

# **Complexity before Cities: Expansion and Social Transformation in the Po Valley (Italy) during the Bronze Age and Early Iron Ages**

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## **1 Expansion, segmentation and collapse during the Bronze Age in the Po Valley**

In Europe, the Bronze Age is a period of relative stability, during which the main cultural groups consolidate themselves and a strong demographic increase occurs. Despite local cultural factors, a number of phenomenon can be detected throughout a large part of Europe, such as the colonisation of new agricultural lands, the emergence of stable settlements, the diffusion of Bronze metallurgy, the increase in exchanges, the progressive emergence of socially dominant networks within still relatively poorly articulated communities. Bronze metallurgy undergoes a period of major technological innovation with the discovery of various types of alloys, adapted to specific artefact, the creation of various types of matrix for metal casting, the perfection of lost wax fusion and the appearance of metal blades.

As a consequence of this creative and technological explosion, exchanges increased in an unprecedented manner. During the Bronze Age, however, the utensils and work instruments, which had been made in flint, in polished stone, in bone and in horn, were little by little substituted by metallic objects.

The diffusion of metallurgy caused a series of changes which strongly influenced the socio-economic structure of Bronze Age communities. It lead to the emergence of a vast network of exchange for raw materials (copper, tin, lead), which extended itself across Europe, enabling the diffusion of new products but also of new ideas. Metallurgists, because of their strongly specialised activity, created a new social class, which accentuated the emerging social division of work.

The productive requirements of a non diversified society can be managed on a family basis. With the appearance of specialised artisans, production leaves the family domain. Specific groups thus possess a technology capable of conferring prestige, wealth and power. In the Bronze Age, wealth is no longer represented only by herds of animals but also by control over raw materials and exchange. Hierarchy begins to appear in society<sup>1</sup> and is visualised by symbols of power such as sophisticatedly decorated helmets, cuirasses, daggers and swords, and precious metal plates. From the XVII-XVIth BCE at the latest, the impulse in long distance exchange and diffusion increases, notably with the intensification of the amber route. The precious resin, used for the fabrication of ornaments and prestige objects, from the Baltic Coast, crosses Central Europe and the Balkans and reaches the Mediterranean. Simultaneously, religious beliefs and funeral rites change. Numerous ritual deposits of precious bronze objects in rivers, lakes and springs have thus been interpreted as offerings to a divinity of water [Burfield1994].

The chosen case study is the description of the settlement pattern dynamics of the Bronze Age (c. 2200 – 900 BCE)<sup>2</sup> in the Padanian Plain (Fig 1). This context is one of the best known and documented of Italian and European protohistory. There is a vast and detailed amount of available data and much field work is currently underway.

During the Early Bronze Age, populations, probably from the same ethno-cultural origin, occupied

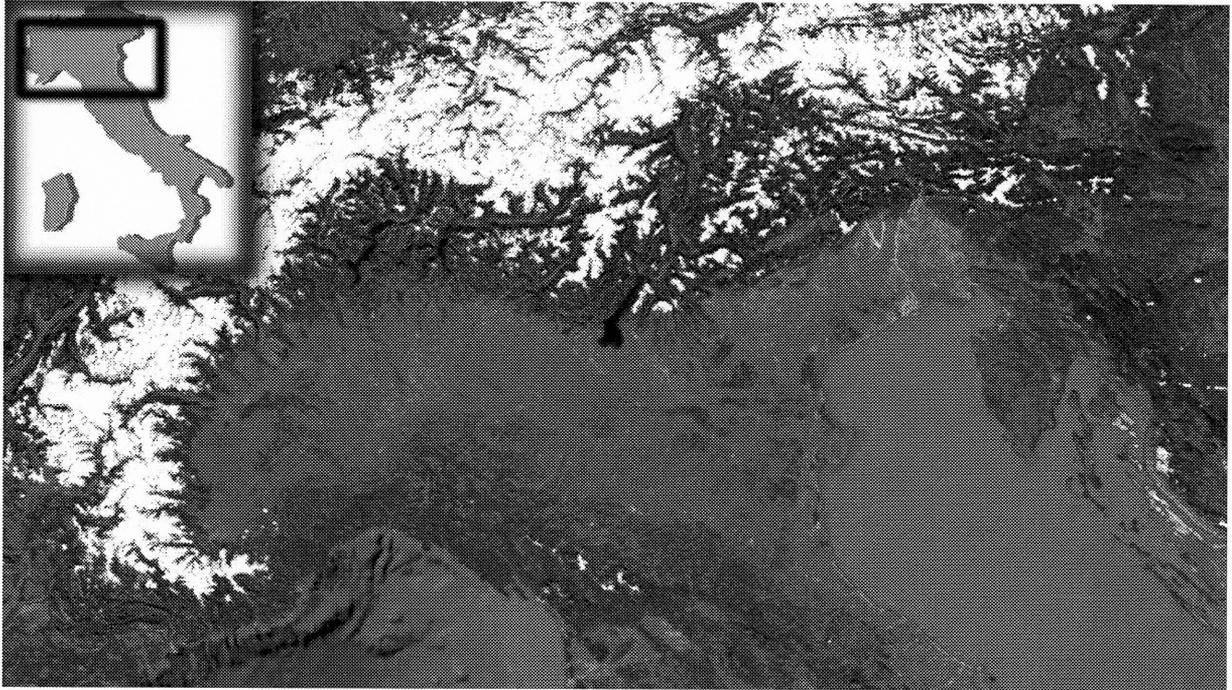


Fig.1 Satellite image of the Padanian Plain

the area around Lake Garda, Trentino and a large part of Lombardy and Veneto. They formed the most important culture of northern Italy, called “culture of Polada”, characterised by the creation of numerous pile dwelling villages along the shoreline of the lake of Garda and the small basins of “Morainic amphitheatres” (Fig 2). The villages of the Early Bronze Age are very small, with a surface that does not exceed one hectare and consequently a population which could not have been superior to 200/300 people. Scholars have proposed various reasons for which the population may have chosen humid areas to establish their villages, such as the abundance of alimentary resources of the lake basin environment, the easy access to the perialacustrine area, which was free of the thick forest which covered the rest of the landscape, the fertility of land immediately adjoining the small lakes, characterised by carbonic lime, light and easy to work.<sup>3</sup>

In this period, agriculture and herding were the base of the economy. Various types of wheat, barley, flax were cultivated and goats, sheep, cows and pigs were herded. Funerary rites of the Polada people are very badly known. A small necropolis (discovered at Romagnago-Loc in Trentino) and a few isolated tombs currently indicate an exclusive use of inhumation and the frequent use of rock-shelters.<sup>4</sup>

The second phase of the Early Bronze Age (EBA2) is characterised, in this region, by a clearly visible typological continuity of material culture. The number of sites increases considerably both along the southern shore of lake Garda and in the infra-morainic basins. However the defining phenomenon is the colonization of the plain in the direction of the Po, respecting some clear tendencies: a predilection for potential humid topographic depressions, and the consequent use of pile dwelling structures.<sup>5</sup> The dimensions of the sites remain constantly small [De De Marinis2000, p. 117].

In the rest of the Padanian Plain, the EBA is poorly attested and we can only observe a certain degree of continuity between the end of the Eneolithic and the EBA, which manifests itself in correspondences of material culture of late bell beaker mainly in Romagna and in the Apennines zone. It is likely that the predominant community was pastoral, mainly involved in ovine transhumance and living in seasonal

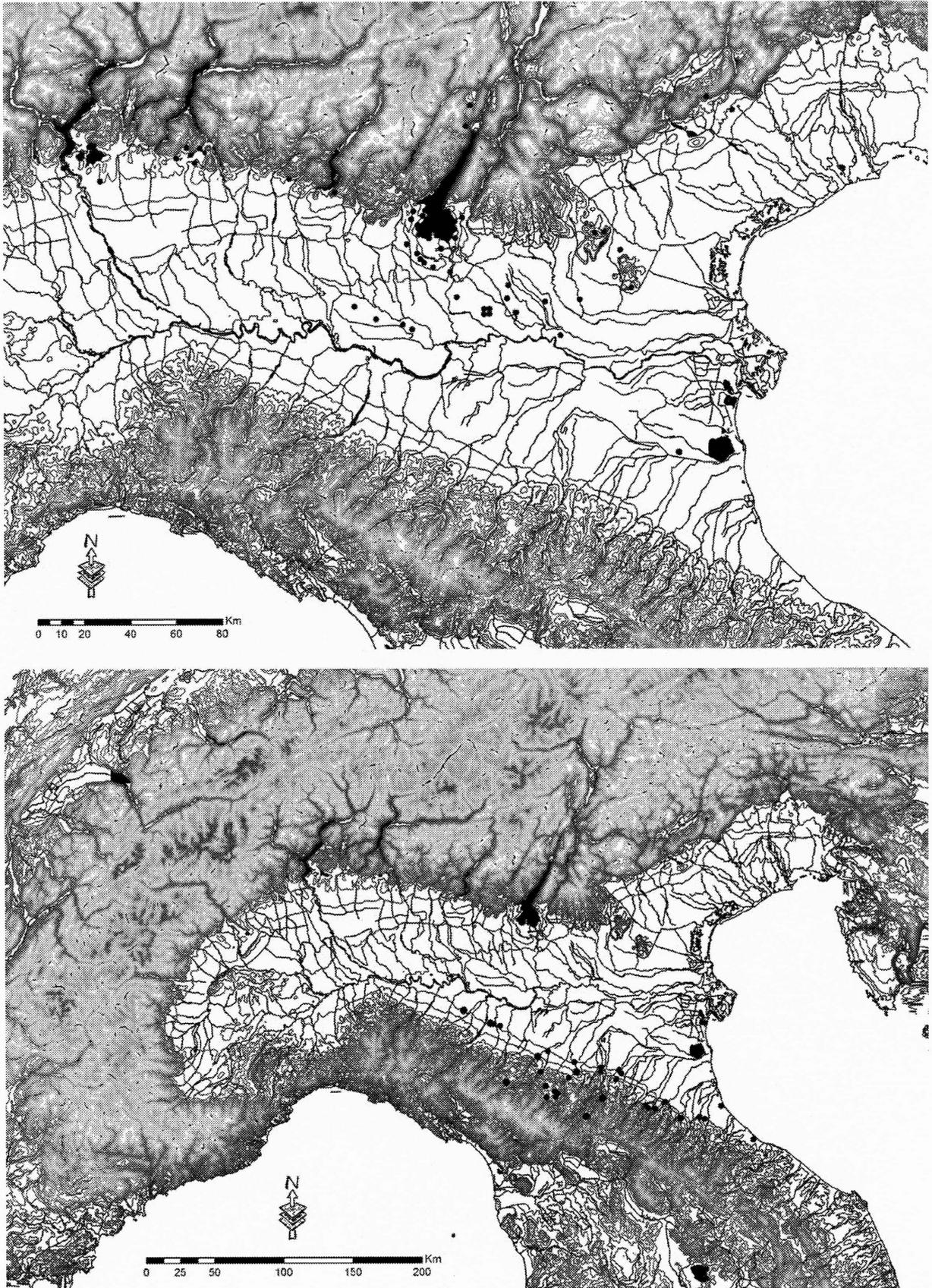


Fig.2 Main EBA evidence to the North and South of the Po.

dwellings, consisting of caves and huts. In this period, the settlements pattern was determined by the disposition of pasture land, water and access to transhumance routes (Fig 2).

A number of metallic deposits from this period have also been found,<sup>6</sup> whose interpretation remains controversial. The deposits are composed of nuclei of metallic objects such as arms and personal ornaments, intentionally buried. In most cases, they were probably reserves of metal, already worked or waiting to be remelted, and belonged to artisans metallurgists. The distribution of these deposits has led to the interpretation that the metallurgists were itinerant artisans [Carancini 1997, p. 389].

The numerous bronze objects found in domestic contexts appear to indicate that, in the MBA and the LBA, these masters were substituted by stable labour. During the oldest period the smiths were probably itinerant and lent their know-how to different, sometimes far distant, communities, as can be clearly seen from the technical and stylistic relations between the various European metallurgical areas and within them.<sup>7</sup>

Most of the EBA2 settlements continue to be occupied during MBA1, be it in the infra-morainic basins and along the shores of the lake of Garda, be it in the plain. But with the passage from MBA1 to MBA2 a new model appears for the first time in the medium and lower plain: the “*terramara*” (Fig 3).<sup>8</sup> These settlements are characterised by houses most of which are built on poles and surrounded by a dike and a surrounding moat. They have obvious structural and technical analogies with the pile dwelling habitat.

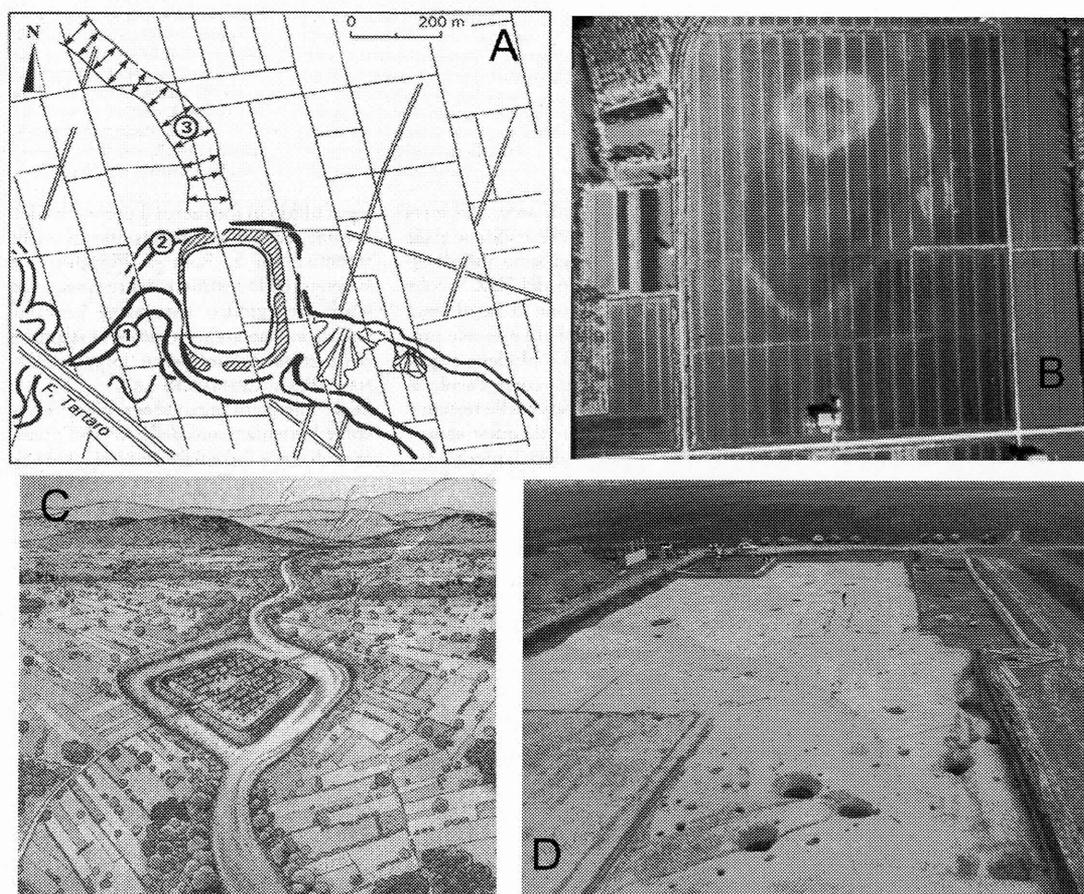


Fig.3 Example of a “*Terramara*” settlement. A: Aerophoto interpretation of the *Terramara* “Fabbrica dei Soci”. B: Aerial view of the *Terramara* of “S. Rosa di Poviglio”. C: Reconstruction of the *Terramara* of “Montale”. D: General photo of the excavations of the *Terramara* of “S. Rosa di Poviglio”.

At the end of MBA1, settlements extend to the territory to the south of the Po and this occupation expands considerably during the MBA2 with the foundation of important sites, before intensifying yet again in MBA3 with an ample and systematic occupation of the whole area. The cause of the important changes which occur between MBA1 and MBA2 and which led to the colonisation of the Padanian plain are unclear (Fig 4). The fact that in the infra-morainic basins the settlements tend to shift away from the deepest areas and to stabilise towards the higher areas and that simultaneously, the habitats of the lower plain are dotted with dike and ditch may well be a sign of an increase in humidity compared to the preceding area. However the detailed climatic history of the Sub-Boreal area is at best controversial because of the difficulty in dating punctually the climatic oscillations and to correlate them with archaeological phases [Ravazzi2003].

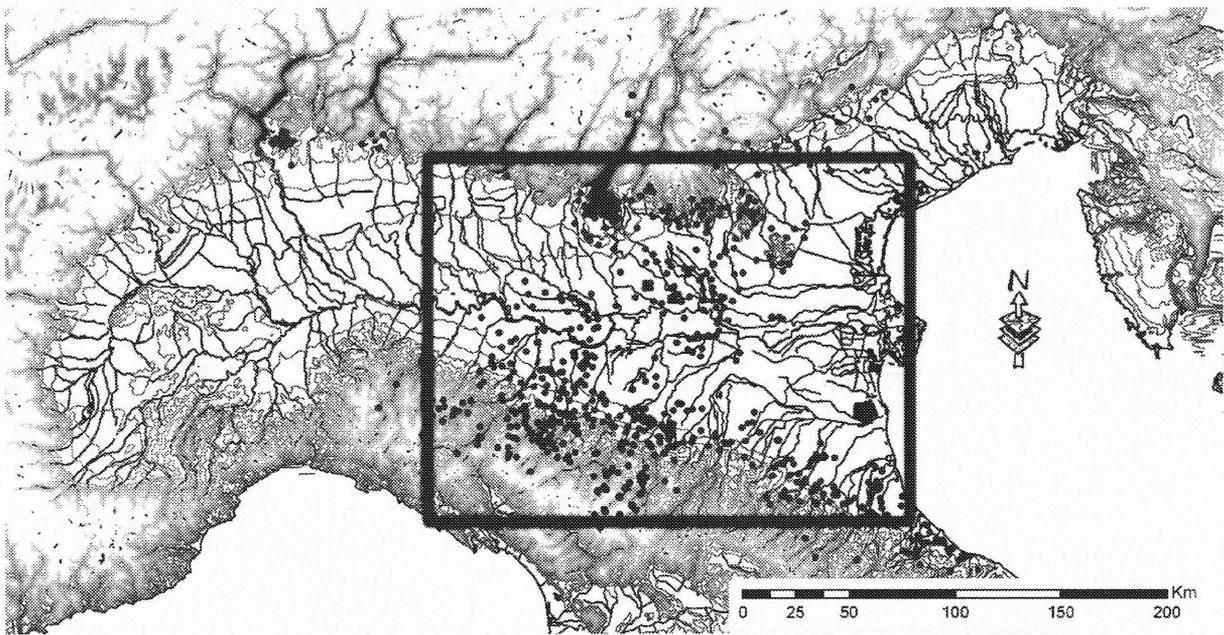


Fig.4 Middle and Late Bronze Age Settlement Distributions (after Barfield 1994, p. 134)

From a topographical point of view, the settlements of EBA2 and MBA1 privilege the depressed areas in the plain, whilst those of MBA2 and LBA are generally closer to the river courses and in more elevated areas, as has been shown thanks to various studies of the micro-relief and the interpretation of aerial photographs. The predilection for elevated areas in the plain may in reality be due not so much to a more humid phase but to economical reasons, such as not occupying the most favourable areas for agriculture, like those along the river course which were easy to cultivate with the primitive instruments of the period (Fig 5).

In this period, the Bronze Age in the North and the South of the Po become very closely linked and should be considered as a single archaeological cultural complex, although significant local variations do exist. Apart from the direct influence from the Polada culture into “terramara and pile dwelling culture”, other cultural aspects are present, such as the middle Adriatic and Central Italic contexts and in particular their connexions to the “*Grotta nuova*” archaeological culture.<sup>9</sup>

Towards the end of the MBA and the beginning of the LBA, the demographic increase accelerates, as can be seen by the systematic occupation of the Cispadanian area (Emilia) and Transpadanian area (Veneto) and by the appearance of large number of settlements which clearly undergo a process of expansion by

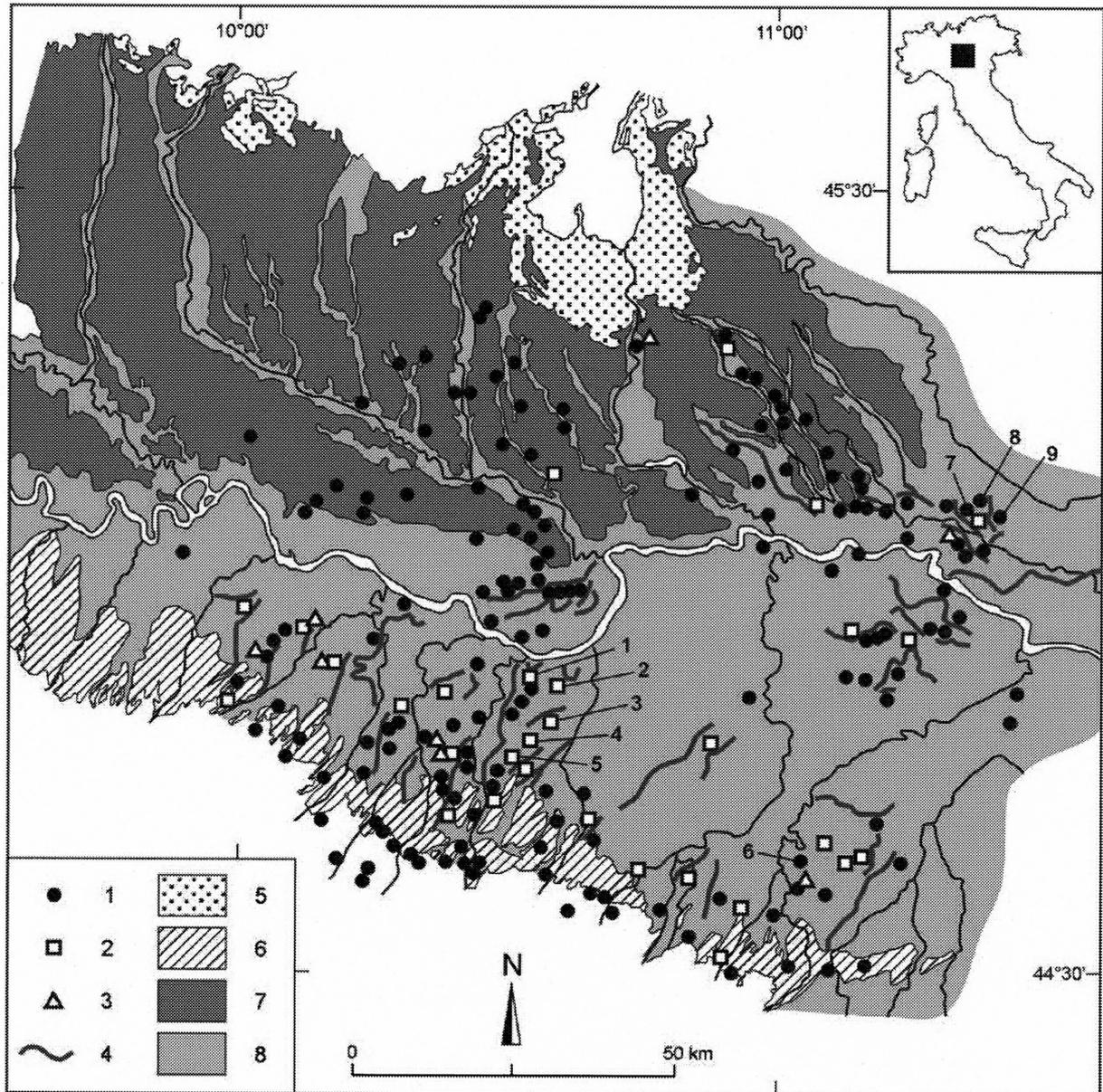


Fig.5 Distribution of the Middle and Late Bronze age sites in central Padanian plain (1) Archaeological sites, (2) banked and ditched sites, (3) *terramare* covering pile-dwellings sites, (4) Holocene palaeochannels, (5) Pleistocene moraines, (6) Pre-Holocene terraces, (7) Upper Pleistocene outwash fans and (8) Holocene alluvial plain (Cremaschi et al. 2006, p.88).

segmentation.<sup>10</sup> Recent palynological evidence has shown that the systematic deforestation of the Padanian plain should be dated to this period [Cremaschi et al.2006].

This notable demographic increase may have been caused by the introduction of new agricultural techniques such as biannual rotation and plough use. Between the MBA and the LBA, the central plain of the Po valley probably became: “the most populated areas of continental Italy and likely one of the most flourishing economical zones in Europe” [Bernabò-Brea et al.1997, p. 745].

From 1200 BCE, on the contrary, one assists to a diffuse crisis in settlement, which seems to affect the whole Padanian Plain and the surrounding areas. Chronologically this process seems to start in central Emilia and to propagate itself in the areas of Garda, Romagna and even in the Mid-Adriatic context.

In a generation, just when society was probably evolving towards more complexity, the area is almost completely abandoned (Fig 6).

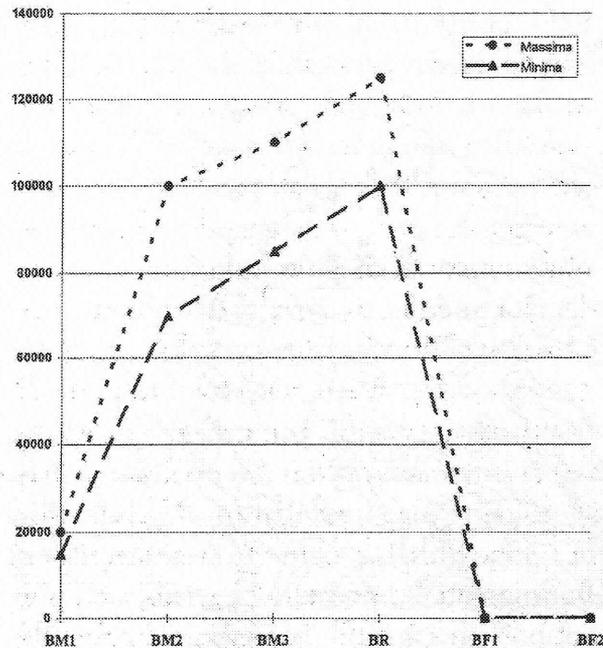


Fig.6 Demographic evolution between the Middle Bronze Age and Final Bronze Age in Central Emilia (Bernabò et al. 1997)

In particular, to carry out a demographic analysis in the absence of written records it is necessary to use information obtained from both the burial grounds and the villages. As we have already seen, the data from the former are scanty and partial. Other difficulties stem from the delicate nature of this kind of study. In the first place it has to be stressed that it is extremely difficult to "take a picture" of a population at a given moment in its development, i.e. to pick out all the distinctive elements that were present contemporaneously, without mixing them up with those of earlier or later phases. Secondly, there is the problem of the alterations undergone by archaeological sites after their abandonment. The hydrographic system of the Po Valley has changed a great deal over the course of three thousand years and settlements may have been buried under thick layers of silt.<sup>11</sup>

Different scholars have tried to explain this phenomenon of diffuse crisis, in general by taking into account various concomitant factors.

Some studies [De Marinis 1997] suggest that the fact that the collapse was contemporary to the crisis of the Late Bronze Age in the Eastern Mediterranean and that it occurred in a geographical context which, even if it is not continuous, is not far from Greece, could indicate an interconnection of some type, which would have affected the whole of northern Italy.

Crevaschi [Bernabò-Brea et al.1997, p.752-753] considers that the demographic increase observed in the course of the development of the Terramare context may have caused such a pressure on environmental resources that their actual availability was endangered. A progressive climatic change towards less favourable conditions may also have had a negative effect on the productivity of the soil, largely in deficit compared to the exigencies of the system, particularly in the area where anthropic pressure was highest.

In relation with the intensive exploitation of the resources it is necessary to observe that with the numerous, well planned and densely populated villages, during the MBA and LBA, radically transformed the Po valley, once uninhabitable, thanks to an intensive use of natural resources. Large scale deforestation occurred in order to leave space for cultivated land and pastoral areas and for hydraulic engineering through the construction of canals, ditches and the alteration of water courses. The numerous transformations and modifications of the topographical aspect of each village attested by the archaeological record, the passage from dwellings on elevated platforms to those directly at ground level, required a strong investment of wood, obtained by an ever increasing deforestation.

The indiscriminate clearing of vegetation may have had numerous negative effects on the balance of the biosphere: in the first place, a decrease in the fertility of the soil and an increase in erosion, in second place hydrological problems causing inundations and over flooding and in more general terms complicating the management of the canalisations, ditches and the protection of possible floods. Indeed the replacement of the forest ecosystem by cultivations, altered the material cycle of the ecosystem [Mercuri et al.2006].

Balista [Balista2003], reviewing different dwellings of the *terramare* sites suggests that concomitantly with an increase in the debit of the rivers, due to one of the sub-Atlantic climatic oscillations, a vast process of avulsion took place. This led to the over alluviation of the network of natural channels and even more seriously of the artificial ones, bringing about a obliteration of the previous geomorphologic landscape, in particular that derived from centuries of transformation and anthropic adaptation of the territory. In a short period of time, a vast transformation of the hydrographical landscape thus took place which led to a definitive change in many river courses.

This particular situation may have favoured certain areas between the end of the Late Bronze Age and the beginning of the Final Bronze Age such as Polesine. This is testified by the presence of settlement continuity between the end of the Late Bronze Age and the beginning of the Final Bronze Age, that demonstrate the movement of the centre-periphery axis of the central Po Valley towards new areas linked to the delta of the Po and to the Adriatic context, with the appearance of important settlements like Frattesna (Rovigo). This protohistorical complex, datable to the late Bronze Age and the early Iron Age includes vast settlement, extending over 9 hectares and two necropolis in which incineration dominates. Regular excavations and systematic surface collections have been undertaken since 1974 and have uncovered some of the domestic structures and a total of c. 650 tombs. This site is particularly interesting because its whole economy appears to have specialised around the large scale production of different types of artefacts in materials including glass paste, bone and deer horn objects, ivory, bronze and other metals and especially amber [Angelini et al.2004].

If the decline may thus be linked mainly to the indiscriminate use of resources, it is now necessary to examine the response of the society to this phenomenon, because the deterministic cause-effect is not sufficient to explain the collapse. As Joseph Tainter [Tainter1988] has clearly shown it is reasonable to assume that knowing that a recourse is being exhausted, the members or administrators of the society will take measures to resolve the problem. The opposite attitude (passivity in the face of a disaster) requires an act of faith, which we have good reasons to doubt. Therefore the real question of the collapse should be looked for in the modality of the reply to the ever increasing problems.

Cardarelli [Cardarelli 1997], taking into account the socio-economic aspect, emphasises the management and organisational capacities of the community. In a society which most authors define as "communitarian" (Fig 7), the importance of labour management was fundamental (agricultural labour,

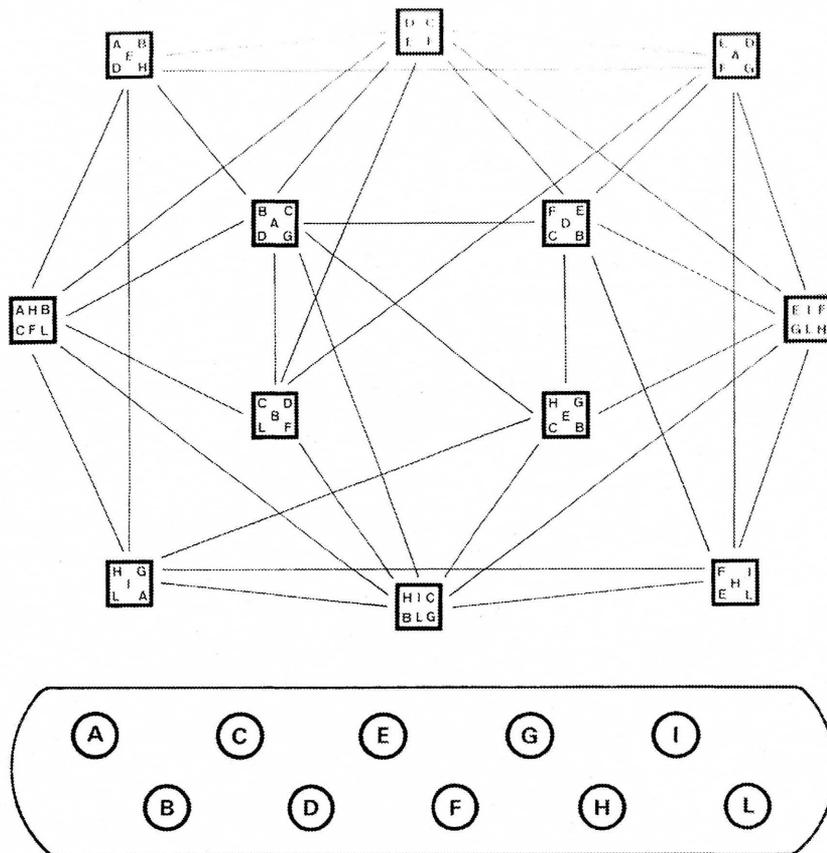


Fig.7 Schematic proposal of a system of interrelations between resident communities of familial groups, based on matrimonial exchanges within a tribal territory. The squares represent villages, the letters, the diverse lineages that form the tribe (Cardarelli 1988)

maintenance of the fortifications, the ditches and the canals), and thus a corollary of non controlled demographic growth, was that society was unable to reorganise itself and develop a new socio-political model. This would have led to the emergence of a coercive management power, which would have probably caused inner and outer conflict for the use of resources.

It is difficult to give a synthetic explanation, but we propose, following Cardarelli, that the collapse is linked to a socio-political incapacity at reorganisation. Familial communities, whose organisation is structured according to a participative model, probably did not succeed in resolving management problems implying the labour force necessary to the upkeep of the important hydrological elements which were fundamental to the life of the village. Indeed, calculations<sup>12</sup> have demonstrated that the construction of canals and ditches, typical of these settlements, required a labour force for the construction ( $x$  for a time  $t$ ). But, the management of such hydraulic operations in time thus required an even greater force ( $x$  for  $t^n$ ) and this implied an hierarchic and articulated social structure, which was probably non existing.

In fact, according to [Bietti-Sestieri1997, p.757] “a large part of the technical and organisational capacity of the community which occupied the plain was absorbed in tasks necessary for the hydrologic control and the use of the alluvial soils”. The fact that a hierarchical political system, capable of responding to the gradual geomorphologic transformation of the landscape, did not emerge probably led to a crisis of primary economical production which in turn led to an incapacity to economic growth. The lack of adaptability to the changing landscape is also clearly shown by the structure of the villages, born in a lake

basin ecology and adapted to one in close proximity to a river but unsuited to a completely transformed landscape.

The lack of a hierarchical organisation is suggested both by the archaeological record and by some propositions of territorial analysis (Fig 8) [Cardarelli1997, Cattani and Labate1997]. Society seems to be based on a network of exchange in which the “nodes” have little hierarchical weight and it is possible to suppose that a crisis, even though it may initially emerge in one localised point, will have a rapid diffusion.

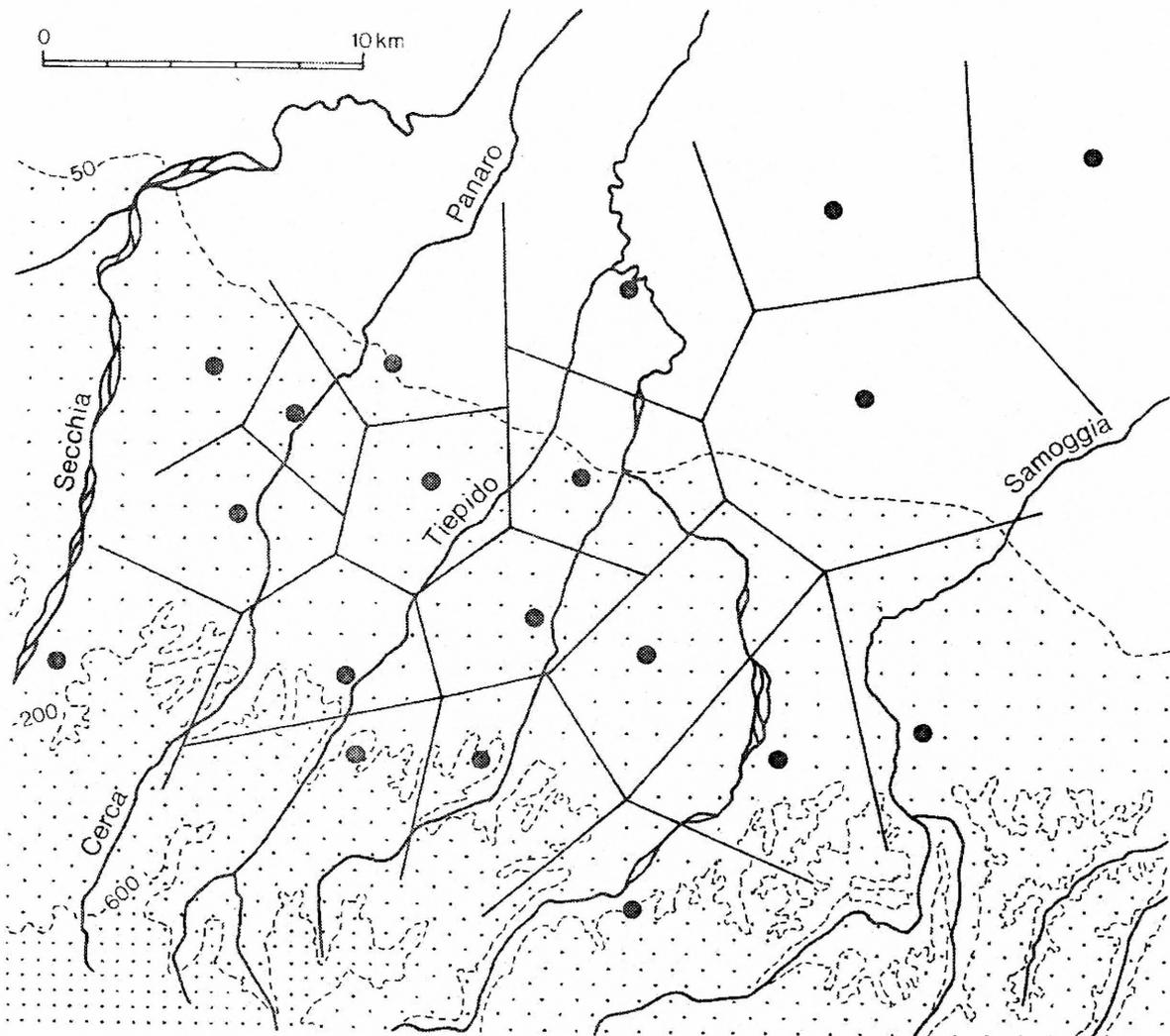


Fig.8 Hypothetical representation of the territories belonging to each single *terramare* in one sector of Central Emilia (between Modena and Bologna) in the MBA. The non hierarchical organisation is assured (Cattani et al. 2004).

This type of reasoning is based on the concept of distributed networks as representations of territorial connections, in which a sudden collapse of one part of the network can lead to very rapid collapse of the whole system if the network is strongly cohesive. From the moment we consider a territorial system we do not consider it in isolation from the surrounding reality but as an integral part of a larger system in continuous relation with similar systems, depending on its degree of openness and reaction.

In the case of the demographic collapse of the Po Valley settlements, we can observe both a general collapse of the system and local variations in the answer to the collapse (openness and reaction!). In the North East, where some important nodes appear to persist, important centres and commercial emporiums

oriented trade and exchange towards other poles and markets (such as for example the before described case of Frattesina), to the South, in the Apennines environment, the collapse of the system enabled the activation of new connections and led to the emergence of a diverse economic system, linked much more closely to the mining resources. These adaptations appear to occur on the margins of the previous system, where the network probably found ways of renewing itself rapidly because it was geographically more linked with other systems.

In other words, at the end of the Bronze Age, a series of circumstances caused the existing system to enter a phase of “de-structuration”, during which the cohesive force between the elements of the structure dissolved and entropy increased.

## 2 Reorganization and Nucleation in the Final Bronze Age and Early Iron Age

The end of the Bronze Age does not result in an absolute social or cultural void, but to the slow formation of a new reality, which is called “Proto-Villanovian” (X-IXth c. BCE) to underline the common elements respective to successive phases (dwelling typology, technology, ceramic forms, funerary rites of incineration). In fact, at the beginning of the Iron Age, a number of centres of “Villanovian”<sup>13</sup> culture (IX-VIIIth c. BCE) emerge more or less simultaneously although the archaeological record of a number of these sites shows clear evidences of continuity [Chiavari et al.2007]. This phase sees the birth of the first nuclei of almost all the future cities: it is the start of the proto-urban Villanovian development, characterised by the formation of large settlements, always localised in elevated easily defensible positions, and clearly larger and more diffused than the Proto-Villanovian villages. The development of these settlements, which were to give rise to the future “Etruscan” cities,<sup>14</sup> initially started in northern Etruria but later also extended itself to the Padanian Plain (Fig 9).<sup>15</sup>

By the beginning of the Iron Age in the IXth c. BCE, the largest settlements probably reached a population of 500 and were situated in the centre of far vaster territories which were formed by nuclei of distinct habitats which occupied the plain and adjacent hills [Parmegiani and Poscolieri 1996, Gleba 2002].

Within the area controlled by each of these centres, other smaller sites emerged, often close to the territories controlled by another centre. They presumably played a role of satellite centres, controlling the territory in a manner which, unlike in the Bronze Age, seems indicative of a politico-administrative hierarchy.

As in the Bronze Age, the villages of the Iron Age, depended for their subsistence mainly on agriculture and animal husbandry. However, the increasing importance of specialised artisans, and in particular metallurgists, modified social stratification and led to an increased accumulation of wealth. It is likely that the dense population of the Villanovian period is partly linked to the exploitation of the numerous mines present in the area and the opening of new commercial routes.

The emerging elite, that of the warriors, based its power within Villanovian society on its control over land and resources. The process of social differentiation which, as we have seen, seems to have been at an embryonic phase in the Late Bronze Age, is clearly shown in the exceptional richness of some of the funerary assemblages: numerous bronze and iron objects, some in gold, amber, precious ceramic. Amongst the “Symbols” of belonging to the upper social class are weapons, helmets, horse riding and horse drawn wagons. The use of these animals, is a clear sign of the superior rank of some of the deceased, a sign that will later be reinforced by two wheeled chariot [Gilman 1996].

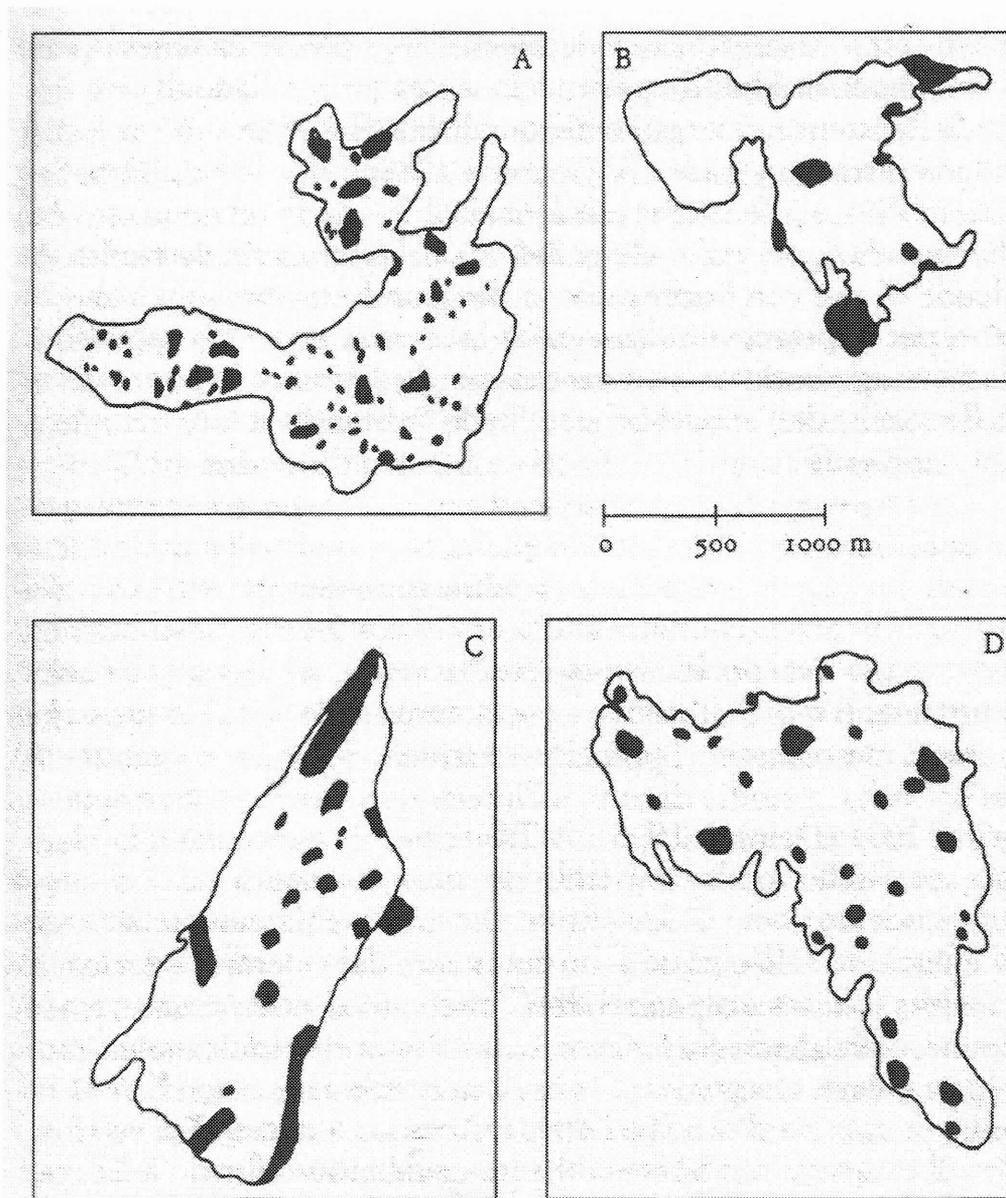


Fig.9 Distribution of the ceramic evidence for the Early Iron Age (Villanovian period) in the area occupied by some proto-urban Etruscan sites (A: Tarquini, B: Vulci, C: Cerveteri, D: Veio)[Carandini1997]:the nucelation process is evident.

The passage from the typical Villanovian phase to the “evolved” Villanovian phase takes place around the middle of the VIIIth c. BCE. It is marked by a clear differentiation in the funerary deposits, in the objects which compose it, both qualitatively and quantitatively, in the structure of the tomb itself and in the apparition of inhumation rituals alongside those of incineration [Von Eles2002, Chiavari et al.2007].

This may indicate an increase in social hierarchy and the first forms of social legitimisation (kingship). The extraordinary funerary deposits of the necropolis of the Villanovian settlement of Verucchio (Rimini) are an emblematic example of this evolution.<sup>16</sup> The necropolis of Verucchio documents a particular aspect of Villanovian culture and contains close to 500 tombs, dated between the IXth and the VIIth c. BCE, and belonging probably to the aristocratic families who controlled the valley of the Meregchia. The sepulchres have brought to light unique testimonies including small artefacts, textiles, amber and jewellery. The

characteristics of the tombs and of the offerings enable us to distinguish different social roles related to the rank, sex and period – this is true even in the case of female and children burials [Von Eles 2002b]. The most eminent individuals assumed a role that appears to have united civil, military and religious power. Other necropolis have provided us with analogous material (Sesto Fiorentino, Massa Marittima, Vulci, Tarquinia) .<sup>17</sup>

An important synthesis for this historical trend is proposed by A. Guidi in a recent paper [Guidi 2006]. He argued, with an archaeological review, that the “*main cultural change in central and northern Italy protohistoric communities between 1000 and 500 B.C. is the appearance of the first cities and of a state society*” [Guidi 2006, p.55]. In particular, he proposes three phases [p.65-66]:

1. Pre-State society with a first nucleation of settlement in Final Bronze Age and Early Iron Age (XI-X c. BCE)
2. The initial early state *by the birth of protourban center and the first outline of hierarchical settlement system but, at the same time, by the evidence of a heterarchical organization of elites reflected in the peculiar type of management of the big centers, subdivided in territorial tribes and in funerary record.* This type of organization is documented in Early Iron Age 2 (IX-VIII) in Etruria, Latium and Emilia-Romagna and in north eastern Italy, while in north-western Italy in Early Iron Age 3 (VII-VI).
3. The third phase is early state, *characterized by a definitive urban systematization (=construction of the first buildings, evidence of road systems, new complex fortifications) of biggest centers.* In particular, it is evident *from the funerary record that a strongly hierarchical society with elite warriors and rich women existed in this phase the of which it was often possible to recognize real kings*. An organized religion with priests and civic cult sanctuaries.

### 3 Conclusion

As we have seen, the Bronze Age in the Padanian Plain is marked by an intensive phenomenon of expansion, characterised by a occupation of the territory and the foundation of numerous sites by process of segmentation. Such a territorial organisation is indicative of a social organisation based mainly on a collective form, marked by the importance of kinship relations.

Territorial segmentation is a capillary process of division and fragmentation of population, but also of social, political and administrative organisation. It is directly related to the structure of the kinship groups. Processes of segmentation are typical in tribal contexts and are characterised by a dynamic of conflict which is tempered and controlled by ceremonies and symbols that guarantee the overall cohesion of the society. These include matrimonial unions and certain seasonal ceremonies, which can be deduced thanks to recent discoveries.<sup>18</sup>

Although, at the end of the Bronze Age, some archaeological evidence could be indicative of the emergence of elites, these do not appear to have been able to guarantee a more articulated management of the available resources, the productivity and the redistribution. After the collapse of the socio-political system in the Late Bronze Age (XIIth c. BCE), and after a first phase of territorial reorganisation (proto-Villanovian – X-IXth c.), a more articulate society appears with craft specialisation and dominant elites (Villanovian – IX-VIIIth c.). In this historical phase, we can observe the first consistent phenomenon of nucleation, which enable the intensive use of new sources of raw materials such as mines and new commercial routes.

The nucleation model states that “dispersed households rapidly congregated into nucleated settlements with the introduction of an abrupt and large increase in energy flow”[Burks2004, p.19]. This phenomenon of initial spatial aggregation implies a considerable increase in social complexity. New structures, models of behaviour, connections and relations emerge and radically transform the existing situation.

This leads to the emergence of a hierarchical settlement pattern, with major centres and peripheral localities, centre of production and of accumulation and distribution.<sup>19</sup> Soon after, between the VIII and the VIIth c. BCE, cultural influences from different origins contributed to the formation and increasing affirmation of the Etruscan culture with the birth of the first important “cities” and the beginning of a true city culture. The increase in complexity, which can be observed between the end of the Bronze Age and the Early Iron Age is thus characterised by a process of social transformation, which results from forms of coordination at the level of social hierarchy and organisation (passage from kinship to kingship) and consequently also at that of the territory (from segmentation to nucleation). These two aspects are presumably extremely closely linked.

Social systems are characterised by a series of unifying factors. Their aggregative force may vary in intensity: low in the process of formation, when the components show clear needs of consolidation, high in evolved societies.

A territorial organization is, consequently, an emergence of a coordination process of population and resources management. And an emergent phenomenon like urbanization (understood as a form of territorial organization) can occur when a number of simple entities give birth to a more complex structure, which is of mutual benefit. Thus, as [Sanders and Price 1968, p. 201] underline: “Nucleation in a civilized society can be considered as a social invention with the primary function of socio-economic integration and control”.

In fact, it is possible to maintain a process of nucleation and develop it only when the organisation of the society produces enough to create an alimentary surplus that exceeds the needs of the family. The surplus enables individuals to specialise themselves in a variety of activities which in turn leads to a division of labour. It is here that the elites play a fundamental role as guarantees of the social structure.

Of course, the process of coordination between population and resource management can enter into crisis. The result is that the productivity of society diminishes, just as its standard of life and a process of social dissolution begins. For example, the damage caused by an excessive pressure on the ecosystem, grows progressively over hundreds of years, and is reflected by in a decrease in agricultural productivity and a diminution in the food and other renewable resources. Because society no longer has access to the indispensable resources to maintain the existing system, it loses its organisational capacity and no longer succeeds in counteracting decline. When the standard of life diminishes, dissatisfaction increases in the communities living in the area of influence and this in turn leads to a diminishing of relations. At this point the political authorities can, for example, decide to reply with military force to oblige peripheral communities to sustain the city. Or they can attempt to emphasize the image of their own cities by building monuments and celebrating ceremonies. Because military and ceremonial initiatives are expensive but do not increase productivity, the standard of life declines all the more. As the pressure on the population and its ecosystem increases, so does the damage to the environment, the reduction of agricultural productivity and of the standard of life and therefore popular discontent increases. In the end, these worsening trends, based on a negative feedback can cause the abandon of the city itself.

The inhabitants migrate towards other locations which offer better opportunities and in some other

location a new city has its origin. The growth and decline of complex societies do not concern only the story of antique Civilisations. The urban ecosystems all undergo phases of growth and phases of decline on a spatial scale that goes from the small suburbs of cities, to the metropolitan area. An area grows because the people and the commercial activities merge into from other areas. However a few decades later, the same area may enter into crisis because the person, or activities transfer to a competing area. The same process can be observed in the large cities over a long time scale... in this continuous game between continuity and discontinuity, coordination and competition...

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- <sup>1</sup> The presence of small “aristocracies”, with more or less powerful chiefs, is documented in certain regions of Central Europe, thanks to the discovery of tombs of so called “princely”.
- <sup>2</sup> The chronology of the Bronze Age, referring to this context, is conventionally subdivided into: Early Bronze Age (EBA) (2300/2200 – 1650/1600) ; Middle Bronze Age (MBA) (1650/1600 – 1340/1300) ; Late Bronze Age (LBA) (1340/1300 – 1200/1150) and Final Bronze Age (FBA) (1200/1150 – 900 BCE).
- <sup>3</sup> For a complete review of these questions see [De Marinis1999, Marzatico2004]
- <sup>4</sup> Funerary rites are particularly interesting, even if they are often poorly documented, because unlike other elements which indicate a cultural continuity between EB and LB from the Garda area to Romagna, the introduction of inhumation (typical of the following “Terramare culture”) shows a clear rupture.
- <sup>5</sup> The diffusion of pile dwellings leads to the term “*pile dwelling archaeological culture*”
- <sup>6</sup> Be it in the Emilian area (Savignano, Scandiano, Baragalla, Castioni Marchesi), in the Bolognese area (Rocca di Badolo, Burzanella di Camugnano), or in the Romagna area (San Lorenzo in Noceto).
- <sup>7</sup> According to De Marinis [De Marinis1997, p.407] the metallic artefacts document the spread of trade and cultural contact with the Rhone valley and the various northern Alpic areas and provide a correlation between EBA2 and the Transalpic period “BrA2b”. Peroni [Peroni1997, p. 34] proposes an important and direct relation with the Danubo-Carpathian area, from where a number of important cultural contribution may have come.
- <sup>8</sup> Recognized as prehistoric villages in the second half of the 19th century and previously exploited as sources of fertilizer, they are defined as entities in their own right not only by their structural characteristics and geographical distribution, but also by the homogeneity of the archaeological remains and the course followed by the history of their study.
- <sup>9</sup> The Grotta Nuova facies corresponds to a period during which almost all of Central Italy was unified within a single archaeological aspect, articulated by local, territorially delimited, groups. Chronologically the Grotta Nuova facies diffuses itself in MB1 and MB2 and is closely connected to the terramare in particular from the end of the MB1. In the Padanian plain its diffusion is limited to Romagna and a part of Emilia [Cocchi Genik2002].
- <sup>10</sup> Segmentary societies are defined as “a social system system comprising numerous relatively small autonomous groups who generally regulate their own affairs but who periodically come together to form a larger group and who, in some senses, may collectively appear to be a single large community. Segmentary societies tend to be agricultural societies living in small discrete areas of a larger identifiable territory” [Darvill 2003, p.383].
- <sup>11</sup> Taken together, these two problems impose great caution on the investigator who sets out to reconstruct the demography of a population in quantitative terms [Bernadò Brea et al., 1997 ].
- <sup>12</sup> The estimate of the number of inhabitants in a terramara is based on knowledge of its total area and a calculation of the density of habitation (number of people per hectare), based largely on data obtained in the most recent excavations carried out in burial grounds and villages. Another estimate can be made on the basis of a calculation of the labor force required to

dig the ditches and construct the embankments. In the case of a terramara of medium size, inhabited by about 300 people of whom one third would have been able to take part in the work, it is conceivable that, with the tools available at the time, the job could have been done in about 185 working days, a period that is considered compatible with the annual necessities of production. From this sort of calculation, it has been deduced that the terramare of smaller size (one to three hectares) were inhabited by between 150 and 450 people, while those of medium to large size (four to nine hectares) could probably sustain around 100 people per hectare. In the terramare with an area greater than ten hectares, the average density was probably lower: 75 people per hectare [Bernabò Brea et al. 1997].

<sup>13</sup> The name derives from the locality of Vilallanov di Castenado, near Bologna, where the remains of a necropolis were found.

<sup>14</sup> Populonia and Vetulonia are the first settlements of this type in the Xth c. BCE.

<sup>15</sup> Unlike in the Bronze Age, in the Early Iron Age Padanian Plain is characterised by a clear cultural fragmentation with the Villanovian culture dominant in the South and the emergence of the Culture of Golasecca in the north. Both follow relatively similar paths of development although urban nucleisation occurs later in the North. For reasons of space and clarity, we will centre our discourse on the Villanovian culture.

<sup>16</sup> Verucchio dominated a territory, linked to Etruria along the river Marecchia which joins the Adriatic at Rimini and thus controlled a key link between the Aegean, the Italian peninsula and Continental Europe.

<sup>17</sup> For a recent review [Salvini2007]

<sup>18</sup> The incredible discovery of the artificial basin of Noceto (Parma), 12x6 metres across and 3 metres deep, currently under excavation (under the direction of Mauro Cremaschi) may well have been linked to one of these ceremonies. It forms a perfect rectangular structure and is filled with fine complete ceramic vases, miniature vases and terracotta statuettes of clear ritual function, all of which are extremely rare on settlement sites.

<sup>19</sup> See [Guidi 2003, 2004] for an exhaustive explanation.

# 都市以前の複合性—青銅器時代および鉄器時代初期のポー川 流域（イタリア）における社会変容と拡大—

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複合性は都市社会システムにおける重要な要素である。複合性は主として社会的機能の十分な専門化と差別化および人間の活動の精巧な組織化によって決定づけられ、過去の様々な社会の拡大と衰退に重要な役割を果たしてきた。

本稿は青銅器時代および鉄器時代初期のパダナ平原における集落動態の統合をとりあげる。青銅器時代は集落数の増加および新たな土地への拡大につながる重要な技法・技術的な革新によって特徴づけられる。この過程は毛管化と分節化によって発生したとみられ、その社会構造において都市的核は見受けられない。

システムの複合化は脱構造化のサイクルを生み出し、再組織化の能力の欠如はシステムの崩壊をもたらした。分裂後に残ったものはゆっくりと再びつながり、最終的に鉄器時代における最初の原基集団を発生させた。これは資源管理、領土計画、エリートの肯定にともなう強い社会的ヒエラルキーの出現が核形成による拡大のプロセスを導いたのに起因する。これが、政治的権力の正統化と段階的な強化により、鉄器時代円熟期において真の意味での都市の発展を可能にしたのである。