religious consciousness of the sixteenth century. Luther, Zwingli, Calvin, and other leaders of the Reformation further contributed to the already existing insecurity regarding some of the doctrines of faith. Mercator's religious and intellectual restlessness clearly reflected the tenor of his time. It was not a passing mood, it accompanied him through his entire life; it even shaped significantly the course of his career.

His educators played a decisive role in modelling Mercator's thought. The Brethren of the Common Life at

Herzogenbusch imbued the young student with a profound and simple religiosity which recognized the Scriptures as the highest authority in questions of faith. Mercator never wavered from this principle. Like many of his contemporaries, Mercator followed the humanist demand to go back to the original source and he applied this method in the same manner to religion as well as to other areas of intellectual inquiry. His reverence for the authority of the Bible went even so far as to prevent him from accepting certain philosophical teachings of Antiquity which had received much attention during the Renaissance.

Nevertheless, Mercator always tried to follow the humanist principles of working with original sources of Antiquity, of applying critical analysis, and of viewing them against their historical background. Therefore one may say that, at least in his method of study and research, Mercator was a humanist. This may also explain why Mercator was accepted almost as an equal among a large circle of humanists despite his disregard for the philosophies of Antiquity. His rejection of those philosophies, however, did not prevent him from entering into discussions about them. His friendship and exchange of ideas with John Dee give evidence of Mercator's openmindedness and tolerance in this respect.

Mercator restricted his reverence for old texts to those which promised to give him information about

geographical, historical or cartographical knowledge. He drew a clear distinction between the scientific wisdom of Antiquity and its philosophies. Even in his prolonged search for answers concerning the 'fabrica mundi', Mercator never had recourse to either "Platonic mysticism",¹ practical Cabala, or any other practices related to the occult sciences, although this would have been quite conceivable in the sixteenth century.

Mercator always tried to keep abreast of scientific and intellectual developments in his time. It was in the scientific-practical sphere where his work had the greater impact. The advancement of cartography during the sixteenth century was due, in great part, to the achievements of Mercator. But his contemporaries, though they admired the cartographer in Mercator, also recognized that he aimed at larger questions than the problems of navigators and explorers. They supported him and spurred him in his non-cartographical endeavors as much as they could by providing him with necessary research-material and also with advice and an opportunity for discussion. It seems as if Mercator understood the practical side of his career, the instrument-making, engraving and outlining of maps, as a means for sustaining himself and his family.

¹H. G. Koenigsberger and G. L. Mosse, Europe in the Sixteenth Century (London, 1969), p. 100.

His ultimate aim, however, seems to have consisted in unraveling some of the mysteries and laws of the 'fabrica mundi'. It is this apparent dualism in Mercator between the practical and the speculative spheres of his work and the methods and thought-patterns prevalent in each which prevents identifying him exclusively with either one or the other of the intellectual tendencies of the Renaissance.

Mercator's strict reliance upon the revelations of the Scripture influenced even his cartographical work. His concept of the North has provided us with the example. Mercator was not the first cartographer to depict the Arctic or to attempt to solve the question of its nature. During the sixteenth century the nature of northern latitudes and of the Arctic had become a pressing question for those intent upon entering into competition with and Spain for the riches of the Far East. A number of theories had been proposed. Mercator studied them, evaluated their probability against the background of existing knowledge of the areas and decided, at the outset of his career as a cartographer, in favour of an arctic land-mass connected to the continental mainland. Although he shifted that land-bridge from Asia to America, he did not alter the basic theory until, in 1569, he proposed an altogether different hypothesis. It could not have been based upon direct information from navigators and explorers. They had not yet penetrated to those high

northern latitudes. Rather, his study and research had brought to his attention a description of the Arctic which had been obtained, so it was said, through "magical art" and with the help of an astrolabe by a friar-mathematician of Oxford. In other instances Mercator may have shied away from magical information; here, he took it seriously. It confirmed him in his interpretation of the purpose of creation. Mercator was convinced that God had created everything to be of help to man. Circumnavigability of land-masses in whichever latitude or longitude, therefore, was in his opinion an essential characteristic of the waters on the earth's surface. Furthermore, the earth had to have an opening into which the overflowing waters could escape so that constant movement would secure their salubrity. Mercator believed that it was all an integral part of that order, harmony, and sympathy which he had recognized as underlying principles of creation.

Mercator's advocating the circumnavigability of Asia and America was not entirely a response to current economic or political ambitions. Apparently, his concept of the North Pole and the changes in it were the result of his persistent research and his personal interpretation of an ordained order in creation. His contribution to intensified exploration of northern latitudes seems to have been restricted to his providing maps which could

be helpful in a defence of the search for north-east and north-west sea-passages to China.

APPENDICES

APPENDIX I
NOMENCLATURE AND INSCRIPTIONS

1538	1541	1569	1595	*
Septentrio Polus arcticus		Rupes nigra & altissima	Polus Arcticus Rupes nigra et altissima	
Islandia				10° - 20°
			Scotia Hirta Orcades Farre insule Picknekap Horn Bern Ikrida Papey Hop Langa ness.	
		Ther prom.		
			Margaster insula	
		Alba		
			S. Thome cenobium	
Scotia			Faire Il.	20°
			Wittinso	-
	Margaster		Rein. knap	30°
			Bergen	

*Degrees longitude. The place-names are read from 60° latitude N. towards the North Pole.

1538	1541	1569	1595	*
			Scetland insule Walders Stadt Brinma	
		Margaster		
Sue (-cia)			Norvegia Anflo Arbogo Leta Dals. Alandel Hempne Swackby Reonca Trundbem Domus regia Gryp Steg C. Regium Rust Rollen Fin:march Varo	30° - 40°
	Lappia		Lofot Berg	
	Wardi	Santi Ruste- ne	Revel Stokholm Abo Ruttis Finla: (-nd) Gesta Raugma Cronaburg Domus Regia Domus regia Berga Holela Nyslot Vesikila Tuna Mostesara Vina Holela lac.	40° - 50°
	Pita			

1538	1541	1569	1595	*
	Tornia		Laia Bod. (-dia) Persora Pita Berquara Tornia Ictaborg Egge Sammavik Swiroy	
	Scricfinnia	Lappia	Scric (-fin) -nia	
		Motka prom:	Stappen Nort cape	
Iug (-oria)				
			Kiana	50°
			Novogardia	-
Finlandia			Oriseba	60°
			Narua	
			Olsby	
			Lapauesi	
			Viburg	
			Iegaborg	
			Pagesca	
	Hutra		Nyslot	
	Pecerra		Onegaborg	
	Starnsu		Corelia	
			Corelenborg	
	Berga		Ula	
			Berga	
			Lap: (-pia)	
	Biarmia	Biarmia	Motka	
			Stetneses	
	Magnetū insula		Wardhuys	
			S. Hug (-o Wil- loughbes land)	
			Suchko	60°
			Bieleieztoro	-
			Kargapole	70°
			Onega flu.	
			Waga	
			Colmogori	
Corelia			St. Nicolai	

1538	1541	1569	1595	*
Permia			Kunesma St. Michael Nordenborg Omba Polonga C. Chr. Cola	
Hu(-ngaria fria)			Semostpogost C. Comfort C. Sowerbere Kildine MYRMANS- KOI MARE (S. Hug-)o Wil- loughbes land	
	Granduicus sinus			
Colmogora			Totma Jug flu. Bobrovesco Usting Dwina Dfina Kowloay Slowoda Stanuwische Apnu Candinos Stanuwische Colgoieue PETZO(-RKE) MARE Matuchin straight Macsin of islands	70° - 80°
	Iura fluvius			
(Hu-)ngaria (fria)	Iuhra (regio)			
Imaum			Vahulicz Kondori Perme Velick Mezena flu. Iuhri Petzora flu. Piesza flu. Pusteozihero Delgoy	80° - 90°

1538	1541	1569	1595	*
		Colgoyeue Vaigatz	Matflo ins. Vaygatz Promay flu. Goozin (flu.)	
				90°
			Sibior	-
			Strupilica	100°
			Cameni	
			Poyassa	
			Condora	
alani			Weliki Poya- ssa	
			Ussa flu.	
			Petz(-ora)	
			Camenoy	
			poyas mons	
			Varen	
			Fretum Nas- sovium	
			NOVA ZEM- LA	
			Oby flu.	100°
			Artawischa	-
			flu.	110°
			Calami	
			Zolotaia	
			baba	
			Obdora	
			Sossa flu.	
			Obea	
			Berezwa flu.	
			Danadim flu.	
			Camen bolse- hoi	
Ugolsi			C. de Oby	
			Iarm zee	
			Cossin flu.	110°
			Molgomzaia	-
(Scy-)thia itra			Cossin	120°
			Tachnin flu.	
Suobani			Scythiċū pro.	

1538	1541	1569	1595	*
	MARE (CRONTHIA)	(Ocea-)nus Scythicus	Zema Imaus mons Baida Colmak Arbam Falconum insula (OCEANUS SCY- THI)-CUS	120° - 130°
Scy(-thia)			Oecharde flu. Sianfur Cauona Aibair Mechiri OCEANUS SCY- THI(-CUS)	130° - 140°
Suby m.			Stingiri Ezina Naiam Naiman Alchai mons Ciorza	140° - 150°
			Desertum de Belgian Carcoran Taingin Cantcoracur Bargu Tabin prom. Plinio	150° - 160°
Nubius la- cus		Tabin pro- (-mon:)	Marmarea Ghien Mongul ats Magog Mongul Tartar villa Tubicines aerei	160° - 170°
	Tabin mare			
Orchades fl.			Zinga Belgian mons Vng	170° - 180°

1538	1541	1569	1595	*
		Polus magne- tis Polus magne- tis	Polus magne- tis Polus magne- tis	
Banagis fl.			Anian reg- num	180° -
	Tabin pro- montorium		El streto de Anian	190°
			Bergi regio	190° -
Balor provin- cia				200°
			Agama (California) regio	200° - 210°
	Belgian de- sertum	Bergi regio	Chiagiga California (regio)	210° - 220°
Amagoch		Indie nove pars	Zubilaga Canaoga Obila flu.	220° - 230°
			Obila flu.	230° - 240°
			Cogib flu.	240° - 250°
			Lago de Canibaz	250° - 260°
Fretū arcticum		Indie nove Septentrio- halia	no place- names	260° -
	Gro(-enlan- dia)			320°
(Baccalea-) rum regio			a furious over fall L. Lumleys Inlet	320° - 330°

1538	1541	1569	1595	*
			E. Warwikes forland Fretum Davis E. Cumberlands Isles C. Walsingam Diers C. Mont ralegh Sandersons tour Hoen pro. C. Bedford L. Darcies land Diauer pro. Hit ats San- dersons Hope prom. Groclant	
(Insule corterealis)	Boier flu.		Lester point Fretum (Fro- boshers) Warwiks for- land Lockes land Beers S. Contie War- wiks sound Desolation Af pro Gilberts sound Chidleis C. Han flu. Marchant yle Base bartyr Fiste flu. Londo cost Nurdu prom.	330° - 340°
	(Gro-)enla (-ndia)	Groclant		
	Thor flu.		Ocibar Ledeue Ijlofo	340° - 350°

1538	1541	1569	1595
			Sanestol
			Regine Eli-
			zabethe
			prom.
			Bondendea
			Aqua
			Cabaru
			C. Spagia
			Hales iland
			C. Cicel
			Munder prom.
			Sbichbod fl.
			Lande fl.
			Feder flu.
			Na prom.
			Sorand
			Fodalida
			Frisland
			Godmer
			Neome
			Rane
			Ibini
			Campa
			Duilo
			Geye puglas-
			ker
			Kronnigs
			gard
			Staps
			Gils
			Natz
			Witsare mo.
			Adelwik
			Gui prom.
			Hian prom.
			Nat flu.
			Diver flu.
			Sadi prom.
			Neum pro.
Gro(-eladia)	De frier cap		Westmanna
			Haska
			Seluoge
			Replawik
	Pigmerrum	Chan prom.	

1538	1541	1569	1595
	Solotoba Alba	Screlingers	Replawik Hecla m. Skalholt ISLAND Greinastari Halar Grims ey Chan prom. Boier flu. Ther prom. Screlingers Ther flu.
	Screlingers		

Inscriptions

- 1538 'Uteriora incognita'
(Inscribed between 70° and 80° latitude N. and 360° and 40° longitude.)
- 'Utrage Scythia cum Sarmantia Asiana nunc Tartarie nomen habet'
(Inscribed between the arctic circle and 80° latitude N. and 200° and 260° longitude.)
- 1541 'Stella polaris'
(Inscribed between 80° latitude N. and the North Pole and 360° and 45° longitude.)
- 'Iuhra regio ex qua Hungaros prodysse volit'
(Inscribed between 70° and 80° latitude N. and 75° and 105° longitude.)
- 'MARE CRONTHIA vel Amalchium hoc est congelatum'
(Inscribed between 70° and 80° latitude N. and 105° and 150° longitude.)
- 'Vrsa minor vulgo plaustrum minus'
(Inscribed between 70° and 80° latitude N. and 255° and 285° longitude.)
- 1569 'In subiectam septentrionis descriptionem quum in polum extendi tabula nostra non posset, latitudinis gradibus tandem in infinitum excurrentibus, & descriptionis aliquid haud quaquam negligendae sub ipso septentrione haberemus, necessariam putavimus extrema descriptionis nostrae hic repetere et reliqua ad polum usque annectere. Figuram sumpsimus quae illi parti orbis maxime congruebat, quaeque situm et faciem terrarum qualis in sphaera esset, redderet. Quod ad descriptionem attinet, eam nos accepimus ex Itinerario Jacobi Cnoyen Buscoducensis, qui quaedam ex rebus gestis Arturi Britanni citat, majorem autem partem et potiora a sacerdote quodam apud regem Norvegiae anno Domini 1364 didicit. Descenderat is quinto gradu ex illis quos Arturus ad has habitandas insulas miserat, et referebat anno 1360 Minoritam quendam Anglum Oxoniensem mathematicum in eas insulas venisse, ipsisque relictis ad ulteriora arte magica profectum descripsisse omnia, et astrolabio dimensum esse in hanc subjectam formam fere uti ex

Jacobo collegimus. Euripos illos 4 dicebat tanto impetu ad interiorem voraginem rapi, ut naves semel ingressae nullo vento retroagi possint, neque vero unquam tantum ibi ventum esse ut molae frumentariae circumagendae sufficiat. Simillima his habet Giraldus Cambrensis in libro de mirabilibus Hiberniae; sic enim scribit: Non procul ab insulis (Ebudibus, Islandia etc.) ex parte boreali est maris quaedam miranda vorago, ad quam a remotis partibus omnes undique marini fluctus tanquam ex conducto confluunt et concurrunt, qui in secreta naturae penetralia se ibi transfundentes quasi in abyssum vorantur; si vero navem hanc forte transire contigerit, tanta rapitur et attrahitur fluctuum violentia, ut eam statim irrevocabiliter vis voracitatis absorbeat.'

(Inscribed in framed plaque from which the map itself seems to be hanging.)

'On the representation hereunder of the Septentrional Regions.

As our chart cannot be extended as far as the pole, for the degrees of latitude would finally attain infinity, and as we yet have a considerable portion at the pole itself to represent, we have deemed it necessary to repeat here the extremes of our representation and to join thereto the parts remaining to be represented as far as the pole. We have employed the figure which is most apt for this part of the world and which would render the positions and aspects of the lands as they are on the sphere. In the matter of the representation, we have taken it from the Travels of James Cnoyen of Bois le Duc, who quotes certain historical facts of Arthur the Briton but who gathered the most and the best information from a priest who served the King of Norway in the year of Grace 1364. He was a descendant in the fifth degree of those whom Arthur had sent to live in these isles; he related that, in 1360, an English minor friar of Oxford, who was a mathematician, reached these isles and then, having departed therefrom and having pushed on further by magical arts, he had described all and measured the whole by means of an astrolabe somewhat in the form hereunder which we have reproduced from James Cnoyen. He averred that the waters of these 4 arms of the sea were drawn towards the abyss with such violence that no wind is strong enough to bring vessels back again once they have entered; the wind there is, however,

never sufficient to turn the arms of a corn mill. Exactly similar matters are related by Giraldus Cambrensis in his book on the marvels of Ireland. Thus he writes:

Not far from the isles (Hebrides, Iceland, etc.) towards the North there is a monstrous gulf in the sea towards which from all sides the billows of the sea coming from remote parts converge and run together as though brought there by a conduit, pouring into these mysterious abysses of nature, they are as though devoured thereby and, should it happen that a vessel pass there, is it seized and drawn away with such powerful violence of the waves that this hungry force immediately swallows it up never to appear again.¹

'Pygmaei hic habitant 4 ad summum pedes longi, quemadmodum illi quos in Gronlandia Screlingers vocant.'

(Inscribed between 75° and 85° latitude N. and 60° and 80° longitude.)

'Hic euripus 5 habet ostia et propter angustiam ac celerem fluxum nunquam congelatur.'

(Inscribed between 75° and 85° latitude N. and 90° and 110° longitude.)

'Polus magnetis respectu Corui insulae'

(Inscribed between 75° and 80° latitude N. and 170° and 190° longitude.)

'Polus magnetis respectu insularum capitis Viridis'

(Inscribed between 70° and 75° latitude N. and 180° and 200° longitude.)

'Oceanus 19 ostiis inter has insulas irrumpens 4 euripos facit quibus indesinenter sub septentrionem fertur, atque ibi in viscera terrae absorbetur. Rupes quae sub polo est ambitum circiter 33 leucarum habet.'

(Inscribed between 85° and 87° latitude N. and 190° and 240° longitude.)

¹Translated by B. van T'Hoff, Gerard Mercator's Map of the World (1569) (Rotterdam, 1961), p. 61.

'Haec insula optima est et saluberrima totius septentrionis.'

(Inscribed between 80° and 85° latitude N. and 300° and 325° longitude.)

'Hic euripus 3 ingreditur ostiis et quotannis ad 3 circiter menses congelatus manet, latitudinem habet 37 leucarum.'

(Inscribed between 80° and 87° latitude N. and 330° and 10° longitude.)

1595 'Pygmaei hic habitant 4 ad summum pedes longi, quem admodum illi quos in Gronlandia Screlingers vocant.'

(Inscribed between 80° latitude N. and the North Pole and 30° and 75° longitude.)

'Samogedi id est se mutuo comedentes'

(Inscribed between 60° and 65° latitude N. and 108° and 113° longitude.)

'Lytarmis primum Celticae pro. Plinio'

(Inscribed between 68° and 75° latitude N. and 109° and 111° longitude.)

'Per hunc sinum mare Caspium erumpere crediderunt veteres diuersi'

(Inscribed between arctic circle and 75° latitude N. and 113° and 115° longitude.)

'Hic euripus 5 habet ostia et propter angustiam ac celerem fluxum nunquam congelatur.'

(Inscribed between 80° latitude N. and the North Pole and 100° and 120° longitude.)

'Tazata Insula a Plinio hic uspiam ponitur'

(Inscribed between arctic circle and 70° latitude N. and 117° and 123° longitude.)

'Desertum de Belgian arenosum'

(Inscribed between 63° latitude N. and the arctic circle and 150° and 157° longitude.)

'Bargu campestria quorum incole vocantur Mecriti'

(Inscribed between 70° and 76° latitude N. and 148° and 160° longitude.)

'In septentrionalibus partibus Bargu insulae sunt
inquit M. Paulus Ven. hb.j.cap.61, quae tantum
vergunt ad aquilonem, vt polus arcticus illis
videatur ad meridiem deflectere'

(Inscribed between 80° latitude N. and the North
Pole and 140° and 180° longitude.)

'Vng quae a nostris Gog dicitur'

(Inscribed between 65° and the arctic circle and
168° and 178° longitude.)

'Polus magnetis respectu insularum capitis Viridis'

(Inscribed between 73° and 76° latitude N. and
180° and 191° longitude.)

'Polus magnetis respectu Corui insulae'

(Inscribed between 75° and 77° latitude N. and 170°
and 189° longitude.)

'California regio sola fama Hispanis nota'

(Inscribed between 70° and 73° latitude N. and 200°
and 220° longitude.)

'Oceanus 19 ostiis inter has insulas irrumpens 4
euripos facit quibus indesinenter sub septentrionem
fertur, atque ibi in viscera terrae absorbetur.
Rupes quae sub polo est ambitum circiter 33
leucarum habet.'

(Inscribed between 80° and 85° latitude N. and 200°
and 245° longitude.)

'Hic mare est dulcium aquarum, cuius terminum
ignorari Canadenses ex relatu Saguenaiensium aiunt'
(Inscribed between 60° and 65° latitude N. and
268° and 277° longitude.)

'Haec insula optima est et saluberrima totius
septentrionis.'

(Inscribed between 80° and 85° latitude N. and 300°
and 320° longitude.)

'Hic euripus 3 ingreditur ostiis, et quotannis ad
3 circiter menses congelatus manet latitudinem
habet 37 leucarum'

(Inscribed between 82° and 87° latitude N. and 330°
and 8° longitude.)

APPENDIX II

THE "SEPTENTRIONALIUM" OF 1595

There exists another map of the polar regions which carries Gerhard Mercator's name (Fig. 14)¹. Unfortunately, this map has caused much confusion and its date is rather controversial. Nordenskiöld thought it to be "Mercator's map of the north-polar regions of 1569, from Rumold Mercator's Atlas of 1595."² This identification obviously is erroneous. Leo Bagrow was more careful but obscured the problem at the same time when he wrote that it is "Gerhard Mercator, polar Map, 1595 (Rumold Mercator). Here, Mercator modified the polar map, which appeared in the lower corner of the World-Chart, probably in consequence of the discovery of Spitzbergen".³ It is not clear whether he refers here to Gerhard or Rumold Mercator. His mentioning the discovery of Spitsbergen, however, indicates a probable solution to the question of dating and attributing this map to either Gerhard Mercator

¹Various examples of this map are preserved, both in public as well as in private collections. The following discussion is based upon the copy of the map in the American Geographical Society, New York.

²Nordenskiöld, Facsimile Atlas (Stockholm, 1889), p. 95.

³Leo Bagrow, Geschichte der Kartographie (Berlin, 1951), text under plate 96.

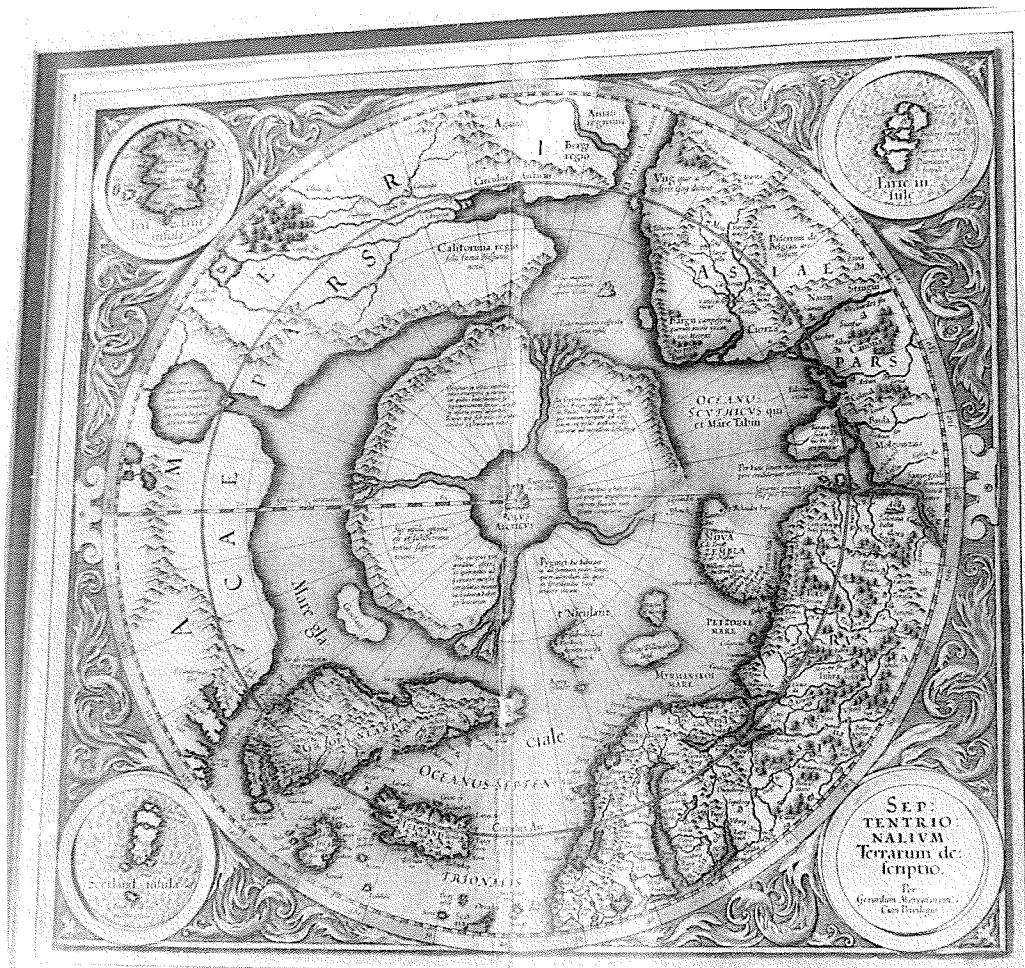


Fig. 15: The Septentrionalium Terrarum
descriptio of circa 1595

or one of his sons.

The 'Septentrionalium Terrarum descriptio' of approximately 1595 retains the basic outline of the polar regions as on the map in the Atlas of 1595. The extension and graduation of the grid are unaltered. The inscriptions together with all the minute details are the very same, even the background decoration was not changed. Except for the area enclosed by approximately 33° to 110° longitude and 70° to 80° latitude N., the chart could be called another copy of the same copper-plate of 1595. The alterations undertaken in this area are rather significant. Indeed, they represent the beginning of a refutation of Gerhard Mercator's concept of four Polar Islands.

Renewed northern exploration had put into doubt the existence of a clearly marked and visible coastline belonging to that Polar Island identified by the inscription relating to the nature of "Pygmies". In consequence, the mountain-range running along its southern coast has been erased, together with the delta of the water-flow characterised as never freezing because of its swiftness (Fig. 15). Furthermore, 'Nova Zemla' (1595) and 'Sir Hugo Willoughbes land' have received a new form; the first one appears as an entirely different island, the latter one is considerably smaller than in 1595. These changes were necessary in order to accomodate first, the discovery

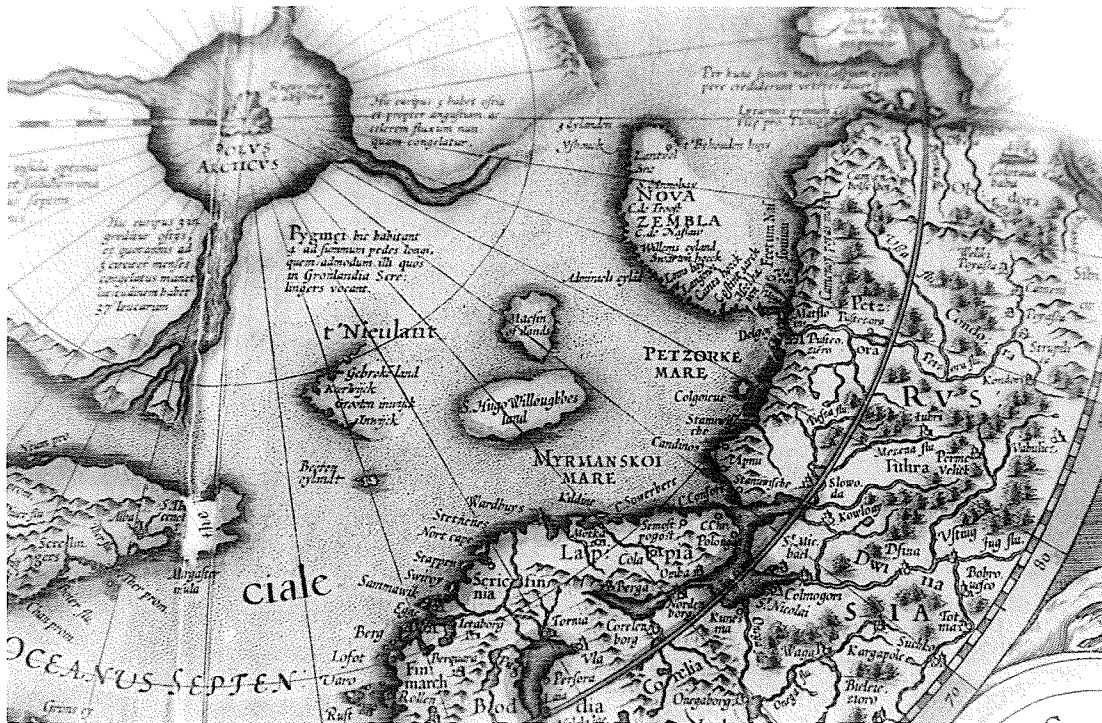


Fig.16: Detail of the Septentrionalium Terrarum descriptio of circa 1595

of Spitsbergen, here called 't'Nieulant' and secondly, William Barents' exploration of Novaja Zemlya.

Only part of Spitsbergen's west coast is drawn with definiteness. No attempt has been made to indicate either the entire extension or detailed nature of the island. Only four inscriptions give the names of known points of reference (Inwijck, Grooten inwijck, Keerwijck and Gebroké land). South of Spitsbergen a small island is situated, the 'Beeren ylandt'. 'Sir Hugo Willoughbes land' and 'Macsin of ilands' are located about half-way between Spitsbergen and Novaja Zemlya.

Novaja Zemlya ('Nova Zembla') is depicted with much care although here too the nature of its east coast has not been determined. Numerous inscriptions relate to the main stations during the island's exploration. On the whole, the island's new outline corresponds more to its actual form than the one on the map of 1595. The characteristic waterway dividing the island into two parts, however, does not appear although it was present on the map in the Atlas.

These changes just noted may be the main criterion for dating this map. The existence of Spitsbergen ('t'Nieulant') and the "corrected" outline of Novaja Zemlya make it improbable, indeed even impossible, that the changes were undertaken before the year 1596: although knowledge of a large island was reported already during

the early expeditions of the English Moscovy Company to Russia,⁴ Novaja Zemlya was not seriously explored until the Dutch William Barents' expeditions of 1594 and 1596-1597.⁵ Spitsbergen, on the other hand, was first discovered in the summer of 1596, again by a Dutch expedition to the North under the command of H. Heemskerck, piloted by William Barents.⁶ Thus, it seems unquestionable that the changes undertaken on the map, dated to approximately 1595, cannot have been made before 1596.

The puzzle, however, of Gerhard Mercator's name on the map and the undoubtedly fundamental identity of this map with the Polar chart in the Atlas of 1595 is still unsolved. To solve it, Koeman's detailed study of Mercator's atlas and of his copper-plates may be of help.⁷

⁴R. Hakluyt, Principal Navigations (edition 1589), pp. 314, 315.

⁵J. K. J. DeJonge, Nova Zembla (1596-1597). The Barents Relics Recovered in the Summer of 1876 by Charles L. W. Gardiner, Esq. and presented to the Dutch Government. (London, 1877). H. Toeppen, Die Doppelinsel Nowaja Semlja. Geschichte ihrer Entdeckung. (Leipzig, 1879). Ch. Bénard, Dans l'océan glacial et en Nouvelle Zemble. Société d'Océanographie du Golfe de Gascogne (Paris, 1909).

⁶W. M. Conway (ed.), Early Dutch and English Voyages to Spitsbergen in the Seventeenth Century (London, 1904), p. 14.

⁷J. C. Koeman (ed.), Atlantes Neerlandici. Biography of terrestrial maritime and celestial atlases and pilot books, published in the Netherlands up to 1880 (Amsterdam, 1969), Vol. II, pp. 281-395.

Koeman's research has led him to the conclusion that Gerhard Mercator's original engravings for the Atlas of 1595 have not been altered before the year 1602.⁸ Therefore, one may have to assume that the alterations on the copper-plate (Spitsbergen and Novaja Zemlya) were done after 1602. This date, however, excludes the possibility of ascribing the authorship of the map to Rumold Mercator since he had died in 1599. In 1604 all the plates of the Atlas together with those of Mercator's Ptolemy edition were sold to Jodocus Hondius who reissued the Atlas in 1606 in Amsterdam.⁹ Furthermore, an account of Spitsbergen's discovery and history, written in 1613 by Hessel Gerritszoon van Assum¹⁰ relates that Jodocus Hondius had engraved Henry Hudson's 1607 discovery of "a firm wall of ice . . . to the N.N.E. of this land [i.e. Spitsbergen] . . ." This wall of ice is missing on "Mercator's map" although it could have been interpreted as substantiating Mercator's theory of the Polar Islands. Considering all these points and the sequence of dates, the most likely time-span in which the changes on Mercator's Septentrional Regions of 1595 could have been undertaken seems to be between 1602 and 1607. Consequently, one cannot really include this

⁸Ibid., p. 302.

⁹Loc. cit.

¹⁰W. M. Conway, op. cit., p. 19.

map of approximately 1602 to 1607 within an analysis of
Gerhard Mercator's changing concept of the North Pole.

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