The villas in the Treviso countryside in the first half of the 16th century. A problem of classification

Renzo DEROSAS

Abstract. From the end of the 15th century a large number of villas were built in the Veneto countryside. This phenomenon—which reached its architectural highest point with the work of Andrea Palladio—is rightly considered to be one of the very special features of the Renaissance Veneto, though scholars have interpreted it in various ways. Some have argued that the villas served mainly as administrative centres for the large estates in which the Venetians invested after they abandoned international trade, whilst others have argued that the villas served mainly for political and social control and were the expression of what was becoming a dominant ideology. However, none of these interpretations rests on precise data with regard to the number of villas, the identity of their owners or the type of landed estate and agricultural context they occupied.

Using data from a survey of landed property drawn up in 1542, this study aims to provide just this information for the area around Treviso, a vast region a few kilometres from the Lagoon, which was described by contemporaries as "the garden of Venice". Though the survey offers detailed descriptions of all the farming concerns occupying an overall area of more than 150,000 hectares, it does not contain any explicit reference to "villas" as such—quite simply because the term at the time had a different meaning, and there was no unambiguous term for all those buildings which we would now classify as "villas". Thus the task was to establish a satisfactory criterion by which to identify the villas among the building complexes registered in the survey. To do this a multivariate correspondence analysis is used, which makes it possible to investigate the relation between the numerous features used to describe the buildings—and relative appurtenances—present on each farm. Automatic classification of the results obtained subsequently produced a class composed of "possible" villas. This was then used to analyze the territorial distribution and ownership of the villas, and thus evaluate the thesis of a functional relation between villa, farm and landed estate.

Résumé. À partir de la fin du XV^{e} siècle, de nombreuses villas furent construites dans la campagne de Vénétie. Ce phénomène — qui atteignit son apogée architecturale avec l'œuvre d'Andrea Palladio — est considéré à juste titre comme une caractéristique importante

✉ Università Ca'Foscari di Venezia; Dipartimento di Studi Storici; San Marco, 2546; I-30123 Venezia (Italy).
Fax: +39 41 522 25 17 E-mail: derosas@unive.it

Extrait de la Revue Informatique et Statistique dans les Sciences humaines XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

de la Vénétie de la Renaissance, bien que les spécialistes l'aient interprété de différentes manières. Certains pensent que les villas étaient tout simplement les centres administratifs de grands domaines dans lesquels les Vénitiens investirent après avoir abandonné le commerce international, alors que d'autres affirment qu'elles permettaient principalement un contrôle social et politique et étaient l'expression d'une nouvelle idéologie dominante. Cependant, aucune de ces interprétations ne se fonde sur des données précises concernant le nombre de villas, l'identité de leurs propriétaires ou le type de domaine et le contexte agricole dans lequel elles s'inscrivaient.

Sur base d'un recensement des propriétés terriennes effectué en 1542, la présente étude a pour but de fournir précisément ce type d'informations pour les environs de Trévise, une vaste région située à quelques kilomètres de la Lagune et que les contemporains appelaient « le jardin de Venise ». Bien que le recensement nous donne des descriptions détaillées de tous les complexes fermiers — couvrant une superficie totale de 150 000 hectares — il ne contient aucune référence explicite à d'éventuelles « villas ». Ceci est tout simplement dû au fait que le terme avait à l'époque une signification différente, et qu'il n'existait pas de terme spécifique désignant les bâtiments que nous qualifierions aujourd'hui de « villas ». Il a donc fallu établir un critère permettant d'identifier les villas parmi les complexes architecturaux décrits dans le recensement. Nous utilisons pour ce faire une analyse des correspondances à plusieurs variables, ce qui nous permet d'établir des liens entre les nombreuses caractéristiques mentionnées dans la description des bâtiments — et des dépendances — de chaque ferme. La classification automatique des résultats obtenus nous a permis de produire une classe composée de villas « possibles ». Cet ensemble fut ensuite utilisé pour analyser la distribution territoriale et les propriétés des villas, et donc d'évaluer la validité de l'hypothèse d'une relation fonctionnelle entre villa, ferme et domaines terriens.

Keywords: villas (Veneto region, early Renaissance), landed property survey, correspondence analysis, automatic classification

Mots-clés : villas (région de la Vénétie, début Renaissance), recensement des propriétés terriennes, analyse des correspondances, classification automatique.

The aim of this article is to provide some statistical information about the villas present in the Veneto countryside (or, more specifically, the area around Treviso) in the mid-16th century, and thus go some way towards making up the shortfall in precise information as to the number and patterns of distribution of these villas.[1] Obviously, if one is considering the stylistic or formal characteristics of specific villas such information is not particularly important; but it becomes much more so when one is dealing with such questions as the origin of the villa itself, the functions it was designed to perform, the groups or social classes who actually owned villas, or even the political and ideological significance that the villas are

[1] A recent attempt to offer a quantitative account (GULLINO, 1994) limits itself to a part of the Venetian owners, thus excluding those villas owned by subjects from the mainland. What is more, the author does not make it clear what criteria were used in classifying the buildings mentioned in the source material as "villas".

Extrait de la Revue Informatique et Statistique dans les Sciences humaines XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

said to have assumed. If we are to try and answer such questions, our knowledge of villas should be as wide-ranging and complete as possible.

Given that there is no sufficiently defined frame of reference, it comes as no surprise that various conflicting—sometimes antithetical—interpretations of the villa phenomenon have been put forward. However, though there may be disagreement about the derivation of certain architectural features, there is general agreement that the early-Renaissance Veneto villa was characterized by a natural symbiosis between a manor house and other rural buildings—all of which formed a coherent functional whole.[2] From this starting point, many scholars have gone on to emphasise the strictly economic role of the Veneto villa, seeing it as not only the place of relaxation about which the Venetian diarist Girolamo Priuli was complaining at the beginning of the 16th century[3] but also—and above all—as a centre of agricultural activity, a place for the collection and treatment of agricultural produce and for the shelter and storage of the men, animals and machinery used in working the fields. Thus the villas are seen as the most obvious result of a massive transfer of Venetian capital away from trade into land ownership and agriculture. However, some argue that the evolution of the old buildings and structures was linked with the reorganization of the countryside into large rented estates, whilst others claim that the villa was merely the collection point for the income from the large number of small farms into which the large estate was broken up.[4] Then there are those who bring the peak period for the emergence of villas forward to the end of the 15th/beginning of the 16th century, arguing that they were the creation of the provincial aristocracy, veritable "gentlemen farmers" who were directly involved in cultivating their own land and not simply in the collection of land rents. This theory has it that the Venetian nobility made their appearance on the scene rather late (in the second half of the 16th century) and in a rather limited fashion; it is argued that they were unable to understand the deep and solid link between landowner and estate that was at the very basis of the villa phenomenon, and thus

---

[2] On this point I limit myself to referring to the fundamental study by ACKERMAN: 1990, p. 89–107, and the ample bibliography he cites.

[3] *Ibid.*, p. 92–93.

[4] GAMBI: 1964, p. 451–2; VENTURA, p. 65–77. On this line of approach with regard to the Verona area, see ZALIN: 1975.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

their arrival led to the end of the "living language" in which Palladio had expressed such a bond.[5]

However there are those who have doubted this view of villas as the centre of agricultural enterprise. It has, for example, been pointed out that only very few villas stood within sizeable agricultural estates—and that even when there is such a sizeable estate the villa does not seem to be equipped with the structures necessary for its full agricultural exploitation. Thus it is an illusion to think that villas had a "significant functional relation" with the surrounding environment. Their real role was to exercise socio-political control over the surrounding countryside; they served as bulwarks of feudal resistance, defending the prerogatives of the provincial aristocracy against the encroachments of the Venetian state. This explains why a large number of villas are concentrated in the area around Vicenza (where the conflict between local aristocracy and State was particularly sharp) and there are few villas to be found in the Padua and Treviso areas—where there were more Venetian landowners, feudal bonds had been undermined and agriculture to some extent rationalized.[6] On the other hand, there is a similarly political reading of the villa as an expression of "the architecture of dominion" which argues the exact opposite—that is, that the villas were a symbol of the political and economic recovery of Venice after its defeat by the League of Cambrai and were indeed the means whereby the colonizing Venetian State overcame the resistance put up by the local aristocrats.[7]

Of course one cannot go into the merits of such arguments here. All I want to point out is how each of them presupposes certain basic knowledge with regard to the number of villas, who owned them, how and when they were created, their role within the organization of agriculture and the structure and methods of agricultural enterprise itself—knowledge which is still a long way from being complete. The present article naturally does not claim to be able to provide an answer to all the above-listed questions; what it does intend to do is establish certain basic points of reference for the study of the villa phenomenon in the area around Treviso using the information to be gleaned from the general

---

[5] ROSCI: 1968, p. 27–54; ROSCI: 1969, p. 78–82

[6] SORAGNI: 1980, p. 137–145.

[7] MURARO: 1978, p. 203–223. BAGATTI VALSECCHI-LANGÈ: 1982, p. 404–418. See also the balanced reflections in COZZI: 1984, p. 518–520. For the "architecture of dominion" see BENTMANN and MÜLLER: 1970.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

survey of landed property carried out in the area in the year 1542.[8] The article is divided into three parts: the first is purely introductory, offering some information on the economic and social position of the Treviso area in the mid-16th century; the second deals with how one is actually to recognise the villas in the information gleaned from our source data (given that the survey makes no explicit reference to "villas", an overall analysis of all the landed property listed is carried out, using the methodology of automatic classification to identify a group of "probable" villas); the third part deals with the social and geographical distribution of these "probable villas" and tests the theory of a functional relation between villa, estate and agricultural enterprise.

1. The Treviso area around the middle of the 16th century

In the early modern era the Treviso area was, from a politico-administrative point of view, different from all the other mainland Venetian provinces. Unlike what had happened in the other major cities conquered by Venice, the Treviso ruling classes had shown themselves incapable of re-forming a coherent and socially homogeneous whole that could exercise unchallenged economic and social power over its province and put itself forward as the natural interlocutor for the central Venetian government. Signs of this weakness were: the absence of a stable City Council with a clear-cut political and institutional role; the anachronistic division of offices between *milites* and *cives*; the role played by the four Colleges of Nobles, Judges, Doctors and Notaries; and the fact that the Commune had almost no financial and judicial autonomy. One result of this was that the surrounding territory was not administered by the city but by the Venetian representatives and their officials (this again was an almost unique case on the Venetian terraferma), a fact which the *distrettuali* [inhabitants of outlying areas who did not enjoy rights of urban citizenship] and the rural oligarchy that grew up amongst them did

[8] The districts of Valmareno, Collalto and San Salvatore are excluded. The analysis of the source material was carried out as part of a collective research programme—*The Treviso Countryside in the 15th and 16th centuries*—financed by the Benetton Foundation and headed by Danilo Gasparini. I covered the computer and statistical analysis of the material, presented in DEROSAS: 1991. The publication of the results has yet to be completed. The material already published includes DEL TORRE: 1990 (to which I refer for a historical presentation of the source material, p. 65 *et seq.*), GALLETTI: 1994; PITTERI: 1994; PIZZATI: 1994, BELLAVITIS: 1994 and TODESCO: 1995.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

not fail to take advantage of, exploiting the ample margins of resistance to various aspects of City policy—particularly in the very delicate area of taxation.[9] What is more, the territory subject to Treviso had since the 14th century undergone a number of "amputations", with most of the minor towns becoming the seats of autonomous districts (*podesterie*) governed by Venetian Rettori who had full judicial power over their area and were subject to the provincial capital only in matters of taxation. These small towns—in some cases little more than villages—had quite soon established their own town councils and College of Notaries, with their own local oligarchy expressing pretensions to nobility—so in each it is clear that the separation from Treviso encouraged a certain social dynamism.[10] Finally, one should also mention the size and number of feudal jurisdictions still extant in the area; whilst these may not have directly hindered the role of the city of Treviso itself, they do reveal a clear "backwardness" which set real limits to any pretensions to urban expansion (fig. 1).

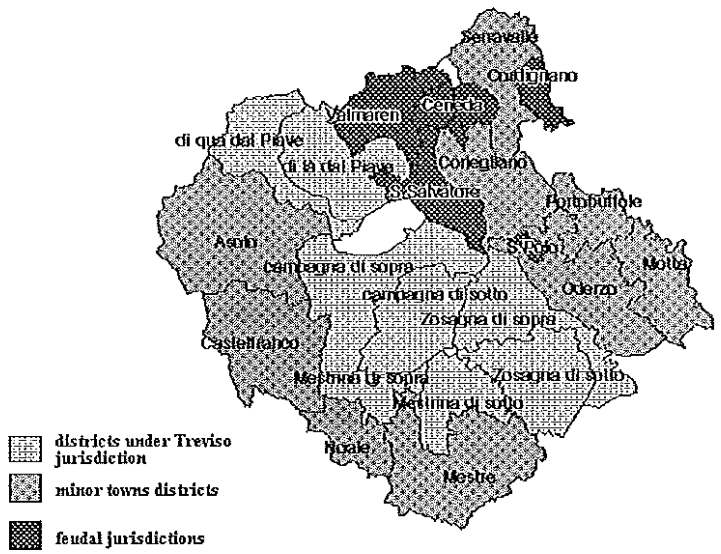

Fig. 1.– The territory of Treviso and its districts

[9] DEL TORRE: 1990, p. 127 *et seq.*

[10] *Ibid.*, p. 39 *et seq.* Further information on the respective centres in PIAZZATI: 1994, p. 14 *et seq.* and BELLAVITIS: 1994, p. 11 *et seq.* On the subject of the urban aspirations of the small towns in the Padua area, see CHITTOLINI: 1990.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 1

Distribution of land ownership (in hectares) and land income (in lire) according to social category*

	Area of farmland				Net income			
	hectares		%		lire		%	
Distrettuali	**29,369**	29,369	**17.9**	17.9	**282,267**	282,267	**17.5**	17.5
Treviso citizens		14,655		9.0		135,270		8.4
Treviso nobles		13,981		8.5		128,085		7.9
Treviso citiz. & nob.	**28,635**		**17.5**		**263,355**		**16.3**	
Minor towns citizens		15,526		9.5		174,746		10.8
Minor towns nobles		6,553		4.0		73,022		4.5
Minor towns citiz.& nob.	**22,080**		**13.5**		**247,769**		**15.4**	
Feudal lords	**2,001**	2,001	**1.2**	1.2	**15,158**	15,158	**0.9**	0.9
Venice patricians		26,649		16.3		291,357		18.1
Other Venetians		9,726		5.9		103,344		6.4
Venetians	**36,375**		**22.2**		**394,700**		**24.5**	
Other individuals	**8,617**	8,617	**5.3**	5.3	**95,996**	95,996	**6.0**	6.0
Lay bodies	**8,396**	8,396	**5.1**	5.1	**74,188**	74,188	**4.6**	4.6
Regular clergy		17,824		10.9		145,225		9.0
Secular clergy		10,423		6.4		94,190		5.8
Ecclesiastical bodies	**28,247**		**17.3**		**239,415**		**14.8**	
Total	**163,720**	163,720	**100**	100	**1,612,848**	1,612,848	**100**	100

* In this and all subsequent tables there may be small discrepancies between the values given and the relative totals (due to the rounding-off of figures); the same is also true of the percentages, the sum of which may be slightly more or less than 100). Instead of arbitarily adjusting the data, I have preferred to maintain the rounded-off figures and provide this advisory note.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Thus, given the substantial incapacity of Treviso to impose its dominion on the surrounding territory, there was sizeable room for manœuvre for such social groups as the *distrettuali*, the citizens of the minor towns and the feudal nobility itself (all of which groups were in the other terraferma provinces relegated to the sidelines of power, when not actually absorbed by the provincial capital itself). There is significant socio-economic confirmation of this substantial equilibrium. If one looks at the division of land ownership and land rents as it emerged from the general land survey of 1542 (table 1), we can see that the various social groups enjoyed roughly equal shares—only the Venetians have a slight preponderance, with 24 % of total incomes and 22 % of the total agricultural land surveyed. Thereafter come the *distrettuali*, the citizens of Treviso, the minor nobility of the small *podesterie* and the ecclesiastical bodies, all with shares that vary somewhere between 14 and 18 %. If one breaks the figures down even further, one sees that the *distrettuali* themselves challenge the first position enjoyed by the Venetian patricians (they own a slightly greater area of land, whilst the land owned by the latter tends, on average, to produce higher incomes). Just behind them, with shares between 8 and 10 % come the citizens of the minor towns, the citizens of Treviso, the Treviso nobility and the regular religious bodies.

However, alongside this noteworthy balance of property and income, there are substantial differences in the territorial distribution of the land owned; table 2 shows the percentage distribution of land ownership for each of the above groups in the various administrative districts covered by the land survey.

Perhaps the land owned by the *distrettuali* is the most evenly distributed; their share practically never falls below 10 % in any given administrative district. There are, however, areas where peasant ownership of the land is much higher than the average: apart from the two small administrative districts of Cordignano and San Polo, this is predominantly the case in the Piave area (over 40 %) and in the two *podesteria* of Asolo and Portobuffolè. All of these areas were less attractive from an agricultural point of view (either because of the quality of the land or because of difficult communication and transport links—hence the generally lower income generated, as mentioned above). However, *distrettuali* land ownership is still quite high in such areas as Ceneda or the *podesterie* of Oderzo and Noale, where conditions were much better, and though it decreases in the other areas it is still considerable (thus supporting the emergence of that rural oligarchy already referred to).

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 2

Percentage distribution of land ownership according to district and social category

	Distrettuali	Treviso	Minor towns	Feudal lords	Venetians	Other individuals	Lay bodies	Ecclesiastical bodies	Total
Piave	43.4	27.8	1.0	2.7	1.7	2.3	4.2	16.9	100
Campagna	10.8	46.3	6.8	0.9	9.2	2.2	4.9	18.9	100
Mestrina	13.2	34.9	0.3	0.3	20.2	2.8	8.6	19.7	100
Zosagne	9.8	23.4	0.1	5.9	32.5	3.6	5.0	19.7	100
Mestre	10.6	5.2	1.5	0.0	38.0	4.9	8.9	31.0	100
Noale	22.0	19.3	11.5	0.0	27.4	6.2	6.2	7.5	100
Castelfranco	15.5	9.2	19.7	0.0	39.4	6.5	1.3	8.5	100
Asolo	30.8	13.0	22.3	0.0	12.1	12.5	1.0	8.2	100
Conegliano	13.8	1.8	50.2	0.6	2.1	1.6	5.0	24.9	100
Serravalle	15.5	1.0	43.1	0.0	0.1	12.6	6.6	21.1	100
Cordignano	51.1	1.1	5.0	0.1	4.3	20.1	4.6	13.7	100
Oderzo	25.1	5.8	19.8	1.2	22.8	6.0	3.4	15.9	100
San Polo	58.5	3.5	1.9	0.0	0.7	1.4	2.7	31.4	100
Portobuffolè	38.2	0.8	23.5	0.0	16.9	8.6	4.0	8.0	100
Motta	15.1	0.4	25.3	0.0	46.8	4.1	8.2	0.1	100
Ceneda	20.8	0.0	36.3	0.0	0.0	11.6	7.4	23.8	100

As far as the other social groups are concerned, their preference for specific areas is even more evident. The citizens of Treviso have a predominant share in land ownership in the Campagna district around the city and then a declining, but still important, share of somewhere between 25 and 33 % in the nearby territories of Mestrina, Zosagne and Piave. Thus they owned sizeable quantities of land in their immediate vicinity and their share diminished as one moves away from the city (the partial exceptions to this rule being in Noale and Asolo). All of which further confirms how the establishment of the minor *podesterie* created a deep fracture even within the city's closest economic interests. The counterpart to this is that in those centres characterized by a dynamic urban society, citizen land ownership was particularly high: in Conegliano, for example, citizens owned more than 50 % of the land, whilst the share was some 43 % in Serravalle. Citizen land ownership share, however, remains substantial in Ceneda, Motta, Portobuffolè, Asolo, Oderzo and Castelfranco (always somewhere between 33 and 20 %), whilst it tends to disappear in the

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Treviso district. As for the Venetians, one can see that their advance into the Treviso province followed two different lines of approach: one passes from Mestre towards Noale and Castelfranco and the other moves towards Zosagna, Oderzo and Motta. These are the zones in which the Venetian property share is highest (though they also have high property shares in Mestre and Castelfranco). Then, finally, there are the ecclesiastical bodies. They are distributed in a fairly homogeneous manner throughout the whole of the territory under discussion; their share is particularly high in Mestre, Conegliano, and Ceneda (somewhere between 25 and 33 % of the property surveyed), and remains substantial in the Treviso district (only in the *podesteria* of Motta is the church's share of landed property negligible).

Table 3

Average size (in hectares) and average net income (in lire) of the farms in each district

District	Average size	Average income
Mestre	13.72	118.00
Noale	6.13	62.70
Zosagne	11.40	107.50
Portobuffolè	5.27	50.86
Mestrina	9.09	89.87
Serravalle	3.90	28.35
Motta	7.74	68.23
Cordignano	3.69	32.36
Oderzo	7.23	65.18
Asolo	3.36	36.41
Campagna	6.92	48.07
Ceneda	3.25	79.02
Castelfranco	6.50	52.97
Quartiere del Piave	2.81	22.89
Conegliano	6.14	49.84
San Polo	2.02	28.37

Let us now consider a final point concerning the organization of agricultural production. Table 3 gives the average net income and the average size of farms (understood here as each individual concern registered in the survey) in the various administrative districts. Though these are quite rough indicators of agricultural organization, one can nevertheless observe certain interesting differences between the various districts: the ratio between the highest average values (Mestre) and the lowest (San Polo and Quartiere del Piave) is approximately 5:1, whilst

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

with the single exception of Ceneda (which has high average income figures but low average farm size) there seems to be a steady relation between income and farm size. There is also a clear gradual change from the southern parts of the area under discussion through the central zones to the north—which obviously reflects the orographic peculiarities of the territory (but also probably has something to do with the varying Venetian presence in these zones, given that the Venetians tend to be found where the average farm size is largest).

2. The source: a survey of landed property without villas

The information presented above is taken from the 1542 Treviso "estimo" or survey of landed property (though the date should not be taken too literally, since compilation of the survey began in 1537 and various adjustments were made to it for more than twenty years after it came into force).[11]

The Treviso archives are rich in land survey material dating from the 14th century onwards, but the 1542 survey is the oldest covering the entire territory to have survived practically intact. It thus offers an exceptional opportunity for the study of the agriculture, the countryside, the economy and rural society of this area in the first half of the 16th century.

The survey describes, often in some detail, all the landed property subject to taxation. It gives the names of owners and farmers, the size of fields and the crops cultivated therein, the types of tenant contracts, the rents due and their composition, the liens of various natures and who pays and receives them, and finally—what interests us most here—it lists all the buildings—"houses, warehouses, victual stores and workshops" and their relative "gardens, vegetable gardens and orchards"—included in the property. Houses inhabited by the owner and gardens and orchards smaller than three *campi* (about 1.5 hectares) were exempted from taxation; but even though we have no way of estimating the extent of possible omissions made by the compilers, there is no doubt that in many cases such gardens and houses were included in the survey description (even if then excluded from the calculation of taxation due). The type and function of buildings is almost always given—sometimes along with information on building materials (brick/stone, wood, reed,

[11] DEL TORRE: 1990, p. 108 *et seq.*

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

tiled or thatched roof, etc.) and on the tools and equipment kept therein. Although the survey does not contain specific instructions to compilers, it does seem that they kept to a fairly standard model when it came to describing the buildings included.

The survey of landed property therefore would seem to be the ideal instrument for a statistical study of the distribution of villas throughout the Treviso territory in the mid-16th century. However, there is unfortunately a serious drawback to the survey: of the almost 35,000 buildings listed not one is explicitly described as a "villa". Analysis of the records has discovered at least 40 types of building structures used in classification, but there is no explicit reference to a villa or any other type of "monumental" structure. On one occasion there is mention of a "palazzo"—the famous Villa Giustinian at Roncade, which is described as follows "residential palazzo with a court surrounded by a wall with four towers and two outbuildings, one on each side, with walls covered with tiles, with a three-field garden and orchard next to the said palazzo and court". [12] By far the most common classification used in the survey (appearing some 12,000 times) is the simple "house"—though there are a number of "large houses" (1,800) and "small houses" (1,500). There are only 209 *case da stazio*, a term that in Venice was used as a synonym for palazzo, whilst those which are described as *in soler* or *solerate*—that is, as having two or more floors—number 486. The most common structure not intended for accommodation purposes are the *tezze* [Dutch barns] (there are almost 9,000). These are followed by stables (416), victual stores (220), dovecotes (230), barns (165) and granaries (only 9). Finally one should also mention the high number of mills listed—around 400, probably one of the highest densities of milling capacity in any area in Europe at the time. [13]

How are we to explain this absence of villas from the land survey? Having excluded the idea that there was some sort of systematic omission of this type of structure, the likeliest answer seems to be one of vocabulary. As is known, in the language of the time the word "villa" referred to a village or to a landed estate; there was no clear-cut term for that type of construction which was defined by its place in a rural—as opposed to urban—context, rather than by its particular stylistic or structural features.

---

[12] State Archives, Treviso, *Comunale*, folder 1231, 1542. *Forestieri, Zozagna di sotto*, c. 103.

[13] For the mills on the Sile, see PITTERI: 1988.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

In fact, Palladio himself used the joint term *casa di villa* ["villa house"] to indicate the owner-occupied country residence.[14] It was the lexical recognition of the specific architectural and functional features of the villa which led to a shift in the term "villa" itself, accentuating its "aristocratic" implications. A study of just how and when this shift took place would be an interesting exercise in cultural history, but it lies outside the scope of the present paper. What I wish to make clear here is the simple fact that the absence of an explicitly-defined term raises a rather difficult problem of taxonomy. In other words, how are we to decide which of the over 15,000 structures classified as habitations in the 1542 survey were actually villas?

The question is obviously a preliminary to an overall study of the survey, because without precise criteria for the attribution of buildings to one class of structure or another such an analysis cannot get underway. The most obvious answer is that some other term was used that is synonymous with the term "villa" as we use it. The most obvious candidate would seem to be *casa da stazio* ("residential house"). Clearly this building had a certain social importance and guaranteed the owners a certain social prestige. However, one has then to verify that this identification of the two terms is correct. Were the 209 *case da stazio* included in the survey all villas, and were there other villas classified within one of the other categories?

There is no clear way of providing an answer to the first question, but there can be no doubt that one would have to answer the second question in the affirmative. There are, in fact, various extant villas which the survey classifies not as *casa da stazio* but as *casa solerata*. For example, the Villa Volpi in Marignano (Mogliano) owned by the patricians Antonio and Nicolò Lion is classified as a *casa solerata* with a tiled roof, or again, another villa on the Terraglio, the Villa Padoan (formerly Contarini) is classified as one of the two *case solerate* in stone with tiled roof, orchard, garden, brick victual store, outbuildings and stables, owned by the nobleman Bernardo Sanudo.[15]

So, do we have to extend the class of villas to include all the 486 *case in soler* as well as the 209 *case da stazio*? It is clear that this would not eliminate the double question raised above—it would simply shift it sideways. The decision to do so would anyway have a significant effect

[14] ACKERMAN: 1990, p. 89.

[15] This information was kindly supplied me by Mauro Pitteri.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

upon the results of the analysis: not only would it influence the actual number of buildings recognized as villas, but also their distribution across the territory, the social profile of villa-owners and the general nature of the agricultural and productive context within which the "villas" are sited.[16]

The real problem lies elsewhere. We have to decide whether it makes sense to continue with the implicit assumption that villas are clear unequivocal entities and that our problem in identifying them simply arises from the late emergence of the term "villa" itself. In general terms one can certainly agree with the view that villas marked something absolutely unique in the history of architecture, something that cannot be confused with other types of buildings.[17] However, without adopting all the abstract socio-architectural hierarchies proposed by Serlio and Doni[18], it seems reasonably clear that there was such a stylistic and structural variety in country residences that their precise classification is hardly a straightforward matter. This difficulty of classification applies all the more to early Renaissance villas of the Veneto, whose "agrarian" and "entrepreneurial" role is so important that the categories within which they are to be included become even more uncertain and unclear. Certainly, the fundamental aspects of the model of a "farm-villa", the term we shall use here for the contemporary term of *villa rustica*, are quite clear—manor house, farmhousing, buildings for livestock and crops and stores, one or more dovecotes, a courtyard and a garden/orchard enclosed by walls or hedges[19]—which should make the type easily identifiable. However, as we shall soon see, these components appear within our source material in such a wide variety of combinations that it is very difficult to lay down precise and clear-cut criteria for distinguishing one category from another.

---

[16] To give only one example: whilst Venetian patricians account for 39 % of villa owners, that percentage is reduced to 27 % if we include *case in soler* in our calculations; on the contrary, the figures for citizens increases from 8 to 17 %.

[17] ACKERMAN, 1990, p. 9.

[18] *Ibid.*, p. 108–109.

[19] See notes 2 and 4 above. There is an interesting and detailed account of the various phases of the building of a country villa over several decades in MOMETTO: 1992, p. 104–109. It is significant that while the writer speaks exclusively of a "manor house", R. Mueller in his preface to the same book explicitly refers to the same building as a "villa".

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

3. An exploratory analysis of the buildings classified

It is certainly no coincidence that along with the above-mentioned lexical vacuum there is a substantial indeterminacy in the very object of our analysis—an indeterminacy which means that classification based on prescriptive criteria could well prove to be purely arbitrary. So it is best to abandon any attempt at classification based on pre-established models and approach the question in an exploratory manner—that is, investigate the internal relations between the different variables under observation and thence try to interpret them. As already mentioned, the land survey contains a fairly wide range of information on the buildings and appurtenances present on each property. The first phase of our investigation, therefore, will involve the use of statistical analysis to establish which are the most significant associations between these various elements. Hopefully, this will lead to a more synthetic picture of the context under study, with a minimum loss of detail. The second phase of the study will involve the use of this statistical analysis to create a classification that is not based on pre-established categories but upon criteria of similarity between the objects (on the basis of the associations established above).

Let us look first at how these farms break down according to the number of buildings present.

Table 4

Distribution of farms according to number of buildings and total surface are

# buildings	# farms	hectares
0	52,446	74,729
1	6,320	11,517
2	5,063	21,213
3	3,310	29,152
4	1,216	16,394
5	362	5,510
6–10	197	4,753
11–29	8	452

In more than 52,000 cases the source does not mention the presence of any building. Undoubtedly, this is a rather unexpected result.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

It conflicts with the widely-held picture of a densely-populated countryside—that is, of rural areas in which resident agriculture (with its necessary complex of buildings) was already established on a wide scale. Naturally one has to treat the data with a certain caution, particularly with regard to the omission of owner-occupied houses (which, as mentioned above, were not included when it came to calculating taxes due, and therefore could in theory be omitted from the survey). However, only a quarter of these farms are owner-run—and so one is justified in suspecting a possible omission.

For the rest of the break-down there are no particular observations to be made: the direct proportion between the average size of the farms and the number of buildings is entirely predictable; overall, the greatest area is occupied by concerns with at least three buildings, followed by those with two, four and one building respectively. Above this threshold, the frequency and relative weight of farming concerns with more buildings declines sharply: there are only 362 cases of concerns with five buildings, and only 8 of concerns with more than 10.

This division already seems rather significant. However, it is still not enough for us to have a clear break-down of the fundamental types of building present in the Treviso countryside in the early 16th century. To do this we must use a much wider range of information on the building complexes of individual farms—information which covers more than the mere number of buildings. As already mentioned, the description of residential houses generally includes reference to type (simple house, *casa da stazio*, *casa solerata*, etc.) to building and roofing material, to the presence of courts, to whether it is used exclusively by the owner, and sometimes to the actual size of the structure. The same is also true of any other buildings present on the property: farm housing, outbuildings, victual stores, barns, stables, granaries, dovecotes and mills. The description also covers such appurtenances as courtyards, orchards, gardens, wells and ovens and even the presence of enclosing walls or hedges. All of these features give us a fairly complete picture of the buildings present on a farm. Along with this information there is other data covering the farm as a whole: the area, the income, the type of land, the products and crops, the way it is run, the geographical location, the social status of owner and farmer, and so on. This information does not serve to identify the building typologies, but it does cast some light on the social context in which they occur.

All of this information could be expressed in a dichotomic or binary form: that is, one can record either the presence or absence of a specific

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

feature. For example, a house may or may not have a tiled roof, may or may not be described as "large", as having a garden, a dovecote, a stable, an enclosure wall, and so on. What I intend to do first is establish the most significant relations there are between these presences and absences considered overall and simultaneously (in fact, separate analyses of the possible cross-tabulations would be too fragmentary and dispersive to be of any real use). Thus one has to find a way of synthetically expressing the reality under study, maintaining all the fundamental features and losing as little information as possible. Multivariate correspondence analysis is, for this purpose, a very useful tool.[20] It functions by redistributing the overall inertia of a contingency table into factors that can be interpreted in relation to the initial variables. These factors are, in fact, new quantitative variables; but there are much fewer of them than the original variables and they should allow an easier interpretation of data.

In this case 35 binary variables were used. Eleven of them involved the main building (whether it was defined as a simple house, *casa da stazio*, *casa solerata*; whether it was brick/stone built and had a tiled roof, whether it was defined as "large", or as used exclusively by the owner). The other six variables covered the absence or presence of other buildings: dovecotes, stables, victual stores, dutch barns, other farm buildings, other farm housing, small churches or chapels, etc. The final variables cover the presence of courts, wells, ovens, gardens, vineyards, fruit trees, etc.

Given that the analysis was to cover the buildings on the farming concerns included in the survey, all those concerns registered as containing no buildings were excluded. Similarly. those in which the main building was a small house [*casetta*] or a house in thatch were not included, because they would have simply added to the bulk of the information and slightly distorted the results. Thus we had 11,483 cases in which the active variables were combined in 781 different ways.

The correspondence analysis involved the calculation of 18 factors. At first sight it would seem that the simplification we intended has not produced particularly noteworthy results. However, one should bear in mind that the dichotomization of the original variables produces a sizeable amount of fictitious inertia into the table, and that the most relevant factors account by themselves for a significant proportion of the total variability (as can be seen from table 5).

---

[20] The bibliography concerning factor analysis and correspondence analysis is enormous. As an introduction I limit myself to citing CIBOIS: 1983; BOUROCHE-SAPORTA: 1980; VOLLE: 1981; GREENACRE: 1984.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 5

Correspondence analysis. Inertia represented by the first ten factors

Factor	Eigenvalue	% inertia represented	% inertia cumulated	Histograms
1	0.1526560	14.417	14.417	
2	0.1217198	11.496	25.913	
3	0.0894364	8.447	34.360	
4	0.0791275	7.473	41.833	
5	0.0733638	6.929	48.762	
6	0.0685865	6.478	55.239	
7	0.0599013	5.657	60.897	
8	0.0559144	5.281	66.177	
9	0.0541682	5.116	71.293	
10	0.0498505	4.708	76.001	

As I have already said, these factors are new quantitative variables which can be interpreted in relation to the original variables. To do this one must use a series of indicators, the main ones being the contributions the original variables make to the inertia represented by the new variables (absolute contributions). In their turn, the factors serve, to different extents, to represent the overall inertia of the variables themselves (relative contributions). Without providing the entire table, I reproduce in table 6 the features that are most significant for the interpretation of the first eight factors.

It seems to be no easy task to give a peremptory identification of the significance and meaning of the factors. The main difficulty arises from the great imbalance to be found in the marginal distribution in the original table—which obviously is reflected in the contributions to the χ^2, on the metrics of which this method is based. In effect, the average behaviour of the elements (variables and statistical units) is characterized by a series of absences (with only a relatively small number of cases breaking very clearly with this pattern): that is to say, that the vast majority of cases covered consist of a farming concern with a simple house and nothing more. In fact, the first factor distinguishes from this mass of cases all those that involve complexes of buildings (defined as the simultaneous presence of structures for livestock shelters and victual stores, and by the presence of dovecotes). From our point of view, the second factor is not very interesting because it further distinguishes within this group between houses with wells and ovens and those without (or those whose possession of these facilities is not registered): these facilities do not

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 6

Main absolute and relative contributions (per thousand) for the first eight factors

1st factor (14.42 %)	rel. contrib.	abs. contrib.	sign	2nd factor (11.50 %)	rel. contrib.	abs. contrib.	sign
dovecote^{+}	293	111	–	oven^{+}	503	211	+
stable^{+}	301	114	–	well^{+}	501	212	+
victual st.$^{+}$	245	93	–				
rural bdg.$^{+}$	655	240	–				
3rd factor (8.45 %)	**rel. contrib.**	**abs. contrib.**	**sign**	**4th factor (7.47 %)**	**rel. contrib.**	**abs. contrib.**	**sign**
stazio	155	100	–	stazio	171	125	–
brick^{-}	351	133	–	owner use^{+}	168	118	–
tile^{-}	396	162	–	vines^{+}	153	112	–
oven^{+}	180	103	–	fruit trees^{+}	188	137	–
well^{+}	193	111	–	large^{+}	109	80	–
5th factor (6.93 %)	**rel. contrib.**	**abs. contrib.**	**sign**	**6th factor (6.48 %)**	**rel. contrib.**	**abs. contrib.**	**sign**
soler	164	127	–	stazio	108	90	–
courtyard^{-}	461	174	–	large^{+}	218	184	–
courtyard^{+}	461	195	+	vines^{+}	358	303	+
other bdg.$^{+}$	160	123	–	fruit trees^{+}	265	223	+
garden^{+}	209	143	+				
7th factor (5.66 %)	**rel. contrib.**	**abs. contrib.**	**sign**	**8th factor (5.28 %)**	**rel. contrib.**	**abs. contrib.**	**sign**
soler	111	105	+	soler	281	285	+
other bdg.$^{+}$	123	116	+	dovecote^{+}	275	284	+
garden^{+}	324	272	+	victual st.$^{+}$	113	117	–
				other bdg.$^{+}$	137	139	–

Besides the cases of "stazio", "soler" and "house", which are antithetical, the symbol "+" indicates that the feature referred to is present, the symbol "–" that it is not. For instance, "garden^{+}" means that a garden is included in the farm, while "garden^{-}" means that there is no garden.

seem to be significantly associated with other structural characteristics and their presence/absence could—as is certainly the case with other features in the survey—depend simply on the accuracy and thoroughness of the individual surveyors. As for the third and fourth factors, they both identify different associations of features that are characteristic of the *case da stazio*: the former involving the presence of oven and well, the second the presence of vines and fruit trees, with a manor house that is used exclusively by the owner and is described as "large". It should come as no

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

surprise that the third factor links the *casa da stazio* with the absence of stone/brick wall and of a tiled roof. In fact, in the case of *case da stazio* it must have appeared superfluous to specify the presence of such building materials. Finally, the fifth factor seems to indicate a negative relation between the complexes in which the main house is described as a *casa in soler* which goes together with other buildings of various kinds, and those cases where the *casa in soler* is registered in the presence of gardens and courtyards.

As well as being difficult to interpret in a clear-cut way, the first five factors represent only half of the overall inertia of the table of data. The analysis should also include the other factors, whose contribution is not much lower than that of the first five and which contain further interesting points. In the eighth factor, for example, the predominant feature is the correlation between *case in soler* and the presence of dovecotes. And one should also investigate the way in which the different variables in their turn explain the inertia of the elements taken into consideration.

Without making things even more complicated, one should at this point summarize certain results by means of graphics. One can in fact produce a visual projection of the variables (and also, as we shall soon see, of the actual objects surveyed) on planes formed by the factors themselves— bearing in mind that the co-ordinate of each element on each factorial axis expresses the correlation of that element and that factor. Thus one obtains a useful synthetic picture of the whole situation, in which proximity between elements (and objects) may be considered as indicating a similarity between the elements (and objects) themselves—even if it is only a partial similarity (because relative only to those factors used) and deceptive (because the quality of the representation, understood as the level of inertia of the element represented by the factors considered, may not be very relevant).

Figure 2 shows the plane formed by the first two factorial axes. The diagram can be interpreted quite easily: the overwhelming number of farming concerns that are "poor" in buildings are concentrated around the origin of the graph, which indicates the average behaviour of the whole table; hence the marked asymmetry in the distribution of the point-variables. The first axis clearly identifies the concerns endowed with a number of buildings, bringing out some features that are typically associated with the *casa da stazio*: the presence of dovecotes, stables, victual store and other rural buildings, the definition as "large". Other variables—such as the presence of vines and fruit trees and exclusive use by the owner—all seem less closely connected with the *casa da stazio*,

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

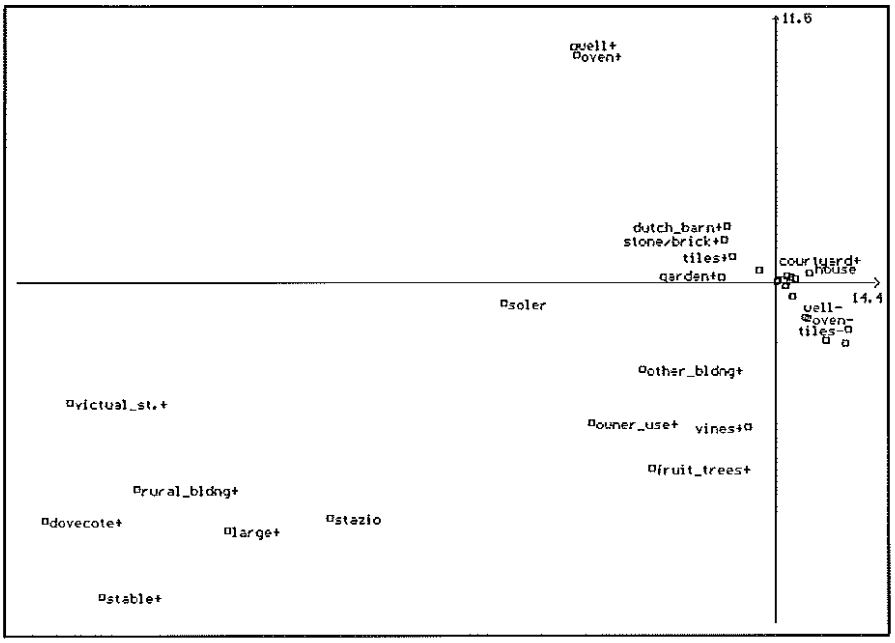

Fig. 2.– Projection of point-variables on axes 1–2

but only in relation to this first factor which distinguishes between those concerns equipped with buildings and those which are not. In fact, as we have just seen, the factor which best illustrates the links between *casa da stazio* and those other variables just mentioned is the fourth. As for the second axis, it is almost entirely determined by the opposition presence/absence of oven and well. From this point of view, the *casa da stazio* would seem to be characterized by below average presence, whilst the *casa in soler* is closer to the average values (however, here too, this impression is partially modified when one thinks of the contributions to the third factor).

Figure 3 shows the projection of point-variables on the plane formed by the fourth and fifth factor. One will remember from table 6 that these two attributes covered are linked with the *casa da stazio* and *casa in soler* respectively. The projection should therefore enable us to identify possible differences relating to these two definitions of the manor house, drawing distinctions within a group that the first factor maintains intact. In short, all the elements to the left of the origin are correlated positively with the *casa da stazio* (and their distance from the intersection of the

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

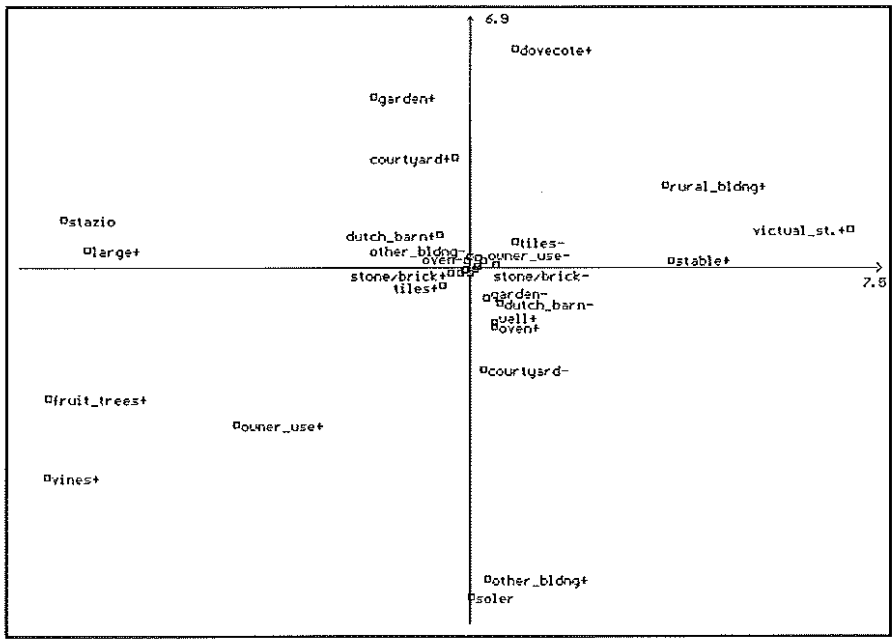

Fig. 3.– Projection of point-variables on axes 4–5

axes is directly proportional to their presence along with such houses). The same applies, for *casa in soler*, for all those points shown below the intersection. So the proximity to an axis indicates substantial indifference to the other factor indicated. The result is the confirmation of the association between *casa da stazio*, the definition as "large", the presence of vines and orchards and the exclusive use of the house by the owner. The latter three are also associated with the *casa in soler*, which is distinguished from the *casa da stazio* by the presence of other buildings. On the other hand, certain oppositions in the second quadrant of the graph are striking: neither the *casa da stazio* nor the *casa in soler* would seem to be correlated with the presence of dovecotes, victual stores and other rural buildings. However, once again one has to mention the deceptive and partial nature of the projections, which cannot be interpreted correctly without using the tables of contributions. Not only is the inertia represented by the two factors very low, but so is the quality of the representation of certain elements. Consider, for example, that the eighth factor, which provides most of the contributions relating to *case in soler* and dovecotes (that is, which represents them best) associates these two variables very closely.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Projections on the factorial planes are, therefore, no substitute for the analysis of numerical results (though even they do not provide totally unequivocal evidence). If we go back to table 6, for example, we see that factors 4 and 6 offer contradictory evidence with regard to the relation between *casa da stazio* and the presence of vines and fruit trees, whilst the fifth and eighth factor are similarly contradictory with regard to the relation between *casa in soler* and the presence of other buildings. The fact of the matter is that the state of affairs covered by this statistical survey does not reveal itself to be clearly structured in adequately distinct typologies (as was to be expected, given the slight simplification obtained through the factorial break-down). So, having made the first fundamental distinction between farming concerns "poor" in buildings and those more richly equipped, it is difficult to form any other clear-cut distinctions between precisely defined groups. In particular, it does not seem to be possible to establish a sharp distinction between the group of *casa da stazio* and *casa in soler*, even if there do seem to be some features that are more regularly associated with the former than the latter.

4. A proposal for automatic classification

A situation of this kind makes the work of classification which is the very purpose of this analysis all the more complex and uncertain. As already mentioned, the almost 11,500 farming concerns covered by the survey can be divided into a good 781 different types, the result of all the various combinations of the variables considered. In effect, the work of classification involves the division of these 781 types into a "reasonable" number of groups which, at one and the same time, have a high degree of internal homogeneity and are as distinct from each other as possible. This means we must have satisfactory criteria for evaluating the similarity between different objects, and a procedure for the efficient application of these criteria. Correspondence analysis meets both requirements. We have already seen how the factors which can be used to break down the inertia of the contingency table can be used to define a multi-dimensional space within which the point-variables can be charted, their co-ordinates expressing the relation between the variable and the factor itself. However, it is also possible to locate within this space the objects or statistical units that these variables describe. In effect, in a contingency table, organization of data in lines or columns is irrelevant,

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

and metrics, methods of calculation and meaning of the factorial co-ordinates of the point-objects are all identical. Thus one can imagine a space (in this case, 18-dimensional, given the number of factors) within which the cloud of 781 types is located—not in a uniform manner but in a number of clusters (even if, for the reasons stated above, these clusters will not be clearly separated from each other). Calculated in relation to all their factorial co-ordinates, the distance between two points—be they objects or variables, it makes no difference—can then be used as a measure of the overall dissimilarity between the two points themselves. Thus, two points which are close to each other—in the n dimensions of the factorial space—can be considered as being more like each other than two points that are further from each other. Having said this, one now has to see how this criterion can actually be applied. There are various methods available, but it should be clear that none guarantees an optimal result from an absolute point of view: considering both the number of groups involved in the classification, and the efficacy of the way these groups have been divided. Thus, here again one has to proceed in an exploratory manner, evaluating results and then deciding upon one's final division of groups. In this case I adopted a non-hierarchical procedure of grouping, using E. Diday's method of dynamic clouds, the principles of which I cannot go into here[21]—suffice it to say that repeated tests with random selection of class centres always gave very stable results.

Table 7 summarizes the results of subdivision into seven groups. Each compartment gives the percentage frequency of each of the different variables in the individual classes: for example, in 21.3 % of the cases in class 1, the main building is simply defined as a "house", whilst in 72.3 % of cases it is described as a *casa da stazio* and in 6.3 % as a *casa in soler*. The column of global profiles covers the distribution of the entire population: thus simple houses account for 94.6 % of the total, *casa da stazio* for 1.8 %, *casa in soler* for 3.6 % and so on. The symbols underneath the percentages facilitate the comparison between the frequency of one value in a particular class and its global frequency. So, the large negative difference between the 21.3 % of simple "houses" in the first class and the 94.6 % frequency of such "houses" in the overall figures is brought out by the "----". On the other hand, the 97.1 % frequency of *casa in soler* in the fifth class is much more than double the average overall frequency of 3.6 % and so is annotated with a "++++". The symbol "- -" indicates that

[21] See GRIGUOLO-MAZZANTI, chap. 6. This method is available in the Addati package, that I used for my analysis.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 7

Profile of the seven stable classes

Variables	Classes 1	2	3	4	5	6	7	Global profile
house	21.3	93.8	80.0	99.7	2.9	100.0	100.0	**94.6**
stazio	72.3	4.5	2.3	0.0	0.0	0.0	0.0	**1.8**
soler	6.3	1.6	17.7	0.3	97.1	0.0	0.0	**3.6**
owner use$^-$	66.4	83.1	86.2	98.6	84.2	97.1	95.7	**94.8**
owner use$^+$	33.6	16.9	13.8	1.4	15.8	2.9	4.3	**5.2**
brick/stone$^-$	51.8	66.6	20.4	20.8	2.6	85.5	14.7	**42.6**
brick/stone$^+$	48.2	33.4	79.6	79.2	97.4	14.5	85.3	**57.4**
tiles$^-$	47.8	38.3	16.0	28.6	3.5	80.9	7.7	**37.8**
tiles$^+$	52.2	61.7	84.0	71.4	96.5	19.1	92.3	**62.2**
large$^-$	45.8	99.7	97.9	100.0	99.4	100.0	100.0	**98.7**
large$^+$	54.2	0.3	2.1	0.0	0.6	0.0	0.0	**1.3**
dovecote$^-$	84.2	98.7	67.2	100.0	100.0	100.0	100.0	**98.3**
dovecote$^+$	15.8	1.3	32.8	0.0	0.0	0.0	0.0	**1.7**
oven$^-$	70.8	95.1	72.8	4.6	79.7	98.9	99.2	**86.6**
oven$^+$	29.2	4.9	27.2	95.4	20.3	1.1	0.8	**13.4**
well$^-$	71.1	95.5	75.1	7.2	83.9	99.5	99.6	**87.5**
well$^+$	28.9	4.5	24.9	92.8	16.1	0.5	0.4	**12.5**
stable$^-$	87.4	99.0	56.6	100.0	100.0	100.0	100.0	**97.9**
stable$^+$	12.6	1.0	43.4	0.0	0.0	0.0	0.0	**2.1**
victual store$^-$	97.6	99.7	63.6	100.0	100.0	100.0	100.0	**98.4**
victual store$^+$	2.4	0.3	36.4	0.0	0.0	0.0	0.0	**1.6**
courtyard$^-$	42.3	61.7	47.9	46.1	77.4	55.5	51.0	**52.8**
courtyard$^+$	57.7	38.3	52.1	53.9	22.6	44.5	49.0	**47.2**
dutch barns$^-$	42.7	45.5	39.4	15.6	65.5	83.8	31.8	**50.3**
dutch barns$^+$	57.3	54.5	60.6	84.4	34.5	16.2	68.2	**49.7**
rural bdg.s$^-$	75.1	97.4	0.0	99.8	100.0	99.9	99.8	**95.1**
rural bdg.s$^+$	24.9	2.6	100.0	0.2	0.0	0.1	0.2	**4.9**
other bdg.s$^-$	89.7	97.4	88.3	98.0	81.0	97.8	96.2	**96.1**
other bdg.s$^+$	10.3	2.6	11.7	2.0	19.0	2.2	3.8	**3.9**
garden$^-$	79.4	76.9	79.6	89.5	83.5	89.5	82.5	**85.4**
garden$^+$	20.6	23.1	20.4	10.5	16.5	10.5	17.5	**14.6**
vines$^-$	98.8	46.4	99.4	100.0	100.0	100.0	100.0	**98.5**
vines$^+$	1.2	53.6	0.6	0.0	0.0	0.0	0.0	**1.5**
fruit trees$^-$	96.4	40.3	96.6	100.0	99.0	100.0	100.0	**98.2**
fruit trees$^+$	3.6	59.7	3.4	0.0	1.0	0.0	0.0	**1.8**
# of cases	**253**	**308**	**470**	**1,227**	**310**	**4,071**	**4,844**	**11,483**

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

the ratio between class percentage and global percentage is somewhere between 0.8 and 1.2, whilst "- -" and "+ +" identify intermediate ratios (between 0.5 and 0.8 and 1.2 and 2.0 respectively).

Thus the columns in the table can be read as profiles of the seven groups formed by the procedure of classification, profiles which enable us to interpret the results produced. Certainly, one cannot at this point engage in some quick, rough-and-ready labelling, but there's no doubt that some interesting facts do emerge from this table with sufficient clarity.

First of all let us look at the combinations between the three main blocks of variables relating to manor houses, service buildings and appurtenances respectively. The first class seems to be quite sharply defined: three quarters of the 253 houses it covers are *case da stazio* (one half of them are described by the survey compilers as "large"—in fact, all the "large" houses are in this group). What is more, in a third of the cases, the survey specifies that the house is used exclusively by the owner (as against a 5 % of such cases in general). Other significant presences, when compared to the average frequencies, are dovecotes, oven and well, stables, and other agricultural or non-agricultural buildings. In short, these are rather substantial complexes of buildings, with a sizeable manor house flanked by a number of service structures. Undoubtedly, this group is closest to that model of the "farm-villa" referred to early, even if some characteristic features are less prevalent than one might have expected: for example, the frequency of gardens and orchards is only slightly above the average, whilst that of vineyards is actually below the average.

The second group, on the other hand, defies precise definition. The main buildings are almost always just simple houses, though there are some fifteen *case da stazio* (none defined as "large"). A significant, but not exceptional, feature here is the fact that the houses are reserved for use by the owner. In effect, the feature that characterizes this group is the presence of vineyards and orchards (almost all of them to be found within this group); however, this one feature is not enough to define a particular type of building, and certainly not enough to define a model of "villa" different from that considered so far.

The third class is much more interesting from our point of view. Here again simple "houses" predominate; though there are some eighty or so "*case in soler*". However, most (80 %) of these houses have brick/stone walls, and 84 % of them have tiled roofs. A good third of the houses here have one or more dovecotes, whilst almost a third have an oven and victual store, a quarter have a garden and almost half of them (43 %) have a stable—all of which is clear evidence of evolved agriculture and a

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

substantial investment of capital in agricultural production. What is more, all the 470 farming concerns included in this third class contain not only a main building but also other rural structures. Thus, even more so than in the first class, a manor house of apparently modest (or average) size is a part of a differentiated complex of buildings. One might say that these were veritable estate farms without a villa proper, or perhaps without a villa as yet (given that the improvement and extension of building work was gradual and could go on for a number of decades). What is beyond doubt is that if those scholars are correct who argue that the spread of villas in the Veneto of the early Renaissance is indissolubly linked with intensified investments in agriculture, then the group of farming concerns covered in third class are not only a sign of the transformations taking place in the countryside but also the prerequisite for the spread of villas within the area.

A common feature in all the other classes is the substantial absence of service buildings. However, amongst these the fifth class does stand out because it contains almost exclusively *case in soler* (that is, of two or more floors), built in stone or brick and roofed with tiles—none of which is defined as "large". Here there are no dovecotes, stables or other rural buildings, whilst in 19 % of the cases there are other structures. The figures for the presence of gardens, vineyards and orchards are the same as the general average or lower. Thus it is possible to find rather important buildings in contexts ill-provided with other facilities.

Finally let us look at the fourth, sixth and seventh classes: these are undoubtedly the largest (covering ten elevenths of the total number of cases), but they are also the least interesting from our point of view. All the habitations are defined as simple houses, which in most cases are not part of a more extended building complex. The differences between these three classes rests on the presence of well, oven and outbuildings in the fourth class; in this class—and, above all, the seventh class—most of the houses have brick or stone walls and tiled roofs. The sixth class marks the lowest point in the hierarchy: all the houses are modest, one-floor affairs, often built of wood, wattle, rye faggots or boards, and totally without appurtenances. Only rarely are such houses reserved for the use of the owner.

As pointed out above, the objects can be located in the multi-dimensional space of the graphics in the same way as the variables. Thus their projection on planes formed by the main factorial axes can help in making the analysis based on the profiles more precise. However, one has to bear in mind that the points do not indicate individual concerns as

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

surveyed but rather the 781 typologies within which these were originally divided (each typology covering a different number of cases). To make things clearer, all those typologies have been excluded for which the inertia explained by the factorial plane is less than 150:1000. For both of these reasons (but, above all, for the former), there is no direct proportion between the number of dots shown and the size of the classes concerned.

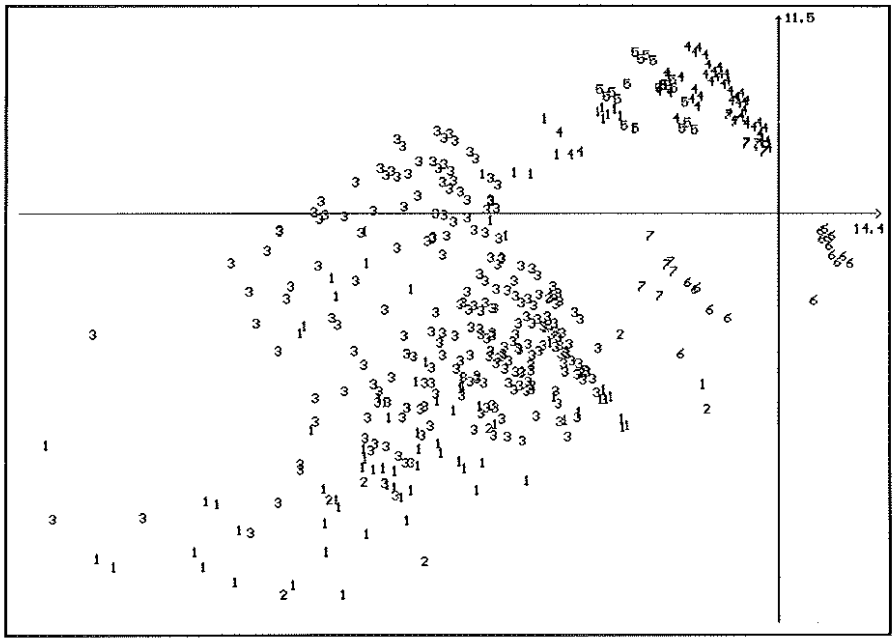

Fig. 4.– Projection of point-objects on axes 1–2 (minimum inertia 150:1000)

Figure 4 shows the projection of the types (identified by the number of the class to which they belong) on the plane formed by the first two factorial axes. As will be remembered, the first axis is to be interpreted as a synthetic indicator of the service structures to be found in each farming concern, the second as an indicator of the presence of well and oven. Leaving aside, for the moment, the question of the vertical differentiation, one can see that the spread from the left towards the right indicates a sort of gradual passage from situations in which concerns are rich in facilities to those in which facilities are very scarce. The first and third class show up very clearly; given that both of them contain the features involved, they are practically superimposed. Amongst them there are also some cases from the second class (indicating the mixed, and presumably artificial,

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

nature of this group: in fact, what we have here are concerns with a *casa da stazio*, which are included in this class thanks to the force of attraction exerted by the variables "vines" and "garden"). All the other classes are spread out more or less around the origin—a sign that their "behaviour" is close to the average behaviour of the entire population of cases (in which the presence of service structures is an exception). The sixth group is the only one to the right of the origin, confirming the complete absence of such structures in this class; however, the outlines of the other classes are also rather well-defined.

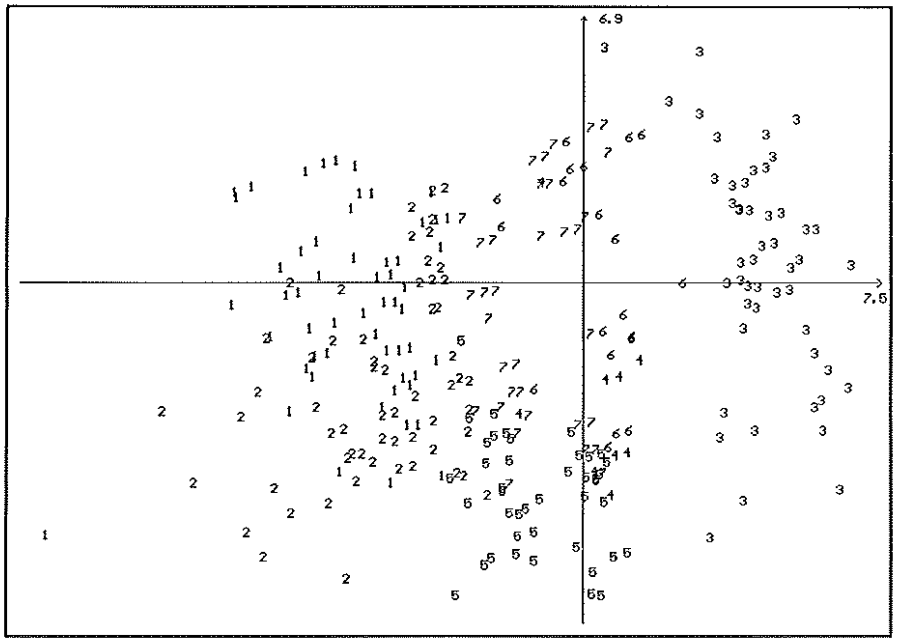

Fig. 5.– Projection of point-objects on axes 4–5 (minimum inertia 150:1000)

However, one must not forget the partial nature of the projections on the factorial planes. What was said above about point-variables also applies to point-objects. Given that the classification takes into account their overall position in the multi-dimensional space, the selection of only two factors necessarily gives a distorted, and partially deceptive, picture. For example, let us look at the projection of the classes on the plane formed by axes 4 and 5. Both of these axes express—though with very low levels of inertia—aspects linked to differences between the manor houses. Here what we see is an opposition between the first and the third class

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

(which before were practically superimposed on each other), a certain similarity between the first and second class, a rather clear outline of the fifth class (*case in soler*) and a substantial lack of differentiation between groups 4, 6 and 7.

In conclusion, the analysis carried out so far has very precise limitations, some of which are intrinsic to the source material used. The compilers of the survey did not have a precise questionnaire to fill out or detailed instructions that had to be followed. In collecting their information they probably followed an unwritten tradition, which—fortunately for us—involved the compilation of many more facts than were strictly necessary for the calculation of income and tax dues. However, they did enjoy a certain amount of leeway in their description of both land and buildings. Once they had registered the presence of a building, there may well have been those who did not feel duty-bound to register if that building was brick-built, had more than one storey, or had a well. And, obviously, the use of the adjective "large" was an even more subjective matter. A statistical analysis based on such material may well appear suspect. However, it is precisely for these reasons—that is, the absence of well-defined prescriptive categories—that any *a priori* criteria of classification risks being both ineffective and presumptuous. If we accept the idea that the approximations within the survey were not the result of a systematic distortion of the facts, then the exploratory approach adopted here becomes much more preferable. By taking a whole multiplicity of elements into account, such an approach is only slightly affected by individual oscillations and omissions.

There are other objections to this method that might be put forward. Apart from strictly technical considerations (in particular with regard to the noticeable imbalance in the marginal distribution of many of the variables considered), a more substantial objection might be that features which should have a different weight in the final result end up, in fact, having the same influence: the type of manor house seems to have as much weight as the presence of fruit trees, the existence of stone/brick walls as much weight as the presence of a well, the existence of a stable as much weight as the presence of a vegetable garden. As for the classification, we have just seen how its outcome is determined by the initial choice of the centre of the classes, which is made at random. Even if a series of intermediate refinements means that one can select relatively better results within a certain number of exploratory divisions, there is no guarantee that starting from different class centres one would not get different, and more effective, clusterings. And finally, the very choice of

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

a certain number of classes rather than another is based on criteria which are to some extent subjective.

All of this has to be borne in mind when evaluating the results obtained, but it certainly does not imply that these results have to be rejected out of hand. Broadly speaking, the picture that emerges from this analysis is both convincing and rich in pointers with regard to a neglected aspect of agricultural history—that is, the actual buildings which composed agricultural concerns. Establishing the basic types of these buildings, their characteristics and size, is in itself worthwhile—particularly when you consider that the identification of a small group of concerns with a fairly extensive complex of residential and service buildings indicates the existence of a dynamic sector in the agriculture of the Treviso area towards the middle of the 16th century. Of course, the analysis of the buildings themselves is not enough to outline the characteristics of the agricultural system (the results achieved so far should now be supplemented by the available data on land use, crops, means of management and so on to open the way to a new exploratory study which will combine all the information we have on these farming concerns). However, this lies way beyond the scope of the present article, and I should now return to what was the starting-point for my own exploratory analysis.

5. "Farm-villas" in the Treviso area: social and geographical distribution

From what has already been said, it should by now be clear that it would be rather high-handed to identify outright the first group defined by our procedure of automatic classification as "villas". However, this group is the closest approximation we can get (on the basis of available data) to the precise model of the "farm-villa". In the following pages I will, therefore, investigate the distribution of these first-group building complexes throughout the Treviso area, look at who owned them and, finally, try to see them in the wider context of land ownership.

Table 8 shows the spread of those houses contained in the first class throughout the administrative districts of the Treviso area. It also shows the data relating to the third class (which I define as containing "estate farms without villas, or without villas as yet") and to *case da stazio*.

One important feature is immediately clear: the "farm-villas" are very unevenly distributed across the territory. In fact, more than two thirds

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 8

Geographical distribution of the "farm-villas", *case da stazio* and "estate farms"

District	#			%		
	farm-villas	*case da stazio*	estate farms	farm-villas	*case da stazio*	estate farms
Quartiere del Piave	3	3	20	1.2	1.4	4.3
Campagna	21	31	43	8.3	14.9	9.1
Mestrina	7	8	70	2.8	3.8	14.9
Zosagne	21	17	83	8.3	8.2	17.7
Mestre	90	60	31	35.6	28.8	6.6
Noale	13	13	21	5.1	6.3	4.5
Castelfranco	83	63	66	32.8	30.3	14.0
Asolo	4	3	9	1.6	1.4	1.9
Conegliano	1	1	3	0.4	0.5	0.6
Serravalle	–	–	11	0.0	0.0	2.3
Cordignano	–	–	3	0.0	0.0	0.6
Oderzo	1	1	42	0.4	0.5	8.9
San Polo	–	–		0.0	0.0	0.0
Portobuffolè	–	–	42	0.0	0.0	8.9
Motta	8	8	24	3.2	3.8	5.1
Ceneda	1	–	2	0.4	0.0	0.4
Total	**253**	**208**	**470**	**100**	**100**	**100**

of the cases are concentrated in only two areas: the *podesteria* of Mestre and the *podesteria* of Castelfranco. The percentages in all the other zones are very low: 8 % are to be found in Campagna and Zosagne, 5 % in Noale, about 3 % in Motta and Mestrina, whilst in San Polo, Portobuffolé, Serravalle and Cordignano there is not a single villa. Ceneda, Oderzo, Conegliano have only one each, and—rather surprisingly—Asolo has just four.

Figure 6 gives a pictorial representation of this territorial spread. The size of the dots reflects the number of "farm-villas" present in each commune; the two concentrations around Mestre and Castelfranco are very clear. In Carpenedo (near Mestre), there is the largest concentration of such structures (13 in all), and from here they seem to spread out in two main directions: towards Mirano and Padua (through Asiano, Chirignago and Spinea), and along the ridge that runs from Mestre through Noale to Castelfranco itself.

It is useful at this point to turn back to table 8 for further comments. It is interesting to note that precisely in those areas where they are both present in significant numbers there is a noteworthy difference between

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

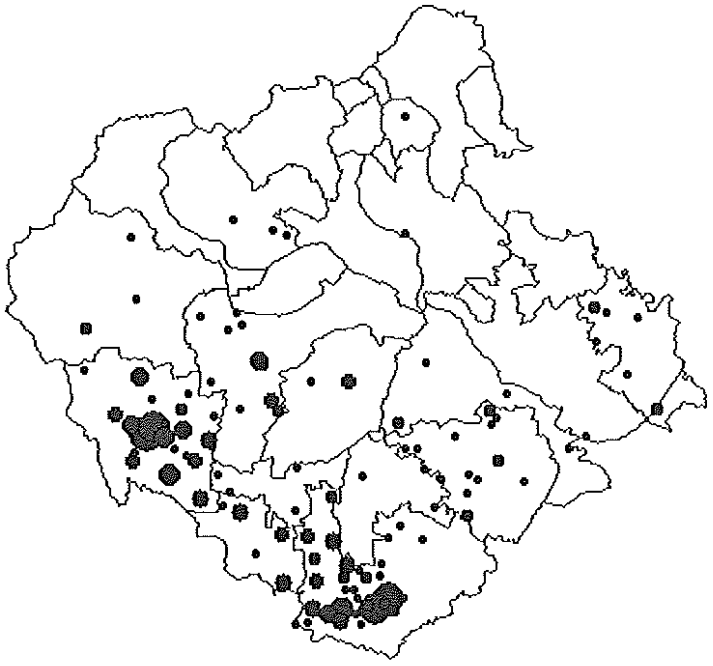

Fig. 6.– Territorial distribution of the "farm-villas" (overall number per commune)

the distribution of the "farm-villas" and of the *case da stazio*. In the district of Mestre there are only 60 *case da stazio*, while there are a full 90 cases classified within the first class (a difference of 50 %), whilst in Castelfranco the respective figures are 63 and 83 (a difference of about a third). On the contrary, in the Campagna there are almost a third fewer villas than *case da stazio*. Thus in these areas where villas are most densely present, the two different systems of classification give rise to rather substantial differences in the results (whilst in the other areas the differences between the two distributions are irrelevant in absolute terms). As far as the third group is concerned the situation is less clearly defined. The "farms" are divided in a less unequal manner, with most being found in Zosagne, Mestrina and Castelfranco, with some being present in Campagna, Oderzo and Portobuffolè. Asolo, Conegliano, Serravalle, Cordignano and San Polo all seem to be almost totally without the type of farming concerns classified in groups one and three, whilst the highest numbers of both are to be found in the districts of Castelfranco and Mestre.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 9

Distribution of "farm-villas", *case da stazio* and "estate farms" according to social category of owner

Owners	#			%		
	farm-villas	*case da stazio*	estate farms	farm-villas	*case da stazio*	estate farms
Distrettuali	10	10	93	4.0	4.8	19.8
Treviso citizens	14	17	50	5.5	8.2	10.6
Treviso nobles	15	2	37	5.9	9.6	7.9
Minor towns citizens	39	18	70	15.4	8.7	14.9
Minor towns nobles	2	2	6	0.8	1.0	1.3
Feudal lords	1	–	4	0.4	0.0	0.9
Venice patricians	98	83	84	38.7	39.9	17.9
Other Venetians	47	39	41	18.6	18.8	8.7
Other individuals	13	10	25	5.1	4.8	5.3
Lay bodies	2	2	15	0.8	1.0	3.2
Regular clergy	5	3	19	2.0	1.4	4.0
Secular clergy	7	4	26	2.8	1.9	5.5
Total	**253**	**208**	**470**	**100**	**100**	**100**

Let us now look at the social profile of the owners as drawn up in table 9. The Venetian predominance is clear: almost two-fifths of the villas belong to patricians, whilst another fifth belongs to non-noble Venetians. The percentages for the *case da stazio* are substantially the same (though using this classification, a further fifteen units belong to Venetian patricians, and a further eight to non-noble Venetians). Moving from the *case da stazio* to the "farm-villa" classifications shows a marked increase in citizen ownership as well, with the number of cases almost doubled (at 15 %, they are the third largest group of owners). A long way behind, at around 5 %, are the citizens and nobles of Treviso and a residual category of other non-noble private citizens. However, when we look at "estate farms without villas", we see a slightly different distribution of ownership. Here the predominant group, at almost 20 %, are the *distrettuali*; but the Venetian patricians are only a short way behind. In general, the division between the main social groups is fairly even. If the interpretation we have given of the farming concerns covered by this sector is correct, then one can deduce that the development of a dynamic agricultural sector (with substantial investments in productivity) involved a particularly wide and varied section of society.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 10

Distribution of the "farm-villas" by district and social category of owners

District	Distrettuali	Treviso citizens	Treviso nobles	Minor towns citizens	Minor towns nobles	Feudal lords	Venice patricians	Other Venetians	Other individuals	Lay bodies	Regular clergy	Secular clergy	Total
Quartiere del Piave	1	2											**3**
Campagna		6	5	2			5	1	1			1	**21**
Mestrina			1		1		3	2					**7**
Zosagne	1	5				1	13	1					**21**
Mestre		1		3			[38]	[34]	7		4	3	**90**
Noale	6		1	1			1	2		1		1	**13**
Castelfranco	1		6	32			[35]	1	4	1	1	2	**83**
Asolo			2					2					**4**
Conegliano					1								**1**
Oderzo	1												**1**
Motta				1			3	4					**8**
Ceneda									1				**1**
Total	**10**	**14**	**15**	**39**	**2**	**1**	**98**	**47**	**13**	**2**	**5**	**7**	**253**

Moving back to the "farm-villas", table 10 shows their distribution according to district and social category of owner. The preference for certain areas is clear—and was only to be expected. The Venetian patricians favour the *podesterie* of Mestre and Castelfranco, and to a lesser extent the Zosagne area. The non-noble Venetians are almost exclusively concentrated in the Mestre territory—that is, right next to the city of Venice itself. On the other hand the country villas owned by citizens are in their turn concentrated in the district of Castelfranco, where their number roughly equals that of the Venetian patricians.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

6. "Farm-villas" in the context of land ownership

Mention has already been made of the fact that most scholars see the emergence and spread of country villas over the period late 15th/early 16th century as part of a wider movement that saw land ownership, agricultural produce and country life become a central part of the economic, social and cultural life of the citizen classes. The reasons for—and forms taken by—this "great transformation" are too well known for me to have to go into them here. The aim of this paper is to see just how far one can establish a precise link between the villa and the rest of the estate owner's property.

Table 11

Overall property of the owners of the "farm-villas": percentage distributions of size and income

	min.	max.	Percentiles						
			5	10	25	50	75	90	95
Hectares	0	1,079.33	0.00	1.04	8.14	28.62	74.37	184.12	310.50
Lire	0	12,941.10	28.10	42.92	131.45	297.65	729.10	2,060.89	3,138.55

The 253 building complexes in the first group belong to 238 different owners: one of whom owns three of them, and another thirteen two each. Thus, if we look at overall property ownership as illustrated in table 11 we see a situation of some dispersion. Net income varies from a minimum of 0 to a maximum of 12,941 lire, and the farm area from 0 to 1,079 hectares. In 10 % of the cases the total area owned is scarcely one hectare; the 60 smallest landowners reach a maximum of eight hectares. Thus the results disappoint those who expected a close relation between building complexes of a certain scale and the size of farming concerns themselves. However, one has to keep in mind that some of the landowners considered here might have had further properties in territories bordering on the Treviagiano, that were not registered in the sources used for this study. Furthermore, the presence of very small landowners should not disguise the fact that there are also very large landowners: more than half the cases involve farms of more than 28 hectares, whilst a quarter are farms of 74 or more hectares, 44 are of more than 100 hectares, thirteen go beyond the 300-hectare mark and two—the Abbey of San Tommaso dei Borgognoni in Torcello and Count Battista da Pola—have estates of more

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

than 1,000 hectares. One should also point out that the distribution along this very uneven division of property reflects in part the social category of the owners—as one can easily see from figure 7. As was to be expected, the few *distrettuali* bring up the rear (with one exception), whilst the opposite end of the scale is occupied by the citizens and nobles of Treviso, followed by the Venetian patricians, and citizens and nobles of the other urban centres of the Treviso territory and the non-noble Venetians. There are also some patricians with very small parcels of land.

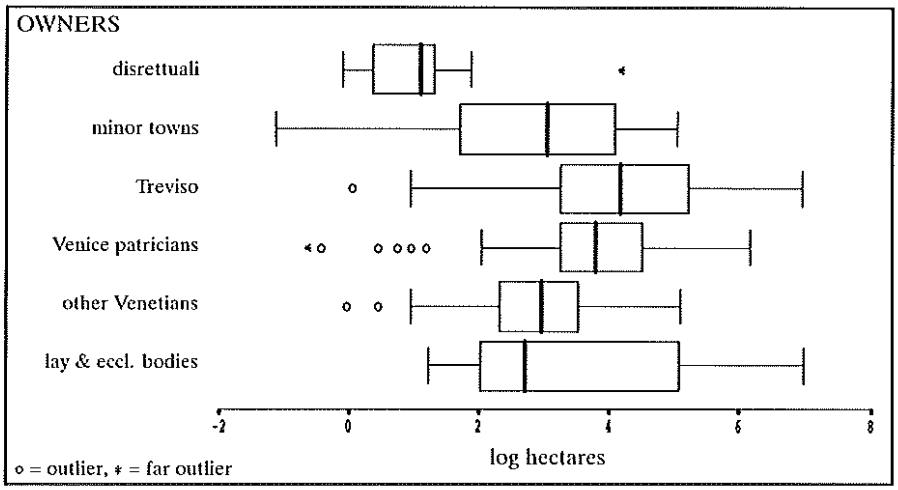

Fig. 7.– Overall property of the owners of "farm-villas": distribution according to social category

So, if at least one half of these "farm-villas" are part of medium-sized, large—and, in certain cases, very large—estates, one is naturally enough led to ask what percentage of large estates had villas. Of course, the establishment of any threshold here is purely arbitrary. I propose to use as a guideline the cut-off point of one hundred hectares.

The survey covers just under 22,000 landowners, of whom 259 (less than 1.2 %) own 100 hectares or over. Nevertheless, their land totals almost 58,000 hectares—that is, more than a third of the agricultural land covered by the survey. This is not the place to analyze the concentration of land ownership, but these few figures alone are enough to show that concentration was noteworthy. For our purposes here it is sufficient to establish just how many of those over-100-hectare landowners were also owners of a "farm-villa".

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

Table 12

Over-100-hectare land ownership
Distribution according to social category and "farm-villas"

	Hectares	#	Farm-villas
Treviso citizens	2,980	18	
Treviso nobles	9,690	48	11
Minor towns citizens	2,949	22	4
Minor towns nobles	2,003	14	
Feudal lords	1,658	5	1
Venice patricians	13,351	65	19
Other Venetians	792	6	1
Other individuals	938	7	3
Lay bodies	5,078	10	1
Regular clergy	15,622	54	4
Secular clergy	2,605	10	
Total	**57,666**	**259**	**44**

Whilst not allowing one to draw any dramatic conclusions, table 12, which shows the number of "farm-villas" owned by the greatest landowners, does raise some interesting points. Of the 259 largest estates, only 44 (little more than one sixth) had a "farm-villa". In fact, the largest part of this group is accounted for by the 54 estates of religious bodies. As we have already seen, religious bodies were still substantial landowners in the Treviso territory: of the ten largest owners covered by the survey, six were monasteries, two were lay bodies (one of them, the Ospedale dei Battuti in Treviso being the largest landowner of all, with a total of 2,445 hectares), one was the Bishopric of Ceneda and only one a private individual, the Treviso nobleman Battista da Pola (who is the third largest landowner). Only four of these large ecclesiastical estates have "farm-villas" (only two of them have *case da stazio*). The Venetian patricians are only slightly less important in the list—even if the richest patrician—Marco Foscari, with 512 hectares—comes only 13th on the list. But of the 65 patricians included, 19 owned a "farm-villa". The proportion amongst Treviso noblemen, another sizeable category of landowners, is only slightly lower (11 out of 48). On the contrary, none of the 18 citizens of Treviso or of the 14 nobles of the minor towns have "farm-villas"—and only 4 out of the 22 citizens of these urban centres have such villas, even though they do own large landed estates.

So it does not seem to be possible to establish a clear, unequivocal relation between villas and large estates. Some of the largest landowners

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

in the Treviso territory (especially the Venetian patricians and the Treviso nobles), did have building complexes created on their estates which are in line with the model of the "farm-villa". However, they were in a minority, even if a sizeable minority. The fact that such structures are entirely missing from the estates owned by either ecclesiastical or lay bodies would seem to indicate that they served more for the pleasure and relaxation of the owner than for the administration of the estate. What is more, one can also find such structures on small and very small estates (often in locations very close to Venice)—estates which were not particularly demanding from the administrative point of view. For instance, it is likely that when the patrician Zaccaria Barbaro went to his *casa da stazio* in Spinea he was thinking more about relaxing and recovering from the stress of Venetian political life than about supervising the cultivation of his fifteen-odd fields that covered a total area of some seven hectares (which he had rented out to two farmers, for a mixed rent in kind and money, whilst reserving the manor house for his own use).

In any case, it is clear that one cannot argue a precise functional relation between certain types of building and the requirements of estate management simply on the basis of the overall size of the estate. If an estate was split up into numerous, far-flung small farms run by different people who paid a cash rent then it probably needed an efficient system of rent-collection rather than a particular complex of buildings (a good strongbox would, in this case, be of more use than a stable or a granary). Obviously, the actual situations in each case could be much more complex—so that within a single estate one might find farms of varying size rented at very different conditions and terms. It is therefore very difficult to establish up to what point the presence of a "farm-villa" indicates a particular type of estate organization.

In fact, it does not really seem to be possible to identify different types of estate. As figs. 8 and 9 show, there were some quite clear tendencies in the organization of those estates over 100 hectares. The first figure breaks down the percentage of individual farms on the basis of four categories of size. Naturally the thresholds are somewhat arbitrary but they do give some idea of the percentage of the total land available that is given over to minimal farms (less than 3 hectares), small farms (3–10 hectares), middle-sized farms (10–30 hectares) and large farms (more than 30 hectares). As far as the large estates owned by the citizens and nobles of Treviso and of the other towns are concerned, middle-sized farms seem to predominate (the two series of distributions are very similar, even if not identical). In the case of estates owned by Venetians (both patrician and otherwise),

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

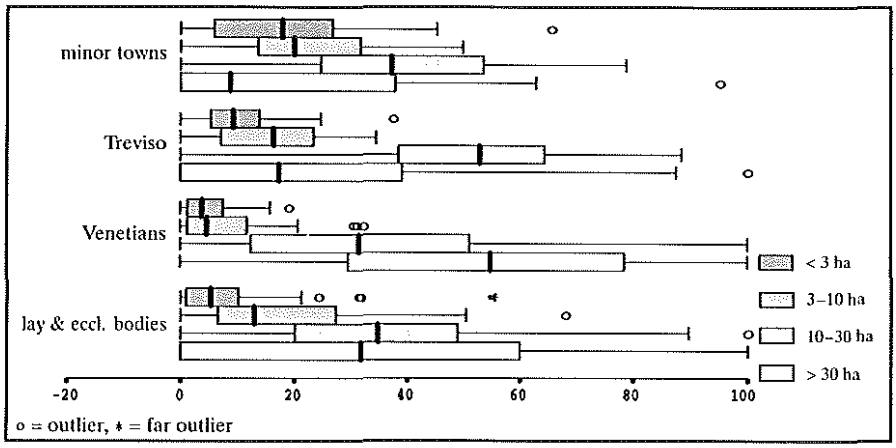

Fig. 8.– Composition of the large estates: distribution of land area in farms of different sizes

there is a marked predominance of farms of over 30 hectares, with the first two groups being only feebly represented. As far as the lay and ecclesiastical bodies are concerned, there is a wide variety of formats on the larger estates.

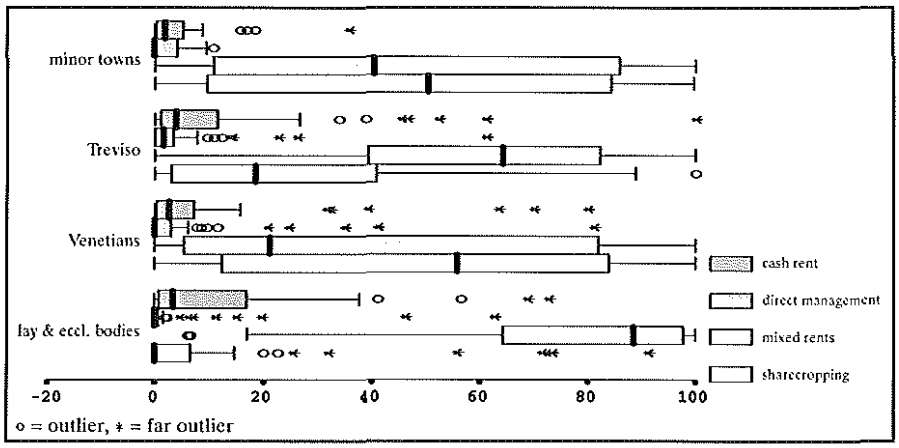

Fig. 9.– Composition of the large estates: distribution of income according to type of farm management.

Figure 9 shows an analogous series of percentages concerning the relation between the different types of farm management and overall income. As one can see, situations of direct owner management and

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

strictly cash rent are scarce. The ecclesiastical and lay bodies—and, to a lesser extent, the citizens of Treviso—seem to favour mixed rents. For Venetians and the citizens and nobles of the minor cities, mixed rents and share-leasing (two types of contract that the survey does not always clearly distinguish) are present to almost equal extents. In effect, they complement each other—hence the wide spread of both.

However, in spite of the interesting points derived from the data, such features do not seem to indicate a model of estate structure in which there is a significant correlation between the number, size and rent terms of the individual farms.[22] And even less so do they make it possible to attribute some crucial value to the presence of a particular type of building. To this end, two further multivariate analyses were carried out. The first was a correspondence analysis to see if there was a relation between the composition of the estate and the way it was run (rent terms, etc.)—but this did not produce any significant results; the second was a principal components analysis based solely on the percentage land share of the different sized farms (minimal, small, medium, large). The result was a predictable contrast between those estates where small farms predominate (in comparison to average values) and those estates in which medium and large farms predominate. However, subsequent automatic classification in four classes (one, more numerous, group closer to the general average and another three which indicate shifts in the three directions just mentioned) reveals that the estates with country villas are almost evenly distributed throughout all four classes.

I will end by giving three examples of the territorial distribution of the estates of some large landowners. As we have just seen, precise types cannot be established, and so the cases chosen must limit themselves to being purely illustrative (with no claim to offering an interpretation of the facts).

With his 1,050 hectares, the Count Battista da Pola was the largest private landowner in the territory—his estates second only to those of the Ospedale dei Battuti and, by just a few hectares, to those of the monastery of San Tommaso dei Borgognoni in Torcello. His income of 6,251 lire was the fifth largest of those covered by the survey. He owned some 76 farms in 46 different communes in six different districts (fig. 10).[23] Most of his estates were divided into medium-sized and large farms: a third of his

[22] Similar conclusions for the Verona area in BORRELLI: 1975, p. 149.

[23] For purposes of legibility, the following maps adopt different scales.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

total land was given over to farms of between 10 and 30 hectares, and a quarter to farms between 30 and 50 hectares, with a further third being occupied by farms of over 50 hectares. Three quarters of his income came from mixed rent contracts. Pola owned two *case da stazio*, both in the area of Campagna di Sopra: one in Barcon had a stable, outbuildings and other rural structures and stood within a large farm of 145 hectares run by the owner (at Barcon Pola had another 200-hectare farm rented on a product-share basis). His other *casa da stazio* was at Sala, in a small estate of not even two hectares (again run by the owner). At Sala, Pola also owned two other farms of 21 and 26 hectares, the rent to be paid part in produce and part in cash.

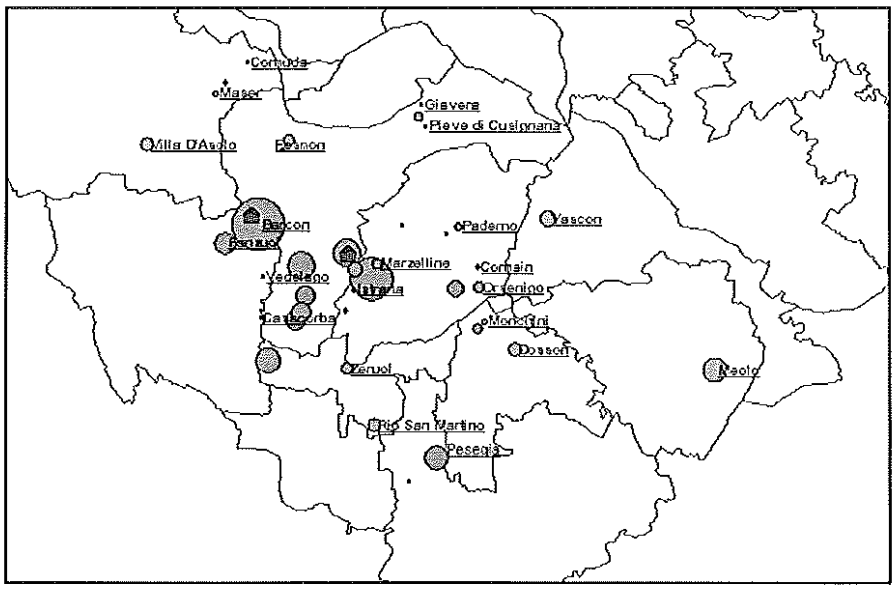

Fig. 10.– Landed estates of Count Battista da Pola (total land area per commune)

After Marco Foscolo, Zorzi Corner q. Giacomo was the largest Venetian landowner covered by the survey: as far as land area was concerned his was the 17th-largest, whereas his estimated income of 5,145 lire was the eighth-largest. His estates of a total of 478 hectares were rather fragmented—comprising some 90 farms scattered across 34 communes in five different zones. Little more than half of his land was given over to medium-sized farms (of between 10 and 30 hectares), whilst the other half was equally divided between small and minimal farms

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

and large farms of between 30 and 50 hectares. There were no farms of above 50 hectares. Even the 83 hectares owned at Poiana were actually divided up into 12 different farms. 80 % of his income came from mixed rent contracts and only 15 % from share-leasing. Corner owned a "large" and "dilapidated" *casa in soler* in Castello di Noale and another large *casa in soler* in stone with a tiled roof, court and garden in Castello di Castelfranco. However, he falls within the first group of our automatic classification because of a large stone *casa da stazio*, with tiled roof, courtyard, outbuildings, stable and other rural structures which he owned in Borgo di Treviso. Situated on a modest owner-managed estate of little less than 3 hectares, this was his only house in the actual countryside (even then, it was very close to Castelfranco).

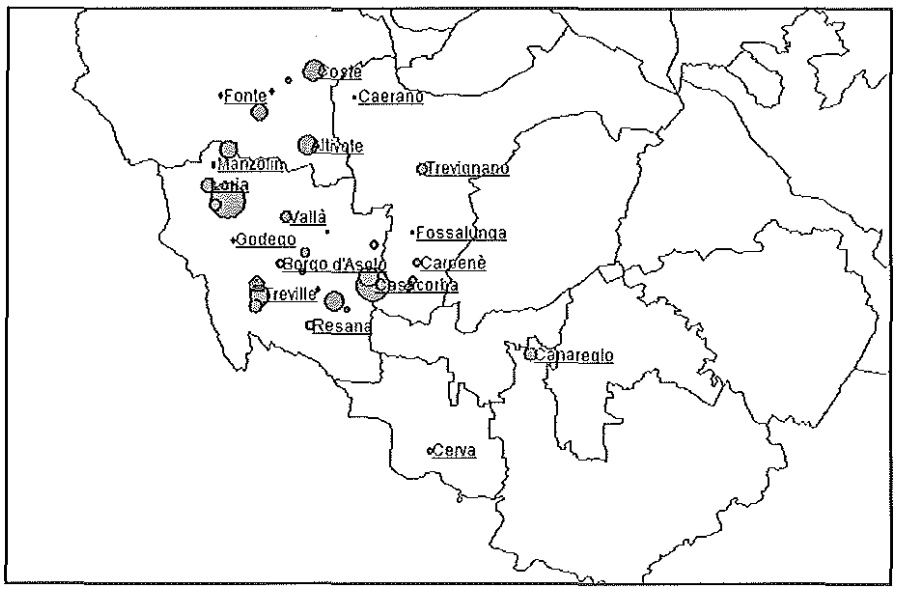

Fig. 11.– Landed estates of Zorzi Corner q. Giacomo (total land area per commune)

Finally let us look at the data of the landed estates of Zuanne Lorenzetto, citizen of Castelfranco (fig. 12). He is the largest non-noble landower included in the survey to own a "farm-villa". His estates are just under 160 hectares, with an income of about 1,400 lire. At Piove di Castelfranco he owned a large stone house with a tiled roof, dutch barns, stable, court and garden, which he kept for his own use. It stood on just one hectare of land, which he managed himself. His surveyed farms

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

totalled 33, but only 5 were of medium size: the largest was of 44 hectares, followed by one of 28, one of 20 and two of 12 hectares—all share-leased. The remainder were all very small farms of less than 5 hectares, rented for cash rent or mixed cash/produce rents.

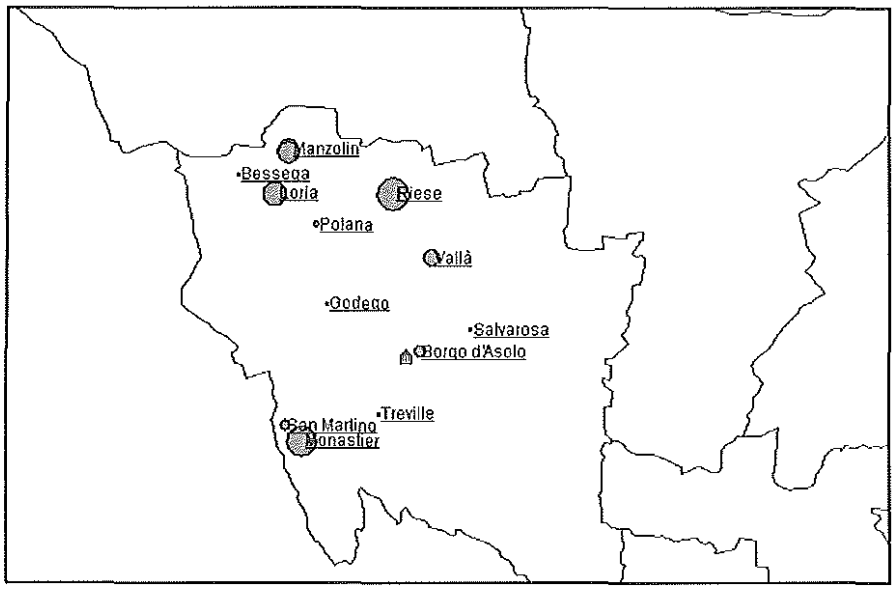

Fig. 12.– Landed estates of Zuanne Lorenzetto, citizen of Castelfranco (land area per comune)

Conclusions

This work has dealt with two different questions: one methodological, the other factual. The question of method concerned the procedure to be followed in order to identify the villas covered by the 1542 landed property survey carried out in the Treviso territory. In the absence of an explicit definition, and reluctant to accept straightforward synonymity between "villa" and "casa da stazio", we preferred to adopt an exploratory approach taking into account a fairly wide range of information contained in the source material with regard to houses and their appurtenances—an approach which drew out the interrelation between these various features, without relying on a pre-established model. This analysis was then the basis for an automatic classification of all the building types covered,

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

which were gathered together in a limited number of groups according to "numerical" (or, more appropriately, geometrical) criteria of similarity. The characteristics of one of these classes seemed to correspond most convincingly to the features of the well-known model of the Veneto *villa rustica*. Thus the cases which fell within this class were considered as "probable" villas so to speak, and their territorial distribution was analyzed—along with the type of estate they occupied and the social category of their owners.

There were some 253 "probable" villas, whilst the *case da stazio* numbered 208. The difference between these two figures may not seem to warrant the use of such a difficult and complex procedure of analysis—given that the general picture we would have obtained from a study of the *case da stazio* would not have been very different from that described within this article. However, we only know that to be so *a posteriori*. Moreover, whilst the coincidence of the two figures seems to support the validity of our method (a wide difference between them would have been quite disturbing), it is also true that the overlap between the two groups is only partial. Not all the *case da stazio* fall within the group of "probable" villas, which does include a certain number of *casa in soler* and even what are registered as simple houses. And there are certain differences in social distribution (with a higher percentage of "villas" being owned by Venetians and citizens of the minor urban centres, and a rather lower percentage being owned by citizens of Treviso), and in territorial distribution (with the percentage presence of villas being higher in the districts of Mestre and Castelfranco and lower in Campagna). If all the *case da stazio* are considered to be villas, that means that there is a type of villa quite apart from the usual model of the country villa (a type defined almost exclusively by the quality of the estate manor house and not by its relative appurtenances). What is more, if the question was only one of identifying villas, perhaps it would not even be worth the trouble. Our study, in fact, has examined the whole gamut of built structures present in the Treviso countryside in the middle of the 16th century. It has shown how the villas can be seen as existing at the top of a hierarchy of types within which it is not always easy to draw precise boundaries. Above all, the study has provided a great deal of information on the building structures present in farming concerns of the time, which may be exploited more fully in subsequent work.

As far as the factual question is concerned, the net outcome seems to be less encouraging. Some of the questions raised at the beginning have not be given clear and definitive answers. At the social level,

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

predominance of Venetians (be they nobles or otherwise) amongst villa owners has been confirmed. The presence of villa owners amongst the nobles and citizens of Treviso seems to be rather slight—especially when you consider the extent of the landed estates owned by these categories. What is noteworthy is that a number of villas seem to have been owned by the citizens of the minor urban centres—and of Castelfranco in particular. The situation is much less clear-cut when it comes to establishing a link between the presence of a villa and certain types of estate management and farm size. Villas can be found on large or small estates, on estates that are integrated or scattered across a certain area, on estates which are farmed on the basis of a variety of land contracts. Certainly, at least some of the fields around the manor house were usually reserved for the owner's use, but otherwise we are faced with such a variety of situations that one cannot formulate any precise hypothesis as to the basis on which the villa estates were run. What is more, it is not clear that the features covered by this level of analysis are sufficiently significant. Perhaps more detailed analysis carried out on individual cases will bring out the links which we have not been able to identify here. However, it is unlikely that they will undermine the impression that the emergence of "villa civilization" in the Veneto countryside during the 16th century was predominantly a cultural and ideological—rather than economic—phenomenon.

Bibliography

ACKERMAN (James S.): 1990, *The Villa: Form and Ideology of Country Houses* (Princeton: Princeton University Press).

BAGATTI VALSECCHI (Pier Fausto) and LANGÈ (Santino): 1982, "La villa", in *Storia dell'arte italiana*, part 3, *Situazioni, momenti, indagini*, vol. 4, *Forme e modelli* (Torino: Einaudi), p. 361–456.

BELLAVITIS (Anna): 1994, *Noale. Struttura sociale e regime fondiario di una podesteria della prima metà del secolo XVI* (Treviso: Edizioni Canova).

BENTMANN (Reinhard) and MÜLLER (Michael): 1970, *Die Villa als Herrschaftsarchitektur: Versuch einer kunst- und sozialgeschichtlichen Analyse* (Frankfurt a.M.: Suhrkamp).

BORRELLI (Giorgio): 1975, "Per una tipologia della proprietà fondiaria della villa tra XVII e XVIII secolo", in VIVIANI (Giuseppe Franco), ed. *La villa nel veronese* (Verona: Banca Mutua Popolare di Verona), p. 141–172.

BOUROCHE (Jean-Marie) and SAPORTA (Gilbert): 1980, *L'analyse des données* (Paris: Presses Universitaires de France, 1980).

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

CHITTOLINI (Giorgio): 1990, " 'Quasi-città'. Borghi e terre in area lombarda nel tardo Medioevo", *Società e storia*, n° 47, p. 3–26.

CIBOIS (Philippe): 1983, *L'analyse factorielle. Analyse en composantes principales et analyse des correspondances* (Paris: Presses Universitaires de France).

COZZI (Gaetano): 1984, "Ambiente veneziano, ambiente veneto. Governanti e governati nel Dominio di qua dal Mincio nei secoli XV–XVIII", in ARNALDI (Girolamo) and PASTORE STOCCHI (Manlio), eds. *Storia della cultura veneta, Il Seicento*, 4/II (Vicenza: Neri Pozza editore), p. 495–539.

DEL TORRE (Giuseppe): 1990, *Il Trevigiano nei secoli XV e XVI. L'assetto amministrativo e il sistema fiscale* (Venezia: Il Cardo).

DEROSAS (Renzo): 1991, "A trentacinque anni dalla «scheda» di Dal Pane : un'applicazione dell'informatica alle fonti catastali", *Quaderni storici*, XXVI, n° 78, p. 721–59.

GALLETTI (Giuseppe): 1994, *Bocche e biade. Popolazione e famiglie nelle campagne trevigiane dei secoli XV e XVI* (Treviso: Edizioni Canova).

GAMBI (Lucio): 1964, "Per una storia della abitazione rurale in Italia", *Rivista storica italiana*, LXXVI, p. 427–454.

GREENACRE (Michael J.): 1984, *Theory and Applications of Correspondence Analysis* (London [etc.]: Academic).

GRIGUOLO (Silvio) and MAZZANTI (Massimo): s.d., *Addati. Un package per l'analisi esplorativa dei dati. Guida all'uso (ver. 3.1)* (Venezia: CIDOC - Istituto Universitario di Architettura di Venezia).

GULLINO (Giuseppe): 1994, "Quando il mercante costruì la villa: le proprietà dei Veneziani nella Terraferma", in COZZI (Gaetano) and PRODI (Paolo): eds., *Storia di Venezia*, vol. VI, *Dal Rinascimento al Barocco* (Roma: Istituto della Enciclopedia Italiana), p. 875–924.

MOMETTO (Piergiovanni): 1992, *L'azienda agricola Barbarigo a Carpi. Gestione economica ed evoluzione sociale sulle terre di un villaggio della bassa pianura veronese (1443–1539)* (Venezia: Il Cardo).

MURARO (Michelangelo): 1978, "Feudo e ville venete", *Bollettino del Centro Internazionale di Studi di Architettura "Andrea Palladio"*, XX, p. 203–223.

PITTERI (Mauro): 1988, *I Mulini del Sile. Quinto, Santa Cristina al Tiveron e altri centri molitori attraverso la storia di un fiume* (Battaglia Terme: Comune di Quinto di Treviso).

PITTERI (Mauro): 1994, *Mestrina. Proprietà, conduzione, colture nella prima metà del secolo XVI* (Treviso: Edizioni Canova).

PIZZATI (Anna): 1994, *Conegliano. Una "quasi città" e il suo territorio nel secolo XVI* (Treviso: Edizioni Canova).

ROSCI (Marco): 1968, "Forme e funzioni delle ville venete pre-palladiane", *L'arte*, n° 2, p. 27–54.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.

ROSCI (Marco): 1969, "Ville rustiche del Quattrocento veneto", *Bollettino del Centro Internazionale di Studi di Architettura « Andrea Palladio »*, XI, p. 78–82.

SORAGNI (Ugo): 1980, "Economia neo-feudale e dialettica del territorio nelle ville venete", *Bollettino del Centro Internazionale di Studi di Architettura « Andrea Palladio »*, XXII, p. 137–145.

TODESCO (Maria Teresa): 1995, *Oderzo e Motta. Paesaggio agrario, proprietà e conduzione di due podesterie nella prima metà del secolo XVI* (Treviso: Edizioni Canova).

VENTURA (Angelo): 1969, "Aspetti storico-economici della villa veneta", *Bollettino del Centro Internazionale di Studi di Architettura « Andrea Palladio »*, XI, p. 65–77.

VOLLE (Michel): 1981, *Analyse des données* (Paris: Economica).

ZALIN (Giovanni): 1975, "Economia agraria e insediamento di villa tra Medioevo e Rinascimento", in VIVIANI (Giuseppe Franco), ed. *La villa nel veronese* (Verona: Banca Mutua Popolare di Verona), p. 51–86.

Extrait de la Revue Informatique et Statistique dans les Sciences humaines
XXXIII, 1 à 4, 1997. C.I.P.L. - Université de Liège - Tous droits réservés.