

GEOGRAPHY AND COSMOGRAPHY IN ITALY FROM XV TO XVII CENTURY.

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ABSTRACT. This paper examines the use and the meaning of the terms "geography" and "cosmography" between the fifteenth and seventeenth centuries to define literature describing Earth, that is its position in Cosmos, the shape, partition and physical characters of its surface, and the peoples which inhabit it. My purpose is to try and find out what we are exactly talking about, when we speak of Humanism, Renaissance, or XVIIth century geography: a necessary, but too often neglected, step in the building of a history of this particular field of human knowledge.

The object of this paper is, let us say, to define the field. What was meant by "geography" between the fifteenth and seventeenth centuries? Did the name and concept of geography exist? Did they coincide with ours? If they did exist, did they remain the same for three centuries, or did they change in the course of time? A rapid history of the term "geography" in the modern period does not take us back very far. Jacopo d'Angelo da Scarperia, the first translator of the *Geographiké Hyphégésis* of Claudius Ptolemy, first introduces it in the Latin West in 1409 or 1410; but he deems it a useless neologism, and at once suggests replacing it by the Latin "cosmographia", well-known thanks to Pliny the Elder and to the more recently discovered Pomponius Mela. It is correct, writes Jacopo d'Angelo, to give the same name to the work of Ptolemy which deals with the same subjects. It is, moreover, precisely the astronomical references on which Ptolemy's work is built that send us back to the Greek word "cosmos", which means "mundus"; that is, the Earth and the heavens, taken together as one. It is above all for this reason that Angelo calls "cosmography" what the Greeks call "geography" (dedicatory epistle to the Pope of the Latin translation of the *Geografia*, 1409-10).

The term "geography" thus appears only to disappear immediately. The Ptolemaic geographic manuscripts and the first prints are entitled *Cosmographia*. But neither has "cosmographia", albeit a well-known word, ever been a common title for a description of the world. The usage is in fact very recent: it dates only from the entry into circulation of the manuscript of the geographic work of Pomponius Mela, towards the end of the XIV century; and for

much of the XV century it continues to be applied to Mela only. Other geographic writings - and also those that we should define in modern terms as cosmographic - bear very varied titles, usually of medieval origin, but they are never called *Cosmographia*.

The term "geography" reappears in the printed editions of the geographic work of Ptolemy in 1478 (*Geographia*) and in Berlinghieri (*Le sette giornate della geographia*, ca.1482). Thereafter, the title *Cosmographia* is almost never used again in the literature which is moving towards being called geographic. Also Strabo, whose *Geographiké* had been translated in 1459 as *De situ orbis terraeque descriptio*, is again called "geographer" in the dedication to Pope Paul II of Giovanni Andrea Bussi's first printed edition (1469). To what is this change due? I have already hazarded elsewhere an attempt to explain this process, starting from an examination of the characteristics of the production of geographic works in fifteenth-century humanistic, especially Papal and Italian, circles (Milanesi, 1992, *Rinascita*). In the course of the XV century, Ptolemy becomes the most important "cosmographer" in circulation. From an author using different descriptive systems but to be considered the equal of Pliny and Solinus, he becomes "princeps" not only of mathematics and of the description of the heavens, but also of the description of the Earth: of a "geographia" which, a useless neologism at the beginning of the century, towards its end is such no longer. In this period, knowledge of Greek among the learned is by now the rule rather than the exception; while an expression such as "situs orbis" seems already a slightly suspect archaism, suggesting an ignorant school-teacher. Ptolemy resolved the cartographers' problem: how to represent the *ecumene* and, in theory, the whole Earth, without having to alter for lack of space the form and proportions of the Earth itself (as was written in 1417 by Cardinal Guillaume Fillastre, one of the very first to study his work). Jacopo d'Angelo had already noted that from texts written "historicorum more" (in the historians' way), like those of Pliny and Mela, it is possible to draw only approximate maps, with the various parts out of proportion. Ptolemy came to offer the moderns the alternative to a cartography having no precise determination of spaces and that remained in any case allusive, never representational. He taught cultivated men who studied and venerated mathematics to construct maps by mathematical methods, and thanks to these methods they could deal on a solid and more acceptable basis than common sense with the information reaching them from all sides about the configuration of the world. One of the causes of this extraordinary interest in geographical subjects among the fifteenth- and sixteenth-century humanists must, indeed, have been precisely the possession, in the form of Ptolemaic

geography and its applications, of the instrument necessary for mastering them.

In the original Ptolemaic definition, geography consists in the calculation of the co-ordinates of a certain number of places, based on astronomical observations and estimated distances; and in technical instructions for constructing from these a world map in geometrical projection (chorography does the same thing, to a bigger scale). But by the 1470s and 1480s "geographia" has come to signify also something else, and it begins to develop as an individual, not exclusively mathematical, field of study. Let us examine a text which is partly a translation into vernacular tercets of Ptolemy's geographic work: the already cited *Sept Giornate de la Geographia* (ca.1482) by the Florentine Francesco Berlinghieri. In the dedication the author promises to treat of "the site of the Earth", "the positions of sites of regions, seas, islands...", "but also the changes of names and their causes and etymologies", "builders of infinite cities", "customs very different from ours", "deeds of peace and war" and "famous men". In short, he anticipates a synthesis of all the geography of the century: the geography "mathematicorum more" of Ptolemy encompassing the chorography "historicorum more" of Strabo and the Latin authors, the antiquarianism and historical geography of the *Liber insularum Archipelagi* of Cristoforo Buondelmonti (1420), of the *Italia illustrata* of Biondo Flavio (ca.1450) and the description of new countries and new times by Enea Silvio Piccolomini (ca.1460). We have here the attempt to organize in a unified work all ancient and modern geographical knowledge, to reconcile "mathematicorum mos" with "historicorum mos", already separate in the Hellenistic period, by inserting the work of Strabo and his successors in the frame prepared by Ptolemy.

This attempt at a synthesis and rebirth of lost or deteriorated knowledge is, in my opinion, the new characteristic of what now, at the end of the XV century, is for the first time called geography, and which is first expressed (unsuccessfully, but that is not the point) in the work of Berlinghieri. This representative of "active" Ficinianism, by means of a synthesis of all possible geographies, offers to all men the knowledge of the Earth and the ability to make use of it, that Strabo had promised to princes alone.

The work was not to serve as ancillary to the study of literature, like the *De montibus* of Boccaccio, or to that of history: Enea Silvio Piccolomini wrote a contemporary history ("quae per nostrum aevum gesta sunt") to which he added, on the Herodotan model, "de locorum gentiumque natura et situ quae videbunt necessaria" (what it will seem needful to say about the nature and the position of places and peoples, *Asia* f.2v.). Geography must serve

the actual life of men directly: geography is not the handmaiden of any other art. Men, like all living beings, need to know their "territory" in order to act: a more-than-Strabonian, profoundly humanistic concept. The carrying structure of the work, however, is not Strabo, but Ptolemy.

The model so established retains its vitality in Italy and elsewhere for a good part of the following century, during which the most widespread form of organic geographic treatise consists of a Latin or Italian edition of Ptolemy, furnished with commentaries and geographic and mathematical appendices, and with ever more numerous modern maps. Additional texts are taken from Strabo, the Latin geographers, and the modern writers and travellers who, thanks to Ptolemy, can be incorporated in the elaboration of scholarly geography: Ptolemy himself, after all, had based his work on the accounts of the writers and travellers of his time.

These updated editions of Ptolemy which, in Italy and elsewhere, bear the title of *Geographia*, and which are often spoken of as incomprehensible archaisms in the geographic production of the Age of Discovery (1990), do not describe the world of the past at all, but that of the present. They are an attempt to produce a modern geography: that is, a geography in which the modern is verifiable through the ancient, and this latter compensates the shortcomings of the modern. This is, in fact, the only possible procedure, in view of the state of knowledge; and above all considering that the scientific foundations of knowledge are the same for ancients and moderns. Nobody, however, repeats Berlinghieri's experiment: until the end of the century, all limit themselves to placing the materials side by side without unifying them. A good example of this kind of work is the Ptolemaic *Geografia*, joined with a *Geografia universale*, published by Giuseppe Rosaccio in 1599, which continues to be much read in the XVII century, with the Ortelius-inspired title of *Theatro*.

Very rare in Italy, on the other hand, are completely new geographic treatises of this type, like the manuscript *Geographia* of Sebastiano Compagni (1509), subsequently plagiarized by Domenico Maria Negri (1557). Compagni follows the Ptolemaic order in the regional description, completing it with ancient and modern authors; but he cuts the cartographic instructions, the co-ordinates and the maps, departing from Ptolemy and approaching Strabo far more than Berlinghieri does (Almagià, 1946, *Compagni*). Also Gian Lorenzo d'Anania's *L'universale fabrica del mondo overo Cosmografia* (1576) is certainly composed on the Strabonian model. An introduction contains some elementary notions of astronomical geography (sphere, great circles, climates): thus had Strabo synthesized in his two books of introduction the geography of the mathematicians, as a

necessary premiss to his personal political-historical geography. The arrangement of topics follows not Ptolemy but probably a series of maps of the continents, or universal, constructed by means of co-ordinates: perhaps some of the works of Giacomo Gastaldi, which enjoyed the greatest prestige. In this case, the name "cosmography" attributed to the text refers less to its astronomical content than to the type of map on which it is based: the "universal" constructed by means of co-ordinates of latitude and longitude which at this time commonly bears the traditional fifteenth-century name, "cosmography". Not to speak, of course, of the influence, still strong among readers and publishers, of the fortunate *Cosmographia* of Sebastian Münster (1544); a work that, on the basis of its contents and the Ptolemaic distinction between "geografia" and "corografia" should rather be entitled "*Corographia*". The title chosen by Münster and d'Anania, however, reminds us that, especially north of the Alps, geographic writing has characteristics and uses definitions different from those current in Italy; and that German, French and Iberian works have a notable influence, not yet studied, on those of Italy; and that consequently the Italian tradition is not the only one operating in the world of geographical culture in sixteenth- and seventeenth-century Italy.

In fact, many foreign cosmographic and geographic texts are read in Italy, being republished, too, and often translated from Latin into Italian, at Venice from the thirties onwards (Donattini, 1992). They repeat, usually in Ptolemaic terms, the distinction between "cosmographia" and "geographia"; and sometimes they try to analyse the role of geography in relation to other disciplines, beginning with cosmography itself.

The opinions of the transalpine authors on these subjects are not, however, completely uniform. Geography describes the Earth, cosmography measures the Earth and the Heavens; the geographer describes the regions; the cosmographer calculates their position, that is, their latitude and longitude. So writes the least 'Ptolemaic' of the German geographical authors, Joachim de Watt (Joachim Vadianus), in the *Rudimentaria in geographiam catechésis* included with his glossed edition of Pomponius Mela (1518). The Ptolemaic "cosmographer's" way of proceeding is similar to those of the astronomer and the surveyor; the "geographer", on the other hand, taking Strabo or Pliny for his model, comes closer to the procedure of the poet or the historian. The "geographer" enumerates the places, and furnishes the toponymy, the origin and history of cities and kingdoms, and natural curiosities. The "topographer", who usually coincides with the geographer, does the same thing in more detail. Cosmography and geography, in short, deal with different subjects (needless to say, the heavens and

the sublunary world are structurally different), with different criteria: mathematical, the first; descriptive, the second. There is, however, an area of overlap - the calculation of the astronomic position of the regions described by geography - in which cosmography is applied to the surface of the globe. Also Egnazio Danti will move in this order of ideas in 1577 (*Scienze matematiche*, p.44), maintaining that the geography of Ptolemy is based on measurements made at the terrestrial Equator and meridian, and so has no relationship with cosmography, which deals exclusively with the sky.

This is also, substantially, the opinion of Petrus Apianus (1524), who, however, distinguishes between cosmography and geography on the basis of their different techniques of representation but not on account of the different subjects dealt with: cosmography is a description of the created world - the Earth included - shown "iuxta mathematicas ostensiones" (by mathematical demonstration); geography is the "depiction" - that is, the cartography - of the most important and best known parts of the Earth (mountains, rivers ...), not always executed according to Ptolemaic (and so, mathematical) criteria, to serve as a reference for the reading of historians and poets ("rerum gestarum et fabularum peritiam habere", ff.II-III)).

On the other hand, for Henricus Loritus (1527), true geography is Ptolemaic, and therefore it can be neither realized nor understood without cosmography, that is, without mathematics and astronomy. This is also the view of Hieronimo Girava, a Catalan whose work is printed at Milan in 1556: but for him descriptive geography is only a "comun" (common) geography, while "propria" (authentic) geography is astronomical geography, that "no se diferencia nada de la Cosmografia" (in no way differs from cosmography), as Ptolemy well understood, and to which Girava intends to confine himself.

The uses of the term "geography" are thus quite varied, and the distinction between geography and cosmography is not at all definite; even if, in general, these authors emphasize the correlation between geography and mathematics, and also the separation between a "true", mathematical geography and a historical-descriptive discipline that cannot be correctly defined as geography.

About 1580, for example, the Florentine Filippo Sassetti calls nautical chart makers and observers of the sky "geographers"; while those who describe distant countries (of those who describe nearby countries he says nothing) for him are "historians" (Milanesi, *Sassetti*, 1989). It is indeed true that in the sixteenth as in the fourteenth and still in the seventeenth century, the cartographers are professionals (sometimes making maps only, but more often drawings and engravings, and projects and realizations of

architecture, civil and military engineering, and scenography); while the "describers", those whom de Watt calls "geographers" and "topographers", are always scholars, men of letters, priests, gentlemen or soldiers engaged in recounting their campaigns in the new worlds.

In short, the situation has not changed much since the previous century. The project of unifying the possible geographies which we have seen develop and yield some fruit in the world of Italian humanism in the fifteenth century and in the early part of the sixteenth, overall becomes less important; but there is no abandonment of the established model, which premises a synthesis of (Ptolemaic) astronomical geography and a (Strabonian) treatise of descriptive geography. More than the actual geographical practices, have changed a little the attitudes, the expectations, of those who produce them and of those for whom they are an object of meditation. Meditation, however, does not in its turn yield very original fruit; almost all the authors, in a foreseeable measured settling-down on the pre-existing patrimony, balance now on the foot of Ptolemy, now on that of Strabo, with occasional references to Pliny.

The few original considerations arise from common sense. They are those of de Watt and above all of Danti, who depart from the traditional interpretation of the value of the Ptolemaic "geographia", derived from the words in which Jacopo d'Angelo explained to his readers the reasons for which he intended to call his work *Cosmographia*. Danti's distinction concerns not the method, but the object, of the inquiry; the method is not under discussion; it cannot, for him, be other than mathematical. I do not know whether other classifiers of mathematics make the same considerations as he does; whatever novelty appears, however, in sixteenth-century attempts to insert the geographies in a scientific system, always take us back to the mathematicians, and never to the descriptive geographers or the cartographers. There is nothing unexpected in this: the mathematicians are inventing scientific foundations for the world; the descriptive geographers and the cartographers are still too busy finding and collocating information about the new and re-calculating the old to pose to themselves the problem of how to collect and classify what is considered to be already known for certain.

The State and War, current interpretations say, will be the founders of what we conventionally call modern cartography (but we should do better to say cartography of the late modern age, or perhaps of the modern State, taking "modern" only in its strongly contested chronological sense, for discriminating the supposed historical ages). Differently, not even these potent household gods will succeed in giving a universally accepted statute to written geography; only the universities will succeed in this, for a

not very long period before and after 1900, by excluding what they do not teach from the officially recognized geographical culture.

At the end of the XVI century, Giovanni Antonio Magini (*Commentarii nel libro I ...della Geografia di Tolomeo*, 1589) does not yet feel able to distinguish clearly among geography, cartography and cosmography: the subject of geography is "the surface of the land and of the water, in so far as it is variously inhabited by living creatures, and in so far as it refers to the circle of the celestial sphere, wherefore the geographer describes the universe, or rather, the known and inhabited part of the universe", giving measurements and positions ("ends, boundaries, dimensions, amplitudes, courses, sites, co-ordinates", f.Iv.). The Maginian ecumene includes not only the lands, but their skies; also because, according to this author, one of the principal aims of geography is to aid "legal science" through the study of astral influences on lands and men: influences that probably constituted the main reason for the interest in geography of the very famous (especially as having inspired Columbus) Paolo dal Pozzo Toscanelli (Gentile, *Catalogo*, 1992). For others, like Girolamo Fracastoro and in general the successors of Hippocrates, the purpose of studying geography is the practice of medicine, through knowledge of the soil, and so of the humours it exhales which create climatic conditions, the physical and moral characteristics of men and the possibilities of diseases and epidemics (Milanesi, *Ramusio*, 1991).

Among the traditional divisions in the description of the Earth, the only one to maintain a relatively certain statute is descriptive chorography, thanks to its total lack of connections with mathematics and Ptolemy. According to Petrus Apianus (1524, f.III), chorography does not have to refer to the "universum telluris ambitum", and is free to dedicate itself to the description of single objects (ports, cities, towers ...). For Egnazio Danti (*Scienze matematiche*, 1577, p.44) "chorography ... can be practised by a simple Painter as a simple mechanical art"; and "topography" (that of Polybius, for instance), is a written text which does not need even drawing, still less geometry. This autonomy is immediately visible in the titles of works like those of Conrad Pickel (Celtis) and Leandro Alberti: very Strabonian descriptive geographies, never defined, however, as "chorography" or "geography", but bearing titles such as *Germania Illustrata* (1500), on the model of Biondo Flavio, and *Descrizione dell'Italia* (1551). At the end of the Cinquecento, of a similar character are the *Relazioni universali* (1599) of Giovanni Botero; and in the following century works like *Les Empires, Royaumes, Estats, Seigneuries, Duchez et Principautez du Monde ...* (1614) of

Pierre d'Avity, and the *Descrizioni universali* (1655) of Luca di Linda which derive from it.

Also in works of this type, however, structure and aims vary enormously. "The mountain of ancient historical texts recovered in the XV century and in the first part of the XVI made history writing in Western Europe a far more complicated and controversial operation than it had ever been since the VI century" (A.Momigliano, *Storiografia antica e moderna*, p.48). It would suffice to replace "history" by "descriptive chorography" to portray an age in which the methodologies available have become too numerous, and in which the field of inquiry has extended its boundaries without defining itself any better in the process. We may therefore try to refer back to Momigliano's picture of the Renaissance historiography of Antiquity to explain the situation of geographical studies of a descriptive nature. "In the XVI century and at the beginning of the XVII", writes Momigliano, "there were antiquarians and historians (the ones often indistinguishable from the others) for the non-classical and post-classical worlds, but only antiquarians for the classical world" (*Storia antica e antiquaria*, p.15). Towards the end of the Cinquecento, especially, it was possible to conceive of a new way of describing countries unknown to classical authors like Strabo and Pomponius Mela; even if that new way assumed the character of, more than anything else, a naturalistic description, or a collection of documentary materials, a history or a treatise on political economy and institutions. There was, in fact, a strong demand for practical information. It came from various sectors of society, who expected precise replies on specific subjects - whether these were the medicinal applications of certain plants, the markets and merchandise available or the possibilities of religious conversion or of military alliance. The first information necessary - how to arrive in those countries - was already provided by a series of separate sources, particularly the cartographical and nautical ones; but these last were not systematically inserted in the descriptions; they were part of the mathematical disciplines, and could be handled suitably only by a different public. In brief, we have not real "geographies" of the countries composing the expanded ecumene of the XVI and XVII centuries; but we have at least the projects and ideas of João de Barros and of G.B.Ramusio for a description of the new worlds including all the elements that Ptolemy, Strabo and Pliny would have deemed appropriate. Like that of Herodotus and the other Greek authors, the geography of the modern period is (paraphrasing Francesco Prontera) "first of all a 'geography of the others'", the product of the crossing of European history with the histories of the other continents (Prontera, *Geografia come genere letterario*, p.194).

In contrast, I find no sign of anyone thinking it absolutely necessary - or even opportune - to replace the works of the classical geographers by others of similar plan and subject for the territories of the ancient Roman Empire. These could already count, not only on a history, but on a canonical geography, at least within the usual scheme of universal history and geography; as in historiography, the most reasonable prospects were of a local, antiquarian geography, rather than of a new panorama of the traditional ecumene. There were also some classical local geographies, still usable for an overall picture - those of Julius Caesar and of Tacitus, for example; but, since these were not enough, corrective instruments were introduced which, to be efficacious, did not need to assume the exacting name of geography: cartography, and the "illustrations" and "descriptions" mentioned above. These instruments seem to me to be the geographical equivalent of antiquarianism, like which they collect information in a systematic manner, aimed at no political or educational end nor at any universal scheme for interpreting the structure of the world.

In Italy the XVII century does not find for "geography" more numerous or deeper studies, nor more precise definitions. In other parts of Europe, one particular form of scientific production - the universal atlas - assembles knowledge on the entire ecumene; but in Italy it has few and not very original imitators. In 1661 the identification of the geographic field remains uncertain. Father Riccioli (1661) maintains that Geography is included in Cosmography, together with Uranography, and defines it as follows: "Geographia simplex est scientia Mathematica de Terraquea mole in Universo, quatenus quanta est, ac mensurabilis tum secundum se, tum quoad proprietates, quas ex positione ad coelum nanciscitur" ("Simple geography is the mathematical science of the terraqueous mass in the universe, which concerns its dimensions and measurements both in themselves and in relation to the properties they derive from its position relative to the sky"). Geodesy and the calculation of the terrestrial co-ordinates, we should say today; geography and gnomonics, Egnazio Danti would have said nearly a hundred years earlier. In general, however, according to Riccioli, geography is not "simplex" but "mixta", that is, mixed with mathematics, or with natural or civil history or chronography. Author of a text of "geographia simplex", "reformed" by him to make it such, Riccioli does not admit to the 12 books composing his work anything other than measurements, co-ordinates and place-names. Ten years later, in 1670, Father Nicolosi, less methodical and reformative, still distinguishes between "historical" (that is, descriptive) "geography" and "mathematical geography", that

is, cartography based on co-ordinates: that which in the XVI century had been called "cosmographia" and in the XV "mathematicorum mos" (*Hercules siculum sive studium geographicum*, 1670).

We are not, all in all, very far from Hieronimo Girava or from Magini - or even from Strabo and Ptolemy; of the last-named, moreover, Father Riccioli constantly acknowledges the correctness. Obviously, there is a change from the past, and it is noticeable, but it really concerns the factual contents of geography, not its statute. This, despite writers' occasional innovative proposals, remains vague; and it continues to exist within an essentialist or substantialist vision of phenomena, in a general picture of qualitative rationalism (that of Renaissance Aristotelianism), in which science tries to realize a "translation" of reality into concepts reproductive of qualitative differences.

All the authors so far mentioned share, in fact, a geocentric vision of the cosmos, considering the sublunary world qualitatively different from the celestial world. Thus they find themselves facing insuperable difficulties, as much in rejecting traditional definitions of the field as in accepting the same denomination for a discipline that studies both subjects, but with the same systems. Perhaps this explains the embarrassing but un-eliminated coincidences between geography and cosmography, and the impossibility of finding an exact definition for the one or the other and of collocating them with certainty in regard to astronomy and mathematics. The only certainty is that, for these authors, descriptive, human, historical geography is a spurious geography: of the two terms of the geography of the fifteenth and much of the sixteenth century, by now only the mathematical one interests students of science, and they consider it to be, in effect, geography. Descriptive geography, on the other hand, is excluded from the field, more and more rigidly defined, of the sciences; it is considered a residuum of the past, and of a past that is no longer a model for the present. The idea of progress appears in geographical writings, too, giving rise moreover to some indignation.

This is the case of the *Lexicon geographicum*, written by Filippo Ferrari (1627) and re-published by Michèl Antoine Baudrand (1670), who brings it up to date in 1683. Baudrand's work provokes the ire of the Professor of Philosophy of Padua University, Vitale Terrarossa (*Riflessioni geografiche circa le terre incognite*, 1686). The Frenchman in fact considers "fictitiae seu quae nec sunt, nec umquam extiterunt" (fictitious, that is, inexistent and never having existed), cities and places indicated on maps, and above all on the Venetian ones of Giacomo Gastaldi (p.442). Terrarossa, on the basis of the

authority of the *Navigazioni e viaggi* of G.B. Ramusio (1550-59), rises up to sustain the primacy of the Venetians in all geographic discoveries, and the truthfulness of all the reports of Venetian travellers, from Marco Polo to the Zeno brothers. There is nothing unusual in this refusal of the geographical Pyrrhonism of Baudrand; it was at Venice itself, moreover, that in the course of the Cinquecento the concept of "geographic discovery", still highly consolatory for national pride, was elaborated (Milanesi, *Siviglia*,). But Terrarossa does not simply praise his homeland's illustrious past; he is irritated by the systematic indication of the errors of the ancients, which he finds also in the reformed Geography of Father Riccioli: the latter "declares absolutely wrong everything the more or less ancient Geographers said about the measurement of places, or in the description of the Earth, if more modern Masters of this art have not since discovered confirmation of its truth" (p.16). Others too think like Riccioli, including an author that Terrarossa does not know, or feigns not to know: the Dutchman Bernhardt Varen, according to whom: "... antiqui Geographi tantum in describendis regionibus occupati fuerunt", (the ancient Geographers were concerned only to describe the regions, *Geographia generalis, Origo Geographiae*, p.7). Theirs was a geography "valde manca, imperfecta et falsitatibus plurimis scatens" (incomplete, imperfect, full of lies), which ignored all America, the northern lands, the austral and Magellanic lands, the possibility of circumnavigating the globe (even if someone had the idea of it), the circumnavigability of Africa, southern Africa; it contained no descriptions of distant lands; it did not know the movement of the seas and the tides, it knew little of the winds, it was ignorant of the prismatic compass and of magnetism (p.7v). Terrarossa does not agree with this approach, destructive of the prestige of the representatives of a past that he is not disposed to separate from the present. Theirs were not errors, but the infancy of knowledge. "The plant of all the Natural Sciences little by little has sunk its roots in the human mind ..." (Terrarossa, p.16); continuing the metaphor, we may say that for him the authors of the past represent the first phase in the growth of this glorious plant, not an obscure period in which its seed had not been cast. There are different ways of conceiving the new idea of progress.

In 1650 the Dutchman, Bernhardt Varen, is engaged, in the wake of Danti (1577), Paul van Merle (Merula, 1605) and Golnitzius (1643), in seeking a new definition of Geography as part of a hierarchical system of disciplines, and in classifying its internal structure; but he has a conception of geography not very different from that of many of his sixteenth-century predecessors. "Geographia dicitur

scientia mathematica mixta" (applied mathematics, we should say, rather than mathematics mixed with some other discipline), "quae Telluris, partiumque illius affectiones a quantitate dependentes ... docet." (Geography is the name given to the mixed mathematical science that teaches ...the aspects of the Earth and of its parts that depend on quantity). These "affectiones" are form, position, dimensions, movement, aspects of the sky and other similar properties (*Geographia generalis*, p.1.). To include in it "descriptionem politicam singularum regionum" (the political description of the single regions) is to ascribe to it too large a field; while he who limits it "pro sola regionum Telluris descriptionem et distributionem" (to the mere description and distribution of the terrestrial regions) attributes to it a field too small. He, however, who over-extends the field is excusable: he does it so as not to bore his readers (*ibid.*p.2.).

Geography - Varen, as is known, continues - is divided into "generalis" and "specialis". The first concerns the Earth as a whole, not the single regions; the second, on the other hand, concerns the regions ("chorography") and places ("topography"). It is the usual definition of the field on the basis of its dimensions and what we may call the entity of the magnifications through which it is examined: just what is written in Book I of the Ptolemaic geography. More innovative, perhaps had been Paul van Merle in his *Cosmographia generalis* (1605): his "geography" is divided into two parts, of which the first is divided into 3 books: 1) "generalis"(de mundo) and 2) and 3)"speciales, continentes sphaeram" a) coelestem b) terrestrem. (1, general, regarding the whole world; and 2 and 3, particular, regarding the celestial and terrestrial sphere). The second part was dedicated to Europe in general, and to particular treatments of Spain, Gaul and Italy, based on modern writers and above all on the personal experience of the author. Here the fields were divided by subject: and the author, who was neither mathematician nor cartographer, had no difficulty in accommodating both cosmography and chorography within a conception of geography usual among the descriptive geographers, based on common sense and on the sensation of the superiority of the moderns to the ancients in the matter of knowledge of the Earth.

Varen's most famous innovation is considered to be the introduction, in the extremely detailed division of his *Geographia generalis*, of the so-called physical geography (Almagià, *Varenio*). This is a group of subjects of study, that Varen lists in his "pars absoluta geographiae generalis", which studies "corpus ipsum Telluris et partes eius atque affectiones eius proprias" (p.2), section III, "in qua Terrae constitutio et partes explicantur" and section V (absolute part of general geography,) that studies

(the body itself of the Earth, and its parts and the aspects proper to it, section III, in which are explained the composition in fundamental elements and the parts of the Earth, and section V). They are, in particular, the chapters "de montibus in genere", "de montium differentiis", "de sylvis, desertis et fodinis" and "de mutatione locorum aridorum in aquosa et contra" ("Mountains in general", "Differences among mountains", "Forests, deserts and mines" and "Transformations of dry into wet places and vice versa" on the transgressions of the sea and the land). These are subjects that, according to Magini writing in 1598, should not have been attempted by him, but left to others: the study of the world "as natural bodies" does not concern the geographer, but "is the province of the Natural Philosopher" (Iv.). Not that there had not been, from the beginning of the Cinquecento, (Apianus, 1524), attempts to create a fixed terminology to define the important "accidentes" of the surface of the globe; and in fact in the Age of Discovery the geographer had appropriated to himself many other topics of physical geography or, rather, of natural philosophy. These themes appear punctually in the "general geography" of Varen, as in those of Girava (1556), Danti (1577) and Magini (1598): subdivision between lands and waters, definitions of islands and continents, definitions and movements of oceans, seas, rivers, lakes and mineral-bearing waters and atmospheric phenomena. In Danti, for example, (*Scienze matematiche*, 1577), mountains, rivers, swamps etc. are listed and defined in Table 33, "Of Geography", col.3, among the "particular parts of the Earth" described by Ptolemy with the use of "gnomonic science" (latitude and longitude), in a list which starts with "Provinces Kingdoms Regions Cities Lands Villas", and ends with "Reefs".

Altogether, Varen's is a geography with up-to-date contents, which tries to appropriate to itself all the fields of observation and all the methods of study available: including cosmography, which is used in the "pars respectiva, explicans affectiones atque accidentia ... quae Telluris a coelestibus causis accidunt" (pp.2-3; analytical part, which explains the terrestrial aspects and phenomena ... deriving from celestial causes) and in all the "Specialis geographia" (particular geography); and including, in the third part of the same, the historical, descriptive, chorographic history of Strabo. One seems to see taking on form and substance again Berlinghieri's dream of re-uniting the two branches of geography, already separate in the Hellenistic period: a dream of re-birth, not of innovation, even if it constitutes the initial condition necessary for novelties to emerge. Further - this is the product of the century and a half which have elapsed between Berlinghieri and Varen - this geography is not considered as an independent discipline, but as a part of mathematics.

It is just from the very results obtained in the recent past by the mathematical sciences that Varen's geography draws the innovative impulse of which the author is aware, and that distinguishes it in our eyes (but that prevented it from being accepted and circulated in the Latin world in the period in which it was published. I do not know why it was so little reprinted even in the world of the Reform, or what effects it had on the geographical culture of that world, to which it was addressed. I believe that this problem would be well worth studying.

Varen does not in fact intend to reconcile Ptolemy with Strabo: he does not start from an ancient model or ideal being re-born, but from the very recent premiss of the change in the status of the Earth itself within the universe. From this premiss flow the reasons which induce him to include cosmography in geography, and not vice versa, and to give the precedence, in the definition of geography, to mathematics: "geographia dicitur scientia mathematica mixta...".

It was the mathematicians, in fact, who demonstrated that the celestial bodies are corruptible like the sublunary ones, and that the Earth is not at the centre of the heavens; but also (and above all, from the geographer's point of view) that the earth is not extremely small in relation to the sky, as the ancients had believed, but is of a more than respectable size (p.3.). The scholar willingly abandons geocentrism, but claims for the Earth larger dimensions, and greater centrality from the human point of view, in relation to the Universe; and he claims for geography a rôle at least equal to that of astronomy among the mathematical sciences (p.5.). This position is the opposite of that summarized by Danti in Vol.1 of his *Scienze matematiche*: Perspective, Observation, Gnomonics, Meteoroscopy, Dioptrics, Geography, Hydrography, Chorography, Topography are subsidiary sciences of Geometry, according to the Pythagoreans (and to Danti himself); "others who consider" (mathematics) "more scientifically give Geography no place among the mathematical sciences" (ibid. p.3.). The more so, Danti recalls at another point in the same work, in that Geography has nothing to do even with Cosmography (p.44.); he places it, however, among the subsidiary sciences to that "II mathematical science" that is "geometry", and he declares it realizable only by the "geometra" (ibidem).

As we have seen, Varen's opinions are not shared by his Italian contemporaries (Riccioli knows but does not appreciate him); also because they cannot accept, at least publicly, his basic assumption; the new rôle he assigns to the Earth. Yet it is common to find among seventeenth-century Italian writings on geographical subjects the same passion for classification that animates Varen, and before

century Italian writings on geographical subjects the same passion for classification that animates Varen, and before him had animated Danti, van Merle and Golnitzius. It does not arise only from the need for clarity of definition, perhaps for didactic purposes. I suppose that their attitude is linked rather to the change in the structure of science which characterizes the century: to the need, that is, to reduce reality to univocally determined, quantifiable, elements: and this presupposes a preliminary analysis, or decomposition, of the perceptible elements.

A synthesis of all possible geographies is destined, however, to remain a dream that no Universal Geography in subsequent centuries will ever succeed in realizing. In spite of Varen, mathematical geography and descriptive geography will have to resume their separate itineraries; more time will pass before the birth of physical geography, which will occur only at the beginning of the XIX century, in the time of Alexander von Humboldt.

In relation to the geography of the XV and XVI centuries, that of the second half of the XVII, like that of today, totally different from one another, represent - save perhaps in certain universalistic ambitions - only a case of homonymy.

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