35 · State, Cartography, and Territory in Renaissance Veneto and Lombardy

Emanuela Casti

If one is to explain why the cartographers of Renaissance Italy were the most innovative and prolific in western Europe in the fifteenth and early sixteenth centuries, one has to look elsewhere than the usual general cultural explanations that are put forward for the rise of the Renaissance. Instead, one has to look at the role of maps as increasingly complex expressions of mastery over territory. One thing is undoubtedly clear: the maps of the past were not simply artistic artifacts (even if they often had a celebratory role). Rather, they mainly served to express an intellectual mastery of the world; they were instruments of territorial action and mediated a new relationship with the environment.

Considered from this point of view, it is clear why cartography developed so early in the Po Valley. The social groups that inhabited the area were undertaking complex and detailed territorial projects requiring intellectual instruments of similar complexity. Foremost among such instruments was the map. Milan, Venice, Mantua, Parma, and Ferrara were powerful city-states whose state apparatus had to meet social expectations concerned with more than mere survival and had to satisfy a society that looked to the state to implement strategies of territorial transformation that would enhance productivity. It is no coincidence that Venice—a city precariously balanced between land and sea—should dedicate some of its most important technical know-how to the mastery and management of the natural environment and initiate the wholesale production of geographical maps. One of the city's prime objectives was to obtain extensive knowledge of its own complex and varied territory. At the same time, its political and military organization, in its territory and also in the lands outside its dominion, made it possible for Venice to adopt farsighted long-term strategies. The role of mapmaking in the Po Valley during the Renaissance is closely bound up with the organization of the state, with questions of political structure, and with the ability of a state to govern the territory over which it exercised sovereignty. Thanks to the established role played by cartography, it is worth considering it a testing ground for the new theoretical approaches coming from the studies on cartographic interpretation.

The last decade has seen maps studied using a number of different methodologies and theoretical/critical approaches, none of which the history of cartography can afford to ignore. This has led to a rediscovery of the dual nature of maps: as social products that can reveal the ways in which a given society constructs its own specific knowledge of territory and as a means of communication that permits the circulation of that territorial knowledge and is also able to play an independent role in that process of communication, influencing the interpreter.

Assuming this theoretical approach, one may assert that through the analysis of the language of the map one can reveal its role of social mediation, through which the territory is known and organized.[1] More precisely, one may affirm that the map is evidence of the intellectual appropriation of reality that man carries out in order to build the world from a linguistic point of view.[2] The names and codes used in a map—henceforward referred to, respectively, as "designators" and "denominative surrogates"—serve to organize the world of experience into ordered knowledge.[3] The semiotic figure that combines designators and surrogates is the icon, that is, a self-

Abbreviations used in this chapter include: ASV for Archivio di Stato, Venice, and SEA for Savi ed Esecutori alle Acque.

1. Though this analytic approach brings together a limited number of researchers, its importance to the interpretation of maps has in some way been officially recognized by the creation of the Commission on Theoretical Cartography, a work group of the International Cartographic Association (ICA). The heads of that work group have written a review titled *Diskussionsbeiträge zur Kartosemiotik und zur Teorie der Kartographie,* published in Dresden under the editorship of Alexander Wolodtschenko and Hansgeorg Schlichtmann (president and vice-president, respectively, of the commission). All in all, the commission brings together more than thirty scholars from all over the world. See <http://rcswww.urz.tu-dresden.de/~wolodt/tc-com/>.

2. The full discussion on which these pages are based is in Emanuela Casti, *L'ordine del mondo e la sua rappresentazione: Semiosi cartografica e autoreferenza* (Milan: Unicopli, 1998), in English, *Reality as Representation: The Semiotics of Cartography and the Generation of Meaning,* trans. Jeremy Scott (Bergamo: Bergamo University Press, 2000), reviewed by Marta Melucci in *Revista Bibliográfica de Geografía y Ciencias Sociales* 185 (26 November 1999), <http://www.ub.es/geocrit/b3w-185.htm>; by Michele Pavolini in *Rivista Geografica Italiana* 108 (2001): 145–46; and by Lisa Davis Allen in *Portolan* 53 (2002): 64.

3. Such new terminology is used to recover the deepest meanings of the name and to show how they are transmitted. I use the word "surrogates" to refer to colors, numbers, figuration, or even relative positioning on the map page.

FIG. 35.1. REFERENCE MAP OF NORTHEASTERN ITALY.

consistent unity endowed with a certain autonomy in comparison with either of them singly taken.

What I am claiming is that the role of the icon is to act on the information initially introduced by the cartographer and, through self-referential mechanisms, turn it into something that is directly produced within the cartographic representation. Therefore, the map is not only a "symbolic mediation" of the territory; it is proposed as a "symbolic operator" that expresses a particular configuration of the world, the cartographic one, as the interface between reality and society. In short, the message communicated by the map is able to replace reality, making the interpreter assume that the cognitive instances produced by it are remarkable and, at the same time, by proposing that such instances belong to the territory, informing social behaviors.[4]

Hence, one can understand that the purpose of this chapter is to debuild, delocate, and recodify the geographical map in its theoretical coherence as a powerful system through which Venetian and Lombard society created a complex relationship with territory. This is the reason I will not refer to maps produced in northeastern Italy by analyzing them in groups, and I will not consider all the typologies and their historical evolution. My purpose is to highlight, by means of some examples, the relationship that society has built with this region producing diversified languages, a relationship that can be understood only by considering the deep relation between the process of "territorialization" and the map, or, better, a particu-

lar aspect of the former—denomination—and the effect of the latter on it.[5]

The area analyzed comprises northeastern Italy (present-day Lombardy, Veneto, Friuli-Venezia Giulia, Trentino-Alto Adige, and Emilia-Romagna) (see fig. 35.1), where the presence of various important duchies (Milan, Mantua, and the republican Duchy of Venice) meant that there were a number of different centers for cartography, but at the same time tended to encourage a uniformity in the cartographic language of representation that maintained a certain specificity related to the political context

4. I use the expression "iconization" to refer to this point, the most sophisticated one, about the production and circulation of meaning achieved by the map. More precisely, iconization can be defined as the communicative process through which conjectural messages are presented as if they were reality, making reference to the self-referential results of a map. On the process of iconization, see Emanuela Casti, "Elementi per una teoria dell'interpretazione cartografica," in *La cartografia europea tra primo Rinascimento e fine dell'Illuminismo*, ed. Diogo Ramada Curto, Angelo Cattaneo, and André Ferrand Almeida (Florence: Leo S. Olschki, 2003), 293–324, esp. 322–24, and also idem, "Towards a Theory of Interpretation: Cartographic Semiosis," *Cartographica* 40, no. 3 (2005): 1–16.

5. When I speak about the process of "territorialization," I am referring to the different practices engaged in by human beings with regard to natural space in order to create the conditions of their survival and social reproduction; denomination establishes the intellectual appropriation of territory. On this theoretical approach and on geography as a territorial form of social action, see Angelo Turco, *Verso una teoria geografica della complessità* (Milan: Unicopli, 1988).

in which the maps were produced. In fact, the area's cartographic production has had a hierarchical development that has followed its different political needs. This is reflected in the way the chapter is organized: on the one hand, focusing on some duchies more than on others;[6] on the other hand, analyzing only some cartographic genres.

Hence, I focus on Venice as the core site of my exposition. During the period we are considering, Venice exercised jurisdiction over most of the previously mentioned area, so a discussion of the development of the administrative structure of the Serenissima (Republic of Venice), and of the cartographic output in that structure, takes us right to the organizational core of the region. Furthermore, Venice is an interesting case because the city early established different magistratures responsible for the management of territorial resources—and these bodies made constant use of geographical maps. Particular attention will be paid to the mapping of water and forestry resources—partly because of the site of the city itself, and partly because its survival and economic vitality depended on the management of these two territorial resources.

As far as the choice of cartographic genres is concerned, one that will be of particular interest to us is that concerning the state's political and military interests. Maps were used not only to indicate the need for fortresses and defenses, but also to plan their construction. Part of this chapter will be dedicated to such military maps, in which we can see cartography serving both as a symbolic expression of power and as a practical instrument of military strategy.

To complete our picture of the state maps, I will also consider "topographic" maps—that is, maps whose main purpose was the general description of a territory. Such maps attempted to offer an objective reconstruction of the territory as a whole, and they illustrate—even more clearly than the other maps under discussion—that the intellectual appropriation of the territory was necessary for the exercise of power.

While the state was the main territorial agent, there were other institutions—such as the church—that in some regions also played a role in territorial management and organization. For example, in Lombardy the *pievi* (extended rural parishes) of the diocese of Milan resulted in a very particular cartographic genre, consisting of maps charting the course of pastoral visits made by the bishop. I will look at these maps and bring out how they established certain specific points of reference, offering one particular view of the territory charted.

The maps discussed, which follow each other in a relatively long space of time, require precise dating if we are to trace their evolution more precisely. This evolution is clearer when seen in the context of mapmaking in general—that is, in relation to the various schools and new genres of cartography and to the emergence of the carto-

graphic genres that were the precursors of subsequent eighteenth-century developments.

STATES AND CARTOGRAPHY

Toward the middle of the fifteenth century, northeastern Italy was divided into the Republic of Venice, the Duchy of Milan, the Duchy of Mantua, the Duchy of Este, and the Principality of Trento (fig. 35.2). A century later, this territory was further broken up into new political entities like the Duchy of Savoy, the Duchy of Parma, and the Republic of Genoa. However, this fragmentation into small political entities did not rule out the exchange of knowledge and technical skills, with books, intellectuals, and craftsmen moving from one state to another. Nevertheless, it remained true that each state adapted these outside influences to meet its own particular needs. No product was ever accepted as it came to the area, but rather was modified according to individual requirements—and for that reason the documents we have reflect specific geographical situations.

Each political authority alternated between a sort of narrow chauvinism and a more open-minded outlook. This mix of attitudes was particularly apparent in the fifteenth and sixteenth centuries, when Italian culture exercised such an influence over the rest of Europe that any sort of narrow-minded defense of the local would have been unthinkable. By the sixteenth century, people on the Italian Peninsula shared a fully codified cultural idiom (fourteenth-century Tuscan), as well as being able to resort to a cultural language that was common throughout Europe (Latin). The peregrinations of clerics, students, and university professors meant that all the countries of Christendom shared a culture based on the same texts, the same principles, and the same levels of knowledge. And even when this university world was split into two parts by the Reformation, the two halves continued to communicate with each other, though with greater difficulty. Exchange was no less intense in the economic field, with goods, money, and merchants/traders traveling along established trade routes linking the shores of the Mediterranean with the rest of Europe.

Such multilevel technical and cultural exchange inevitably involved cartography—and above all, the cartography of world maps and globes, which offered a vision of the world as a whole. The case was slightly different for large-scale chorographical maps, which were drawn with local measurements and knowledge by local cartogra-

6. The Duchies of Parma, Modena, Ferrara, and Trento played an important role in the balance of power among the various states in the area, but they were influenced, as far as cartography is concerned, by knowledge and techniques produced elsewhere.
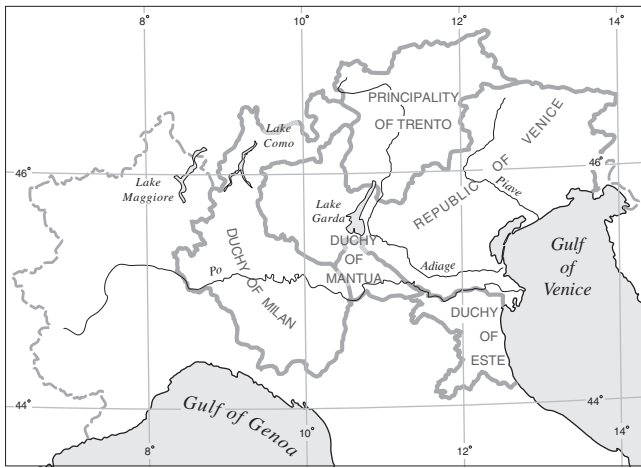
FIG. 35.2. REFERENCE MAP OF NORTHEASTERN ITALY IN THE FIFTEENTH CENTURY.

FIG. 35.3. REFERENCE MAP OF NORTHEASTERN ITALY IN THE SIXTEENTH CENTURY.

phers and commissioned by local authorities. It is difficult to generalize about the various technical idiosyncrasies of local cartographers, and the exercise does not help us much in understanding the ideological aspects of mapmaking. In looking at the key phases of cartography in the Po Valley, it is much more useful to look at the political influence exercised over the region as a whole by some of the political entities mentioned earlier. For instance, in the case of Venice—a state that at certain points seems to have taken on the scale of an imperial power—one should remember that in the sixteenth century its borders extended beyond the Veneto proper to include parts of Lombardy (the areas around Brescia, Bergamo, Como, and Cremona) and Istria (following a series of annexations that had taken place over the previous century) (fig. 35.3). What is more, as a naval power, the Republic made its influence felt in a large part of the Mediterranean and even as far away as the Black Sea and the Sea of Azov.

This political expansionism enables one to understand the wide variety to be found in Venetian cartography: whether it was involved in the political and economic management of nearby territories or was exercising its commercial hegemony over more distant lands, Venice needed maps that met several requirements. This is why cartographic output in the city covered a wide range of types—nautical, administrative, political, military, descriptive, and celebratory—that are noteworthy in terms of both quality and quantity. Nor should one forget that Venice attracted new information and technical innovations from all parts of the globe. And it was in this cultural climate that, in the middle of the fifteenth century, Fra Mauro drew up the large *mappamundi* created for Afonso V, king of Portugal (the copy that the cartographer himself presented to the Venetian Republic can still be seen in Venice at the Biblioteca Nazionale Marciana).[7]

In order to understand the interdependence between Venice and other states—and grasp the important role maps played in the management of state territory—one should start by looking at the Venetian administrative authorities for whom these maps were produced.

MAPS AND THE VARIOUS MAGISTRATURES IN VENICE

What distinguishes Venetian cartography is that it was already playing an established role in the state bureaucracy for territorial management in the sixteenth century. Elsewhere in Italy, the visual knowledge of sites and the use of maps as administrative aids would become widespread only two centuries later, when the general measurement of state territory in land registry lots would lead to the uniform compilation of information. The reasons for Venice's head start are to be found in the political climate that led to the establishment of the administrative authorities for territorial management. During the course of the sixteenth century, Venice changed from a naval to a land-based power, finding itself having to govern an economy that was no longer based on trade but on the exploitation of its own territorial resources.[8] Thus, the relationship between

7. See David Woodward, "Medieval *Mappaemundi*," in *HC* 1:286–370, esp. 315–16 and pl. 18.

8. On Venetian history and the fundamental effect of the city on the mainland, see the following key works: Marino Berengo, "Il problema politico-sociale di Venezia e della sua terraferma," in *La civiltà veneziana del Settecento* (Florence: Sansoni, 1960), 69–95; Daniele Beltrami, *Forze di lavoro e proprietà fondiaria nelle campagne venete dei secoli XVII e XVIII* (Venice: Istituto per la Collaborazione Culturale, 1961); Angelo Ventura, *Nobiltà e popolo nella società veneta del '400 e del '500* (Bari: Laterza, 1964); and Gaetano Cozzi, ed., *Stato società e giustizia nella Repubblica Veneta (sec. XV–XVIII)*, 2 vols. (Rome: Jouvence, 1980–85).

the terra firma and the city itself changed radically. The Venetian hinterland now had a precise new role: it was to be the stage on which the state asserted and confirmed its power. This political project led to a new phase in the appropriation, control, and management of the terra firma and to a new organization of the territory as a whole.[9] This is why there was a profound change in the bureaucratic apparatus of the state, which now needed administrative, technical, and legislative bodies capable of exercising control and management over its territories.

The magistratures set up for this purpose were well ahead of their day in the administrative use they made of cartography. As early as 1460, the Council of Ten[10] had issued a decree requiring all the *rettori* (city governors) of its land possessions to have chorographical maps drawn up of their areas and send them to Venice. These maps were then to be kept either in the Venetian chancellery or in the city's council chamber. They were to provide certain definite information—longitude, latitude, borders, details on neighboring states, and information with regard to transport—and were to be drawn up by experts after on-site surveys. Obeying the established conventions of the geographical map, they were to include "indications of winds, of east and west, of cities, rivers and plains and the distances from one place to another."[11] The new form and scale of these maps makes them important prototypes from which to follow the subsequent evolution of Renaissance cartography; they are also important because they bear witness to the belief that good territorial government required the collection of as much territorial information as possible—and that the best bodies to organize such a collection of information were the magistratures, administrative authorities with specifically defined areas of responsibility (table 35.1). Hence, there is ample documentation of the history of the Veneto in the archives of these bodies, which played a role in the administrative organization of the Republic from its earliest years. The magistratures, in fact, reflected not only an elaboration of the administrative apparatus but also a growing awareness of the problems relating to the management of the natural environment.[12] Bringing together three levels of power—technical expertise, decision-making power, and executive power—they were autonomous institutions capable of following a project through from initial conception to final implementation (fig. 35.4).[13]

The magistrates could call on the services of renowned technicians; almost all the famous engineers and architects of Venice worked, at least occasionally, in a consul-

of *Antichi scrittori d'idraulica veneta* (Venice: Ferrari, 1919; reprinted 1987); Cristoforo Sabbadino, *Discorsi sopra la laguna (parte I),* ed. Roberto Cessi, vol. 2 of *Antichi scrittori d'idraulica veneta* (Venice: Ferrari, 1930; reprinted 1987); and Cristoforo Tentori, *Della legislazione veneziana sulla preservazione della laguna* (Venice: Presso Giuseppe Rosa, 1792). See also Salvatore Ciriacono, "Irrigazione e produttività agraria nella terraferma veneta tra Cinque e Seicento," *Archivio Veneto,* 5th ser., 112 (1979): 73–135; idem, "L'idraulica veneta: Scienza, agricoltura e difesa del territorio dalla prima alla seconda rivoluzione scientifica," in *Storia della cultura veneta,* 6 vols. (Vicenza: N. Pozza, 1976–86), vol. 5, pt. 2, 347–78; and Sergio Escobar, "Il controllo delle acque: Problemi tecnici e interessi economici," in *Storia d'Italia: Annali,* vol. 3, *Scienza e tecnica nella cultura e nella società dal Rinascimento a oggi,* ed. Gianni Micheli (Torino: Einaudi, 1980), 83–153, esp. 104–53.

10. Set up as a special body in 1310, the Council of Ten became a permanent part of the Venetian government in 1355 and consisted of seventeen members (including the doge and six councilors). The supreme body in questions of penal law, it could intervene in matters relating to state security, the freedom of Venetian subjects, and the behavior of members of the patrician class and the clergy. Its administrative, financial, and political action all tended toward the exercise of control over the public realm. The council was also the guardian of public morals, exercised control over the *scuole e arti* (secular religious foundations and craft guilds) of the city and the area ruled by the doge, oversaw the workings of the state chancellery, and was responsible for woods and mines.

11. The need for precise information about the territories of their dominions is revealed by a decree issued by the Council of Ten on 27 February 1459 (1460), which orders the *rettori* (governors) of the terra firma to send detailed maps of each of the individual provinces that fell under their jurisdiction. In particular, the decree states that "in the chancellery . . . or council chamber" there should be "a true picture of all the cities, lands, castles, provinces, and places" of Venetian dominions, so that anyone who has to take decisions regarding these places may know about them from "true and detailed eye-witness and not from the opinions of others." On the basis of this decree, the *rettori* of the various regions, cities, and castles were to, "with the advice of the inhabitants of the territory and other experts who know the city or the place where they live, have someone make a representation of the territory, the places and the districts with the cardinal points, castles, rivers, flats, and the distance from one place to another and the places near us and their distance, and have some experts and wise people examine the map in order to see whether it has been made in the correct way; once they have examined it they have to send it to our governor." See Archivio di Stato, Venice, Consiglio X, various, reg. XV (1454–59) fol. 197 r.

12. On the history of the Venetian administration and the specific question of the establishment of the various magistratures, see the exhibition catalogs edited by Maria Francesca Tiepolo: *Laguna, lidi, fiumi: Cinque secoli di gestione delle acque* (Venice: Archivio di Stato, 1983); *Cartografia, disegni, miniature delle magistrature veneziane* (Venice: Archivio di Stato, 1984); *Ambiente scientifico veneziano tra Cinque e Seicento* (Venice: Archivio di Stato, 1985); and *Ambiente e risorse nella politica veneziana* (Venice: Archivio di Stato, 1989). While other Italian states established offices for the protection and management of the environment, these were not as fully integrated a part of the state bureaucracy as those in Venice. From the vast amount of material on the subject, see the chapter by Leonardo Rombai, "Cartografia e uso del territorio in Italia: La Toscana fiorentina e lucchese, realtà regionale rappresentativa dell'Italia centrale," in *La cartografia italiana* (Barcelona: Institut Cartogràfic de Catalunya, 1993), 103–46.

13. Only certain key matters of public interest—such as those concerning the protection of the lagoon—had to be formally approved by the Venetian senate after full exposition and discussion.

9. On the history of the Venetian administration and the plans and projects involving the mainland, see such contemporary sources as Marco Cornaro, *Scritture sulla laguna,* ed. Giuseppe Pavanello, vol. 1

TABLE 35.1 Venetian Magistratures Responsible for the Management of Territory

Name	Date Founded	Description
Provveditori sopra Boschi (Superintendents for Forests)	1452	Responsible for both publicly used and private woodlands in order to protect the lagoon by maintaining the hydrogeological balance of mainland territory.
Magistrato alla Sanità (Magistrate for Health)	1486	Responsible for public health and hygiene and for defense against epidemics; its powers included the imposition of penal sanctions.
Magistrato delle Acque (Magistrate of Water)	1501	Controlled activities to protect the lagoon (seen as forming a single interconnected system with rivers and the sea); its powers included the imposition of penal sanctions.
Savi alla Mercanzia (Superintendents for Merchandise)	1517	Had jurisdiction over matters of trade, shipping, and economic activity in general.
Provveditori alle Fortezze (Superintendents for Fortresses)	1542	Responsible for fortresses and other fortifications (construction, maintenance, armament, and supplies).
Provveditori sopra Beni Inculti, Deputati all'Agricultura (Superintendents for Uncultivated Resources, Deputies for Agriculture)	1556	Responsible for improving agricultural and mainland irrigation and water supplies in order to increase production; its jurisdiction covered the concession of water resources for industrial use or irrigation.
Provveditori sopra Beni Comunali (Superintendents for Municipal Goods)	1574	Responsible for drawing up land registers of public lands (marshland, woodlands, and pastureland), for the renewal of permissions and the prevention of illicit infringements, and for the resolution of disputes between different town councils.
Deputati alle Miniere (Deputies for Mines)	1655	Responsible for the administration and regulation of mines; previously this had been the direct responsibility of the Council of Ten.
Provveditori all'Adige (Superintendents for the Adige River)	1677	Responsible for the technical and financial management of the Adige and its tributaries to keep them open for shipping and to prevent flooding.
Camera dei Confini (Border Chamber)	End of the 17th century	Responsible for the conservation of the various documents concerning state borders.

tancy capacity as a *proto* (technical chief) or *perito* (expert). This latter role was particularly important, given that those who held it did not implement political decisions but applied the scientific and theoretical knowledge of the day in an attempt to meet the actual requirements of environmental protection.

Hence, the administration of the territory involved relations among different agents according to the problem under consideration (fig. 35.5), and maps played a significant role. Maps that concerned questions of public interest were commissioned from technicians by the magistrature concerned, then presented before the Council of Ten. Questions of individual interest, on the other hand, might be illustrated by two maps: first, the map drawn up on behalf of the private individual who had raised a particular problem; this would be followed by a second map drawn up for the magistrature that had to settle the question. Disputes between private citizens or monastic or-

ders—concerning such things as water rights, land boundaries, and property rights—were also illustrated by means of such double cartography, with both of the contending parties submitting their own maps to the legal body that would decide the question. It is clear that the existence of two different maps covering the same disputed area gives us the chance to compare what might have been conflicting accounts and thus establish just how "conjectural" the two maps were. Nevertheless, it is clear that these various institutional uses gave rise to the pervasive use of geographical maps—which not only accounts for the large number of maps produced but also indicates the indispensable symbolic role those maps played in territorial management.

Two of the most important magistratures responsible for territorial policies were the Magistratura delle Acque (Magistrature of Water) and the Magistratura sopra Beni Inculti (Magistrature of Uncultivated Resources). The for-

FIG. 35.4. POWERS OF THE VENETIAN MAGISTRA-
TURES AND SOURCES OF INFORMATION FOR THE
MAGISTRATURES.
Based on Emanuela Casti, *L'ordine del mondo e la sua rap-
presentazione: Semiosi cartografica e autoreferenza* (Milan:
Unicopli, 1998), 84.

mer was responsible for all problems relating to water
systems and water use—including the problematic rela-
tionship between the city of Venice and its lagoon envi-
ronment. In 1501, the Venetian senate established the Savi
ed Esecutori alle Acque, a permanent body with full exec-
utive powers whose mandate covered three traditional ar-
eas of concern: the lagoon itself, the rivers feeding into it,
and the littorals bordering the sea. Although all of these
were interrelated, special attention was focused on the la-
goon, which was of vital importance for the very survival
of the city. As a special defensive barrier against attack
from the mainland, the lagoon had to be protected against
the silting caused by fluvial deposits. At the same time as
they defended the city, however, the waters of the lagoon
also posed a threat to it, undermining the painstaking
work of land reclamation that had gone on over the years.
The Magistratura sopra Beni Inculti was set up in 1556 to
be responsible for questions relating to land reclamation
and water supply. In these two institutions worked two fa-
mous cartographers: Cristoforo Sabbadino and Cristo-
foro Sorte. The former was *proto* and engineer for the
Magistratura delle Acque, the latter *perito ordinario* for
the Magistratura sopra Beni Inculti for some decades, ap-
plying their expertise not only to the mapping of land and
water resources but also to the outlining of projects to be
undertaken. Their works are, in effect, expositions of the-
ories concerning the exploitation of territorial resources.[14]

ADMINISTRATIVE CARTOGRAPHY
IN THE MANAGEMENT AND
CONTROL OF TERRITORIAL RESOURCES

Cartography found a place in the regular practice of state
administration because of the central government's need
to know the precise characteristics of the territory over
which it exercised dominion.[15] Administrative maps usu-
ally had certain characteristics: they existed in conjunc-
tion with a written text, they were medium to large in
scale, they were in manuscript form, and they were in-
tended for circulation in administrative circles.

Map and written text were two interdependent parts of
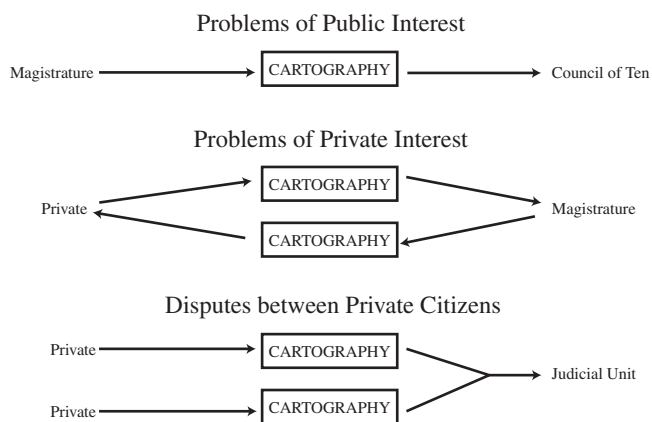the one administrative document. The written text re-

FIG. 35.5. RELATIONS AMONG THE DIFFERENT
AGENTS AND THE ROLES OF CARTOGRAPHY IN AD-
MINISTRATIVE PRACTICE.
Based on Emanuela Casti, *L'ordine del mondo e la sua rap-
presentazione: Semiosi cartografica e autoreferenza* (Milan:
Unicopli, 1998), 85.

ferred to what was illustrated by the map, which in turn
could only really be understood by reference to the writ-
ten account. It is important to underline this symbiosis
because it shows how the two parts were complementary
to each other, rather than one being more important than
the other. This is a fundamental point because it meant
that the cartographic representation, given that it had
such a written complement, did not necessarily have to
fulfill all its usual functions.

The administrative map was medium to large in scale.
Indeed, the category covers a heterogeneous assortment
of maps that range from the chart of a single property or
stretch of river to the depiction of an entire region. How-
ever, apart from some peculiarities in measurement
and representation, these are all maps that we would now
define as topographical—that is, they depict a territory in
such detail that it is possible to recognize its morpholog-
ical and human-made features. As is well known, the
amount of information contained in a map is limited by
the restrictions imposed by scale. Therefore, it is through
the study of a number of large-scale maps illustrating proj-
ects proposed and/or implemented that one is able to fol-
low the process of "territorialization" in action.

Another important point is that the administrative map
remained a manuscript map not just in its first stages of

14. Sabbadino was appointed *proto* in 1542; Sorte was appointed
perito ordinario in 1583, even though he was already working there the
year the magistrature was instituted (1556).
15. See the extensive discussion of this type of document in *Car-
tografia e istituzioni in età moderna: Atti del Convegno, Genova, Im-
peria, Albenga, Savona, La Spezia, 3–8 novembre 1986,* 2 vols. (Genoa:
Società Ligure di Storia Patria, 1987).

use, at a time when printing was just beginning, but also after printing had established itself as the prime means for the publication and diffusion of documents. I emphasize this to underline that such maps were not intended for the public but reserved for a few decision makers and planners. The fact that such maps did not have a role of disseminating public information had an effect on their contents: they did not aim to be of general interest but rather aimed to present specific information for a precisely defined audience. Closely connected with this point is the fact that the maps were intended for circulation in administrative circles. These maps were designed for use in dealing with public bodies. Even when they were commissioned by private individuals—as was the case, for example, with the later *cabrei* (land register maps)—they continued to respect the logic behind the original publicly commissioned documents (given that they might be used by the public authorities for tax assessments, etc.). Even though these maps might have made use of heterogeneous styles, one can still recognize that they met a standard of communication established by public institutions and broadly reflected the ideology behind territorial policy, whether or not they were drawn up according to explicitly codified rules (which, in fact, was only rarely the case).

At this point, we have to identify the features that are most clearly connected with what I have called the "process of territorialization." The first point to be made concerns those involved in the use and creation of the map—the cartographer and the public official who was the intended recipient of the work. This recipient is not to be considered as just any individual but rather as someone with a specific position in the community, a territorial agent who in his public capacity used the map to obtain information that would enable him to achieve certain socially beneficial objectives.[16] In the case of these administrative maps, however, the authoritative territorial agent was often a figure who combined the two roles of constructor of territorial image and implementer of projects; that is, the cartographer was also the person who carried out the proposals contained in the map.[17]

The second observation to be made concerns the symbiosis between map and written text. One consequence of this is that the process of naming was not the same as in other genres of cartography. In the most striking case, in fact, the administrative map was mute—that is, it did not contain any place-names as such. Examples of this kind can be found in various administrative offices.[18] These might, for instance, be maps that accompanied an application for authorization of some particular project, or they could be maps that accompanied some general catalog or inventory (for example, a land register). In such cases, a cross-reference referred the user to the place-names given in an accompanying text or it was simply assumed that the two documents could be consulted together, so there was

no point in repeating information. Whatever the case, the function of naming and identification was largely assigned to the text rather than the map. Although this fact may not generally appear very important, it gains much more relevance when one examines exactly how names functioned in these map-text combinations. The maps were not intended to establish points of reference or act as aids to wayfinding, an unnecessary function considering the prior local geographical knowledge of the administrators for whom they were made. Nor were they intended to serve some symbolic purpose of communicating the significance and meanings society attributed to the territory in question, for the administrators were already well aware of these. Rather, their function was to increase the administrator's knowledge of specific new information gathered from direct physical observation.

It would be unreasonable to expect the administrative map to be objective and faithful to reality. Its aim was to illustrate the conceptualization of a project iconically by presenting the elements that supported the idea. In effect, the inclusion of signs on a sheet of paper is the translation into graphics of a whole series of mental operations carried out by the cartographer in order to communicate not only a name but also various aspects associated with its

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16. This agent is considered the third interpreter of the map, that is, the person who in some way is interested in understanding and using the cartographic message. The process of interpreting the map is linked to the geographic one and produces different types of interpreters who have dissimilar specific functions. The territorial actor transforms space into an ordered and communicable territory, the cartographer interprets the territory and proposes it in a codified language, and the recipient takes from the maps some instructions he needs in order to do his own work. In fact, the interpretation implicit in using a map is an act of territorial management that envisages strategies of production and ways in which land resources are to be used. Interpreted, the map becomes an effective instrument of action, and its being as a linguistic-symbolic entity results in a series of practical relations and decisions: knowledge of territory is extended, ways of organizing and managing territory are suggested, and there is some sort of mediation among different social interests. On the role of the interpreter and that of denomination and naming in the regulation of social order, see Emanuela Casti, "Rappresentazione e pratica denominativa: Esempi dalla cartografia veneta cinquecentesca," in *Rappresentazioni e pratiche dello spazio in una prospettiva storico-geografica: Atti del Convegno, S. Faustino–Massa Martana, 27–30 settembre 1995,* ed. Graziella Galliano (Genoa: Brigati, 1997), 109–38.

17. For example, the engineer-cartographers who worked in the magistrature played a double role: they drew up maps and at the same time were those expected to put forward and implement projects for the modification of territory. On the figure and role of the cartographer, see Massimo Quaini, "La cartografia a grande scala: Dall'astronomo al topografo militare," in *L'Europa delle carte: Dal XV al XIX secolo, autoritratti di un Continente,* ed. Marica Milanesi (Milan: Mazzotta, 1990), 36–41.

18. For example, the map of the Treviso area by Cristoforo Sorte, which is examined later, represents a vast, well-known, and widely settled area, but uses only a few essential designators in doing so.

referent. As a member of a particular society and culture, the cartographer will produce this visualization by following culturally accepted (and determined) operations of selection, simplification, classification, synthesis, and, in some cases, symbolism. In fact, it should be added here that when the surrogate consists of a coded entity that gives a substantial "rendition" of information, one can speak of it as a symbol. This whole process of mapmaking involves the application of technical criteria that tend to attribute precise meaning to each and every sign, no matter how small or apparently insignificant. The use of symbols in a map is a perfect example of this "iconization" because the aim is a conceptual synthesis in which the function of designators and surrogates for designation is that of symbolic mediation. In effect, this use of the symbol draws its power from a system of differences that circulate through—and shape—social practices and ideological constructions.[19]

In administrative maps, iconization emphasized special features of the area depicted and aimed to convince the user of the necessity of the proposal that the map was intended to illustrate. The maps examined in the following section offer three examples to illustrate how this worked in the context of Venetian institutions responsible for the management of hydraulic, agricultural, and forest resources.

THE MAGISTRATURA DELLE ACQUE (MAGISTRATURE OF WATER): CRISTOFORO SABBADINO'S "DISSEGNO DEL TRIVISAN"

The first map we will examine bears the date 1558 and is titled "Dissegno di Trivisan" (Map of the Treviso area) (plate 30). In fact, it not only shows the Treviso region and the rivers that flow through it, but also a large part of the Venetian lagoon, together with the coastline extending as far as the lagoon of Caorle with the corresponding stretch of sea.[20] This was the area covered by a project on which Sabbadino had worked since 1540, which he had already illustrated with a number of maps of the lagoon and the hinterland.[21] The idea was to redirect all the watercourses that ran into the river system in the eastern section of the lagoon and feed them into a single canal that flowed not into the lagoon but either into the sea at Lio Maggiore (at the northeastern end of the Lido, the lagoon opening farthest from the city of Venice) or directly into the river Piave. The project was not implemented, but Sabbadino would return to it in the last of his *aricordi* (memoranda) drawn up in 1557—that is, just before he produced the "Dissegno di Trivisan." This reveals the radically new reading that this *proto* gave the entire problem of the management of watercourses—a novelty of approach that can also be seen in his writings.[22]

Sabbadino was the first to bring together the wealth of knowledge relating to tides, rivers, and marine currents that had been produced earlier by isolated studies but was here applied in unison to enhance the understanding of one particular problem: the Venetian lagoon. The result was a dynamic and organic view that saw the lagoon as comparable to the human body, living and breathing through the ebb and flow of its salt waters. As Sabbadino wrote, the basic idea was that if one wanted to maintain this body "living, beautiful, healthy, and sprightly," it had to be treated as a single whole. Hence, the lagoon was more than just "the lagoon of the patricians"[23]—that is, the area around the city of Venice itself—but extended as far as the remote tributaries flowing into it from the Adige and the Piave (where the tide's flow into the river estuaries produced a beneficial backwash of currents that cleared fluvial deposits away from the built-up areas and the harbor mouths).

A native of Chioggia, Sabbadino offered an accurately drawn and colored account of the delicately balanced situation in the outlying areas of the lagoon, which were extensively settled and combined a wide variety of environments. In fact, careful and continuous action to counteract

19. The concept of the icon is taken from the semiology of Algirdas Julien Greimas and Joseph Courtés and is used to indicate how, at a communicative level, the map endows designators with particular significance, so they not only refer to the world but transmit how that world is conceptualized (Casti, *L'ordine del mondo,* 39–42, 52, and 98–101). On the nontransparency of maps, see J. B. Harley, "Deconstructing the Map," *Cartographica* 26, no. 2 (1989): 1–20.

20. See Francesca Cavazzana Romanelli and Emanuela Casti, eds., *Laguna, lidi, fiumi: Esempi di cartografia storica commentata* (Venice: Archivio di Stato, 1984), 31–36; Emanuela Casti, "Cartografia e politica territoriale nella Repubblica di Venezia (secoli XIV–XVIII)," in *La cartografia italiana* (Barcelona: Institut Cartogràfic de Catalunya, 1993), 79–101; and Francesca Cavazzana Romanelli, "L'immagine antica del Trevigiano, itinerari attraverso la cartografia storica," in *Il territorio nella cartografia di ieri e di oggi,* 2d ed., ed. Pier Luigi Fantelli (Venice and Padua: Signum, 1997), 146–83, esp. 160–61.

21. The documents, conserved in the ASV, are: 1545, the lagoon with the islands of Mazzorbo, Torcello, and Burano, 80 × 130 cm (SEA, Laguna n. 8); 1546, Venice with the lagoon canals, 223 × 150 cm (SEA, Laguna n. 9); 1556, the lagoon between the port of Brondolo and the Lio Maggiore canal, 240 × 145 cm (1695 copy by Angelo Minorelli) (SEA, Laguna n. 13); 1557, external consolidation work on the built-up area of Venice, 62 × 83 cm (SEA, Laguna n. 14 bis); and 1557, Chioggia and part of the lagoon, 150 × 80 cm (SEA, Laguna n. 16). For a description and interpretation of the maps, see Eugenia Bevilacqua, "La cartografia storica della laguna di Venezia," in *Mostra storica della laguna veneta,* exhibition catalog (Venice: Archivio di Stato, 1970), 141–46.

22. In particular, Sabbadino, *Discorsi sopra la laguna.*

23. Cristoforo Sabbadino, "Trattato sulla Laguna di Venezia e sul modo di conservarla" (ASV, Miscellanea Codici n. 232 and 233, SEA, n. 234). The document is published in Roberto Cessi, ed., *Antichi scrittori d'idraulica veneta,* vol. 2 (Venice: Ferrari, 1930; reprinted 1987), quotation on 138.

the effects of fluvial silting was essential to the survival of not only the special habitat in the outlying lagoon but also the islands of Venice itself (which were not all included on the map of this area of lagoon but were of central concern to the proposal being put forward). This was the period when the focus was shifting away from maritime trade to the acquisition and exploitation of landed estates (a phenomenon that went together with—and sometimes preceded—Venetian military conquests on the mainland). The farming estates and industrial activities that centered on the aristocratic villas of the terra firma were important economic entities, and the rerouting of a river or the enclosure of marshland in order to safeguard the lagoon might well disturb water supplies for irrigation and milling (the manufacturing sector depended on the presence of rivers to power mills, sawmills, hammers, looms, etc.). Therefore, what might once have appeared as theoretical questions about the lagoon watercourses became much more concrete questions involving a real clash of economic and political interests. Opting for one solution rather than another implied an entire vision of the future of the Venetian state: was the Serenissima to remain a mercantile power or become a power based on land ownership? [24]

In the "Dissegno di Trivisan" Sabbadino used names to formulate an argument in favor of a proposal advanced on the basis of knowledge about the physical and social dynamics inherent in the lagoon and its territory. One should recall here that a designator communicates at two levels; the more straightforward of these is the level of denotative communication, but there is also connotative communication, in which a name serves to transmit (socially established) symbolic/scientific/performative associations.[25] Placed on a map, the name functions denotatively as a referential indicator: its location on the map is analogous to the real-world location of the feature to which it refers. Connotative communication occurs through the combination with the name itself of various other codes, which serve to highlight certain aspects of the feature referred to and thus reveal the importance society attributes to it.[26]

Sabbadino used designators in different ways: those that do not refer to water were used merely as referential indicators, serving to identify location but no other associated features. However, various surrogates (numbers, colors, figuration) were used for designators referring to tides, sea currents, and rivers to highlight the scientific knowledge possessed by the Venetian experts in the field. In effect, the map illustrates the action of the tides in the lagoon: signs and color codes indicate that the area marked *laguna* cannot be given a precise outline but can be delimited only by a rather wide and indeterminate amphibious strip, because the ebb and flow of tides means that allowance must be made for expansion at both a daily and a seasonal level.

It is counterproductive to try to establish fixed outlines for the lagoon as one might fix river banks; instead, one has to recognize the indeterminacy of the lagoon and the need to maintain it free from constrictions. The stippling indicating the areas underwater at certain periods and the uncertain color coding used for the borders of the lagoon (somewhere between the green used to indicate water and the brown used to indicate dry land) were intended to indicate this dynamic status of the entity as a whole. The marine currents were indicated in the area marked *mare* with color coding differentiating between river waters and sea, showing how the former are pushed by the counterclockwise currents in the Adriatic. Then there is the river Piave, which, due to its alpine origin, was characterized as posing a certain threat to the lagoon, given its unpredictable seasonal flow and sudden spates. The course and flooding of this river were also indicated using color; the river bed is shown with braided lines containing the same uncertain greenish brown color used to indicate the amphibious borders of the lagoon. I claim that this was intended to represent the dynamic nature of the river. Other watercourses do not have this detail, given that they flow with constant volume from a single spring source and so do not have the same dangerous behavior that needed to be accentuated cartographically.

But Sabbadino's embattled defense of Venice and its lagoon did not only involve him in taking on the rivers and the seas. He also identified a third key agent in the environmental imbalance in the region: the human factor. A well-known sonnet of his says that three types of men were ruining the lagoon: aristocrats, engineers, and private individuals.[27] He therefore set himself the task of charting the relation between people and water. From a cartographic point of view, humans were indicated through their manipulation of the territory: settlements, roads, the rerouting of rivers, and the establishment of economic activities (e.g., enclosure of marshlands for fish farming). Sabbadino showed all these features on his map, even if he made no attempt to identify their specific characteristics. Rural settlements were indicated with a name and the figure of a church colored pink—a generic indication of a *pieve* (rural parish church)—but there was no attempt to use customized signs to indicate individual features. What

24. On the advances in knowledge concerning hydraulics, see Salvatore Ciriacono, *Acque e agricoltura: Venezia, l'Olanda e la bonifica europea in età moderna* (Milan: FrancoAngeli, 1994).

25. The most important Italian reference work for a study of the semiology of territory is Angelo Turco, *Terra eburnea* (Milan: Unicopli, 1999).

26. On the semiotics of maps and the role names play as a key component of the entire message communicated by a work of cartography, see Casti, *L'ordine del mondo*.

27. Sabbadino, *Discorsi sopra la laguna*, 32.

is more, the naming of all the settlements naturally emphasized the increasing population in the region—and the cartographer was well aware of the influence of growing demographic pressure on questions relating to the protection of the lagoon.

Similarly significant is the fact that Sabbadino named all the drainage or water projects that had a direct influence on the equilibrium of the lagoon as a whole. *Fossavechia* (old ditch) and *cavanova* (new channel) indicate the rerouting of rivers and were depicted in a way that shows them as part of the natural network of waterways, leaving one in no doubt that the work of man is no temporary phenomenon and therefore must be included as a permanent feature of the complex hydrological system. The same is true of the river defenses, "muri de . . . " (walls of . . .), that are shown along the Piave; these are colored pink (the same color we saw used for human settlements) and thus are immediately identified as signs of the presence of man. Economic activity in the lagoon comprised fish farming in the *valli* (marshes). Val Dogade and Val Roza indicate an important conflict in the lagoon: the fish farms may have had an economic payoff, but they also had a very negative effect on the ebb and flow of water in the lagoon. The Venetian government had been trying to resolve the problem posed by fish farms for more than a century. Several times, indeed, the elimination of the farms had been ordered and often carried out, but, given their profitability, they were soon back. So it was no accident that of all the economic activities in the lagoon, Sabbadino chose to focus on the physical conditions of this one. Nor was it an accident that the marshes, where the fish farms were located, were depicted using stippling and color coding to indicate that they were areas of seasonal expansion of the lagoon—an expansion that the fish farms obstructed (fig. 35.6).

The use of a number of names, along with the more disparate use of representational devices and codes, reveals how Sabbadino intended the map to bear out his agenda in illustrating the importance of the dynamics of the water system in the Trevigiano. In short, the map argues that river, sea, and man all have an effect on the lagoon, which can be protected only by respecting the natural dynamics of the water system and trying to control the human influence thereon.

THE MAGISTRATURA SOPRA BENI INCULTI
(MAGISTRATURE OF UNCULTIVATED RESOURCES):
CRISTOFORO SORTE'S PLAN FOR THE
IRRIGATION OF THE TREVISO AREA

Another document worthy of discussion is Sorte's 1556 "Dissegno da adaquar il Trivisan" (Plan for the irrigation of the Treviso area), a map that covers the Treviso plain from the alpine foothills in the north to the Venetian la-goon in the south (fig. 35.7).[28] The geographical area covered in the map coincides with part of that depicted in the near-contemporary map of the Treviso region by Sabbadino that we have just analyzed, but here the main focus is on land irrigation and its agricultural uses. In the mid-sixteenth century, some of the swampland bordering the Venetian lagoon was reclaimed, and new opportunities emerged for boosting agricultural output by means of an efficient system of irrigation. In 1556, in order to meet this need for an expansion of agricultural land (and hence agricultural output), the Venetian senate established three permanent Provveditori sopra Beni Inculti (Superintendents of Uncultivated Resources) who were responsible for the management of land reclamation and the concession of water resources to private individuals.

The map is not signed, but we can identify the author from other documentary evidence: in a letter of appointment from the Venetian senate to Giovanni Donà (who a few years later would become one of the Provveditori sopra Beni Inculti), mention is made of one "Maestro Christoforo" of Verona who was to accompany Donà on his tour of inspection and make charts and drawings of the places visited. This Maestro Christoforo must have been Cristoforo Sorte, who is now recognized as a major sixteenth-century cartographer.[29] A man of varied skills and talents, Sorte came from a fittingly heterogeneous background: he had been an apprentice in the studio of the painter Giulio Romano, had worked on land surveying (mainly alpine) with Father Giovanni Antonio Vanosino, and had been an engineer in the service of Bernardo di Cles, bishop of Trento (the city where Sorte would have come into contact with the landscape/cartographic traditions of northern Europe).

This plan for the irrigation of the Treviso region shows that Sorte was involved in the administrative assessment of terra firma resources by the Provveditori sopra Beni Inculti. It also provides a perfect example of how cartographers in sixteenth-century Venice were expected to take on a variety of roles and provide different types of land maps using a varied range of skills. Adopting a type of landscape perspective drawing formulated by Leonardo da Vinci—a technique that met certain precise needs of cartographic representation—Sorte varied the angle of the viewpoint in a single map according to the type of terrain he was depicting: for example, he presented a plan view image of flat terrain and an oblique bird's-eye image of mountainous terrain. At the same time, he gave measurements of plain terrain and also calculated the

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28. See Cavazzana Romanelli and Casti, *Laguna, lidi, fiumi*, 37–44; Casti, "Cartografia e politica territoriale"; and Cavazzana Romanelli, "L'immagine antica del Trevigiano," 162–63.

29. More will be said on Sorte later.

FIG. 35.6. DETAIL FROM "DISSEGNO DI TRIVISAN." The illustration shows a detail of plate 30 covering the Venice lagoon. Fish came both from the open lagoon and from *valli,* banked-in areas of the lagoon, where fish were farmed. The fish farms were very profitable and were run by private individuals; however, they clashed with the interests of the community as a whole because the closed-in sections of the lagoon had a negative effect on the tidal exchange of waters. The result of this clash of interests was that from the fourteenth to the seventeenth century the government of the Serenissima would on various occasions have the *valli* enclosures demolished. This map represents an interesting attempt to give a cartographic rendering of territorial dynamics by means of the depiction of lagoon areas subject to flooding (light green stippling) and the use of a different color (dark green) to indicate the river waters flowing out into the sea (thus showing how the counterclockwise sea currents drove those waters and made them a contributing factor in the erosion of the littorals). Size of the detail: ca. 40.9 × 35.9 cm. Photograph courtesy of the ASV (SEA, Piave, r. 104, mappa n. 5).
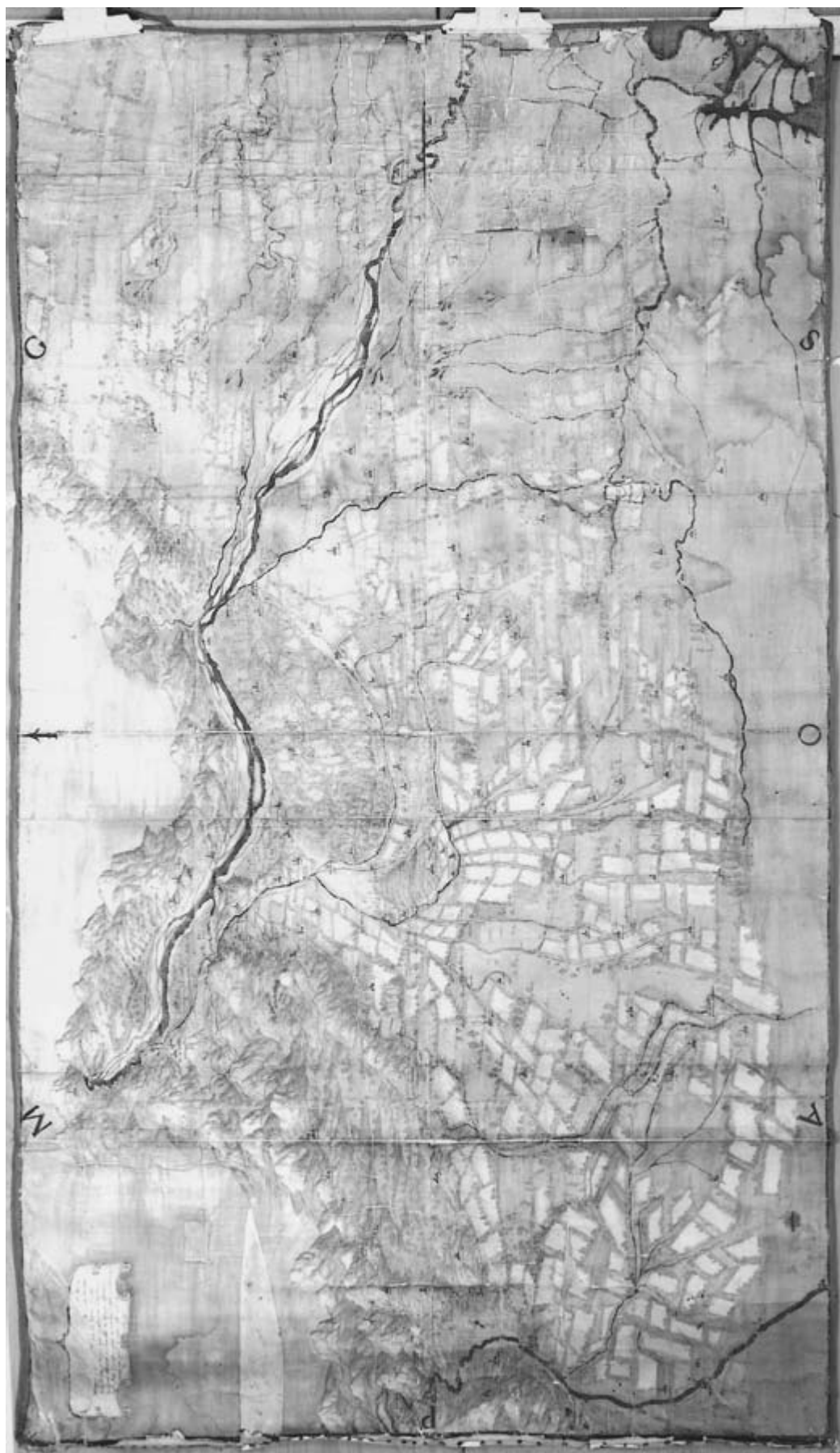
(*Facing page*)
FIG. 35.7. CRISTOFORO SORTE, "DISSEGNO DA ADAQUAR IL TRIVISAN," 1556. Watercolor and pen drawing on paper. Almost contemporary with Sabbadino's map of the Treviso region and covering largely the same area, Sorte's map shows the plain from the farthest Alpine foothills of the Feltre area down to the lagoon around Torcello. The use of perspective makes for a very realistic, three-dimensional rendering of the mountains and hills, but also gives the impression that the whole region is on a downhill slope, crisscrossed by canals, spring-fed rivers (in the lower part of the plain), and various main watercourses (the river Brenta at the left of the map and the river Piave cutting diagonally across it). The upper left part of the map is badly damaged, and only a few of the words of the original scroll inscription are legible; among these are the name "Zuan Donatto," together with a reference to the senate's commission of an on-site feasibility study of a land reclamation and irrigation project and the date 25 November 1552. Archive records, among other documents, have revealed that this "Zuan Donatto" (whom we know as Giovanni Donà), was accompanied on his site visit in August 1556 by "Maestro Christoforo" of Verona, who was to make drawings of the sites and places visited—which shows that Sorte was involved from the very beginning in the work of the Magistratura ai Beni Inculti, and that this map might be considered a sort of outline manifesto of that body's intentions.
Size of the original: 105.5 × 183.5 cm. Photograph courtesy of the ASV (SEA, Diversi, mappa n. 5).

FIG. 35.8. DETAIL FROM SORTE'S "DISSEGNO DA ADAQUAR IL TRIVISAN." The theory-bound nature of the map is clear from the large, purely imaginary fields, which were intended to indicate the results that would be achieved by land reclamation. These were included in the map as illustrations of the validity—and necessity—of the irrigation scheme proposed.
Size of the detail: ca. 33 × 24.8 cm. Photograph courtesy of the ASV (SEA, Diversi, mappa n. 5).

distances between the highest points in the mountains and certain fixed points of reference he himself established. The result was that he could provide elevation profiles that, when superimposed on each other, gave a volumetric image of the mountain regions. The map under consideration here does not, however, employ both techniques but rather employs only perspective—though the two techniques are present in Sorte's map of Trevigiano—perhaps because here the Dolomites serve only to mark the northern limit of the real area of interest.[30] The cartographer has adopted a raised point of observation over the southern part of the region, depicted at the bottom of the map by "O" (Ostro). An arrow in the upper margin indicates that north is toward the top of the sheet, with the other points of the compass marked by the initials of the relevant winds (for example, M = Maestro, G = Greco, P = Ponente, A = Aquilo, and S = Scirocco).

Like Sabbadino, Sorte was interested in a conceptual rendering of the territory. The thesis this map argues for is that suitable incentives for the existing irrigation channels of the Brentella di Pederobba and the Piavesella di Nervesa—together with adequate concessions of water access—would cause the naturally arid region of the Treviso uplands to become fertile. Sorte's depiction of the clearly imaginary fields covering a large part of the area, flanked by tall lines of trees that allude to the land's fertility (fig. 35.8), was obviously intended to convince the recipients of the validity of the plan proposed. The aim
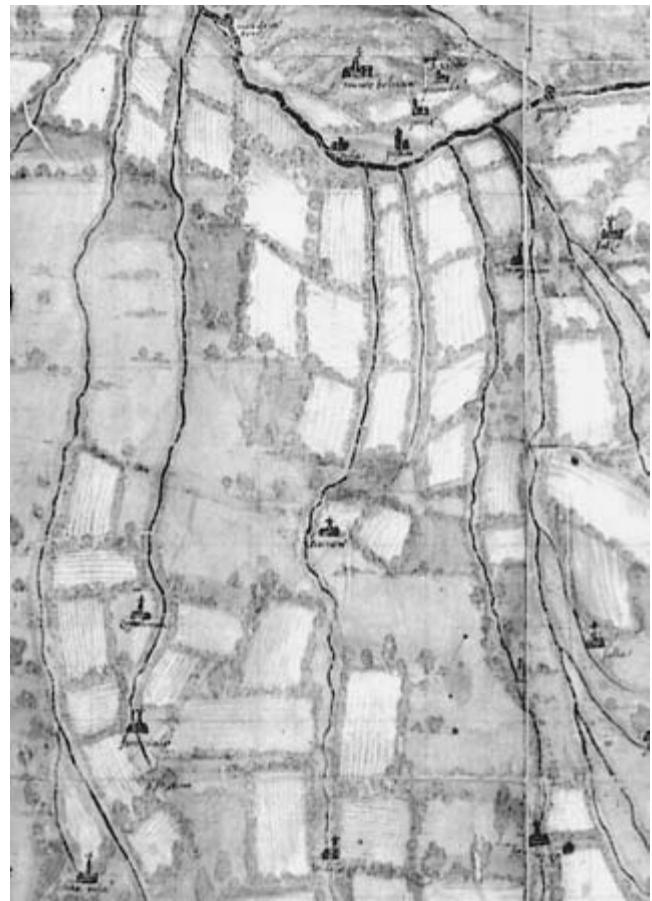
was to show not only that the plan could be implemented, but that its efficacy was beyond doubt.

Unlike the previously discussed map, this map contains hardly any names that could serve to indicate points of reference, with the exception of Treviso, Montello, the Piave River, the Sile River, and the names of a few other settlements along the rivers. Even these are shown extremely small. The straightforwardly locational nature of

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30. The use of perspective in this map shows the combination landscape-map through the adoption of the "iconic conjunction." This semiotic figure is based on the union of the landscape perspective and the cartographic one in the same document. Its communicative issue is iconization—that is, as we have already seen, the process through which conjectural messages are presented as if they were reality. On the landscape as cartographic icon, see Emanuela Casti, "Il paesaggio come icona cartografica," *Rivista Geografica Italiana* 108 (2001): 543–82.

the signs indicating these places is clear from the fact that no specific characteristics of towns are depicted. The one exception is Treviso, shown complete with city walls, while the others are all depicted with the conventional symbol for a settlement (a church) or the conventional color of water for the rivers (blue). The focus on the settlements along watercourses emphasizes the importance of the construction of waterways as a basis for widespread human settlement. Otherwise, the map is devoid of names, an absence that makes the image appear to be a more natural pictorial rendition.

The map uses the two characteristics of the terrain (form and color) to communicate real data: form, coupled with a particular shade of brown, indicates that we are in the foothills of the Dolomites. The same brown is used to depict the alluvial fan at Montebelluna, and the braided streams of the Piave indicate how they were formed, by shifts in its bed. The use of color coding and the depiction of the watercourses gives us an image of the incline of the terrain and helps us to identify the uplands and the beginning of the lower plain: the altitude and aridity of the former is indicated by its ocher color, while the lower plain, rich from the presence of running and standing water because of the lack of a sufficient gradient to favor drainage, is shown by a blue-green color to suggest potential vegetation or, at least, well-watered land. The out-of-scale perspective rendition of the wide tracts of cultivated land shown in relation to the watercourses indicates that the economy of the entire area was based mainly on agriculture—which, though affected by the permeable nature of the soil, would still benefit from a thorough system of irrigation. As in the case of the previous map, one might say that the sign system implies a firsthand knowledge of the terrain and (especially in this second map) indicates that the proposal being put forward was based on careful consideration of the available scientific data. It should also be pointed out that this rendering of the morphological features of the terrain does more than simply suggest that it is possible to govern nature; it also indicates how one could stimulate the productivity of nature by means of an irrigation plan that would have the added benefit of removing the need for land reclamation projects around the borders of the lagoon. Indeed, the lagoon is represented in the map on the right side, if only partially and imperfectly, in order to underline the ultimate objective of the proposed intervention.

The map seems to argue that it is the way in which water is managed (and not simply the presence of water or the nature of the soil) that determines whether an area is suitable for human settlement and the establishment of profitable human activity. So, here again, we can see the iconic intent behind the map: the depiction of irrigation as making a positive contribution to the survival of the lagoon as a whole.

The two maps considered so far in this section demonstrate that labeling serves to provide a balance between the density and the clarity of the information conveyed. In short, it serves to explicate content in such a way that the recipient is convinced of the validity of the project being proposed. In establishing the amount of information to be conveyed, the map fixes the level of detail and thereby consolidates the focus on certain specific issues. Sabbadino accomplished this by means of an "extension" of the meaning communicated by the designator, while Sorte used other codes that act as "surrogates" for the absent designator. In both cases, however, the result is the same: communication of the social significance attributed to the territory.

THE MAGISTRATURA SOPRA BOSCHI (MAGISTRATURE OF FORESTRY): THE PAULINI MAP OF THE BELLUNO REGION

The control of the watercourses feeding into the lagoon was first and foremost intended to preserve the lagoon and therefore guarantee the survival of Venice itself.[31] Complementary projects either planned or carried out consisted of trying to reduce the amount of fluvial silt actually being carried into the lagoon—a goal that was pursued both by rerouting watercourses and by working to conserve mountain woodlands (which served to hold the topsoil and thus reduce the amount of detritus being carried by rivers).[32] The Serenissima, therefore, focused on the joint concerns of water and woodland, mountain and lagoon. Without going into ideological considerations that would take us too far from the points under consideration here, we cannot ignore the political importance of a plan of action that was so wide-ranging that it covered the entire mainland system of woodlands and waterways. In effect, these two natural resources became the context in which the state established its symbolic role as a power that could actually govern the forces of nature.[33]

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31. For a bibliography on the lagoon, see Francesco Marzolo and Augusto Ghetti, "Fiumi lagune e bonifiche venete, guida bibliografica," *Atti dell'Istituto Veneto di Scienze Lettere ed Arti* 105, pt. 2 (1946–47), sect. 2, and the update, Michele Pellizzato and Margherita Scattolin, eds., *Materiali per una bibliografia sulla Laguna e sul Golfo di Venezia* (Chioggia: Consorzio per lo Sviluppo della Pesca e dell'Aquicoltura del Veneto, 1982). With regard to legislation on this subject, see the anastatic reprint of Giulio Rompiasio's eighteenth-century *Metodo in pratica di sommario, o sia compilazione delle leggi, terminazioni & ordini appartenenti agl'illustrissimi & eccellentissimi collegio e magistrato alle acque: Opera dell'avvocato fiscale Giulio Rompiasio,* ed. Giovanni Caniato (Venice: Archivio di Stato, 1988).

32. On legislation concerning these territorial resources, see Ivone Cacciavillani, *Le leggi veneziane sul territorio, 1471–1789: Boschi, fiumi, bonifiche e irrigazioni* (Padua: Signum, 1984).

33. On this point, see Emanuela Casti, "Criteri della politica idraulica veneziana nella sistemazione delle aree forestali (XVI–XVIII sec.)," in

While environmental considerations may have been at the basis of the Serenissima's policy with regard to woodlands, the city's interest in timber resources was much more wide-ranging. Venice was a city built on wood pilings, a maritime city with a large fleet—so timber was one of its essential raw materials. Therefore, it is clear why there should be so much documentary material revealing the Venetian government's interest in this particular territorial resource.[34]

Three fundamental concerns lay behind the forestry policy of the Venetian senate: environmental protection (deforestation and land erosion, topsoil loss, and lagoon silting), forestry management (regulation of water sources and silviculture), and exploitation of woodland resources (conduct of inventories and regulation of tree felling).[35] The Serenissima was involved in these concerns both as a judge in settling disputes between private individuals and as a litigant in trying to assert its jurisdiction over the various mountain communities that considered the woodlands a local resource to be managed according to local needs, irrespective of the rulings laid down by Venice itself.[36]

Hence, various different magistratures were involved in these concerns, each perhaps pursuing different aims, but all of them guided by a solidly based forestry policy.[37] It is interesting to trace the way in which the administrative apparatus developed as the state became more and more aware of the importance of issues relating to forestry management. The Magistratura sopra Boschi survived from the second half of the fifteenth century to the very end of the Venetian Republic (its duties were to a large extent subsequently taken over by other offices instituted during the nineteenth century). However, important issues in the management of forestry resources were dealt with directly by such bodies as the Provveditori all'Arsenal, the Savi ed Esecutori alle Acque, the Provveditori sopra Beni Inculti, and the Provveditori sopra Beni Comunali. It should also be pointed out that legislation covering forestry matters was the province not only of the senate but also of the Council of Ten. The repeated clashes between these two bodies over questions of jurisdiction in these matters reveal just how important to national security forestry resources were considered to be.

To illustrate the basic features of the Serenissima's forestry policy, I have chosen a map relating to the protection of the environment drawn by two private citizens, Iseppo and Tommaso Paulini. At the beginning of the seventeenth century, these two owners of forests in the Belluno area applied to the Venetian government to resolve an environmental matter. In a written manuscript of some forty leaves, complete with several watercolor drawings and colored engravings, these two private individuals informed the administration of their own project for the defense of the Venetian lagoon (fig. 35.9).[38] It was quite com-

mon for Venetian citizens with no official appointment to put forward such suggestions to the state bureaucracy, which actually encouraged participation of this sort in the discussion of questions of general interest to the community as a whole. Naturally, alongside such individuals' eagerness to play a role in public decision making was their desire to see their own proposals implemented, which might well have the result that the individuals themselves would either be paid by the state or share in the profits the scheme produced. The Paulinis, too, had their own request to make: should their proposal meet with the government's favor, they wanted to be appointed to the management of the fiefdom of Fontanabuona in Friuli. Furthermore, their attention to matters relating to forestry can hardly be considered disinterested, given that they themselves were owners of several areas of mountain woodland.

Having said all that, I should point out that the Paulinis' project does not seem to have been merely an expression of private interest; in scale of approach and completeness of analysis, it echoes the most advanced territorial projects that had been put forth in Venice in previous decades. The presupposition on which their plan

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L'uomo e il fiume: Le aste fluviali e l'uomo nei paesi del Mediterraneo e del Mar Nero, ed. Romain Rainero, Eugenia Bevilacqua, and Sante Violante (Milan: Marzorati, 1989), 17–24.

34. With regard to the importance of timber for maritime cities, it is perhaps sufficient to recall that Braudel argued that a major factor in their growth and decline was dictated precisely by the extent to which ready supplies of wood were available; see Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, 2 vols., trans. Siân Reynolds (New York: Harper and Row, 1972–73), 1: 140–45.

35. Lucio Susmel, "Il governo del bosco e del territorio: Un primato storico della Repubblica di Venezia," *Atti e Memorie dell'Accademia Patavina di Scienze Morali, Lettere ed Arti* 94 (1981–82), vol. 2, 75–100, and Lucio Susmel and Franco Viola, *Principi di ecologia: Fattori ecologici, ecosistemica, applicazioni* (Padua: Cleup, 1988).

36. On the role of the mountain communities, see Ivone Cacciavillani, *I privilegi della reggenza dei Sette Comuni, 1339–1806* (Limena, Padua: Signum, 1984).

37. On the legislation regarding this, see Adolfo di Berénger, *Saggio storico della legislazione veneta forestale dal sec. VII al XIX* (Venice, 1863), republished in Adolfo di Berénger, *Dell'antica storia e giurisprudenza forestale in Italia* (Treviso-Venice, 1859–63), 527–622; an anastatic reprint of the complete work was published as *Studii di archeologia forestale* (Florence, 1965). See also Emanuela Casti, "Il bosco nel Veneto: Un indice del rapporto uomo-ambiente," in *L'ambiente e il paesaggio,* ed. Manlio Cortelazzo (Cinisello Balsamo, Milan: Silvana, 1990), 106–27.

38. See Giuseppe Paulini and Girolamo Paulini, *Un codice veneziano del "1600" per le acque e le foreste* (Rome: Libreria dello Stato, 1934); Cavazzana Romanelli and Casti, *Laguna, lidi, fiumi,* 45–51; Maria Francesca Tiepolo, ed., *Boschi della Serenissima, utilizzo e tutela,* exhibition catalog (Venice: Archivio di Stato, 1987), 36 and figs. 32a and 32b; and Emanuela Casti, "Cartografia e politica territoriale: I boschi della Repubblica Veneta," *Storia Urbana,* no. 69 (1994): 105–32, esp. 115–21.

FIG. 35.9. ISEPPO PAULINI AND TOMMASO PAULINI'S MAP OF THEIR PROPOSAL TO PROTECT THE VENETIAN LAGOON, 1608. A map of the course of the Piave from Belluno to the sea; watercolor drawing on paper. The map is part of a manuscript codex on paper that was conserved in the Archivio Secreta. Almost the entire document, of about forty sheets, is illustrated with watercolor drawings. Some of these were produced for the occasion, while others are colored versions of prints taken from elsewhere. Each plate is described with a caption and preceded by copies of various official acts and documents, such as the petitions submitted to the authorities by the authors of the codex, Iseppo Paulini and Tommaso Paulini, together with the related rulings by the political and technical-administrative bodies concerned (the Senate and the SEA, respectively). The entire codex seems to be part of an of-

ficial file (due to its bulk, it was most probably a separate attachment). The purpose of the document was to offer the Venetian authorities an outline of a project for defending the Venetian lagoon against fluvial silting. The two writers based their argument on the idea that the management of mountain woodland and water resources had a decisive effect on the lagoon environment as a whole: the frequent fires that destroyed woodland made it possible for streams to wash away topsoil, which was then deposited in the lagoon by the rivers that flowed into it. The remedies proposed were the construction of fire watchtowers and the passage of severe laws against fire starters.

Size of the original: 40.7 × 51.3 cm. Photograph courtesy of the ASV (Secreta Materie miste notabili, Codice Paulini, reg. 131, cc. 14v–15).

was based is quite straightforward: they argued that not only did the network of rivers have a decisive effect on the environmental balance in the lagoon, but both rivers and lagoon were closely bound up with a third factor—forestry resources. The authors claimed that the gradual silting up of the lagoon was due to the erosion of mountain woodlands. Damaged by accidental or intentional fires—the latter a way of clearing land for cultivation—

woodlands were no longer sufficient to prevent topsoil from being washed away into rivers, adding to the immense amount of detritus that was the cause of the problems in the lagoon.

The drawing provides a figurative synthesis of the entire analysis put forward in the pages of the codex: harsh laws punishing the burning of woodlands should be supplemented by the creation of watchtowers that would

make it possible to spot fires before they got out of hand; one is illustrated in the map, at upper right. The blighted mountains would thus flourish once more, becoming like the verdant mountains of Austria (depicted at upper left, beyond the line indicating the border) or the famous "Woodland of St. Mark's" on Montello (depicted lower left, above Treviso), which, as the source of timber supplies for the arsenal, was subject to special jurisdiction.

The perspective rendition presents the territory divided into two distinct parts: plain and mountains. Even allowing for the approximation involved in the use of the rules of perspective, it is clear that the respective sizes of the two parts have been reversed: a small plain in the foreground soon gives way to a wide and extensive mountain valley that is totally out of proportion and appears to be comparable in size to the plain itself. While the method of drawing relief used does not give precise information with regard to altitude, it does render the morphological differences between plain and mountain: the former is dotted with numerous concentrated settlements, while the presence of man in the latter is indicated solely by the destructive effects of fire.

The woodlands are depicted using mainly figurative representation and color coding. In the Belluno area, the color brown and short vertical strokes representing the trees depict the erosion of the mountain slopes and the presence of dead or dying vegetation, while in nearby Austria, green is used to show the healthy state of the woodlands. Though unnamed, the Montello woodlands are easy to identify, partly because of their location and partly because the color coding and the way the trees are schematically drawn depict a species that is particularly common in that area, the oak.

Other territorial features, specifically water and plains, are represented by nuanced shades of blue and green. These are intended to be in sharp contrast with the color used to depict the woodlands. The detritus carried by the Cordevole and the Piave from the mountain slopes down toward the lagoon is represented by pebbles of exaggerated size. Again the woodland is the central focus: the thinning of the mountain forests has detrimental effects on the whole environmental system.

The use of a lexical code is exemplified by the presence of the single regional name Val Serpentina, along with the names of the most important cities: Cividal (Belluno) and Treviso (in this context, I do not consider the legend and the phrase "fire-watch towers," which do not play a direct role in territorial syntax).

The Paulini map was addressed to a very important recipient—the Venetian senate, a political body that had the power to decide whether a project would be implemented or not; hence, its message was directed toward a clearly identified social agent, and the map served as mediator in three ways: it offered an intellectual image of the territory (depicting it as a complex system); it put forward strategies to be followed (not only offering a particular interpretation of the dynamics in the territory but also indicating measures that should be taken—the erection of fire watchtowers and the redirection of the river at the mouth of the Piave); and finally, it emphasized the central importance of the woodlands as a key element in the whole mountain environment and a crucial factor in the future of the lagoon.[39] The presentation of the woodlands in a particular way—as the focus of a representation that depicted the forests' clear relation to other territorial features—produced in the recipient the realization that it is possible—indeed, essential—to consider the woodlands and the mountains crucial factors in any scheme for the protection of the lagoon. This claim appears to have been all the stronger if one looks at the attitude taken by the administration in the period after the presentation of the Paulini proposal. In effect, the Serenissima was increasingly aware of the need for an overall approach to territorial management alongside the implementation of individual schemes, with woodland resources a key factor.[40] Up to that time, the mountain areas had been considered of peripheral importance, but thenceforward the Venetian senate clearly saw them as playing an important role in the maintenance of the environmental balance in the lagoon. And it would seem reasonable to suggest that the Paulini map made an important contribution in shaping—if not creating—this shift in perspective.

In the period we are considering, the cartographic depiction of mountain areas presented certain specific problems: quite apart from the natural difficulties inherent in the environment itself, there was the extreme irregularity in the way it was settled and the wide variety in the levels of knowledge from one area to another. This design problem is clear in all the contemporary maps of the mountains, which do not follow the formal conventions common in maps depicting plains and valleys; instead, the information is presented in summary form, there is a high margin of inexactitude, and there is a clear shift in the informational criteria applied from one area to another. It is rather restrictive to attribute all of this to the mere physical difficulties in mapping mountain areas; we should also bear in mind that the centuries-old functional relation between mountain and plain had a real effect on the stylistic and expressive choices made in charting such areas. The alpine areas had remained partially isolated from history; the repercussions of this were, to some extent, felt in the lowland valleys that were the natural continuation of the plain, but were then spread to the secondary villages with different degrees of influence, proportional to their degree

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39. A scroll in the map explains the purpose of its authors and gives instructions as to how it is to be read.

40. Cacciavillani, *Le leggi veneziane*, 89–101.

of isolation. Naturally, this situation led not only to the consolidation of forms of economic life that were entirely self-sufficient but also to the establishment of local forms of judiciary for the resolution of property disputes.

POLITICAL-MILITARY CARTOGRAPHY AND TERRITORIAL DEFENSE

The political-military cartography of the period in this region was contemporary with the emergence of administrative cartography, and in some respects even antedates it. The genre can be divided into maps that show overall systems of defense—that is, entire stretches of border territory—and those that show the ground plans of fortresses either proposed or already constructed. These are two separate genres, addressed to very different recipients: the former were obviously intended for the government bodies that decided military strategy, while the latter were drawn up for the public offices responsible for the design and maintenance of defense structures: in Venice, from the sixteenth century onward, this was the responsibility of the Provveditori alle Fortezze (Superintendents for Fortezze).[41] These different cartographic genres had different chronologies: maps of systems of territorial defense were made in the fifteenth century, while in the sixteenth, plans of fortifications began to appear,[42] and these were comparable to administrative or celebratory plans of cities.

As in the case of administrative maps, military-political maps can really be understood only by considering the political and social climate in which they were produced. Therefore, one should bear in mind that after having consolidated its own borders, the Venetian Republic embarked on a massive fortification program in the period 1458–71. The western parts of Venice's new mainland territories were connected by a narrow corridor of land between the Duchy of Mantova and the Principality of Trento (see fig. 35.2). If this dangerous bottleneck had been lost, it would have meant that the troops in the Brescia area were isolated and that Venice could not provide military relief for the Verona region. In order to protect this corridor, the Republic not only embarked on the fortification of certain centers—for example, in 1458 it fortified Asola (today in the province of Mantua), which protected the road to Brescia—but also undertook a number of defense projects involving the rerouting of waterways. Further confirmation of the care and attention lavished on Venice's very valuable possessions in Lombardy during the second half of the fifteenth century is the extensive fortification work carried out on Brescia itself (1466).

One should not forget that the Duchies of Milan and Mantua represented a real threat to Venice, given that they had well-organized armies and were always looking for ways to curtail the Serenissima's status as a land power. This is why it was only from the end of the fifteenth century that Venice began to look toward the fortification of its eastern borders—and why, when it did so, it followed a very different tack to that followed in the west. The threat here was posed not by well-organized armies that tended to attack large urban centers but by hordes of Turkish horsemen who swarmed across the plains of Friuli. Given that their movements were unpredictable, Venice had to draw up plans of defense on a territorial scale, creating the new line of defenses at Fogliano (1478) and reinforcing the defenses along the banks of the Isonzo. After the defeat at Agnadello by the League of Cambrai in 1519—when an alliance of Italian states (headed by the Papal States) made the first serious dent in Venice's stature in the Adriatic—the Venetians changed military strategy; having become convinced of the dangers posed by combat in the open field, they began to create fortresses that served not only as military bases but also as instruments in a defensive war of attrition. The fruits of this change in approach included the design for Palmanova in Friuli and the construction of the walls of Brescia and Bergamo, all of which are considered perfect examples of sixteenth-century fortification.[43]

These military-political maps were generally unaccompanied by written texts, were drawn on a medium scale, were always in manuscript form, circulated in state organizations, and contained only military information. Unlike administrative maps, they were not accompanied by a written text because the cartographic rendering of information was complete unto itself and all denoted content had to be completely understandable through the drawing itself. This explains why there is such a varied range of designators and surrogates: in mapping the urban centers, colors and figurative devices were used to indicate fortifications, while in charting watercourses they were used to indicate possible obstacles or advantageous

41. Military maps are to be found from before this date, at the time of the Magistratura sulle Fortezze, among the documents from the following offices and bodies: the Provveditori alla Terraferma (Administrative Offices Responsible for the Mainland), Dispacci Rettori (Dispatches from City Governors), Provveditori ai Beni Inculti (Authority Responsible for Land Reclamation and Irrigation), Processi (Trial Documents), Savi ed Esecutori alle Acque (Authority Responsible for Water Resources and the Lagoon), Provveditori delle Rason Vecchie (Public Auditors), and Deputati del Consiglio dei Dieci sopra Miniere (Deputies to the Council of Ten Responsible for Mines and Mining).

42. Maps illustrating sieges or battlefields, which are often included under the heading of military maps, were later products. Given that they were very different from military maps, in terms of both content and form, I have not included them in this discussion.

43. Among the many discussions of the Republic's fortification strategy, see Ennio Concina, *La macchina territoriale: La progettazione della difesa nel Cinquecento veneto* (Rome: Laterza, 1983), and Michael E. Mallett, *L'organizzazione militare di Venezia nel '400* (Rome: Jouvence, 1989).

points for troop movements. Numbers indicating distances along roads serve to indicate the shortest routes from one place to another. The maps are of chorographic scale: they represent wide swaths of territory while offering a high level of detail that is appropriate to the density of the information and allows for precise orientation and a clear outline of the fortified areas.

Military maps are manuscript documents: the valuable information relating to one's own or enemy territory, often obtained through espionage, was considered top secret and intended only for the eyes of the ruler or the governing bodies. A direct consequence of this was the choice of information to include: the maps contain only information useful for planning troop movements or the defense of military strongholds. Naturally enough, given that their aim was to reproduce an image of a military defense system, these maps focus on one particular image of territory—intended to confirm the reassuring status of fortifications—and ignore other territorial features. So, here again, it would be pointless to expect these maps to offer a picture of the territory as it actually was at the time they were drawn up. We should not forget the purpose of these maps and realize that information relating to nonmilitary matters was given only in a very schematic form. Works by well-known fifteenth-century cartographers should provide a more detailed illustration of these points.[44]

THE MAP OF LOMBARDY BY GIOVANNI PISATO

One of the oldest extant maps of the region, Giovanni Pisato's map of Lombardy shows the cities and terrain between Verona and Milan, at the time identified by their respective positions on the "near" or "far" side of the Mincio River (fig. 35.10).[45] At roughly the same latitude as Peschiera, the Mincio cuts through the narrow bottleneck already mentioned, forming a fragile link between the territories of Verona and Brescia—a link that Venice would protect with a system of defenses referred to as the Serraglio. Pisato drew this map around 1440, depicting the main theater of war among Venice, Mantua, and Milan and giving useful military information regarding the area. The military nature of this map meant that it was used and updated over a long period—as we can see from the erased standard that was once depicted flying over the city of Bergamo and the date 1496 inscribed under the flag of Saint Mark flying over Cremona (referring to the year Venetian forces took and sacked the city).

The map includes features of terrain important for fortifications or troop movements, including settlements, watercourses, and bridges (fig. 35.11). The large trees scattered over the territory are schematic references to the widespread presence of woodland, which might be either a hindrance or a useful hiding-place for an army on the march.

The map's political-military function is clear from the way the settlements are depicted: each has a standard indicating whether it is controlled by the Venetian, Visconti, or Gonzaga forces. Iconographical features were used to try to give a faithful image of the cities as armed citadels, while in less important towns there is either a precise indication of the presence of castles (Lazise, Sirmione, Garda, and Torri del Benaco) or a more general indication of a church, tower, or housing (for example, at Pescantina). The more important fortified sites on this particular military chessboard (Valeggio, Peschiera, and Lonato) are shown on a larger scale, and attention is given, although schematically, to the configuration of the fortifications; see, for example, the Scaligero castle at Peschiera (the cartographer also provided a realistic rendition of the bridges here) or the citadel and castle in Verona. This relative sizing obviously creates a hierarchy of importance, while the more realistic rendition of the large centers makes it easier to recognize them. It should also be noted that different shades of pink are used in coloring the fortifications: the primary defense structures, such as bridges and towers, are much brighter than the others.

The central importance of water is revealed by the presence of Lake Garda, Lake Como, the Po, and the other rivers that wind through the plain of Lombardy. The map exaggerates these bodies of water, with the terrain appearing as narrow strips of land between wide expanses of water whose importance is emphasized by the number of craft traveling along them. In a region crisscrossed by rivers, bridges were also of central importance, and the map gives outsize renditions of the fortified bridges at Valeggio, Peschiera, and Mantua. The use of a single (blue-green) color for all the bodies of water emphasizes that they all form a single network—perhaps suggesting the use of deliberate flooding as a tactic for creating difficulties for land troops.

44. I have omitted discussion here of several political-military maps that can be seen in the first volume of this series. For example, see P. D. A. Harvey, "Local and Regional Cartography in Medieval Europe," in *HC* 1:464–501.

45. Baratta has made an exhaustive study of the geographical features covered by this map; see Mario Baratta, "La carta della Lombardia di Giovanni Pisato (1440)," *Rivista Geografica Italiana* 20 (1913): 159–63, 449–59, and 577–93; Giovanni Marinelli, *Saggio di cartografia della regione veneta* (Venice, 1881), 2; Giuliana Mazzi, "La cartografia: Materiali per la storia urbanistica di Verona," in *Ritratto di Verona: Lineamenti di una storia urbanistica,* ed. Lionello Puppi (Verona: Banca Popolare di Verona, 1978), 531–620, esp. 542; and Antonio Manno, "Strategie difensive e fortezze veneziane dal XV al XVIII secolo," in *Palmanova: Fortezza d'Europa, 1593–1993,* ed. Gino Pavan (Venice: Marsilio, 1993), 501–49, esp. 514. The parchment is reproduced in color in *Imago mundi et Italiae: La versione del mondo e la scoperta dell'Italia nella cartografia antica (secoli X–XVI),* 2 vols., ed. Luciano Lago (Trieste: La Mongolfiera, 1992), 2:292–93 (pl. III).

FIG. 35.10. MAP OF LOMBARDY BY GIOVANNI PISATO, CA. 1440. Watercolor and pen drawing on parchment. One of the oldest extant maps of the region, this map covers an entire parchment, complete with a 27-centimeter-long "neck," at the end of which is the hole used in tying the parchment when it was rolled up. The only information we have on the cartographer is his name, which is given—along with the date—in a small panel at the top right. The very particular style used in this map is so close to that of contemporary pictorial canons that, if there were no evidence of the document's having had a practical use, one might conclude that it had been created for decorative purposes.

Size of the original: 65 × 89 cm. Photograph courtesy of the Biblioteca Comunale, Treviso (MS. 1497).

Initially, the roads were not shown; later, long ink-drawn lines were added linking the main centers, with numbers indicating the distances between them. Such information was crucial in deciding the time required to march from one place to another and in analyzing the possibilities for attack or retreat. The addition of these numbers confirms that this map was intended for military use. This is further borne out by another addition to the map: the long wall the Veronese built in 1345 between Valeggio and the Tartaro Springs in Povegliano. This structure formed an important system of defense between Venetian and Mantuan territory: by rerouting the Mincio, it was possible to flood large tracts of land and thus make them inaccessible to land troops. The map also shows another area that could be similarly flooded for military purposes: the damp lowlands in the Verona area known as the Valli Grandi.

The information given was intended not to describe the territory but rather to outline an impregnable system of defense. This information is conveyed solely by cartographic means: the use of surrogates renders the map eas-ily legible; the strategic importance of each feature is depicted as part of a precise system of defense. The map not only shows places and watercourses but also uses shifting scales and color coding to indicate the relative military importance of each fortification and body of water, and mileages are used to suggest the best routes between one place and another. Hence, designators and surrogates do not simply serve to present a mass of information; they offer a reading of a complex system of defense based on an order that has to be appreciated and respected. While Pisato's map does not bear any heading or title that makes its military-political use explicit, a semiotic analysis of the cartographic language employed reveals that the map cannot have been intended for any other purpose. If the cartographic syntax used was not the result of mere arbitrary choices, this document is a good example of the focused use of signs to establish order in the world.[46]

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46. All those procedures used by the map to "show" the designator—that is, the quantity of information being communicated and its type
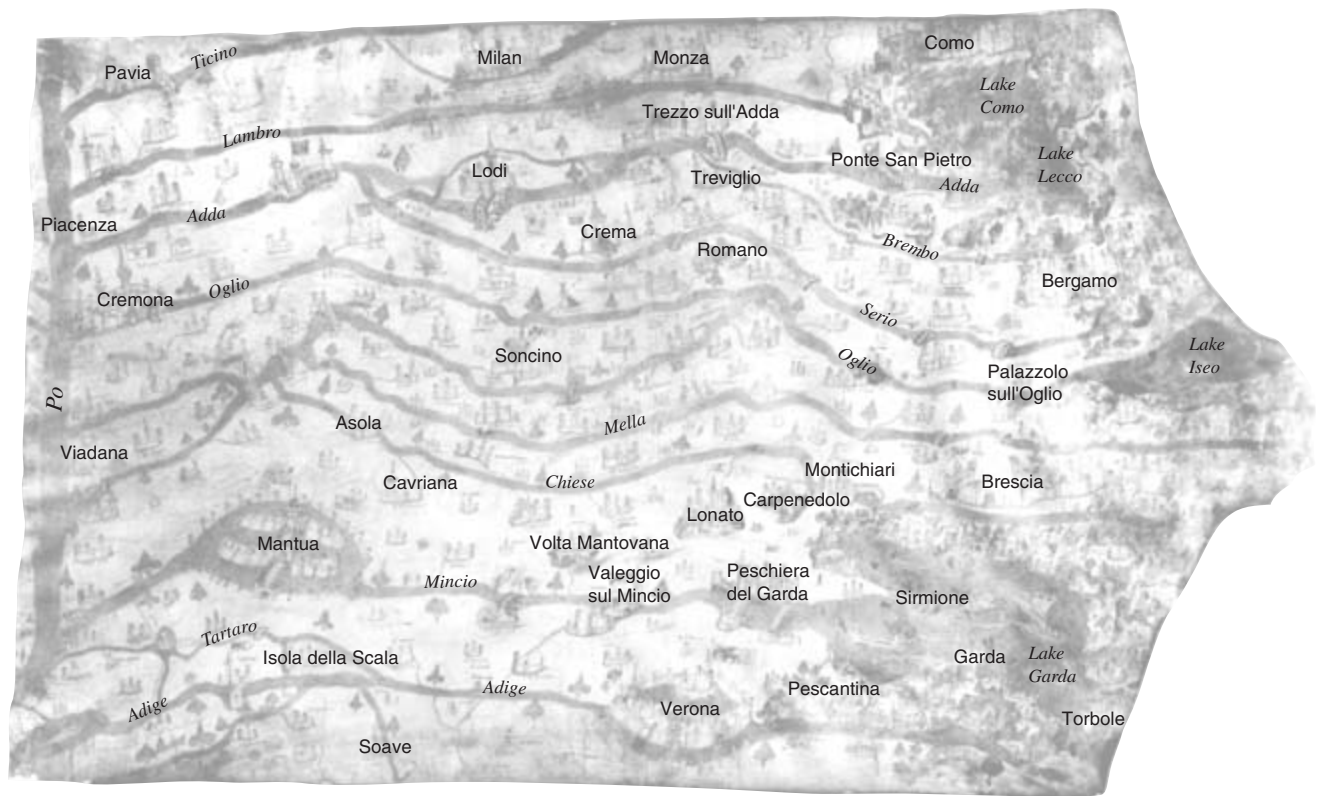
FIG. 35.11. EXPLANATORY DIAGRAM OF PISATO'S MAP OF LOMBARDY. The main cities, rivers, and lakes have been identified. An even more complete diagram can be found in Mario Baratta, "La carta della Lombardia di Giovanni Pisato (1440)." *Rivista Geografica Italiana* 20 (1913): 159–63, 449–59, and 577–93, esp. 581–84.

THE ALMAGIÀ MAP: A MAP OF THE VERONA REGION

There can be no doubt that the main aim of the fifteenth-century map of the Verona region known as the Almagià map (fig. 35.12) was to provide a clear picture of the territory between Verona and Mantua, which was crucial in defending the approaches to Brescia; part of the defense system in this area was the large wall between Valeggio and Villafranca depicted in Pisato's map. We do not know where, when, by whom, or for whom it was produced. Attempts to come up with a convincing date continue and give rise to theories that are often contradictory, for the map depicts urban features and records events that date from different periods.[47] Perhaps it was constantly being updated due to its use as a political-military document.

The number of signs used in depicting cities, towns, roads, and rivers clearly indicates the map's main political-military focus. So do the signs representing woodlands near certain population centers, for such areas are of strategic importance in warfare. The mountain areas of the Lessini Hills and the Alps may also have been depicted due to considerations of military strategy. In this map, cartographic signs are few and far between and often give the distorted impression that these areas were still largely in-

accessible and represented the extreme frontier of the Serenissima's territorial conquests, which had yet to be

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(i.e., referential and/or conceptual)—not only make the map the place where the intellectual appropriation of the world is achieved, but make it a denominative projection, because it communicates some of the meanings of the designator and presents them in a hierarchical order. See Casti, *L'ordine del mondo,* 69–76.

47. Almagià, the first to study the map, established a date of about 1439 due to the fact that in the north, between Lake Garda and the Adige, small boats are shown illustrating an incident in a war between Venice and Milan in the first half of the fifteen century. In 1439, the Venetians undertook a hazardous land and river journey to bring a total of twenty-five ammunition chests and six galleys to the shore of Lake Garda still under their control and thus maintain contact with the besieged city on the opposite shore. Recently Mazzi has argued for a date a few decades later because of the presence of some Verona buildings on which work did not begin until the 1450s. See Roberto Almagià, "Un'antica carta topografica del territorio veronese," *Rendiconti della Reale Accademia Nazionale dei Lincei: Classe di Scienze Morali, Storiche e Filologiche,* 5th ser., 32 (1923): 63–83, and Giuliana Mazzi, "La conoscenza per l'organizzazione delle difese," in *Il territorio nella cartografia di ieri e di oggi,* 1st ed., ed. Fantelli Pier Luigi (Venice: Cassa di Risparmio di Padova e Rovigo, 1994), 116–45, esp. 117–24. See also Cavazzana Romanelli and Casti, *Laguna, lidi, fiumi,* 60–65, and Harvey, "Local and Regional Cartography," 478–79 (fig. 20.13) and pl. 34, where the map is illustrated in color.
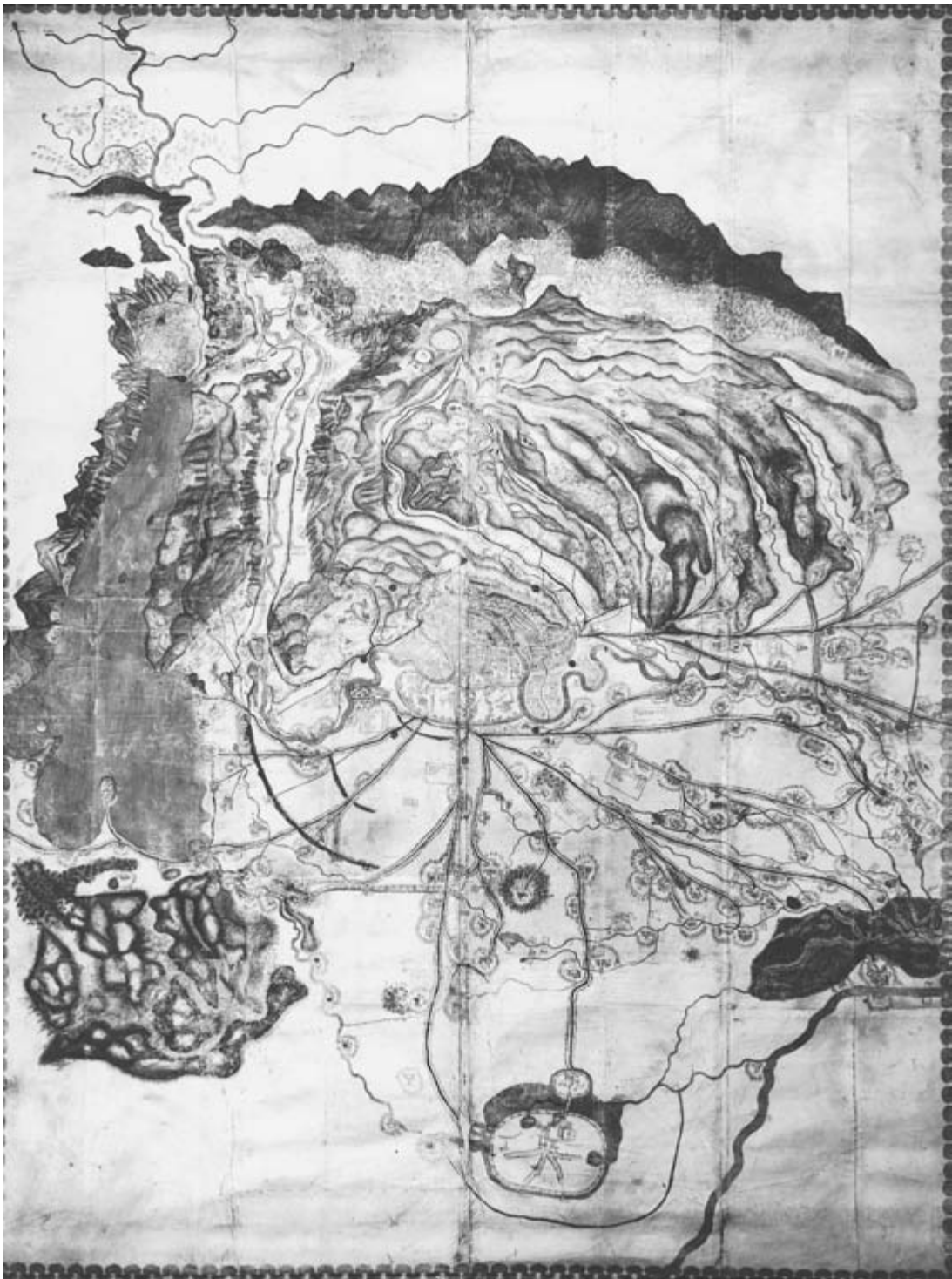
FIG. 35.12. THE ALMAGIÀ MAP OF THE VERONA REGION, FIFTEENTH CENTURY. Watercolor drawing on parchment. The importance of this map is borne out by its troubled history: in 1805, it was taken to the Court Archives in Vienna along with other valuable material from Venice, and it was returned only after the First World War. Apart from its extreme age, the map's other significant features are the exceptional size of the parchment, the accuracy of the drawings, and the skillful use of color and perspective. In the north, the initial stretch of the Adige highlights the geographical and po-

litical border formed by the Alps, which then give way to dense woodland. Skillful drawing and use of color and perspective can also be seen in the depiction of the Lessini Hills, while the morainic rubble of Lake Garda is depicted orthogonally. The extent of the woodlands (shown by the depiction of vegetation) is not always accurate, but the network of rivers is very accurately charted.
Size of the original: 300.2 × 224.8 cm. Photograph courtesy of the ASV (Miscellanea Mappe, dis. 1438).

fully assimilated at either a political or an intellectual level.[48] Roads, complete with numerical indications of distances, fan out from the central hub of Verona, forming a basic framework of notable arteries around which the map is constructed. Cities are shown as much larger than their surrounding territory. Ideologically, Verona is presented not only as the center of the visual representation but also as the center of an order that extends over the entire area around it. The city, in which the seats of civic and religious power are easily identifiable, is depicted both as the linchpin of the Republic's defense against attack from the south and west and as an important political entity.

The enemy city of Mantua is depicted very differently. Characterized by fourteenth-century architectural features, the city is shown defended by large walls and lakes to the north. South of the city, where the lakes are less extensive, a defensive system based on flooding of the land (the Serraglio) is represented. The depiction of Mantua is deliberately intended to show an enemy city. The very fact that the urban features shown are not up to date indirectly bears out this claim; it would obviously have been very difficult to get more recent information on the state of the enemy.

Thus, there seems to be no doubt that this large parchment map was drawn up for the Venetian government and served a political-military purpose. This political-military aim determined the map's semantics and its syntax. Its purpose explains why there are areas without information: a map intending to offer a general description of the territory would have included as much varied information as possible, but a military-political map achieves its purpose by concentrating on the features that enable it to do one specific thing—depict the territory charted as a possible theater of war.

THE MAP OF PADUA AND THE SURROUNDING TERRITORY BY FRANCESCO SQUARCIONE

Francesco Squarcione's map of Padua and the surrounding territory (fig. 35.13) is of undoubted importance for a number of reasons: its age (it dates from 1465), its form (it is made up of a number of parchment sheets glued together, as is the map of Verona), and its graphic rendering.[49] However, although we know that the map was preserved among the records of the communal chancery in Padua, we do not know the precise purpose it was intended to serve. That is, we do not know whether it is a political-military or an administrative document. If we privilege a semiotic analysis of this document, the map shows us unusual features: the depiction follows two different communicative systems. Through icons formed by the designator and figurative and chromatic surrogates, the map gives a well-ordered representation of the city's system of defense, such as the fortified town of Padua, the
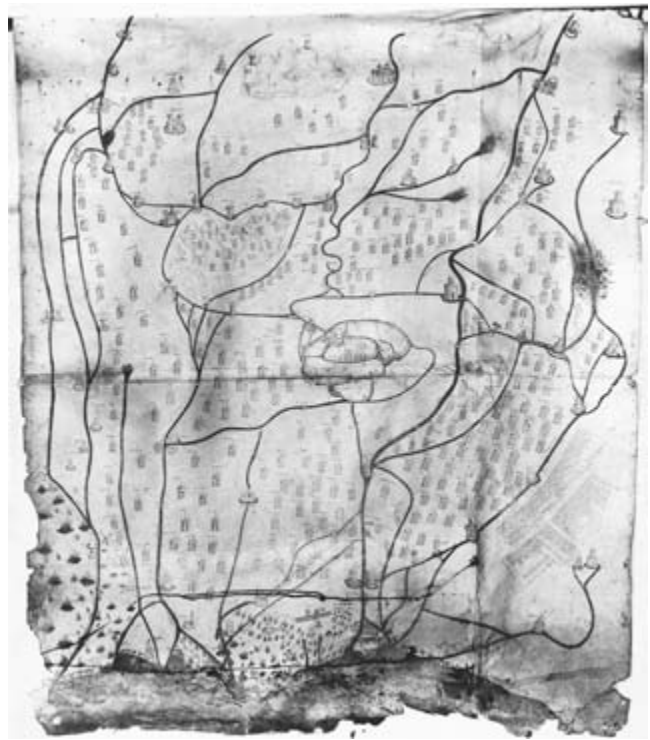

FIG. 35.13. FRANCESCO SQUARCIONE'S MAP OF PADUA AND THE SURROUNDING TERRITORY, 1465. Watercolor and pen drawing on parchment. Attributed to the Paduan painter Francesco Squarcione, this work bears a number of similarities to a 1449 map by Annibale Maggi: the depiction of Padua, the account of the system of watercourses (with some additional canals and some cuts in the area to the south of the city), the number and names of the outlying towns and villages (with the addition of the fortifications at Oriago, on the Brenta between Stra and Fusina), and the two tables giving distances. The purpose of the map is not known.

Size of the original: 117 × 101 cm. Photograph courtesy of the Assessorato ai Musei, Politiche Culturali e Spettacolo del Comune di Padova (Miscellanea MS. 53v e 177r–v).

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48. On the question of names and denominations, see Almagià's "Un'antica carta topografica," which accurately lists all the place-names used in the map.

49. Almagià argues that the map is one of the results of a 1460 ruling by the Council of Ten that called for the creation of an entire series of maps of the terra firma; however, recent studies seem to show that the reasons behind the creation of the map had little to do with centralized fact finding or decoration. Puppi and Olivato have discovered the original commission for the work, which shows that it was intended to be a sort of catalog of the region surrounding the city and was to be kept in Padua's own city chancellery office rather than sent on to Venice. See Roberto Almagià, *Monumenta Italiae cartographica* (Florence: Istituto Geografico Militare, 1929; reprinted Bologna: Forni, 1980), 12 and pl. XIbis; Lionello Puppi, "Appunti in margine all'immagine di Padova e suo territorio secondo alcuni documenti della cartografia tra '400 e '500," in *Dopo Mantegna: Arte a Padova e nel territorio nei secoli XV e XVI* (Milan: Electa, 1976), 163–65; Loredana Olivato Puppi and Lionello Puppi, "Venezia *veduta* da Francesco Squarcione nel 1465," in *Per Maria Cionini Visani: Scritti di amici* (Venice, 1977), 29–32; and Lionello Puppi, ed., *Alvise Cornaro e il suo tempo,* exhibition

rivers, and the fortifications along them. Through the use of icons formed by the designator and followed by a symbol, the map includes a number of towns and villages that have little to do with defense. The main symbol used to indicate these settlements is that of a chapel surmounted by pinnacles; these symbols are laid out in lines within the network of rivers—a representation that seems to have more to do with the compilation of a list of such settlements (perhaps for some sort of census) than with the cartographic rendition of the appearance of territory. However, one cannot evaluate the use of representational and symbolic notation solely from a technical point of view.[50]

The symbolic notation was part of medieval tradition (and thus indicates the survival of traditional cartography), while the more representational notation is a product of the modern period, during which the real form of objects was reproduced.[51] Hence, one can make out two levels of communication, with two levels of importance: the indication of fortifications and the indication of settlements, with the former clearly more important than the latter. In considering this theory, one should also bear in mind that previous efforts to understand the purpose of the map by reviewing possible analogies with other maps have proved unfruitful. Semiotic analysis suggests the presence of two aims that do not necessarily contradict each other, given that the public office for which the map was intended was responsible for both areas (defense and census-taking). This document, therefore, highlights how, in the absence of a strictly codified cartographic language, a cartographer could shift from one "register" to another, thus giving greater freedom to those actually interpreting and using the map. It is clear that the range of choices was not totally open but was determined by the surrogates used; however, as in this case, such signs can communicate multiple messages.

One might conclude by saying that the maps examined as examples of the political-military genre have certain features in common. Not only do they contain a particular selection of information; they also use notational devices in such a way as to produce an image of the territory that can be used in drawing up strategic projects and deciding on tactics. Above all, the image they give serves to reinforce the idea of territory as an entity whose "legitimacy" rests on the fact that it was subject to the coordinated exercise of the Serenissima's power.

URBAN FORTIFICATION MAPPING

We will now examine the second type of political-military map, the urban cartography of fortifications, which was closely associated with manuscript city plans. Indeed, maps of fortresses can be considered as occupying an intermediate position between political-military and urban forms of cartographic representation, a hybrid po-

sition that is borne out by these maps' use by authorities responsible for the building and maintenance of fortresses, not for the implementation of military strategy.

These documents describe the fortifications whose construction or maintenance was the responsibility of a particular magistrature, the Provveditori alle Fortezze, set up in Venice in 1542. During the sixteenth century, this genre of maps still presented some of the features of administrative cartography, and thus was often accompanied by notes, project outlines, or theoretical treatises. However, another characteristic feature of such maps was that they not only indicated what already existed but often outlined theoretical models that were the result of research into more efficient systems of defense.[52] In order to make their presentation more convincing, they included not only an outline of city walls but also features that made it possible to identify a particular city center.

The main purpose of these maps was the description of the fortification of an entire city or a single fortress. Hence, their focus was on what was yet to be built or what could be improved. This is why the maps present their information in such a geometrical manner: the very style of drawing used conveys the geometrical nature of the defense layout, thereby underlining the theoretical approach and practical efficacy of the project itself. The end result was a cold and analytical technical drawing that offers a planimetric map of the construction that in no way reflects a hierarchy of importance (and therefore does not indicate the strong and weak points in the defenses).

These maps were often accompanied by a written text, because those presenting theoretical studies, projects, or territorial land surveys always offered a written outline of the main features of their work. As in the case of the administrative maps studied earlier, place-names are given in the accompanying text. Often the maps themselves give only the name of the fortress, providing other names only in a fragmentary manner. Hence, the entire cartographic representation itself served as a sort of notational surrogate, with figures and numbers taking the place of names.

Among the various important maps accompanying written projects or theoretical treatises one should defi-

catalog (Padua: Comune di Padova, 1980), 233–34. The map is reproduced in color in Lago, *Imago mundi et Italiae,* 2:297 (pl. VII). See also Harvey, "Local and Regional Cartography," 479 and fig. 20.15.

50. In every cartographic communication, the information is made to conform to norms of codification of signs that can belong to two systems: the analogical and the digital. The first one communicates through relations of difference, while the second is based on distinction. For a deeper analysis of the two, see Casti, *L'ordine del mondo,* 43–47.

51. Only with the advent of fully codified cartography in the eighteenth century would this analogic notation be abandoned and replaced with abstract signs.

52. For Renaissance mapping and warfare, see chapter 29 in this volume.
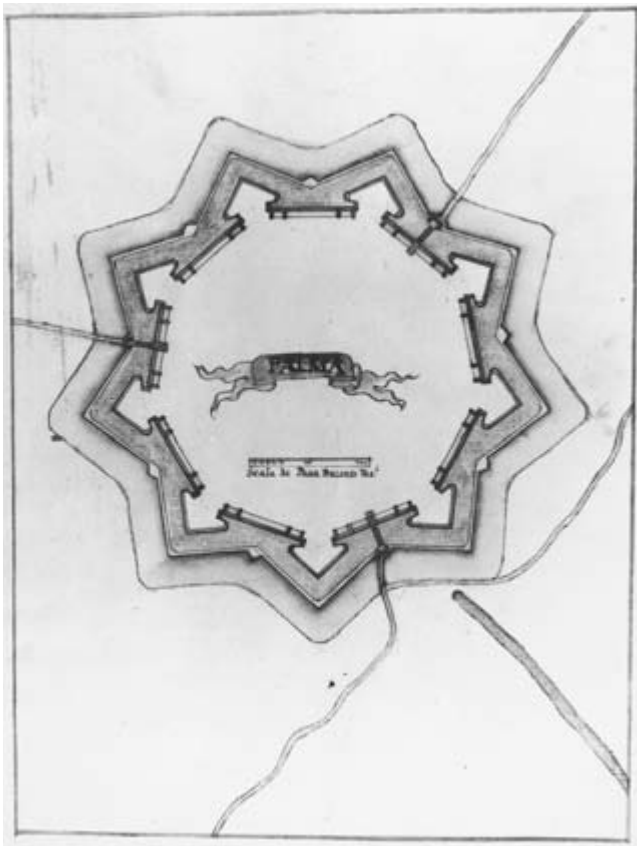
FIG. 35.14. MAP OF PALMANOVA, FIRST HALF OF THE SEVENTEENTH CENTURY. Watercolor and pen drawing on paper. Given the type of fortifications shown, this undated work can be assigned to the first half of the seventeenth century. Although the spareness of the drawing and the absence of accompanying documents means we cannot say a lot about the map's function, our understanding of it is facilitated by the fact that it was kept in an archive of drawings relating to fortifications, fortresses, cities, and fortified islands. Filed in this way, the documents must have had a regular administrative use, but unfortunately we cannot identify what that was. However, the fact that all the material concerns fortification suggests that it was intended for the magistrature responsible for such matters.

Size of the original: 48 × 36 cm. Photograph courtesy of the Biblioteca Nazionale Marciana, Venice (Cod. It. VII 2211 [= 10049], c. 111).

nitely include those depicting the city of Palmanova, whose star-shaped ramparts made it one of the finest examples of the art of fortification.[53] It received a good deal of attention from cartographers, and there are a number of maps of it; one of the most important is a map accompanying an administrative document drawn up sometime in the first half of the seventeenth century (fig. 35.14).[54] The map shows the fortifications and the roads leading to the three city gates, along with the Taglio canal, which flows southward from the fortress. The area within the city walls is blank, except for a simple scroll bearing the

word "Palma." All attention is thus focused on the external walls, with the color blue used to emphasize the importance of water in the city's defenses and size given by the inclusion of a scale of two hundred Venetian *passi*. The presence of Venetian measurements and the emphasis on water might be taken as indicating an administrative use for the map, so perhaps the document was in fact intended for the Provveditori alle Fortezze, in whose archives there are a number of similar drawings. With regard to completed or nearly completed fortifications, one might mention one of Peschiera.

The mapping of fortifications sometimes involved such important cartographers as Cristoforo Sorte, who in 1571 was summoned by Francesco Marcello, the *provveditore* of Peschiera, to draw up a map of the city's new fortifications and also to study the obstructions to the course of the Mincio that had resulted from that building work (fig. 35.15).[55] Work on the fortification, designed by Guidobaldi II Della Rovere, the commander of the Venetian land forces in 1546, had begun in 1549. Sorte's planimetric drawing indicates the extent of the landfills and excavations necessitated by the construction. The fortifications on the Lake Garda side (lower right on drawing) consisted of two bastions between which was stretched the chain closing off the port. The Mincio side was dominated by the Cantanara bastion built above the old Scaligero fort (left on drawing), beneath which the drawing shows the five arches of the bridge over the river. This technical drawing informs us how the fortifications might have created problems for the flow of river water—problems on which the experts involved in the management of territorial resources might be called to offer their opinion. Sorte was concerned not so much with illustrating the usefulness of a system of defense as indicating whether it was actually suitable for the site on which it was built. An autograph note in the top right corner explains the color coding used, pointing out that one particular combination (red superimposed on green) indicates the structures that were responsible for the water flow problems. Once again, the importance of water systems over defense was urged, given that the problems caused by disruption of the former were potentially even graver than those posed by shortcomings in the latter. This is a perfect illustration

53. On maps of Palmanova, see Gino Pavan, ed., *Palmanova: Fortezza d'Europa, 1593–1993* (Venice: Marsilio, 1993).

54. See Pietro Marchesi, "La difesa del territorio al tempo della Serenissima," in *Palmanova: Fortezza d'Europa, 1493–1993,* ed. Gino Pavan (Venice: Marsilio, 1993), 57–72 and also 109–11.

55. See Giuseppe Gerola, "Documenti sulle mura di Peschiera," *Atti e Memorie dell'Accademia di Agricoltura, Scienze e Lettere di Verona,* 5th ser., 4 (1928): 85–105. More general sources include Ennio Concina, *La macchina territoriale: Relazioni dei rettori veneti in Terraferma,* ed. Amelio Tagliaferri, vol. 10, *Provveditorato di Salò, provveditorato di Peschiera* (Milan: Giuffrè, 1978), and Lionello Puppi, *Michele Sanmicheli architetto: Opera completa* (Rome: Caliban, 1986), 150.
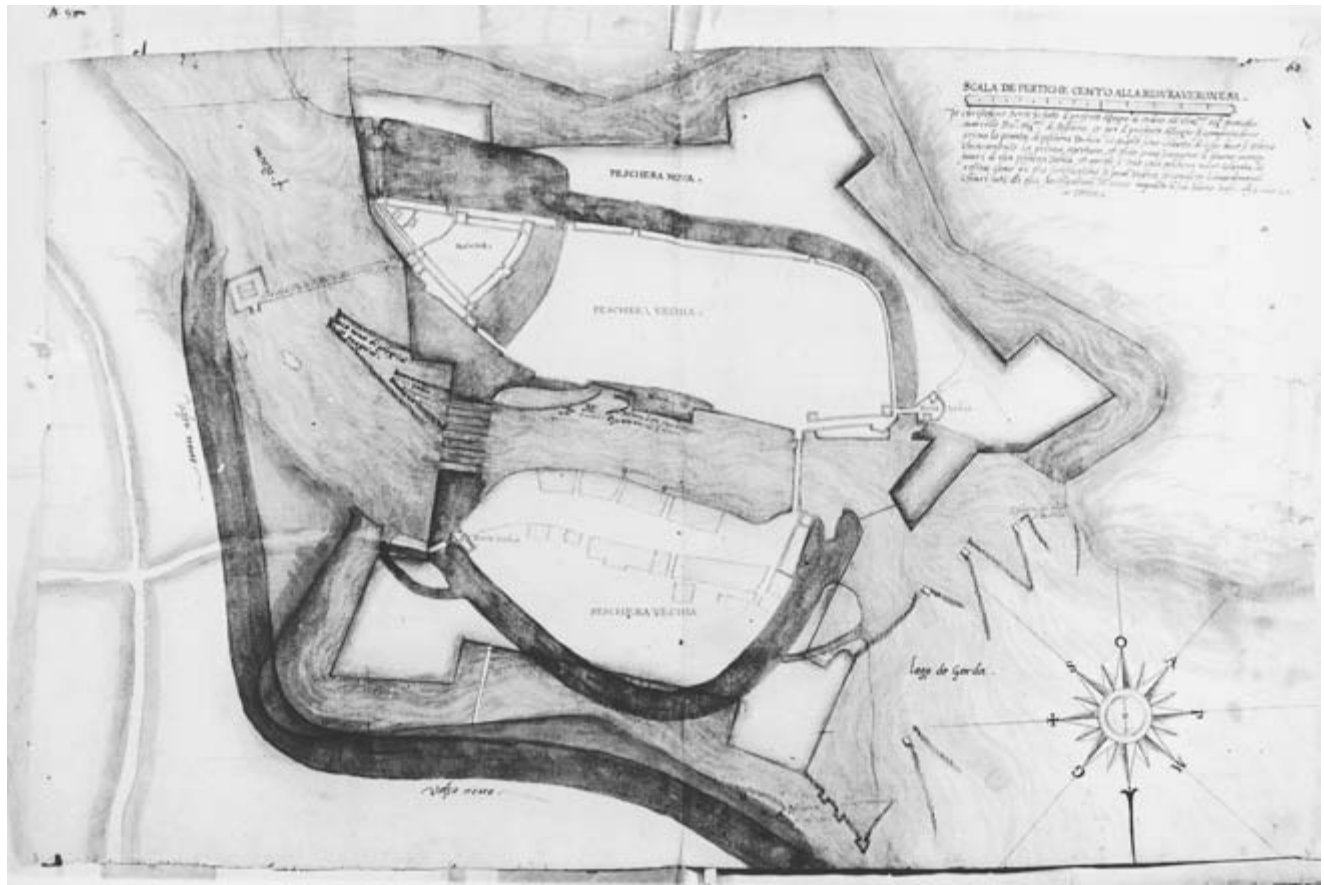
FIG. 35.15. CRISTOFORO SORTE'S MAP OF PESCHIERA'S NEW FORTIFICATIONS, 1571 (3 JULY). Watercolor and pen drawing on paper. While this is another Sorte map that might be defined as "technical," it also reveals the cartographer's very personal style. His use of color—different shading, bold contrasts, and underlining—created aesthetic effects that clearly distinguish this map from the usual technical drawings

of fortresses. However, Sorte never forgot his main descriptive purpose: the passage in the upper right corner explains that such effects have been used solely to emphasize the problems connected with defense and the management of watercourses. Size of the original: 46 × 70 cm. Photograph courtesy of the Biblioteca Nazionale Marciana, Venice (Cod. It. VI 188 [= 10039], c. 43).

of how an exclusively technical view of fortress maps prevents one from understanding the Venetian state's approach to military strategy—an approach based not only on consideration of defense systems but also on exploitation of the potential of a particular structure in a particular territorial setting.

The Role of Descriptive Regional Cartography in the Provision of Territorial Information and the Celebration of Power

Having noted the role played by the state in the early modern period, is it possible to identify a form of cartography that did not reflect a particular hierarchy of interests, that did not rigidly select the information it contained? Here it is necessary to draw a sharp distinction between the maps of the fifteenth century and those of the

sixteenth—first, because there was a noticeable evolution in the state over this period (only toward the end of the sixteenth century did states become fully fledged administrative entities, the principal agents of territorial management) and second, because this was the period that saw the emergence of the idea that reality existed insofar as it could be depicted, and that its visual representation was, in effect, a way of giving substance to what one wanted to exist.[56] During the fifteenth century, Venice was still a fragile entity whose interests in the representation of territory were limited to those outlined earlier, al-

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56. On the ideological conception of the world and the way it was represented in the early modern period, see Franco Farinelli, *I segni del mondo: Immagine cartografica e discorso geografico in età moderna* (Scandicci: Nuova Italia, 1992). For a theoretical consideration of cartography as communication, see Christian Jacob, *L'empire des cartes: Approche théorique de la cartographie à travers l'histoire* (Paris: Albin Michel, 1992).

FIG. 35.16. MAP OF LAKE GARDA. Watercolor and pen drawing on parchment. Untitled, undated, and of unknown authorship, this map showing Lake Garda can—thanks to the style used in depicting Turri (Torri del Benaco) and Brenzonu(m) (Brenzone)—be roughly dated toward the end of the fourteenth century. Hence, it is one of the oldest extant examples of Italian cartography. The precision with which the lakeshore towns are depicted—and, above all, the importance attached to identification through place-names—reveals that the map was intended to chart the densely settled area of the lake.

Size of the original: 40 × 61 cm. Photograph courtesy of the Biblioteca Civica, Verona (MS. 2286).

though in the sixteenth century the consolidation of the state meant that it became a territorial agent with an interest in controlling all the information relating to its dominions. One should also add that, due to the change in the attitude toward visual representation itself, the organs of the state began to see that maps were an important means of establishing general intellectual control over the territory as a whole. This is why during the fifteenth century maps either had a precise aim or else gave a cluttered representation of territory, crammed with disparate sorts of information. In effect, there was no established code for the selection of information; and only later would there emerge general, well-structured cartographic projects that followed certain established rules designed to depict the territory "as it really was." We can argue that the most innovative introduction of this genre of cartographic production concerns two main aspects: first, the description of the territorial organization of the state and second, the celebration of power.

In considering the first period, the fifteenth century, we can analyze a manuscript map of Lake Garda whose provenance, exact date, author, and possible recipient are little known. The aim, however, is clear: to present information that is specified through the use of place-names (fig. 35.16).[57] These are given great prominence: all the names of the lakeside towns are given in Latin on billowing scrolls. The importance of the named towns is emphasized by the use of a more or less elaborately drawn castle. This reveals that what the map aims to transmit is not merely the location but also the essence or significance of each town. The focus is on the lakeshore. As in the case of portolan charts, there is no single correct orientation. Given that the names are aligned parallel to the coast, the map has to be rotated if one is to read all the

57. Even though the map has been dated to the end of the fourteenth century, we can consider it an example of the representations of the period preceding the new configuration of the state in the sixteenth century. See V. Fainelli, "Il Garda Scaligero," *Il Garda* 2, no. 1 (1927): 6–12; Almagià, *Monumenta Italiae cartographica*, 5 and pl. VII, no. 2; Alessandro Cucagna, ed., *Mostre "Cartografia antica del Trentino meridionale," 1400–1620,* exhibition catalog (Rovereto: Biblioteca Civica "G. Tartarotti," 1985), 19.

information on it. The large number of towns indicated reveals intensive human settlement and modification of the shore of Lake Garda. Even the indications of woods between one settlement and another—or the sketching in of uplands that limit the lakeshore areas—are intended to focus on the lakeside settlements. We can argue that the main purpose of the map was to indicate the intensive development of the lakeshore, and that it fulfilled not only a descriptive but also an ideological function.

As a result of its reduced political power in the Adriatic, sixteenth-century Venice shifted from being a mercantile city to being one of landowners with interests in agriculture and the terra firma. That is why the city authorities commissioned a large map of the Tyrol and the Bergamo, Como, Padua, Treviso, and Po Delta areas to hang in the Sala del Senato.[58]

So Sorte, in addition to working, as we have seen, for the Magistratura sopra Beni Inculti, was also officially recognized as cartographer to the Republic, and we find evidence of his working as such from 1586 (the date of the first map) to 1594 (the date of the last). While the large map of the Venetian terra firma has been lost, we do still have the five individual maps that the senate asked Sorte to draw to complement the large one, which enable us to understand the main characteristics of sixteenth-century descriptive maps (fig. 35.17).[59]

One should start by saying that these maps were innovative not only from a technical but also from an ideological point of view because they introduced a new approach to the representation of power. Having abandoned the early sixteenth-century idea of large public maps as a sort of exposition of an ideal world, the cartographers of the second half of the century were stimulated by new geographical discoveries to draw up maps that had a clear political meaning: their aim was to represent the range of a prince's or state's power. One of the primary illustrations of that range was the intellectual appropriation of territory implicit in the map itself. Celebratory cartography, therefore, could no longer rely merely on rhetorical devices and symbols; it had to provide as faithful a portrait of territory as possible. That is why Sorte and others invented methods of cartographic surveying and representation that were based on first-hand empirical study of the territory to be mapped, also introducing technical innovation to cartographic production. For the linear distances on these maps, the cartographer started from measurements taken *in situ*. The distances between one place and the next were measured along roads that were divided into sections in the manner of a compass traverse. First, one measured the orientation in degrees at the beginning of each particular section, then one gave first the length of the section and then the final orientation in degrees—and thus one had enough data to give precise linear distances. The main points of reference (towns, buildings, and crossroads) were fixed using a compass so as to establish their exact

58. For some reason the project was held up, because in 1568 Cristoforo Sorte reported to the Venetian government that said map was in part completed and would, he hoped, be finished after his collection of data relating to inland waterways and irrigation. The project did not get underway again until 1578—that is, after the two serious fires in the doge's palace of 1574 and 1577. The renewed commission confirmed that the map was to depict the entire terra firma and would cover the entire wall of the long senate chamber. Clearly intended to celebrate Venetian power, it would also be a practical tool at the service of those who were to wield that power. However, the commission was further modified in 1582, when it was decided for political reasons to drastically reduce the size of the map, which, it was thought, would be better kept locked away in a cupboard, safe from prying eyes. Sorte was also required to complement this single map with five individual maps. After the fall of the Serenissima, the documents of the Venetian Republic were dispersed, and they are now in collections in Venice and Vienna. On Sorte and this particular type of cartography, see Juergen Schulz, *La cartografia tra scienza e arte: Carte e cartografi nel Rinascimento italiano* (Modena: F. C. Panini, 1990), 65–95. This work contains a full bibliography on the cartographer.

59. In addition to figure 35.17: 1586, map of the Bergamo region, 340 × 168 cm (Venice, Collezione Donà delle Rose); 1590, map of Friuli, 216 × 166 cm (Vienna, Österreichisches Staatsarchiv, Kriegsarchiv, N. B VII a 167); 1591, map of the Brescia region, 340 × 169 cm (Venice, Collezione Donà delle Rose); and 1591, map of the Verona and Vicenza regions, 294 × 165 cm (Venezia, Museo Correr, Carte Geografiche, MSS. P.D. C 864/3). All five maps are watercolor and pen on paper. While important as individual works, Sorte's maps are particularly impressive as a whole and bear witness to an important political project. The canons used in drawing up the maps reveal the purpose they were intended to serve: to offer a precise record of all the Venetian projects implemented on the terra firma since the very early days of the Serenissima's expansion into the hinterland. Though of differing sizes, these five maps are almost identical in terms of scale, projection, orientation, and graphic style. A balanced use of visual proportions means that there is no clear informational hierarchy in the way the various aspects of the territory are portrayed, but there is a sort of balance between natural and man-made features. Indicated by either a sketched outline or a rough plan of their outer walls, the cities seem to act less as a dominant hierarchical feature than as a point of reference for all the outlying areas. The territorial features depicted cover morphology, water resources, vegetation, and man-made artifacts. One can see that the use of place-names to indicate cities, towns, roads, rivers, hills, and even entire regions was an essential step in the intellectual appropriation of the territory as a whole. See Marinelli, *Saggio di cartografia della regione veneta,* 17–19; Roberto Almagià, L' "Italia" di Giovanni Antonio Magini e la cartografia dell'Italia nei secoli XVI e XVII (Naples: F. Perrella, 1922), 40–41; idem, *Monumenta Italiae cartographica,* 38–39 and pls. XLIII and XLIV; idem, "Cristoforo Sorte e i primi rilievi topografici della Venezia Tridentina," *Rivista Geografica Italiana* 37 (1930): 117–22; idem, "Cristoforo Sorte, il primo grande cartografo e topografo della Repubblica di Venezia," in *Scritti geografici (1905–1957),* by Roberto Almagià (Rome: Edizioni Cremonese, 1961), 613–18, esp. 615–17; Juergen Schulz, "Cristoforo Sorte and the Ducal Palace of Venice," *Mitteilungen des Kunsthistorischen Institutes in Florenz* 10 (1961–63): 193–208, esp. 202–6; idem, "New Maps and Landscape Drawings by Cristoforo Sorte," *Mitteilungen des Kunsthistorischen Institutes in Florenz* 20 (1976): 107–26; Giuliana Mazzi, "La Repubblica e uno strumento per il dominio," in *Architettura e Utopia nella Venezia del Cinquecento,* ed. Lionello Puppi, exhibition catalog (Milan: Electa, 1980), 59–62; Lelio Pagani, "Cristoforo Sorte, un cartografo veneto del Cinquecento e i suoi inediti topografici del territorio bergamasco," *Atti dell'Ateneo di Scienze Lettere ed Arti di Bergamo* 41 (1978–80): 399–425; and Schulz, *La cartografia tra scienza e arte,* 65–95.

FIG. 35.17. CRISTOFORO SORTE'S MAP OF PADUA AND TRIVISO, 1594. This map of the Treviso area appears to be very different from that drawn up for the Magistratura sopra Beni Inculti that we analyzed earlier. The main aim here was to offer a description rather than argue a proposal, and Sorte represented the territory in a more objective manner. Hence, the plain is depicted by the indication of essential features, with the centers accurately named and placed in relation to the network of watercourses. The mountains, on the other hand— depicted according to the new system developed by Sorte (that is, rendered volumetrically on the basis of on-site survey readings)—are shown as almost impassable terrain.

Size of the original: 295 × 160 cm. Photograph courtesy of the Kriegsarchiv, Österreichisches Staatsarchiv, Vienna (N. B VII a 154).

orientation and thus create a network of interrelated reference points. As I have already mentioned, the measurement of elevation was even more complicated: Sorte calculated the distance between the highest parts of the mountains and various fixed points he himself chose. The procedure was rather like triangulation, even if in the latter distances are fixed by geometrical calculations that enable one to define them with exactitude. Nevertheless, one cannot deny that Sorte's work marked an important technical innovation: his was the first attempt to effectively measure the area of plains and render upland elevation, in the process raising technical problems that would be fully resolved only two centuries later. Others, including Leonardo da Vinci, had also given a volumetric rendition of mountain landscapes, but *qua* landscape, that is, as a feature of paintings; Sorte was the first to use such volumetric studies of mountains in drawing up maps.[60]

Sorte's cartographic drawings representing plains and uplands were also innovative. The combination of different viewpoints emphasized the different nature of the terrain: the plains were depicted in plan view, while the topographical features of the uplands were shown obliquely (for example, Sorte drew on his skill as a painter to indicate the presence of such features as bare rock face).[61] The immediate identification of the type of territory or settlement is evoked by the signs and does not require any explanatory notation; what is given serves as a practical supplement but is not essential to an understanding of the map.

As far as denomination is concerned, the information in these maps by Sorte is conveyed by a balanced use of signs and labels, with the names of cities, roads, mountains, rivers, and entire regions given. The most important cities are identified both by name and by either a planimetric layout of the central area or a perspective depiction of key buildings. Because there is no representational hierarchy, the picture of the territory that emerges is one of precise on-the-spot measurement, "naturalness," and neutrality—even if we know how problematic that idea of neutrality is when dealing with systems of symbolic representation, particularly in these cartographic genres employed by state bodies and organizations.

PASTORAL VISITS CARTOGRAPHY AND ECCLESIASTICAL POWER IN LOMBARDY

Having considered some cartographic genres produced by the political structure of Venice, we find it necessary to consider the cartographic production of another kind of power present in Lombardy in the sixteenth century, ecclesiastical power. The comparison is made here to underline the political use of maps and their differences in relation to the institutions that produced them. In fact, maps of pastoral visits made for such a powerful and well-

organized body as the Diocese of Milan offer a way of understanding and representing territory that is anchored in ideological principles and political interests that are mirrored by—and sometimes show themselves only in—iconographic representations.

These maps document the pastoral visits made by Carlo Borromeo, archbishop of Milan, in the second half of the sixteenth century, and by his successor, Federico Borromeo, in the first two decades of the seventeenth.[62] An ancient episcopal duty, pastoral visits were, after the Council of Trent, required of every diocesan bishop, who was expected to visit all the *pievi* under his control annually. In 1565, Carlo Borromeo recognized a number of existing entities as parishes and also created a large number of parishes *ex novo*—so one cannot rule out that one of the purposes of the maps under discussion was the settlement of precise boundaries between the various *pievi*.[63] In this period of ecclesiastical reorganization, the registers containing written accounts of the information gathered during pastoral visits were supplemented for the first time

60. Archive documents contain Sorte's list of the technical instruments used: a *bossolo* (compass), *pertica* (measuring rod), and *livello* (gradiometer). The on-site procedures involved were: (1) the identification of directions (the winds) and their angle (in degrees) in relation to an established line of reference; (2) the calculation of distances (the unit of measure used—*pertiche, passi,* etc.—might vary from place to place); (3) the calculation of altitudes (as these could not be measured using the system of similar triangles, Sorte attempted to establish the vertical angles of elevation taken from a precise position); and (4) the use of the gradiometer. At the drawing board, the cartographer then reduced his readings to scale and transcribed them (Lelio Pagani, "La tecnica cartografica di Cristoforo Sorte," *Geografica* 2 [1979]: 83–92).

61. For the use of the iconic junction in Sorte's cartographical production we refer to the map of the Treviso area already analyzed. For a deeper study, see Casti, "Il paesaggio."

62. The most recent work on this subject, which covers all the maps discussed in this section, is *Itinerari di san Carlo Borromeo nella cartografia delle visite pastorali,* ed. Ernesto Brivio et al. (Milan: Unicopli, [1985]). Of the numerous works on the life of Carlo Borromeo, see the collection of essays in *L'alto Milanese all'epoca di Carlo Borromeo,* Rassegna Gallaratese di Storia e d'Arte 37, no. 124 (Gallarate, 1984–85); Cesare Gallazzi, "Visite pastorali ed apostoliche di Carlo Borromeo: Il mito di Pastore itinerante," in *Busto Arsizio prima di, con e dopo Carlo Borromeo* (Busto Arsizio, 1984), 227–38; and Ambrogio Palestra, ed., *Visite pastorali alle pievi milanesi (1423–1856),* vol. 1, *Inventario* (Florence: Monastero di Rosano, 1977).

63. The *pievi* were an early unit of ecclesiastical organization, and their division into subordinate parishes came about in the twelfth century. On the origins of the *pieve* and the problems it raises, see Gian Piero Bognetti, *Sulle origini dei comuni rurali del Medioevo* (Pavia, 1926); Ambrogio Palestra, "Pievi, canonici e parrocchia nelle pergamene morimondesi," *Ambrosius* 32 (1956): 141–43; and idem, "L'origine e l'ordinamento della pieve in Lombardia," *Archivio Storico Lombardo,* 9th ser., 3 (1963): 359–98. On ecclesiastical organization and regulation, see the collection of essays *Le istituzioni ecclesiastiche della "Societas Christiana" dei secoli XI–XII: Diocesi, pievi e parrocchie. Atti della sesta Settimana internazionale di studio, Milano, 1–7 settembre 1974* (Milan: Vita e Pensiero, 1977).

by maps of the territory concerned.[64] However, the prime objective of these maps seems to have been a functional description of the territory—that is, the provision of an image that would clarify the relation between individual parishes and *pievi* upon which they were dependent. Hence, the maps served to give a visual picture of territory that had previously been documented solely through dry lists—the very simple written accounts drawn up in registers. This basic itinerary information was soon supplemented by the inclusion on all the maps of the distances between one place and another based on firsthand experience. Obviously these data were useful to the bishop in planning his pastoral visits, but they also had a more general intent: they helped him to form a picture of the territorial aspects of ecclesiastical organization and thus to evaluate the functionality of the religious district and its capacity to maintain effective relationships with the parishes.

About forty anonymous maps of the single *pieve* districts date from the Borromeo period. We do not know anything about their makers—not even whether they were laymen or clerics or had an established role in the Milan diocese. From the maps one can deduce that they were not professional cartographers but amateurs who aimed to give a picture of each area and its ecclesiastical organization using the means best suited to their main purpose: the provision of all the essential information concerning the various *pievi*. They show enough of the rural road system to follow the bishop's itinerary, which included stops at all the parish churches and at a number of rural oratories. This depiction of the road network includes not only distances between the various communities and the main *pieve*, but all the necessary bridges over watercourses. The towns are shown by means of either a symbol of a church or a schematic ground plan. In some cases, the maps give information on the type and use of the terrain, identify crops and woodlands, and sometimes indicate where there is sloping ground. Sometimes alongside the map of the main *pieve* area there are maps of individual parishes that provide more detailed information on individual towns and villages. Let us now consider an example.

The map drawn up to chart one of Borromeo's first pastoral visits (in 1566) shows the area of the *pieve* of Pontirolo (fig. 35.18). Rivers divide the territory into sections occupied by the towns and villages associated with the various parishes that were scattered across the territory and served as junctions in a network of ecclesiastic organization intended to cover the entire region. One should not forget that the church authorities supplied various services (such as those of schools and workshops), as well as offering moral and material succor, so their role was clearly one of territorial management. This is why most of the information on the maps takes the form of names es-

tablishing the social significance of each part of the territory: place-names alongside symbols of churches indicate places of religious significance, the names of roads (complete with distances) offer firsthand information relating to the site, and the names of the watercourses that make up the network of rivers form a frame of reference for the region. The word "Levante" (east) indicates orientation. All of this information offers a picture of a neatly subdivided territory ordered and controlled by the ecclesiastical authorities.

If Carlo Borromeo set up this complex organization in the Milan diocese for the exercise of control over the whole of the diocesan territory, the refined humanist Federico Borromeo standardized the procedures involved. For example, although the accounts of the former's pastoral visits were written up by the scribes who accompanied him on different occasions (their handwriting is sometimes highly idiosyncratic and often difficult to read), the visits of the latter were transcribed in fine copy and then bound in special, elegant tomes. Similarly, the maps accompanying the accounts of the latter are different from the ones that accompanied those of the former, both in aim and in cartographic content and style. From a technical point of view, they were clearly drawn up by masters of their medium whose work—often colored in tempera—is of great artistic as well as documentary value. The most prolific of these mapmakers was the Brescian painter Aragonio (Aragonus Aragonius), the author of many maps.[65]

One example of a map by Aragonio concerns the *pieve* of Missaglia. Drawn up to accompany the account of Federico's pastoral visit of 1611, the map shows all the artist's painterly skill in the use of color and background effects to give a vivid and complete account of all the towns, villages, farmhouses, and oratories in the area (fig. 35.19). At the center of the map is the *pieve* of Missaglia (Masaglia) itself, whose status is emphasized by its depiction on a scale larger than that used for the other settlements. The facade of the church—with its tripartite

64. For a general discussion of cartography in Lombardy, see Aurora Scotti, "La cartografia lombarda: Criteri di rappresentazione, uso e destinazione," in *Lombardia: Il territorio, l'ambiente, il paesaggio*, ed. Carlo Pirovano, vol. 3 (Milan: Electa, 1982): 37–124; Archivio di Stato di Milano, *L'immagine interessata: Territorio e cartografia in Lombardia tra 500 e 800* (Milan: Archivio di Stato, 1984); and Marco Tamborini, *Castelli e fortificazioni del territorio varesino* (Varese: ASK, 1981).

65. The artist came from a family of painters and moved to Milan at the time of Federico Borromeo. He worked as an engineer for the Curia in the period 1608–11, creating a series of maps that are still extant. On these works, see Angela Codazzi, "Le carte topografiche di alcune pievi di Lombardia di Aragonuus Aragonius Brixiensis (1608–1611)," *Memorie geografiche*, 1915, no. 29, and Brivio et al., *Itinerari di san Carlo Borromeo*.
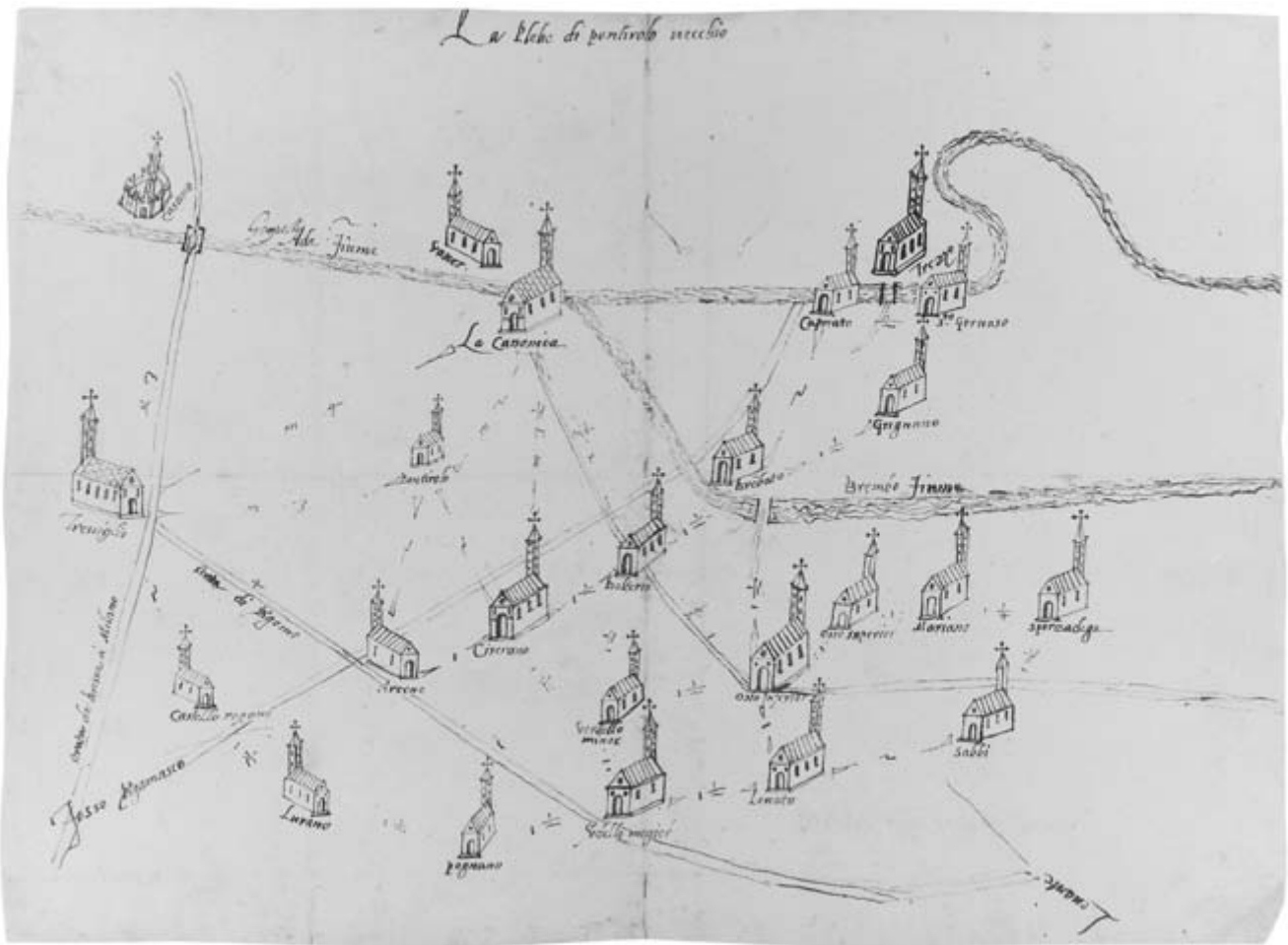
FIG. 35.18. MAP OF THE *PIEVE* OF PONTIROLO VEC-CHIO AND THE SURROUNDING AREA, 1566. Pen drawing on paper. This map shows the eastern part of the extended territory (or jurisdiction) of the *pieve*, which Archbishop Carlo Borromeo visited first on his annual visit to all the *pievi* in his diocese (that this map shows just part of the *pieve*'s jurisdiction suggests that there was another map relating to the other part of the *pieve* covered by a later visit). The location of towns and villages (indicated by a standard axonometric representation of a church) is fairly accurate. The orientation is shown by the indication ("Levante") that east is at the bottom of the

map. The course and confluence of the Adda and the Brembo are shown, together with an indication of a moat and bridges in the Bergamo area. The best roads are marked out: for example, that from Bressa to Milan and the Bergamo road. The minor roads are only sketched in roughly or simply replaced with a written indication of the distances from one village to another.

Size of the original: 30 × 41.2 cm. Photograph courtesy of the Archivio della Curia Vescovile di Milano (Raccolta carte topografiche e disegni; formerly in Section X, Visite pastorali, Pieve di Treviglio, vol. III [formerly vol. XII]).

division, complete with windows—is given in detail, together with a few of the surrounding houses. From this center, lines lead out to the various satellite churches, giving an immediate visual image of the ecclesiastical organization of the area. The rounded hills—typical of Aragonio—are exaggerated. No roads are shown, but the winding watercourses are prominent. The map is less concerned with giving detailed information than with offering a convincingly realistic visual picture of the territory. Although the sixteenth-century maps we have looked at so far were often concerned with giving precise information, this map successfully proposes a particular

vision of the territory, even at the cost of omitting certain physical or manmade features.

In the maps drawn up during the period of Federico Borromeo, there was a definite shift in attention. Previous maps had already depicted the organization of religious power throughout the territory; these new maps focused much more on details of landscape, with their authors trying to convey a visual image of a beautiful and densely populated region. This was a period when the links between the art of cartography and the art of painting were the closest they ever were in the history of modern cartography and also the most revolutionary. However, if the
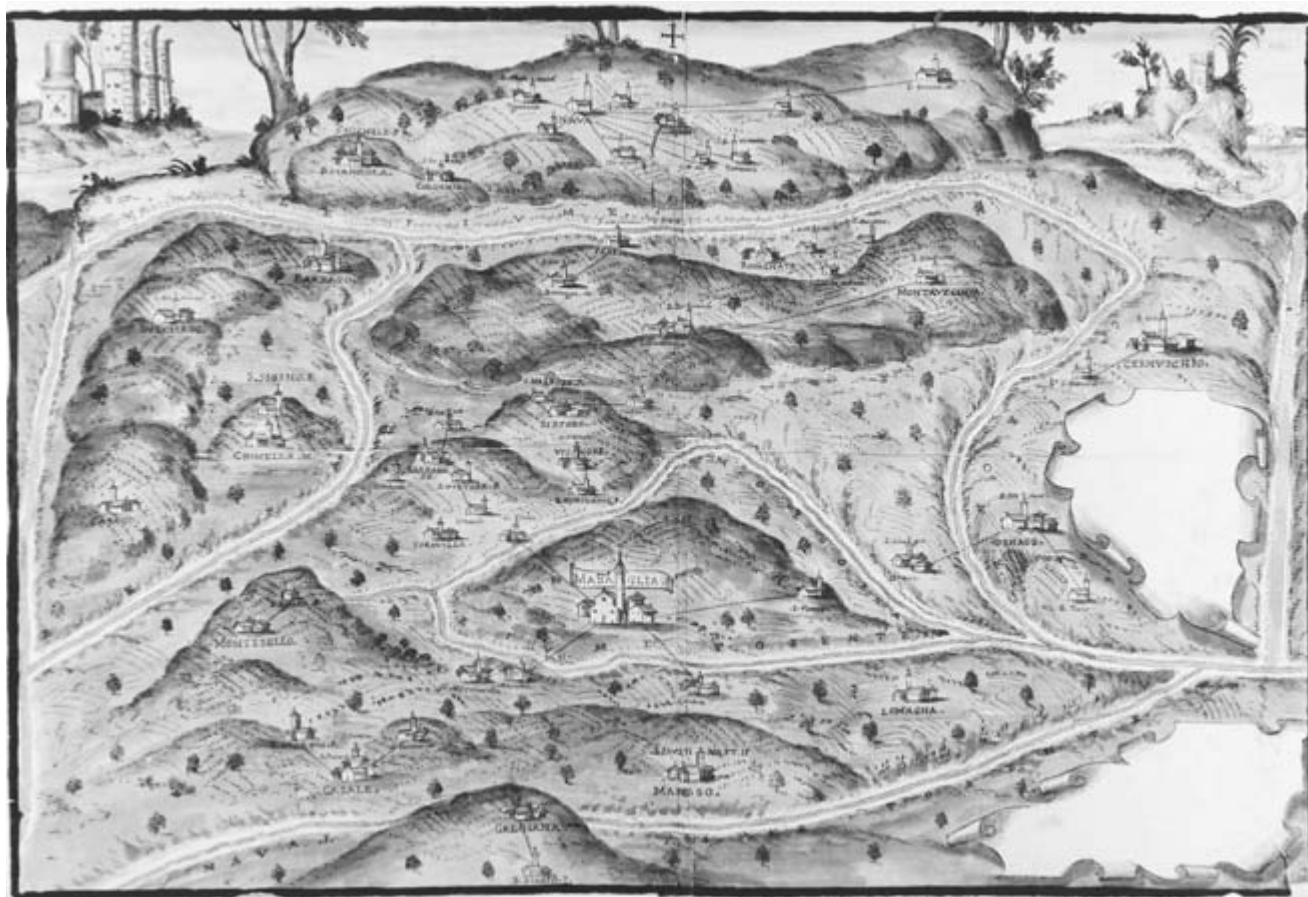
FIG. 35.19. THE AREA UNDER THE *PIEVE* OF MIS-SAGLIA BY ARAGONUS ARAGONIUS, 1611. Watercolor and pen drawing on paper.
Size of the original: 44.3 × 65.4 cm. Photograph courtesy of the Archivio della Curia Vescovile di Milano (Raccolta carte topografiche e disegni; formerly in Section X, Visite pastorali, Pieve di Missaglia, vol. XXX e XXXI).

rhetoric of painting initially displaced the rigor that had been a feature of sixteenth-century maps, it would, in its turn, soon be displaced by a type of cartography that considered strict and careful measurement the one and only way of producing a true representation of territorial form.

CONCLUSION

In order to draw some conclusions about what we have tried to demonstrate, it is worth considering the two levels of analysis we have followed: the typology of cartographic documents examined and the theoretical approach used to interpret the maps. Concerning the first level of analysis, the various types of document analyzed here have revealed the multiple interests that the governments of northeastern Italy had to satisfy during the Renaissance period, ranging from administration to defense, from description to celebration, and aimed at the organization and management of the territorial resources and the exercise of control over them. The types of maps identified show how the reason behind the creation of a document might influence the information included and the cartographic language chosen, and, whether the latter was considered complete in itself or supplemented by a written text, it reveals the interests and motivations behind the document and the communicative aims its author had set for it.

From the previous analysis we have been able to see that one simply cannot correctly interpret these documents unless one first identifies the cartographic type to which they belong (and thence obtain a way of deciphering the iconographical message each contains). The complexity of the cartographic languages in the period we are discussing means that such identification of types is a question not of neat classification but rather of correct interpretation. Precisely because those languages had not yet been flattened out into an arid collection of abstract signs, they still managed to communicate whole series of multiple associations

and hidden messages that would find no place in later cartographic techniques. So the identification of type does not merely serve to classify a document, it provides an important indication as to how it is to be read.

As for the second level of analysis, the theoretical approach to the map, I have tried to demonstrate that semiotic analysis underlies the mechanisms through which the designators and the different surrogates are put on a map, helping us to understand the purpose of the document. In fact, every sign on the map has a specific aim that is connected to the meaning of the other signs, creating a general message. We have seen how misleading and limited it can be to judge the value of a map simply on the basis of whether it contains interesting information; the cartographic document must be assessed as a complex piece of discourse, addressed to a precise audience, with clear objectives and communicative goals. In fact, I have often argued that what a map offers is not the layout of territory but rather a specific idea of that territory: the map transmits a theory, offers an iconic depiction of territory. In the cartography of this period produced in Lombardy and the Veneto, one can see the application of designators and surrogates to communicate social practices and ideological aspirations or constructions. The map is not a window thrown open onto the world; it is a deceptively naturalistic and transparent system of symbolism that conceals a hidden, opaque, and arbitrary mechanism of representation. However, it is precisely because such manuscript cartography—and manuscript administrative cartography, in particular—is "theory-bound" that it enables us to understand how territory itself may be considered as a process. What the map offers us is not a banal rendition of landscape but an instance of a dynamic process arising from the relation between humankind and the natural world. At this level, a map not only embodies an act of "registration," but also puts forward aims and projects for territorial change. The fact that the cultivated fields in Sorte's 1556 "Dissegno da adaquar il Trivisan" may not actually have existed, or that river water was not visibly distinguishable from the sea into which it flowed (as Sabbadino portrayed it), is not essential. What is important is that these messages, which one might call "distorted," reveal how technicians and experts used maps as persuasive tools in public debate; to stress and underline those features that, within the entire body of information contained in a map, were the most worthy of attention, was to make a highly efficient rhetorical presentation of the facts.

The Venetian Republic's introduction of maps into the public debate about questions of territorial management reveals the importance maps took on in Renaissance Italy. The map became part of the process of government; its symbolic mediation of facts had an effect on political decisions. In effect, the map's communicative efficacy made it into a tool for the furtherance of social strategies, a highly effective means for the promotion of political policies. So in northern Italy, maps appear as a cultural product that, in turn, generated culture and territorial knowledge—and it is as such that they were able to impose an innovative interpretation of the world.