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## **Cartographic cataloguing and filing: towards a new definition of the colonial mapmaker**

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### **ABSTRACT**

This paper is a reflection on the opportunity to move beyond the taxonomic paradigm in cartographic cataloguing and filing. A theoretical and methodological analysis is presented so as to provide a clear definition of the colonial mapmaker by abandoning the positivist approach. The reference framework is the cartography of the Italian colonial period.

The point of departure is that cataloguing and filing are useful instruments for ranking and organizing even though they are not able to express the complexity of a cartographic project during territorial conquest, such as that of the colonial period. Hence, we suggest the identification of new criteria adopted for the publication of a Dictionary of Italian Colonial Mapmakers (DISCI Project) as a result of a project carried out over the last five years by Italian geographers.

Following the theoretical approach of cartosemiotics, we reflect on the role of the Italian colonial mapmaker who – traditionally seen as “the person who draws the map” – is analysed within the cartographic production process. Precisely, by belonging to a particular cartographic institution, the mapmaker contributes to supporting a specific political or ideological project. By considering different professional typologies of Italian mapmakers belonging to public and private institutions, we demonstrate their role in the project of territorial conquest.

### **INTRODUCTION**

This paper purports to abandon the taxonomic paradigm in cartographic cataloguing and filing, and to define a system that, based on semiotic theory, recuperates the figure of cartographer as the central element from which inspiration is drawn. Thus, the cartographer is examined independently of the traditional general meaning of “map-making technician”. Rather, the dimension of this professional figure is re-analysed as that of territorial agent and social communicator within the map construction process. The various roles cartographers have performed in Italian colonial production are pointed out, and on this basis several resulting cartographic typologies are indicated. The study is included in a more extensive research project directed towards the publication of a comprehensive dictionary of Italian cartography (DISCI)<sup>1</sup>.

### **1. CARTOGRAPHIC CATALOGUING IN ITALY**

The first cartographic cataloguing in Italy was done in the second half of the 19th century, and its results can be seen relative to the impetus that cartographic research had acquired in response to several innovations in the field of geography. Most important was the institutionalization of

geography at the university level and recognition of its status as an academic discipline. Then there was the social significance that the Geographic Societies came to hold, recognized especially in its early stages as the highest expression of the science of geography. A third innovation was the political interest that geography and cartography held with regard to colonial expansion.

In 1881, by way of illustration, Giovanni Marinelli published his *Saggio sulla regione veneta*, the first attempt to propose cartography as an independent category of documentary sources (Marinelli, 1881). This work sought to produce a catalogue that essentially would be able to lead to a definitive identification of documents. From the time of its publication, this work became for geographers the reference model and provided stimulation for study and research in the field<sup>2</sup>.

Yet it was Roberto Almagià, in the first half of the 20<sup>th</sup> century, in his series of *Monumenta Cartographica*<sup>3</sup>, to signal a transformation in the history of cartography. He proposed in this work the use of cataloguing criteria derived from the geographical content of the maps. The *Monumenta* is indeed collected in a broad format, conceived to reproduce the documents in such a way as to permit a cross reading with the texts, which are linked and more importantly refer back to the information the maps viewed as documents able to establish ways of describing and conceptualizing the world. The importance of such collections appears fully evident if we consider their diffusion and persistence over the years<sup>4</sup>.

The works thus published from the final years of the 19<sup>th</sup> century through the first half of the 20<sup>th</sup> therefore promote a transformation of cartographic methods. From a mere instrument registering reality, the map becomes evidence of the means by which a society relates to its living space. Several decades later, in the 1980s and '90s, however, a taxonomic approach became predominant. On the trail of the neopositivist system, the goal became that of making a "catalogue" that went beyond listing all the maps produced in the history of Italian cartography, one that was extremely detailed in precise technical and constructive specifications of the documents. Such accuracy nevertheless eventually had to return to the options foreseen in prepared filing that had caused so many editing difficulties (Baldacci, 1984). It was indeed in the presumption of exhaustive thoroughness that the results were rather partial and well removed from the established objectives. Such an approach, even if it failed to achieve its objectives, stimulated meetings and debates on the history of cartography, the social role of maps, and the problems of their being catalogued<sup>5</sup>.

From these brief references to cartographic cataloguing in Italy, the need arises to concisely recall some of the guiding principles of cataloguing.

## 2. BEYOND TAXONOMY: TOWARD A SEMIOTIC METHOD

In order to specify new criteria for cataloguing and filing to adopt in editing a dictionary of Italian cartography, we must consider the colonial mapmaking figure, anchored to cartographic studies presenting the map in its role of social mediation. The results reached by cartographic interpretation indeed permit us to deal with that figure, considered traditionally and generally as a "mapmaker", in a radically new way, reconsidering this figure as a subject invested with important social implications.

The semiotic approach (Wood, Fels, 1986; MacEachren, 1995; Casti, 2000a) turns out to be useful to our objective in that it affirms that it is indeed the presence of the interpreter that makes of the map the point of departure for the unfolding of a semiosis, in which signs become *signing vehicles*, meaning that they are able to produce self-referential messages (Morris, 1946). The interpreter is seen not only as cartographer and thus the person who codifies information and transfers it onto the map, but also as the one who receives information and causes it to circulate

socially, nourishing and transforming it. More specifically, we individuate three points of time in which the interpreter executes such a semiosis: the *semantic* moment, which by way of its codification aims at producing new meaning; the *syntactic* moment, which develops the communicative system through its association with signs; and the *pragmatic* moment, in which the map becomes the interpretive target and matrix of socially recognizable behaviour.

Such a theoretical method, then, points out the double role of the map: a *social product* able to demonstrate the construction practices of a given society's territorial knowledge (Harley, 1992; Jacob, 1992; Farinelli, 1992); and a *symbolic operator* which circulates this knowledge and actively conditions those who interpret it (Casti, 2003). This then provides the opportunity to reconsider the figure of interpreter as part of the cooperation created between the maker of the document and its receiver. Remember that these two figures reciprocally influence each other. Just as the maker of the document responds to the needs of its receiver, the latter simultaneously is conditioned by the informative choices of the cartographer. In colonial cartography, for instance, particular cartographic institutions attempted to answer the needs of those who under various auspices were responsible for working within the colonial project, formulating a cartographic production that, however articulated and varied, was wholly directed towards demonstrating the practicability and legitimacy of the colonial project.

## 2.1 CARTOGRAPHY IN THE COLONIAL ENTERPRISE

Before going further into the specifics of this new way of looking at the figure of the cartographer, we might call to mind just what colonialism represents, from the cartographic point of view. Colonialism can be defined as a political project put into action by the European nations in conquered foreign territory, which made uniform and extensive survey cartography necessary for exercising political, administrative and military control (Gambi, 1992). The achievement of such cartography meant putting into operation a quantity of resources and techniques that, although coordinated by ministerial apparatuses, required the participation of all the competencies available in the metropolitan territory – that is, in Italy. There was thus the vastness and complexity of the colonial cartographic project in promoting the establishment of *government* entities responsible for official cartographic production. (Cerreti, 1987). To these must be added in a subordinate role *private* institutions, associations and enterprises aiming to spread and propagate the political project at every level (Traversi, 1964).

Thus can be seen the intersection of cartography and colonialism (Casti, 2000b, 2003), and the attempt to construct an interpretation specifying the central role of cartographers involved makes a solid theoretical foundation absolutely essential. Keep in mind that the language of the map – starting with the recuperation of the territorial language (1<sup>st</sup> level semiosis) – proposes a *metasemiosis* (or 2<sup>nd</sup> level semiosis) – which permits the exclusion from the cartographic category those figures who add apposite symbolic material onto the map. The cartographer, in short, would be the one who cartographically translates a territorial semiosis pre-existent to the map itself. Nevertheless, this initial consideration reveals its partiality if thought of in the way colonial cartographic information was formed; that is, dealing with a cartography of *elsewhere* – of an unknown social landscape, intellectually unpatronized by European society, where territoriality as such was not yet recognized. The original toponymy become obscured to the advantage of a new denomination, sanctioned by means of the map. The colonial operator, considering the territory a space lacking any social value, was free to attribute Western logic and values to it. In doing this, whether dealing with drawing table projects or those actually carried out on the ground, the map was relied on for all practical operations (Cerreti, 2001). With these elements in mind, we can turn now to a consideration of several aspects of the cartographic/denomination symbiosis to review the professional figures working within the cartographic institutions that were involved in the colonial enterprise.

### 3. SEMIOSIS AND THE COLONIAL CARTOGRAPHIC TYPOLOGIES

Focusing on the construction of cartographic information and thus on semantics, we can define three phases of process development: i) the production of information; ii) the codification to which the information is subjected; and iii) the adequacy of the map in responding to social exigencies. (See Table 1)

The first phase recalls the cartographic/denomination symbiosis and its modalities of information retrieval through two distinct map typologies that depend on the way in which the information was produced: *survey* maps and *derivative* maps<sup>6</sup>.

**Table 1:** Phases of the information construction process in relation to cartographic typologies.

<b>Production</b>	<b>Cartographic treatment</b>	<b>Social exigencies</b>
• Survey maps	• Topographical maps	• Expansion
• Derivative maps	• Demonstrative maps	• Planning
	• Thematic maps	• Consensus

*Survey* maps are made from on site data taken from exploratory surveys, from regular topographic campaigns (based on the use of trigonometry, geodetics, the determination of the azimuth, etc.), or from hydrographic surveys when dealing with marine cartography. *Derivative* maps, on the other hand, are created by assembling information provided by other maps, or by re-elaborating on-site data gathered for other purposes. On *survey* maps, the coincidence between the territorial semiosis and cartographic semiosis is total, from the moment that the interpreter names the territory while constructing the map, consequently playing the double role of territorial agent and cartographer. In the case of *derivative* maps, however, information is produced by transposing a territorial semiosis, at the 1st level, into a derived, or cartographic, semiosis, at the 2nd level, with different professional operators involved.

The second phase – the cartographic treatment of the information – varies according to the motives for which a map is being created. We must remember that the intellectual appropriation of the world inherent to a map tends to respond to one of two basic needs: to *describe* it, attempting to restore recognizable forms by means of direct observation of reality, or to *conceptualize* it, explaining how it functions on the basis of interpretive categories. In the latter case the map makes no attempt at reproducing reality, but tries to replace it by creating an iconization<sup>7</sup>. From this point of view, we can determine three documentary typologies of the documents: one for *topographic* maps, another for *demonstrative* maps, and still another for *thematic* maps. Each typology is a description or conceptualization of the world according to various perspectives distinguished by the selection and codification treatment to which the information is subjected.

The third and final phase deals with social demands, or exigencies, the map responds to, with particular reference to *pragmatic* considerations, so the map becomes an interpretive target and matrix of socially recognizable behaviour. These can be summarily listed as those of *expansion*, *planning*, and *consensus*.

Pragmatic analysis illuminates the conditions under which communication occurs – how two different interpreters react upon each other starting with the autonomous function of the map itself<sup>8</sup>. The communicative relationship is indeed what is established between the first interpreter,

the cartographer who creates the document, and the second interpreter, the receiver who uses the information provided by the map. This relationship is mediated by the cartographic self-reference – that is, the acceptability of the map as it is, in comparison with its capacity for independent communicative intervention with respect to the intentions of its creator. For our purposes here,

therefore, rather than considering the map according to an evaluation of a product of exclusively constructive choice, it is considered as the expression of a communicative process.

From this point of view, interpreters are evaluated in terms of the different roles performed in the production of the various cartographic typological objectives achieved by them.

The demand for territorial expansion requires a descriptive knowledge of the land by means of information that refers to geographic phenomena, thus initially recalling the *topographic* map. The interpreter in this context (both as cartographer and official receiver to whom the map is addressed) is an authoritative agent with the faculty of activating the pragmatics of the symbols within a social context – to carry out actions of military, administrative or political control – ratifying definitively the references and thus all the operations required, starting with mobility<sup>9</sup>. Planning activity requires the *demonstrative* map, which foresees the practicability of the territorial transformation, since it contains topographic and functionally thematic data for carrying out the project<sup>10</sup>. With this cartographic typology, too, the interpreter performs a socially relevant role, but his authoritativeness is different from that of a functionary belonging to one or another official institution. Maps circulating within a government institution are intended to inform regarding the means by which to put territorial planning into action, while those produced by private organizations are meant to obtain consensus by spreading the idea of “Elsewhere” that can justify colonizing action.

The interpreter of the *thematic map*, lastly, is qualified in still another way. The production of such a map within government institutions is directed towards economic and political planning, and thus operates by furnishing data elaborated in the function of such objectives. As for private organizations (publishing houses, geographical societies, and colonial institutions), the interpreter’s role is to become knowledgeable about the colonial territory by means of mural maps, scholastic atlases, and textbook maps. In this social context, various popular and/or scientific magazines or posters are published with the aim of legitimizing the colonial enterprise.

Although each cartographic institution is addressed to different receivers, all results are complementary. This is the point at which the colonial cartographic institutes and their skills must be taken into consideration.

#### 4. COLONIAL CARTOGRAPHIC INSTITUTIONS AND SKILLS EMPLOYED

First let us concisely summarize the whole picture of Italian *government and private institutions*, their status, their production, and their responsibilities.

Based on statutes of the period, we can group the colonial cartographic institutions into three categories: *government institutes*, *geographic societies*, and *editorial institutions*. The work of the first two categories, strictly linked to ministerial directives and government policies, saw their territorial mission as the collection of data. The editorial institutions, however, were primarily concerned with the compilation of maps drawn from already available information.

The category of *government institutes* can themselves be divided into three types: i) *Official cartographic institutes (IGM and IIM<sup>11</sup>)*, responsible for surveying the colonial territories or their coasts. These institutes, on the one hand, were technical and consignment apparatuses, fully equipped and adequately skilled to initiate and carry out a cartographic campaign. They also had to decide what type of production process to follow. ii) *Ministerial cartographic offices* (the various offices that eventually became the *Cartographic Service* of the Colonial Ministry. These offices served to coordinate and control the entire colonial cartographic production and to complete primarily derivative maps for not only state offices but also for the general public. iii) *Colonial cartographic offices*, locally based in the colonial territories, usually with technical support from the IGM. These offices were responsible for completing maps for public

administration and planning offices (both of which were responsible to the Head of the Colonial Ministry)<sup>12</sup>.

The *colonial geographic societies* (*SGI, SEC, SAI, SSGC*<sup>13</sup>), aiming at various levels of scientific and economic targets, were directly involved in government actions supporting political projects by means of the production of demonstrative and thematic maps. This activity was especially intense in the initial phase of the expansionist movement, aimed at obtaining consensus for colonial policy within the national parliament and among the cultural and economic elite. Their cartographic production was strictly linked to exploration aimed at investigating the presence of resources. Such maps were published in the official journals of these organizations or their occasional publications.

Finally, we can distinguish two types of editorial institutions: i) *Cartographic institutes* (*Cora Geographic Institute, Italian Cartographic Institute, G. Giardi Cartographic Studio*), private organizations producing primarily demonstrative maps, at times on commission for other public and private entities committed to their popular divulgation. ii) *Publishing houses* (*Graphic Arts Institute of Bergamo, De Agostini Geographic Institute, Italian Touring Club, Vallardi, Hoepli, Paravia, R. Bemporand & Sons, Artaria*), aimed at spreading Geographic information among the general public and thus committed to completing maps and atlases for popular and scholastic use.

#### 4.1 Diversification of the figure of mapmaker

Diverse competencies and skills were practiced within the various organizations, not only in relation to the specific purposes of each office or institute, but also to the particular job performed according to the type of production. To discourage the thought that differences in social position may have had more importance than professional roles played, we turn once again to semantics. Three semantic areas can be distinguished within the field of cartography to which professionals in the field can be seen to correspond (see Table 2).

The first area, indicated as *1<sup>st</sup> level semantics*, refers specifically to the cartography/denomination symbiosis and deals with semantization of the territory. In this case, the professional figures involved are those who, although employed to produce maps, also function as land surveyors. The second area, *2<sup>nd</sup> level semantics*, refers to the way the information is treated (selection criteria, restoration standards, communications regulations) and to the additional competencies related to the institutional structure. The third area, *3<sup>rd</sup> level semantics*, regards graphic transposition, engraving and editorial aspects for the print media. The division of areas emphasizes a semantic presence that, while codified, stimulates new interpretations and influences the final results of the information. In addition, it delineates a plurality of professional figures that, to maintain specific types of professionalism, fragments their total profile.

For example, the first semantic level involves two different professional figures, the *explorative mission topographer* and the *explorer-geographer*. Both proceed operationally by means of on site investigations, and actuate the earliest territorial codification. However, these figures are called upon to favour one of two semantic types, either territorial or cartographic. The former has the technical tools to transpose the territorial data onto the map with geometric rigor. The latter selects and interprets the insertion of the data into the cartographic document.

The figure of topographer can be collocated within the government cartographic institutes (IGM, IIM) which supply the specialized personnel to survey the territory and supervise technicians through the application of rigorous conventions and standards in the making of *survey maps*. Topographers are the heirs of those cartographers who, prior to the adoption of Euclidean cartography, measured and reconstituted topographical data with land surveying instruments while at the same time interpreting the territory. With the introduction of the new topographic

**Table 2:** The three areas of cartographic *semantics* and the diversification of the professional cartographer in each

<b>SEMANTICS I</b> denomination /cartography	<b>SEMANTICS II</b> codification and treatment	<b>SEMANTICS III</b> graphic transposition
<b><i>Government institutes</i></b>		
<ul style="list-style-type: none"> <li>• Topographer on explorative mission</li> </ul>	<ul style="list-style-type: none"> <li>• Eminent personalities</li> <li>• Orientalists</li> <li>• Topographic mission chief</li> <li>• Geodetic topographer</li> <li>• Mapping topographer</li> <li>• Restoration topographer</li> <li>• Photogrammetric topographer</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Draftsman/engraver</li> <li>• Draftsman-cartographer</li> </ul>
<b><i>Colonial geographic societies</i></b>		
Explorer-geographer	Cartographer-geographer	Draftsman/engraver
<b><i>Publishing houses</i></b>		
	Cartographer-geographer	Draftsman/engraver

system, the figure of cartographer came to coincide with that of topographer – a technician able to transpose onto a map that which had already been established elsewhere. This was a transformation of social roles. From an interpreter able to draw the world more or less autonomously, the topographer becomes a survey and restoration technical systems expert who applies the rules that organize the representation of the territory without contrivances.

The figure of geographer, on the other hand, may be placed within the colonial geographic societies (SGI, SEC, SAI SSGC) which based their cartographic production on the work of geographers who were members of the expeditions – of declared scientific character, but often with ulterior commercial and political objectives – which were regularly organized. We should note that these organizations recruited personnel who were able to manage geographic information and its cartographic translation (Orazio Antinori, Odoardo Beccari, and Manfredo Camperio come to mind). Such names, coherent with the methodological system described above, in addition to their specific academic or political objective, covered the territory for academic reasons, often in advance of their accompanying topographers (Cerreti, 1995). This translates into the formulation of a territorial semantics with a cartographic semantic orientation. Explorer-geographers, prior to their departure, were instructed as to the “empty spaces” on the map to fill in. Then, while travelling, they applied compass measurements, established altimetric quotas, described orography, hydrography, delineated sketches of itineraries made, always collecting and selecting territorial data that would serve to modify or update already-existing maps or take the form of *demonstrative* or *thematic* maps upon return to Italy (Surdich, 1992). The role of the explorer-geographer, therefore, while maintaining traces of similarity to that of mission topographer, is a professional technician whose work is radically limited by supervision and by rigid standards that limit his personal contribution to the cartographic enterprise, and is confined to the mere execution of that which is established at the institutional level. Meanwhile, the margins of independent decision-making for the explorer-geographer are broader. He is not simply a technician, but rather more a professional able to take command of the geographic information inclusive of its socio-territorial attributes above and beyond its technical references.

Regarding *2<sup>nd</sup> level semantics*, or how cartographic information is treated, it is useful to recall the overall operations establishing the means and standards to create the cartographic icon<sup>14</sup>. Here too the leading role is played by the person who defines the codification choices, rather than the

one who actually applies them. The *government cartographic institutes*, such as the IGM, were managed by several *eminent personalities* (Antonio Loperfido, Nicola Vacchelli, etc.), who defined the means by which topographic recognition of geographic phenomena was utilized, and, through their codification of the language, established specific rules for the colonial situation (Mori, 1922; IGM, 1939).

The professional figures that applied such norms varied according to the institute to which they belonged. The IGM included: the *topographic mission chief*, the *geodetic topographer*, the *mapping topographer*, the *restoration topographer* (for land survey applications), and the *photogrammetric topographer* (for aerial survey). The topographic mission chief was the head of operations, while those involved in land survey operations played roles increasingly applicative and less autonomous. However, the professional figures in aerial survey, a more complex procedure, were obligated to assume the role of photogrammetric topographers<sup>15</sup>.

Different from the IGM, whose normative system was entirely decided by the board of directors of the institute, the work of the ministerial apparatus was directed by the *Cartographic Service*, and depended on the individual initiative of its current director (Achille Dardano, for example) or on the initiative of those responsible for specific cartographic projects. These managers thus assumed a relevant importance in determining the territorial knowledge transmitted to the map.

As for the Geographic Organizations, the most responsible roles were performed by “official” geographers attached to the *Colonial geographic societies* (Giuseppe Dalla Vedova, Giovanni and Olinto Marinelli, Giotto Dainelli, ...), who developed their professional activity within the organization, by their collaborators in the private *Publishing Houses* (e.g., Arcangelo Ghisleri, Mario Pennesi, or Riccardo Riccardi), or even by the founders of private *Cartographic institutes* (Guido Cora, first of all), who independently managed the entire process of the construction/codification of cartographic information.

Finally, 3<sup>rd</sup> level semantics (affixing the data on the photoplate and its preparation for printing) is considered the responsibility of the draftsman/engraver. This job varies according to the cartographic type and the organization in which it functions. In government institutes, it is a secondary activity in the editing of the topographic map, determined by a myriad of mostly anonymous professionals, some of whom have been inserted in the headings of the Dictionary on the basis of the frequency with which they appear in the map production of the various institutes (listed in “subheadings” or inserted in the main heading of the institute in which they operate). In the production of demonstrative or thematic maps, however, this work is the responsibility of the draftsman-cartographer, who assembles the products of the geographer or the topographer. In the geographic societies and the publishing houses the draftsman-cartographer assumes even more responsibility by establishing a collaborative relationship with the cartographic geographer (Eugenio Heber and his collaboration with Ghisleri come to mind), although in the context of the strict codification of the colonial cartographer, his intervention in handling the information was very limited.

## 5. CONCLUSION

At this point it appears evident that, abandoning the taxonomic paradigm, the work of cataloguing and filing is to be included within a broader context of cartographic interpretation. We have pointed out the impossibility of referring to the confusion of taxonomic norms that become arbitrary and inapplicable. Rather, the cartographic semiosis, exhibiting tools adequate for the definition of the colonial cartographic professional, turns out to be a useful instrument for clearly defining the professional cartographer, and, perhaps, for re-evaluating the entire history of cartography.

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<sup>1</sup> Research conducted in connection with the DISCI project (Historical Dictionary of Italian Cartographers) presented to the MIUR (COFIN, 2003) and coordinated at the national level by Ilaria Caraci. It proposes a synthesis of reflections, already published in Italy, on the new meaning of the cataloguing utilized within the field of semiology (E. Casti, 2004; 2005a). An edition of the Dictionary of Italian Colonial Cartographers is presently being prepared, originally edited by E. Casti, with revision and organization of the themes by F. Burini. It will be published this year.

<sup>2</sup> From Maria Baratta (1922, 1924, 1928) to Giuseppe Caraci (1959); from Attilio Mori (1903, 1922) to Paolo Revelli (1931, 1936).

<sup>3</sup> Two Italian collections are by this author: *Monumenta Italiae Cartographica*, 1929; *Monumenta Cartographica*, 1944-1955). Subsequently, in collaboration with R. Almagià and M. Destombes, *Monumenta Cartographica vetustoris aevi*, 1964.

<sup>4</sup> These collections deal with many regions, among which are Y. Kamal, S. Fauat, *Monumenta Cartographica Africae et Aegypti*, 1926-1951; A. Cortesào, A.T. Da Mota, *Portugaliae Monumenta Cartographica*, 1960; H. Nakamura, *Monumenta Cartographica Japonica*, 1972; G.A. Skrivan''c, *Monumenta Cartographica Jugoslaviae*, 1974; Monchengaldbach, *Monumenta Cartographica Rhenaniae*, 1984; G. Schilder, K. Stopp, *Monumenta Cartographica Neerlandica*, 1986-2000; M. Watelet, *Monumenta Cartographica Walloniae*, 1995.

<sup>5</sup> On the role played by maps in challenging the scientific value of the taxonomic principle, see reference to the French establishment of colonialism in Africa: Casti, 2000b.

<sup>6</sup> The recourse to cartographic typologies does not intend to emphasize any structural differences in the information contained in the map. Rather, it aims to show the phases of such information so as to delineate and define the various competencies the colonial cartographer had to possess.

<sup>7</sup> Iconization organizes the significant product of the map and causes it to circulate, increasing communication regarding the essential functions of the map: to describe and to conceptualize. More specifically, the final result of self-reference is the most sophisticated point of meaningful production and circulation achieved by the map. By means of iconization, the map presumes to tell us how the world functions and does it on the basis of a theory aimed to make us accept without doubt what it proposes. The message carried by the map, in short, is able to replace reality, making us assume the cognitive examples of the production as relevant, and simultaneously proposing such examples as belonging to the territory, informing social behaviour. See E. Casti, 2003.

<sup>8</sup> Regarding self-referencing, the results of autonomous production, see the second phase of the cartographic semiosis, the synthesis that, while not considered separately here, implicitly constitutes one of the fundamental supports for this kind of reasoning. For more on autonomously produced results, see E. Casti, 2000a, especially pp. 97-145.

<sup>9</sup> On the repercussions of the utilization of maps in colonial expansion, the Adua case is illuminating. In this case the map's role as a reference tool demonstrated devastating results for those favouring the defeat of the Italian army in its conquest of Abyssinia. In fact, the discrepancy between the representation and the reality was a determining factor in the prevalence of the occupiers. See E. Casti, 1996, 2000a, 2005b.

<sup>10</sup> E.g., the IAO ("Istituto Agronomico per l'Oltremare" - Overseas Agronomy Institute) of Florence, without producing surveyed cartography, made use of maps produced by the IGM ("Istituto Geografico Militare" - Military Geographic Institute) as a basis for preparing its planning proposals. For more on the role of this institute, see P.G. Massaretti, 1998; A. Masturzo, 1996.

<sup>11</sup> Respectively, the Military Geographic Institute and the Marine Hydrographic Institute ("Istituto Idrografico della Marina"), which, in addition to being based on the Italian national constitution, were also official cartographic organs of the colonial enterprise.

<sup>12</sup> On the role of public and private colonial organizations and their interrelationships, see especially C. Cerreti, 2000; G. Monina, 2002.

<sup>13</sup> Respectively, the *Italian Geographic Society*, the *Commercial Exploration Society in Africa*, the *African Society of Italy*, and the *Society of Colonial and Geographic Studies*, to which should be added the *Italian Royal Academy's Study Center* for the IAO, another cartographic producer (“Società Geografica Italiana, Società di Esplorazione Commerciale in Africa, Società Africana d’Italia e Società di Studi Geografici e Coloniali, Centro Studi per l’AOI della Reale Accademia d’Italia”).

<sup>14</sup> This refers to the semiotic figure in the selection/communicative process, here intended as the totality of signs that, united in name, are able to demonstrate, by giving the draftsman’s position a particular significance, placing it, too, within the communications process (Casti, 2000a, pp. 93-96).

<sup>15</sup> The topographic mission chief assumed a particular relevance in the area of organizing the operations of the topocartographic objectives, as it was to him that the task fell of coordinating and directing the topographic mission. He had to assure that surveying operations conformed to IGM regulations, and was authorized to make all decisions regarding innovations in surveying procedures suggested by particular conditions of the terrain – e. g., the introduction of new conventional signs. The geodetic topographer was responsible for operations of triangulation, geodetically-based measurement, and determination of both regular and expeditious astronomical points of reference. The mapping topographer executed the final survey with the aid of the Pretorian Table. Lastly, the job of the restoration topographer was most similar to that of the draftsman, and affixed the information onto the map. With the development of aerophotogrammetry, the working procedures became more complex, and new professional figures were introduced which, of minor importance to the present research, can be included in the study of photogrammetry.

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