

The characteristics of the Iron Age shares in the Adige Region, in the context of the Alpine range of Northern Italy

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ABSTRACT - The basic typology of alpine archaeo-ards is illustrated. One of their main feature is the type of share. While in the Western Alps the "mass" type prevails, in the Eastern Alps the "sword-shaped" type predominates. In the Adige region hybrid forms as "trowel-shaped" shares are common. The analysis of the Valcamonica prehistoric ard rock engravings points out an evolutionary trimillenary outline of the Alpine archaeo-ards and consequently also of the roots of the Adige region ards.

KEY WORDS: Archaeo-ards, Share, Iron Age, Northern Italy

PAROLE CHIAVE: Archeo-aratri, Vomere d'aratro, Età del Ferro, Italia settentrionale

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1. INTRODUCTION

If this XXIII Scientific Meeting is dedicated to the memory of Bernardino Bagolini, this contribution is even more so, because in an epistemological context, it deals with a subject which was of great interest to him: the economic foundations of prehistoric human existence. A subject and context of which we spoke in our meetings and on our trips and which stimulated me to publish this, just as he himself did many years ago, inserting my brief personal essay on archaeo-zoology in his magazine *Preistoria Alpina* (FORNI, 1984). Therefore this contribution, even though schematic, represents the fulfilment of an implicit commitment to him.

It is known that the main aim of archaeology and history is to learn about the aspects of different cultures and ways of life of the past and in particular of the more fundamental aspects such as the standard of life, that is, how and on what people lived. It is therefore obvious that agriculture and its technology for agrarian based cultures (as were the majority of prehistoric cultures from the Neolithic onwards) have to be particularly focused upon. But how, in what way and to what extent

must the description and reconstruction of the past be carried out?

For historians, it is essential to distinguish between the chronicle and historic aspects. The former, being propaedeutic to the latter, is merely a list, a description and a chronology of the local facts while the latter ideally seeks a relationship and an interpretation.

Likewise, "chronicle" archaeology merely describes and dates the findings of particular sites, "historic" archaeology tries to interpret them, to underline the interconnection in the most ample and general way possible, with no limit of space and time. In order to reach this goal it is necessary to distinguish between findings which are useful above all for dating and chronicle purposes and those that, like work implements, for example, represent the turn of the key for the individualisation of the social economic correlation.

It is necessary to distinguish work implements: some are of marginal or even casual use. On the other hand some are essential. Of all the tools, ard (as well as its successor, plough) certainly has the most important role.

The introduction of ard coincides substantially with the domestication of oxen followed

shortly by the use of wagons. These three elements are closely correlated. Because of their strength and meekness oxen appear to be the most suitable animals for ploughing. The archaeologist SHERRATT (1981:287) reckoned that, thanks to the use of animal power, man was at least 4 times faster when cultivating with the ard during prehistoric and early periods than when spades or hoes were used. These data are confirmed by the manuals of approximate estimations on agricultural work dating back to the period before the mechanisation of the land (NICCOLI & FANTI, 1955; BERNARDI, 1951). This meant an enormous increase of productivity for agricultural workers and implied the existence of a food surplus; consequently the communities differentiated and that which before was a community of only agricultural workers turned into one of traders, artisans, priests and soldiers as well. The first villages were born: transport of the products from the country into the storehouses in the villages had given rise to the introduction of wagons.

The technological/agronomic consequences resulting from the introduction of ard didn't give rise to an immediate and unique development. Initially with the use of a wooden share the ard could only be used on loose or humid-soft soils in order to track drills for seeding in line. It is only when iron shares are introduced (copper being too malleable, bronze being too fragile and expensive) that ards develop the ability to till and generally cultivate the soil.

The specific methods required in the research of working implements must also be mentioned. In fact, as already known, research on the events can be carried out in synchronic perspective. This is because every event represents, so to say, the result of a situation, which is, in itself the result of the preceding one but which can, however, be focalised and studied in its contemporary context. In this way prehistorians can be divided in Neolithic historians, in experts on the Copper Age and in the Bronze Age and so on, according to the chronological position of the matters dealt with.

Research on work implements is, on the other hand, very different. To start with, documentation on this subject is generally incomplete. This is also because iconographical and archaeological documentation is generally scarce. When in the Metal Ages there was an increment in graves and sarcophagus monuments laden with bas-reliefs illustrating the activity of the dead, these certainly did not refer to farmers. The same can be said for the more artistically elaborate constructions such as temples, the triumphal or government buildings which were surely not manual workers' huts. Thus, bearing in mind the long-term character of these tools, an eth-

nic-archaeological type of diachronic definition in conducting historic research is necessary and furthermore the conduction should take place on a large scale in order to have a greater amount of data.

2. FROM THE GENERAL TYPOLOGY OF ALPINE ARCHAEOLOGICAL ARDS TO THE SPECIFIC ADIGE-AREA TYPE

As everybody knows agriculture on the two alpine slopes came from two different directions: the Mediterranean and the Danube. The danubian cultural wave reached the alpine areas not only from the North but also from the South, penetrating in the Venice-Po region across Istria and the Isonzo basin, confining with a watershed, gently sloping in some places and with the Danube. It was from these directions that ards were introduced into our country during the Late Neolithic and the Copper Age.

It is necessary to explain that when we say archaeo-ards we intend ploughing implements that belong to types or subtypes which are not in use any more or that are becoming extinct. It is understood that such a denomination refers to a category and not to single implements, which will continue to be called ards. Documentation on the alpine archaeo-ards is handed on to us not only from normal sources of information (real shares and scenes representing ploughing, on vases, situlas etc.), but also from three extraordinary archives: the most exceptional is the one on the rock engravings of Valcamonica: hundreds of thousand of representations chronologically dating from the Mesolithic to the Iron age, with almost fifty ploughing scenes. This will be dealt with later on. Another big archive of rock engravings with an even greater number of ploughing scenes (571, according to DE LUMLEY, 1996) is that of the region of Monte Bego in the Maritime Alps but the typology of ards is very different in comparison to the Valcamonica one and also, chronologically speaking, its period of duration is more limited (mainly during the Iron Age). The third archive consists of fossil ard furrows discovered in the Aosta Valley, in different places of the Grisons and presumably also in Velturno in the Isarco Valley (BZ), according to a recent article by DEL RI & TECCHIATI (1994).

As we have already mentioned, the technological-agronomic consequences resulting from the introduction of ards did not have an immediate and unitary development. Initially, with the wooden

shares, ards could only be used on loose or humid-soft ground and above all to trace furrows for planting seeds in rows. An extraordinary expansion of its use came about with the adoption of iron shares (copper being too pliable, bronze being too fragile and expensive). With regard to this, one must realise that, these improvements of great importance went alongside with a remarkable morphologic and functional differentiation. This is the reason why it is necessary to recognize a typology of Ploughing Implements, even if it is reduced to the essential. Regarding this, it should be stated that the easiest and most realistic classification of ards, which has already been illustrated on other occasions (FORNI, 1981, 1990, 1997a) and which is hereby reassumed (and which we will to some extent re-elaborate and complete), is the classification which, without neglecting the morphological-constructive aspects (LESER, 1931; ŠACH, 1968) emphasises a typology of technological efficiency (HAUDRICOURT & DELAMARRE, 1955; STEENSBERG, 1966). Two aspects of this must be looked at: depending on the level of efficiency in general and on the suitability of the implements in fulfilling specific requirements for the particular type of soil which is to be worked.

Therefore, as we can see in the specific typological chart, the first aspect distinguishes Ploughing Implements, in symmetric ones (which simply cut the ground) and in asymmetric ones (because of the asymmetric plough-shares or the mould-board, placed only on one of the sides, which turns the soil). During prehistory and the main part of the Classical Era, all ards were symmetric. It is only in the Roman-Imperial era that ard with Wheeled forecarriage (*plovum*) appeared, while those equipped with coulter and mould-boards appeared later on (*versorium*). The most antique ards, including shares, were completely made of wood even though the presence of single cases of shares made of stone, bone or horn should not be excluded (FORNI, 1993). The wood used for shares not only came from particular types of forests featuring such qualities as hardness, resistance (fibrousness) of their lumber, but was also charred with a flame in order to accentuate its consistency. HAUDRICOURT & DELAMARRE (1995:209) pointed out the sporadic use of wooden shares even in the last century, in poor Alpine valleys, in the region of Queiras (France). Even STRABO (XI, 4, 3) in ancient times refers to populations that used ards made of only wood, without metallic shares. The Albanians from the Caspian were among these populations.

The second aspect distinguishes, as already mentioned, almost vertical wooden ard-shares, which are suitable on grounds with big pebbles,

roots, etc. (using this model of ards, ploughmen could easily avoid obstacles), and horizontal stock-share types, the so-called Triptolemus ards, used on loose soils, without stones and roots, which have been worked for some time.

With the introduction of iron shares a great technological revolution took place because, as already underlined, it gave rise to cultivation or, however, to the intensification of the cultivation of vast areas with compact, clayey ground, particularly common not only in the Peninsula, but in the same vast Po-Venice area, excluding north-western areas.

Symmetrical ards can also be individualized (FORNI, 1981 and in engraving b) for other characteristics such as: straight or curved bures, bures inserted in the cavity of the ard-beam, or vice-versa, (which, in alpine rock engravings can be distinguished by a bure sticking out of the ard-beam); a long ard-beam (high) probably grasped with two hands and a short hard-beam (low) that can be moved with just the one hand; an ard-beam with one or two handles or even without any; a single or double ard-beam (ards with double handles). The structure can be angular (absence of front part), triangular (with front part and oblique stock-shares), quadrangular (with vertical front part and horizontal stock-shares). These last examples are not generally present on southern Alpine slopes.

It is also necessary to consider the fact that in prehistoric ards, the purpose of the front part was not, as yet, to regulate the depth of the furrow, but only to strengthen the structure. This was necessary when ards were not made of a single piece of wood.

Generally, symmetrical ards are not equipped with a Wheeled forecarriage, but their transition from symmetrical to asymmetrical went along with, or even preceded, the transition from simple ards to ones made with a Wheeled forecarriage. At the end the two innovations became one.

We have mentioned that completely wooden shares were used through to the end of the last century. These shares, and obviously even those made with harder wood, wore out rapidly because of the extraordinary friction they underwent. So as not to throw the whole implement away it was therefore necessary to be able to replace only the worn-out part. Of great interest to us were the findings of structures of numerous, almost intact, prehistoric and protohistoric ards with wooden shares in the marshes and swamps of Jutland, in Germany and in northern France (FRIES, 1995). Such shares consist of a simple stick that is generally wider at the top end, like a spearhead, in order to make it sturdier. They are referred to as *massa/mazza*

(stick) type when shares are made out of “disposable” wood. The continuous presence of such types of shares, even though made of iron, has been proved up till recent periods even further to the south, reaching the central part of the Po Plain (FORNI, 1996). These categories of ards feature an oblique position of the ard-stock, that is the part of the implement that touches the ground with its point and that cannot be replaced. Shares and sometimes also under-shares are placed on top of the ard-stock. Even in this case it is obvious that only the shares suffer the impact and the high friction with the ground.

ALINEI (1996: 134-135) linguistically underlines how the term *massa/mazza* used for shares is found from west Piemonte/Lombardia through to the whole of the western part of Emilia: the *Terramare* territory. Following this linguistic track, FORNI (1997b: 459-460), has identified “*massa*” type shares and has reconstructed their relative ards, combining findings which, up till then, had not been considered to belong to that particular culture. SÄFLUND (1939) had already noticed the affinity between the ards of the *Terramare* and those of prehistoric Jutland.

Shares from North-East Italy and the corresponding area to the North of the Alps (BERANOVA, 1980; FORNI, 1990; FRIES, 1995; POHANKA, 1986) are entirely different, at least from the Iron Age onwards. They clearly appear as “spade-shaped”, that is without a stick handle and particularly flattened just like a spade. The oldest documentation on shares of this type can be found in the rock engravings of the *Valcamonica* and perhaps also in the engravings in the Montebelluna (TV) cist and, generally speaking, their ancestors are the “shoe-shaped” shares hypothesised by PERINI (1982) for the Lavagnone ard.

In the Central-Oriental Alps, and more precisely within the Alpine-Adige area, the pre-Roman iron shares, together with some isolated cases of “spade-shaped” and “nail-shaped” shares (ŠEBESTA, 1996: 117), are evidence of hybrid morphology. In fact the north Adige share generally appears to have a rather ample and flat blade on one side that makes it look more like a “spade-shaped” type and, on the other side, it is pedunculated as in the “*massa*” type shares. That is to say that it is not attached to the ard-stock by means of flaps or sleeves, as in the oriental ones, but, on the contrary with either tangs or with a handle on a long or short stick, as in the western ones.

Numerous of these hybrid type ards have been found in Sanzeno (NOTHDURFTER, 1979), in Appiano (LUNZ, 1990), in Ortisei (PRINOTH FORNWAGNER, 1993), in Pergine (PERINI, 1978). When

there is a bend in the tang or in the handle, the shares are similar to a trowel and so this term is used for these types of shares. “Trowel-shaped” shares have been found in the four localities mentioned above. Forms of short pedunculated shares (therefore hybrids between the western and oriental types) have been conserved until recent periods in the Sole valley. Numerous examples are preserved and exhibited in Pellizzano in the *Al Tabià*. It must be said that smaller shares and in particular “trowel-shaped” shares could also be used as iron for hoes (GLEIRSCHER & NOTHDURFTER, 1993; NOTHDURFTER, 1979; LUNZ, 1990; PRINOTH FORNWAGNER, 1993). Ethnography provides a lot of documentation on this subject (BARTOLOZZI, 1939: 9, in the notes).

3. THE ROOTS OF THE ADIGE VALLEY ARDS: THREE THOUSAND YEARS OF TYPOLOGY HISTORY OF ALPINE ARDS IN THE VALCAMONICA ROCKS

The first archive mentioned above is particularly precious in order to complete our basic knowledge of ards, and particularly of the origins of the Adige region ards and is therefore the “corpus” of the prehistoric representations of the *Valcamonica* ards. This gives us the detailed outline of the evolution of ards during the three millennia that preceded the vulgar era. Even on other occasions (FORNI, 1997a) this complex of prehistoric and protohistoric engravings, has been illustrated and its analysis is hereby re-elaborated and completed. The objectivity of such representations (which is necessary for determining an approximation on the morphological structural characteristics of the prehistoric ards, compatible to scientific technical demands) is assured for its analogy, determining the significant and constant correspondence, even in the more schematised styles, between the actual objects found archaeologically (daggers, halberds etc.) and their representation on rock. With regard to the dimensions, such correspondence is approximate, only for evident reasons. The prehistoric artist had a specific type of ard in mind and therefore illustrated it with what we could define, in modern language, as a realistic sketch. He reduced the dimensions of it, just as we would do. Consequently the details: joints, bonds etc., are rarely evident (they can only be deduced).

After the pioneer researches of MARRO (1933), of GLOB (1951) and of SÜSS (1958), a remarkable number of ards of the *Valcamonica*, were

published by ANATI (1982), PRIULI (1991), FOSSATI (1994), and were referred to only with regard to their main use, but the person who specifically dealt with this was DORIANA PIOMBARDI (1988), who based her degree thesis on this subject. This thesis represents the most complete inventory on ards representations (and their dating) and was subsequently up-dated by her (PIOMBARDI, 1989, 1994). We have based the typological analysis in the following chart on this inventory (keeping in mind the taxonomic principles exposed in FORNI (1981) - which are synthesised here above and then illustrated and re-elaborated in special charts). In this chart, we have reproduced with an accurate schematisation, the various representations of ards (not including such unimportant elements, such as the dimension of the ploughing scene).

We should now give further explanations of the dating technique of the representations of analysed ards, but for this our previous publications can be consulted (FORNI, 1997a).

From the detailed analysis of the 44 illustrations of prehistoric ards of Valcamonica (in which we have omitted the ploughing scene of Rock n° 1 of Cemmo, because everything apart from the yoke, the two heads of the oxen and the feet of the ploughman was ruined by erosion), the following elements seem very important:

1 - Ards appeared in Valcamonica and in the surrounding areas with their definitive fundamental structure. That is there are no pre-ploughing implements. These rakes, etc., appear in the near Valtellina at Grosio (PACE, 1972, 1974), but their dating is uncertain. According to DE MARINIS (1994), FOSSATI (1994) and to the majority of the most recent authors, the first representations of ards date back to the Middle Calcolithic, that is around 2800 BC. According to ANATI (1982) they could even be more ancient.

2 - The greatest number of representations of ards that research has now produced and the more precise dating provide us with a better knowledge of the evolution of the structure. The main structure (34 on 40), present in all three millennia, is the (radial) one in which the stock-share is in an oblique position at an angle according to the Pellegrini method (PELLEGRINI, 1991) measured 45°/35° (0° the horizontal position and 90° the vertical one). In fact, in the Calcolithic period the average value is 45°, in the Iron Age the average value is 41.74° but in the Bronze Age the average value is 49.62°. The Triptolemus ards are not present (that is the Mediterranean type ards featuring horizontal stock-shares), but as we can see, especially in the Iron Age, some are similar to this type of ard. In the preceding periods, the types with an aver-

age flare angle allow us to deduce that this implement (even if it is not a Triptolemus type) had always been used on grounds that had already been cultivated for some time or tilled beforehand with other tools (fire, spades etc.), since wooden shares were not suitable for turning the soil. It can be deduced that Valcamonica, just like Monte Bego, was a sacred place where the populations, from the hills or the foot of the mountains, went for their periodic ceremonies representing the rural activities they practised in their habitual hill or highland habitat.

3 - From the Calcolithic to the Copper Age, the main structure does not undergo any changes except for the limited sporadic presence of different types. Ards with long and heavy beams are typical of this period and often appear grasped with two hands.

4 - In the Bronze Age, even if the general number of samples is very limited, ards introduce some significant improvements and differences. In this period the models all appear to be so different that researchers are often confused. First of all, in the transition from the Copper to the Bronze Age, levers (which were practically non-existent until then) appeared on short handles (n. 18, 19), as well as other types without beams (n. 23, 24, 25), probably used to trace furrows in grounds which had already been ploughed, in order to sow in rows. Of considerable interest are ards 21 and 22 with their almost horizontal stock-shares which are connected to the bure with a reinforced front part. These types have already appeared sporadically in preceding periods but are of greater importance here in terms of percentage, due to the limited number found. Levers on short handles and horizontal stock-shares will be developed in the following period.

5 - In the Iron Age ards become more slender, but stronger. The short beam, now always featuring levers, appears grasped with only one hand. The other hand in fact holds the goad-stick. Typical signs of the insertion of the metallic share into the stock (evidently it was made of wood before), are of fundamental importance: they can be seen very clearly in the scene of Rock 17B1 in Bedolina, n.34, dating back to the VIII century BC (where their triangular "spade shaped" outline appears) and represent the most ancient documentation on the use of iron shares in our country or at least in the continental area. In other cases rings, which were used to fix it to the ard-stock, appear (Seradina I, Rock 8B, n. 37). But the use of metallic shares, especially from the beginning of the VII century BC, must have been so taken for granted that the artist did not emphasize them anymore. The fact

that the new type of agile, effective and strong ards always hauled by horses (sometimes showing the reins but mainly the bridles) is of great importance. Whilst before oxen were tied to ards by means of a yoke, here the horses are more frequently strapped to the helm. It is not surprising that in earlier periods yokes were also used for horses. Even at the beginning of this century yokes were used in the Western Alps (FERRERO, 1997).

6 - The agrarian colonisation of Valcamonica only came about in a significant way in the Iron Age. As already mentioned, it is in this period in fact that ards with (iron) shares in an almost vertical position appear with great frequency (6 on 19), being suitable for the ploughing of uncultivated or recently cultivated grounds.

7 - It is in this period that other important novelties are introduced like the flaps on the sides of the stock-shares and the use of curved bures. In apparent contradiction to what has been said in the previous paragraph, it is a significant fact that the appearance of ards with a stock-shares in an almost horizontal position date back to the Iron Age and are substantially identical to the classical ards of

Triptolemus (5 on 19). This is a clear sign of a more stable agriculture which dates back to ancient times, when deforested areas were cultivated. Comparing the specific ards of the Garda area during the Bronze Age we can see that it was not until later that they actually appeared in Valcamonica. So probably, apart from local cultural facts, this was because the valley was mainly covered with stony ground which made their use very difficult.

8 - While shares similar to the "massa" type (and particularly the stock-share) prevail, the "spade-shaped" ones are rarer (cfr. for instance the one engraved on Rock 17B1 of Bedolina). The intermediate hybrid forms such as the Adige region ones are less distinguishable but there surely must have been a great number of them.

A recent publication has been edited (FORNI, 1997a) comparing the typology of ards documented on the rock engravings of Monte Bego region and the one in Valcamonica, while an analysis of the correlation between the documentation supplied by the rock engravings of both the regions and those of the Aosta Valley and Grisons fossil furrows are being published (FORNI, 1997c).

SUMMARY - The basic typology of alpine archaeo-ards is illustrated. One of their main feature is the type of share. While in the western Alps the "mass" type prevails, in the eastern Alps the "sword-shaped" type predominates. In the Adige region hybrid forms as "trowel-shaped" shares are common. The analysis of the Valcamonica prehistoric ard rock engravings points out an evolutionary trimillenary outline of the alpine archeo-ards and consequently also of the roots of the Adige region ards.

RIASSUNTO - Si illustra la tipologia fondamentale degli archeo-aratri alpini. Una delle loro essenziali caratteristiche è il tipo di vomere. Mentre nelle Alpi Occidentali prevale il vomere tipo "massa", in quelle Orientali predomina il tipo "a ferro di vanga". Nell'ambito atesino sono diffuse forme ibride quali il vomere "a cazzuola". L'analisi delle raffigurazioni rupestri preistoriche d'aratro della Valcamonica evidenzia un profilo evolutivo trimillenario dell'archeo-aratro alpino e quindi anche le radici di quello atesino.

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MORPHO-FUNCTIONAL AND CHRONOLOGIC TYPOLOGY OF THE ARDS REPRESENTED IN VALCAMONICA

n.	Representation	Location	Era	Structure	Share Inclination	Shares material	Bure	Plough- beam	Hand -grip	Sled	Goad/ stick	Sub- type
0*		Cemmo R1	CRr	-	-	-	-	-	-	B	-	-
1		Bagnolo Masso 2	CRm	Ang.	Ob 40°	Non metallic	DF	L	2 m	B	-	b
2		Borno Rock 1	CRm	Ang.	Qo 30°	Non metallic	D	L	2m	B	-	b
3		Cemmo R2	CRm	Ang.	V 90°	Non metallic	D	-	-	B	-	g
4		Ossimo R8.1	CRr	Ang.	Ob 32°	Non metallic	DF	L	2m	B	-	b
5		Ossimo R8.2	CRr	Ang.	Ob 35°	Non metallic	DF	L	2m	B	-	b
6		Ossimo R7	CRr	Tri	Ob 45°	Non metallic	D	L	-	B	-	b
7		Naquane R99	CRr	Tri	Qo 27°	Non metallic	D	Me	-	B	-	b
8		Scene 1 Dos Cuì	CRf	Tri	Ob 45°	Non metallic	D	L	2m	B	-	b
9 i		Scene 2 Dos Cuì	CRf	-	-	-	D	L	1 m	B	-	-
10 i		Scene 3 Dos Cuì	CRf	-	V 90°	-	D	L	1 m	B	-	g
11 i		Scene 4 Dos Cuì	CRf	-	Qv 85°	-	D	L	-	B	-	g
12 ii		Scene 5 Dos Cuì	CRf	Tri	Ob 35°	Non metall.	D	L	1 m	B	-	b
13 ii		Scene 6 Dos Cuì	CRf	Tri	Ob 32°	Non metall.	D	-	-	B	-	b
14 i		Scene 7 Dos Cuì	CRf	Ang.	Ob 32°	Non metall.	D	L	2 m	B	-	b
15		Scene 8 Dos Cuì	CRf	Ang.	Qo 25°	Non metall.	D	Me	1 m	B	-	b
16		Scene 9 Dos Cuì	CRf	Ang.	Ob 40°	Non metall.	D	L	2 m	B	-	b
17 ii		Scene 10 Dos Cuì	CRf	Ang.	Ob 40°	Non metall.	D	L	2 m	B	-	b
18 (3)		Campanine R 8, 1	CRB	Ang.	Ob 40°	Non metall.	D	CoMa	-	B	-	b
19 (3)		Campanine R 8, 2	CRB	Ang.	Ob 40°	Non metall.	D	CoMa	-	B	-	b
20 (4)		Campanine R X	CRB	Ang.	Qv 85°	Non metall.	D	Me	-	B	-	g
21		Foppe di Nadro 22,1	Br	Tri	Ob 32°	Non metall.	D	L	2 m	B	-	b
22		Foppe di Nadro 22,2	Br	Tri	Ob 32°	Non metall.	D	L	2 m	B	-	b
23		Naquane R 94,1	Brf	Ang.	Ob 40°	Non metall.	D	-	-	B	-	b
24		Naquane R 94,2	Brf	Ang.	Ob 43°	Non metall.	D	-	-	B	-	b
25		Naquane R 94,3	Brf	Ang.	Qv 85°	Non metall.	D	-	-	B	-	g
26		Foppe di Nadro 40,1	Fi	Ang.	Ob 45° (5)	Non metall.	CF	MeMa	-	-	-	-
27		Foppe di Nadro 40,2	Fi	Ang.	Ob 43°	Non metall.	DF	MeMa	-	-	-	b
28 (6)		Foppe di Nadro R 26	VIII B.C.	Tri	Ob 47°	Non metall.	LC	CoMa	1 m	E	-	b
29		Seradina R I R 27 B	VIII B.C.	Ang.	Ob 50°	Non metall.	D	MeMa	1 m	E	-	b
30		Bedolina R 17 B 2	VIII B.C.	Ang.	Qo 30°	Non metall.	C	Me	1 m	E	-	c
31 (7)		Seradina III R 27 C 5	VIII B.C..	Ang.	Ob 55°	Iron in	D	Me	1 m	E	Si	b
32		Seradina III R 27 C 6	VIII B.C.	Tri	Ob 35°	Iron in	C	-	-	E	-	b
33		Seradina I R 6 B	VII B.C.	Ang.	Ob 55°	Non metall.	DF	CoMa	1 m	E	Si	b
34 (8)		Bedolina R 17 B 1	VII-VI B.C.	Ang.	Qo 30°	Iron	CF	Co	1 m	E	Si	b
35 (7)		Seradina III R 12 C 1	VII-VI B.C.	Ang.	Qv 60°	Iron in	DF	MeMa	1 m	E	Si	b
36 (7)		Seradina III R 12 C 2	VII-VI B.C.	Ang.	Ob 45°	Iron in	D	CoMa	1 m	E	Si	b

n.	Representation	Location	Era	Structure	Share Inclination	Shares material	Bure	Plough- beam	Hand -grip	Sled	Goad/ stick	Sub- type
37 (9)		Seradina I R 8 B	VII-VI B.C.	Ang.	Qo 30°	Iron	DF	CoMa	1 m	E	-	b
38 (7)		Seradina III R 12 C 3	VII-VI B.C.	Ang.	Qv 65°	Iron in	D	CoMa	1 m	E	Si	b
39 (7)		Seradina III R 12 C 4	VII-VI B.C.	Tri	Qv 70°	Iron in	D	MeMa	1 m	E	Si	b
40		Coren Sellero R 7	VII-VI B.C.	Ang.	Qo 30°	Iron in	D	CoMa	1 m	E in	Si	b
41 (10)		Naquane R 57	VI-V B.C.	Ang.	Ob 35°	Iron in	DF	CoMa	1 m	E	Si	b
42		Pià d'Ort	V-IV B.C.	Ang.	Qo 30°	Non metall.	CF	CoMa	1 m	-	Si	b
43 (11)		Naquane R 35	F	Ang.	Ob 50°	Iron in	DF	CoMa	-	-	-	b
44		Bedolina R 16	F	Ang.	Qo 30°	Iron in	CF	CoMa	1 m	E	Si	b

NOTES

1 - It is obvious that the dimension of the ards shown are technologically irrelevant; the prehistoric artist chose the ards according to his own personal interest and possibilities. What is really important is the overall structure, the parts and their position in relationship to the implement and consequently, the angle that the working part - the share - and the bure form. This angle has been measured, as shown in the illustration reproduced by PELLEGRINI (1991). With relation to the technological/ergological aspects, if there are curves, the "strings" of the respective "bows" are taken into consideration. It is evident that the measure of the angle is only approximate because of the difficulty in obtaining measurements from this type of illustration, considering that the prehistoric artist did certainly not measure the angles (even though he had a precise model of a share in mind). Statistically speaking, it must be taken into account that this chart applies to the illustrated shares and as a result the numerical importance of each single type depends more on its symbolic value for the prehistoric Camuni - which is also important - than on its actual diffusion: one can consider, for example, the ploughing type with vertically inclined stock-shares used for cultivating new soils which has been represented many times on Rock 12 in Seradina, in connection with the fertility rituals, as DE ABREU (1989) underlines.

2 - Anati assigns it to the Late Neolithic. 3 - Featuring the reinforced bure in the exact position where the share fits. It probably replaces broken shares. 4 - Two wings appear. 5 - Reins are present. 6-9 - Bridles are present. 10 - The iron share emphasizing the rings that fix it to the ard-stock. 11 - One wing appears. 12 - Inverted position of the lever.

Meaning of the symbols and abbreviations

* This representation has not been numbered because it may be considered as part of the inventory of ploughing scenes, but not of the inventory of representations of ards.

i: incomplete plough in engraving

ii: incomplete plough, in some parts interpretation is uncertain

Era

CRm: Calcolithic / Middle Copper (1st half of III millennium BC)

CRr: Calcolithic/ Late Copper (2nd half of III millennium BC)

CRf: Calcolithic/ Final Bronze (end of III millennium BC)

CRB: Calcolithic/ Final Bronze /beginning of Bronze (between III and II millennium B.C.)

Br: Bronze (II millennium B.C.)

BrF: Final Bronze /beginning of Iron (between II and I millennium BC)

Fi: beginning of Iron Age

F: Iron Age (century uncertain)

Ard structure

Tri: triangular (presenting front-piece)

Ang: angular

Shares

Ob: oblique

Qo: almost horizontal

V: vertical

Qv: almost vertical

Bure

D: straight

LC: slightly curved

C: curved

F: sticking out behind the (plough) beam

Ard-beam

L: long

Co: short

Me: medium

Ma: hold with grip

Hand-grip

1 m: with one hand

2 m:= with two hands

Sled

B: bovine

E: equine

Various symbols

R: rock

In: probable but not certain interpretation

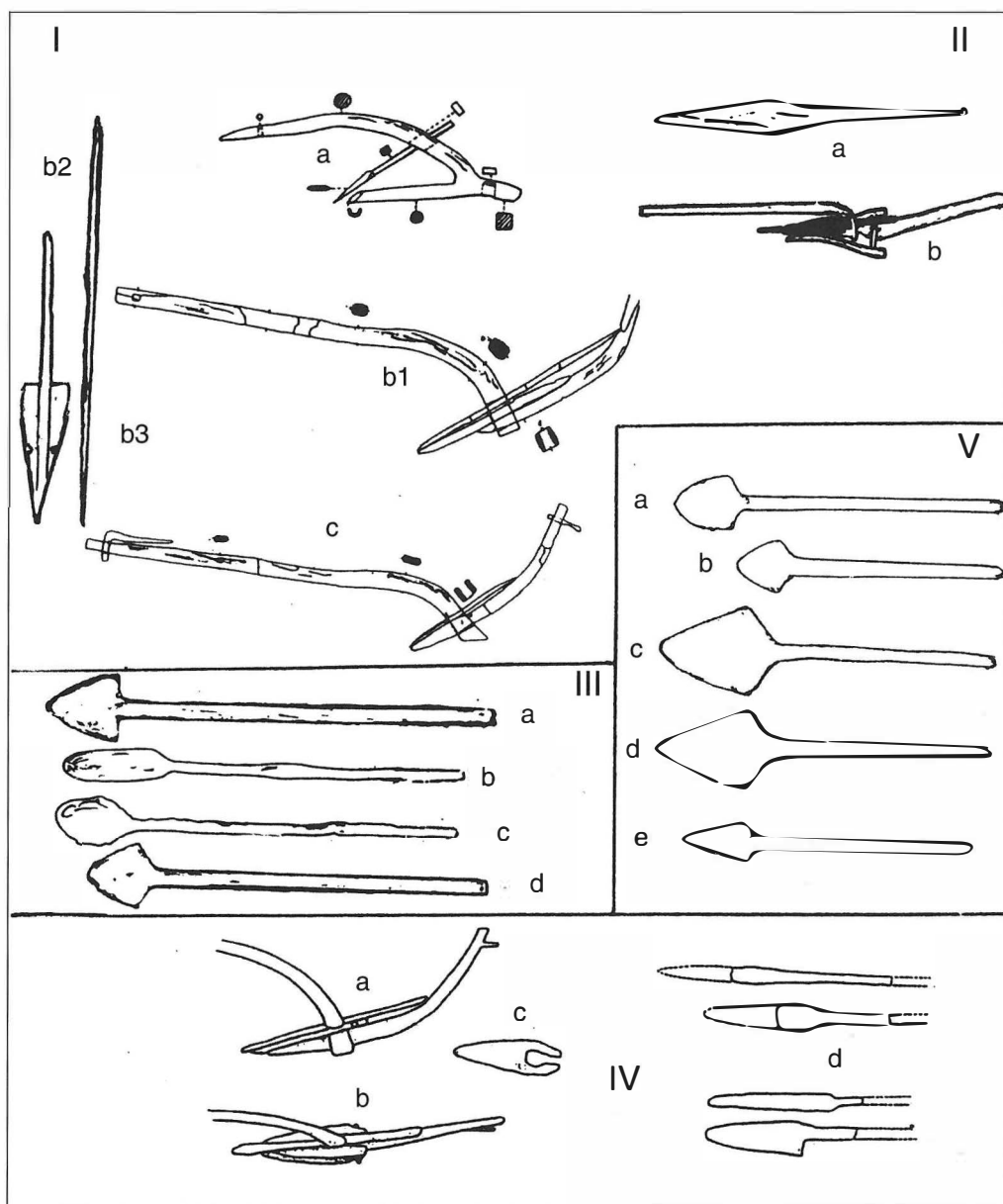


Fig. 1 - Stick shares (=massa "type", cfr. Italian "mazza" = stick) in archeo-ards of Central-North-West Europe.

I. Archeo-ards (redrawn by GLOB, 1951) with wooden share; the affinity with Terramare ards of (Bronze age) is very significant. a: the ard of Dabergotz (northern Germany), the late period of the local Iron Age; b₁: Donneruplund (Jutland) ard, 40-200 BC; b₂: detail of the (massa) share; b₃: details of the "under-share"; c: Dostrup (Jutland) ard, 790 BC (local Bronze Era).

II. Even if iron shares belong to the Roman Period, they are the "massa" type model dating back to the Bronze Age and also probably to the Copper Age (FORNI, 1996). a: Gallic-Roman of Banon (alpine area of Provence) "massa" type share; b: a small German-Roman model preserved in the Museum of Colony (the short-pedunculate share is black).

III. Other "massa" type shares. a: Gallic-Roman Thoraix (Doubs), near the borders between Alsazia and Giura (FORNI, 1996); b,c: Hunsbury (Britannia, the Iron Age, redrawn by REES, 1979); d: German-Roman of Wiltzhofen (Baviera, redrawn by LESER, 1931).

IV. Ligneous ard of Terramare reconstructed according to the indications of Säflund, 1939 (FORNI, 1997b). a: a side view; b: seen from above; c: findings of ply-like under-share; d: "massa" shares.

V. The "massa" type shares of the western Po valley (cf. FORNI, 1996): the presence of these shares in the Late Middle Ages and in the contemporary age is again linked to the tradition of such shares which extends from western Emilia to the Jutland. a,b,c,d: from Belmonte (Turin), High Middle Ages; e: from Madignano (Crema).

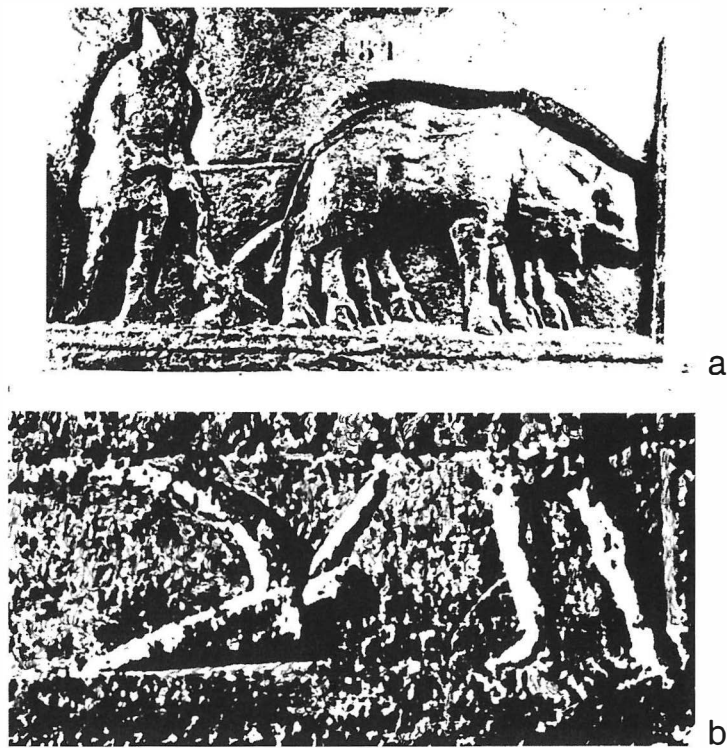


Fig. 2 – a: Bas-relief of a Gallic-Roman burial ground of Nîmes (Provence), showing a share the structure of which implies a “massa” type share; b: Bas-relief of a Roman burial ground conserved at the Turin archaeological museum; this type of ard also implies a “massa” type share. These documents link the prehistoric era (Terramare and North-Western Europe) and the Recent Middle Age (FORNI, 1996).

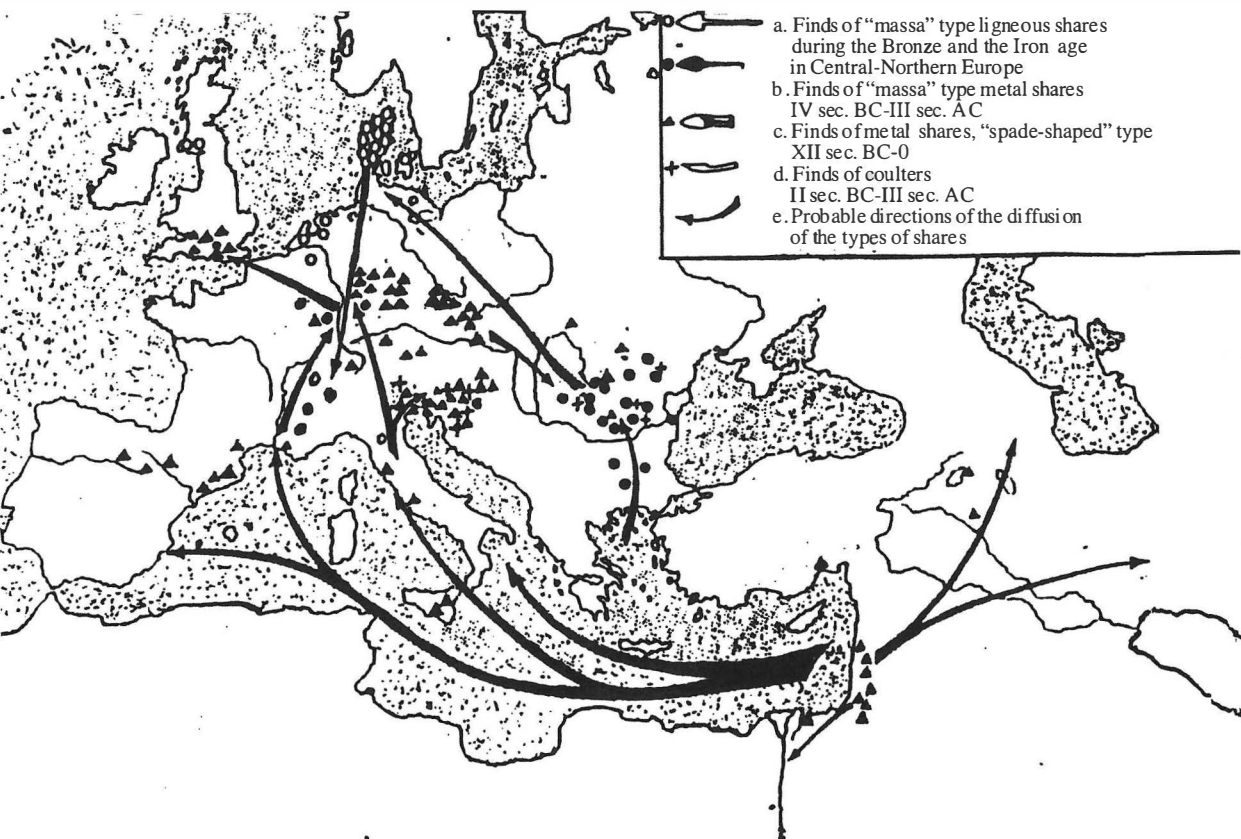


Fig. 3 - The stick “massa” type shares of very ancient local tradition, widespread from the Western Emilia (Terramare = Bronze Age) to the Jutland, but also in other parts of Europe, was made of iron, with the introduction of iron metallurgy from the oriental Mediterranean (redrawn by SPEHR, 1976, with changes and updating).

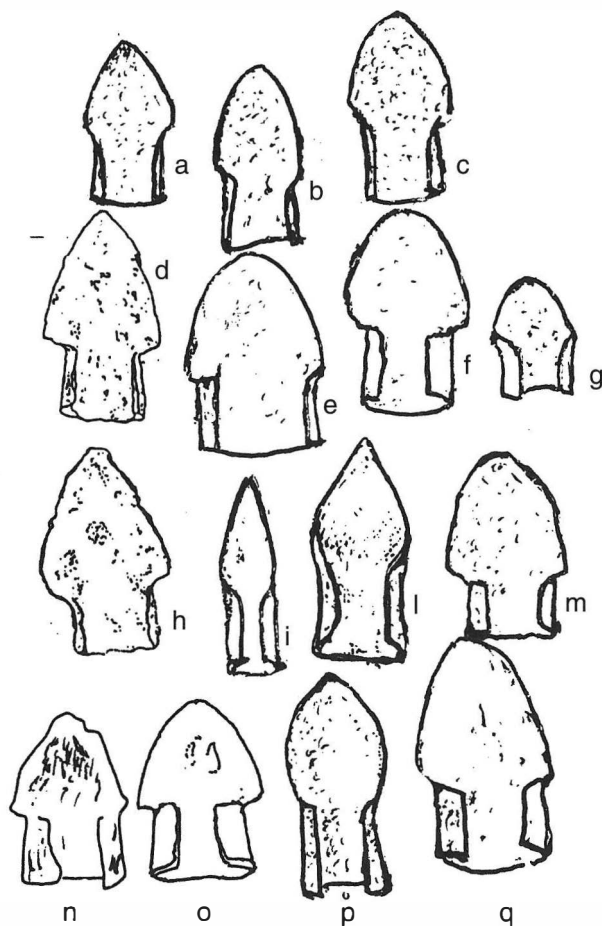


Fig. 4 - Pre-Roman shares and those of the Roman Period of Venezia Giulia (redrawn by FORNI, 1989) underline the local tradition of "spade shaped" shares which goes back to the Iron Age, but with roots in the Bronze Age (cfr. the "shoe-shaped" shares of Lavagnone; PERINI, 1982). a,b,c: findings in the countryside of Aquileia; d: Cernizza, the countryside of Gorizia; e: Tauriano (Spilbergo); f: Orsaria (Udine); g: Pociolets (Maniago); h,i: the countryside of Gorizia; i,l: Tomai (Trieste); m: Idria of Baccia (Alto Isonzo, Slovenia); n: Aviano (PN), Reca (Alto Isonzo, Slovenia); p: Casai of Tan (Portogruaro); q: Idria of Baccia (Alto Isonzo).

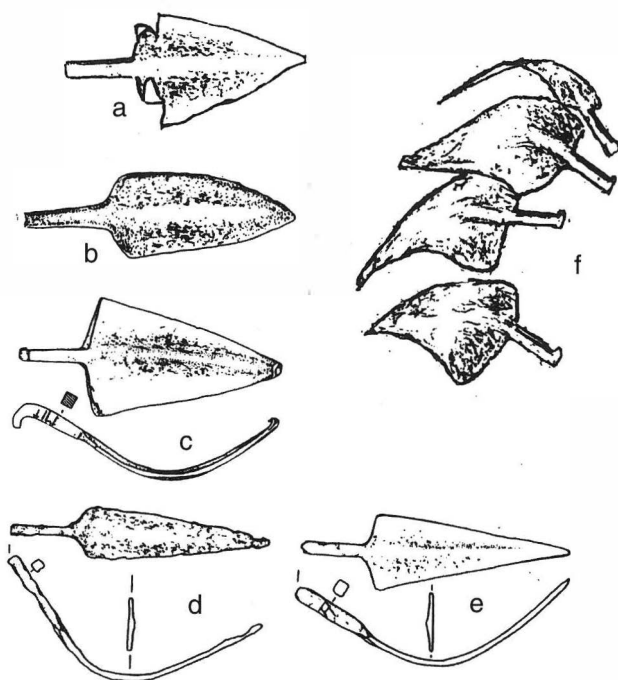


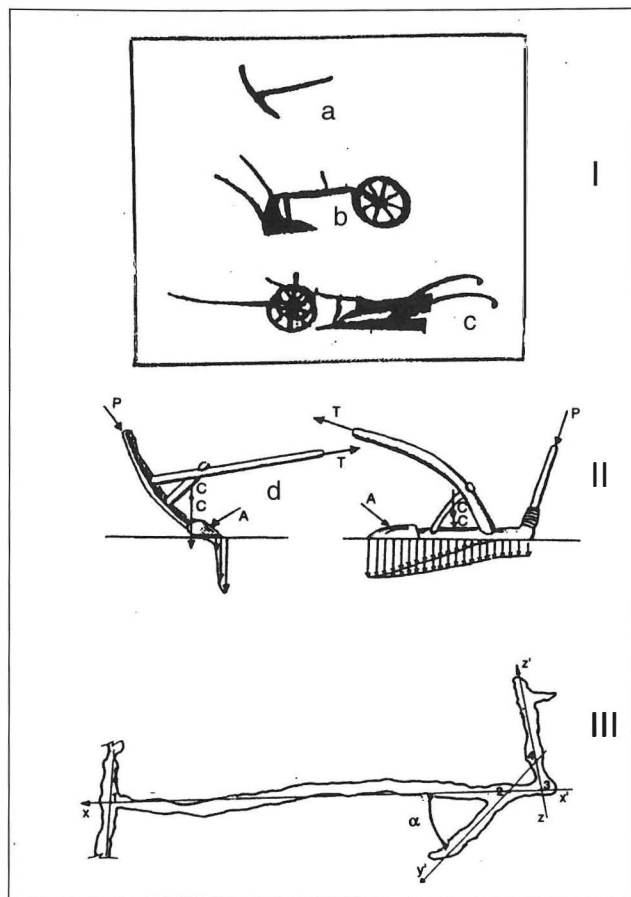
Fig. 5 - a "Trowled-shaped" short-pedunculate archeo-ards of the alpine Adige region (Pellizzano, Val di Sole): are of great interest because they show the hybridization between the western, "massa" type shares (showing the peduncles) and "spade-shaped" types which are typical of the east because of their particular wide blade and the rudimentary little flaps b: from Serso, Trento (redrawn by Perini, 1978); c: from Sanzeno, Iron Age (redrawn by NORTHDURFTER, 1979); d,e: shares, hoe-shares, hoes from Col de Flam, Ortisei, Bolzano (redrawn by PRINOTH FORNWAGNER, 1993); f: findings of four "trowel-shaped" shares in Appiano, Bolzano, redrawn in the position in which they are exhibited at the Archaeological Museum of Bolzano (cfr. LUNZ, 1990).

Fig. 6 - A fundamental typology of the archeo-ards, based on the taxonomical principles of LESER (1931), KOTHE (1947), WERTH (1954), ŠACH (1968), BRATANIC (1952a,b), STEENBERG (1956), FORNI (1981,1996), TROCHET (1987), LERCH (1991), FRIES (1995). This is essential in order to interpret the chart regarding the Camuni ards.

I. a: a simple symmetrical ard; b: symmetrical ard *currus*-type (one-wheel ard); c: asymmetrical plough with two-wheeled forecarriage (*Versorium*).

II. The mechanical analysis of the symmetrical ard. As can be seen in the graph showing the force during the tracing of the furrow, it is possible to identify two fundamental types of ards: the one on the left is with oblique almost vertical stock-shares (A), the one on the right with horizontal (or almost horizontal) stock-shares. In the first type, the centre of gravity C rises when the stock-share becomes vertical. The ard is therefore more and more unstable and difficult to conduct. This type of ard is suitable on grounds that have not been reclaimed and are full of obstacles (stones and roots) and on clayey and damp grounds. In the second type the friction of the share (A) on the ground adds to the pressure (P) the ploughman exerts on the ard-Handle, but, the low position of the centre of gravity C makes the tracing of the furrow easier. The horizontal position of the furrow reduces the attrition produced by a long ard-stock. This type of ard is not suitable for damp clayey- grounds. In both cases, the tractive force T is applied to the beam (cfr. FORNI, 1990:182).

III. The bure/ard-stock angle α (PELLEGRINI, 1991).



a



b

Fig. 7 - The oriental "spade-shaped" share penetrated not only into the Trentino region (ŠEBESTA, 1996:117), but also in the central Alps. a: here there is a ploughing scene engraved on Rock 17B1 of Bedolina (Valcamonica) dating back to the VII-VI century to BC, this type of share is evident; b: details of the ard-stock that stresses this particular share.