THE CARPENTER'S CALIPERS FROM THE PRE-CLASSICAL WRECK AT CAMPESE BAY, ISLAND OF GIGLIO, NORTHERN ITALY (c. 600 BC)

The pre-Classical wreck off the Island of Giglio in the Tuscan Archipelago, was found in 1961 by Mr. Reg Vallintine. The remains of the vessel, which can be dated to c. 600 BC (or soon after), were situated in 45 to 55m of water at the base of an off-shore reef known as *Secca i Pignocchi* in Campese Bay on the north west side of the island. Excavation of the site was carried out between 1982 and 1986 by Oxford University MARE in strict collaboration with the Superintendency of Archaeology for Tuscany, under the direction of the present writer (Bound & Vallintine, 1983; Bound, 1983; 1985A; 1985B; 1985C; 1986; 1990A; 1990B; 1991).

The fine wares from the wreck consisted of aryballoi (Figs 1-3), craters, oinochoe and skyphoi from Corinth, mugs and aryballoi from Sparta (Fig. 4), Ionian bowls, bucchero kantharoi and an aryballos from Etruria (Fig. 5). The amphorae were of Etruscan, Samian, East Greek and Phoenician-Punic origin. Three intact Greek lamps were excavated, two of which were charred at their beaks thus indicating shipboard use (Fig. 6). The metal finds included fishing weights, ship's fittings, arrowheads, lead and copper ingots, and an ornate Greek helmet which was found in 1961 and is now in Germany (Figs. 7-9). The ship was also carrying iron bars, small nuggets of copper (*aes rude*) and amber, all of which we interpret as currency. The organic remains include gaming bones, a wooden writing plaque, an elaborately carved wooden lid, a fragment of inlaid furniture, and a series of musical pipes (*auloi*). A number of the Etruscan amphorae were full of olives, while others contained pine pitch. A section of the keel (Fig. 10) and its associated planking was also recovered; these showed that the vessel was of laced, or sewn, construction.

The calipers: find spot

One of the most remarkable artefacts to have come from the wreck was a pair of carpenter's calipers; to our knowledge the only ones to have survived from antiquity. We cannot be certain whether these were part of the cargo, of belonged to the ship; the latter seems more likely.

The wreck was located in 1982 when a metal detector signalled a metallic presence of considerable size beneath the sand. This turned out to be a large amorphous concretion from which protruded the handle of an Etruscan amphora. Because the concretion itself had little appeal, and because it was firmly adhering to a boulder, it was decided that, for the time being, it could safely be left in situ. During the final days of the 1985 season, the concretion was freed from the boulder using a car jack and then raised to the surface with the aid of air-filled lifting bags.

Directly underneath the concretion a small assemblage of interlocking pieces of worked wood was found. Because of its close resemblance to modern calipers, identification was not difficult. If these did indeed belong to the ship then it is possible that the overlaying concretion represented the remains of a tool bag.

State of preservation

Only the heads survived. The beam, or shaft, was broken off where it emerged from the sliding, or mobile, head. This was unfortunate, for it is likely that the beam would have been calibrated, and could have given us information on the unit of measure. In figures 11, 12 and 13 the draughtsman has recreated the remainder of the beam to give an impression of the intact tool.

Measurements

Ht. of heads 94 mm. Width of fixed head at ends 10mm. Width of fixed head at centre 22 mm. Width of mobile head at ends 12 mm. Width of mobile head at centre 24 mm. Thickness of heads 13 mm. Section of shaft 15x6 mm. Surviving length of locking pin 49 mm. Section of pin 11x5 mm.

The fixed head

The beam passes right through the fixed head so that the end of the shaft is flush with the outside edge of the head. The head is fixed permanently to the beam with four wooden pins (Figs 13 & 14).

The sliding or mobile head and braking mechanism

The function of the sliding head is to move up and down the beam so that the object to be measured can be accommodated between the jaws. The beam passes through the centre of the sliding head. For the purpose of freezing the head in position while the measurement is being taken, a wooden braking pin is passed through an oblong cutting in the head. This second cutting is perpendicular to the beam. In figures 15 to 19 it can be seen that the upper cutting which takes the locking pin, slightly overlaps the cutting through which the beam passes. In this way, when the braking device is removed, one millimeter of the upper side of the beam is visible as a slight lip in the bottom of the upper cutting.

The purpose of this lip is to provide a surface which can rub against the braking pin and freeze the sliding head by means of friction. At first glance the braking pin appears to be oblong in form, but this is deceptive, for the pin, in fact, is slightly wedge shaped (Figs 20 & 21). If it were a perfectly symmetrical oblong, then, through repeated use, it might become slightly worn, so that its efficacy as a restraining and halting mechanism would be impaired. Being slightly wedge shaped ensures that there will always be an adequate surface area in contact with the top of the beam.

The tool would have been held by the shaft, just behind the sliding head. The sliding head's braking capability would have been activated by the application of pressure from the thumb on the broad end of the pin. Since the dimunition of the pin is slight the braking mechanism would have been fairly sensitive and would have responded to only slight pressure. The head would be remobilized by the simple means of applying a little pressure with the forefinger on the narrow end of the pin.

Retaining stud

One feature of the sliding head was, at first, a puzzle. Just beneath the cutting for the beam on the rear side of the head, was a little rounded niche. The explanation for this came from looking at one of our calipers in the draughting office. On the side at the end of the shaft was a metal retaining stud to stop the sliding head from slipping off the end of the shaft. The ancient calipers would clearly have required a similar device, and so the tool maker put a stud at the end of the beam (Fig. 22). Such a placement on the side for the ancient artificer, would have been too conspicuous, so instead he put it on the underside of the beam. The problem now was one of aesthetics, for when the jaws were fully open there would have been about a centimeter of the beam protruding from the back of the sliding head. Although this, does not in any way, offend modern taste it must have been displeasing to the ancient tool maker. He therefore notched the back of the sliding head in such a way that when the jaws were wide open the retaining stud was absorbed into it, so that the back of the head would have been flush with the back of the beam (Fig. 23). In this way, when the jaws were at maximum extension, the tool would have had a balanced symmetrical profile. Attention to such detail reveals the tool maker's pride and sense of craftmanship.

Metal pointers or pins

At the bottom of each head was a metal pin. With the possible exception of the retaining stud, this was the only metal to have been used in the tool. The pins, which were either copper or bronze, have not survived, but we know them to have been there from the holes that were used to contain them and the greenish copper staining and salts that were surrounding the holes.

Similar pointers can be found on the heads of some modern calipers. They are used for taking precise measurements where the jaws are ineffective (such as the interior rim diameter of a pot). In carpentry, they are also used for scoring measurements on to wood.

The holes to take the pins were drilled, and thus were round in section. This presented a problem for the tool maker for if the posts of the pins were also rounded, then, no doubt, it would not be long before they began to turn in the holes and slowly work their way free.

To prevent this the posts of the pins were carefully beaten so that they were square in section. They were then inserted into the bore holes with little wooden shims on each side, four per hole. These were flat where they abutted the sides of the post, and were rounded on the sides in contact with the surrounding wood. Five of the shims survived. To inhibit slippage it is likely that glue was used with the shims.

The locking mechanism

A complex instrument of this nature would have been expensive. It was also a delicate tool which would need to be stored properly when not in use. The snipe-nose ends of the heads, and the precision fitting of the sliding head over the beam, would have been a particular cause for concern in the constanlty moving environment of a ship at sea. To overcome these worries the heads would need to be locked together so that they would buttress each other and prevent any loose movement that might cause the tool to damage itself.

We have described how the top of the beam was not flush with the bottom of the upper cutting. One millimeter of the top edge of the beam passed through the upper cutting so as to provide a surface against which the braking pin could rub. This lip had a secondary function as part of the tool's locking mechanism. That part of the shaft which was aligned with the cutting for the pin when the jaws were closed, was notched (Fig. 24). In this position, when the pin was inserted, it passed between the edges of the notch, thus preventing any movement of the sliding head until the pin had been removed or partially withdrawn. So simple; yet so effective.

The calipers, it is worth noting, were found in the locked position.

The modern appearence of the calipers might tempt one to query whether they could be of later date and of an extraneous origin. This is impossible because of the sealed context from which they came directly beneath a large concretion deep in the sand. If this were not enough, there is proof of an even more categorical nature. Along one side of the locking/braking pin, and down either side of the sliding heads, are the fugitive remains of several letters in Archaic Greek script.

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ILLUSTRATIONS

Fig. 1 A Corinthian aryballos from the Giglio ship.
Fig. 2 Combatting warriors on an aryballos from the Giglio ship.
Fig. 3 Heraldically positioned sphinxes on a Corinthian aryballos from the Giglio ship.
Fig. 4 A Laconian aryballos from the Giglio ship.
Fig. 5 Wild boars on an Etruscan aryballos from the Giglio ship.
Fig. 6 Ship's lamps (charred at their nozzles).
Fig. 7 Corinthian helmet from Giglio ship at time of recovery.
Fig. 8 Same helmet after conservation.
Fig. 9 A tracing of the decoration on the helmet from the Giglio wreck.
Fig. 10 Section through the keel of the Giglio ship showing the "sewn" method of construction. The cord is laced through holes which have been drilled through the keel and the chamferred edge of the garboard in the rabbet. The holes for the lacing were plugged with dowels.
Figs. 11 to 24
Drawings of the calipers which were recovered from the Giglio wreck (all except 18 and 19 are at half scale). Drawings by Caroline Caldwell.

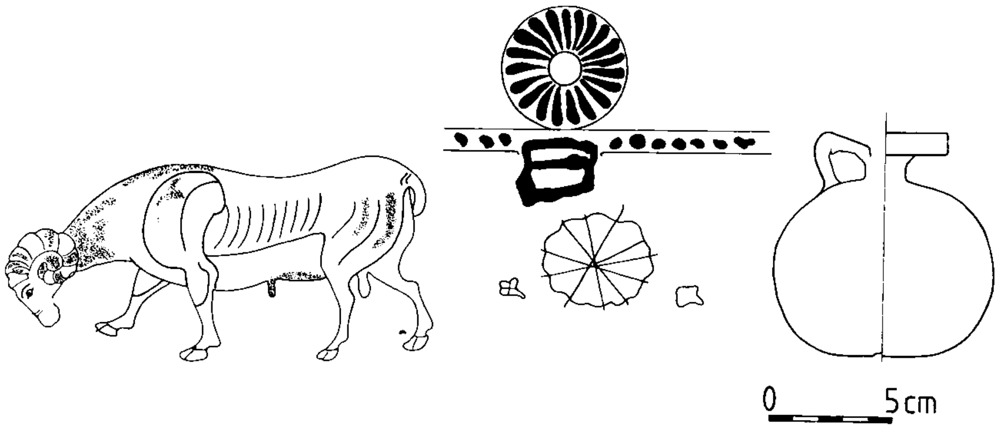


Fig. 1

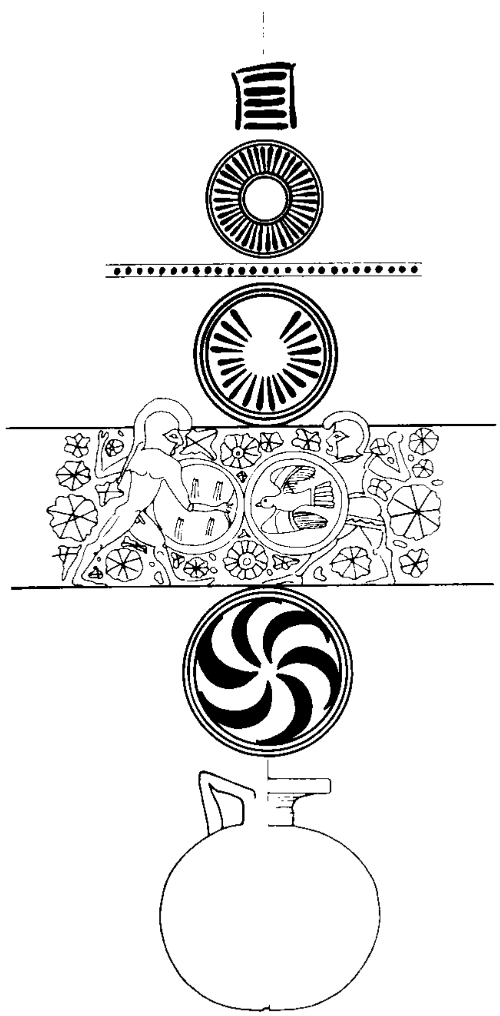


Fig. 2

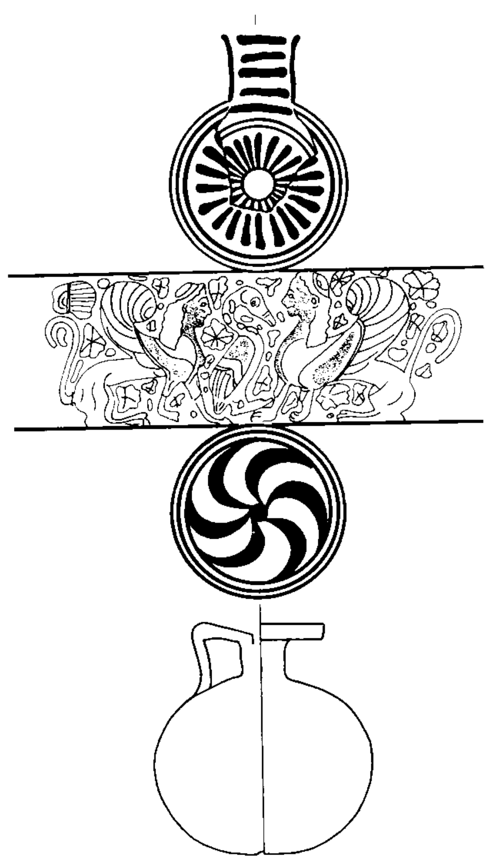


Fig. 3

Fig. 4

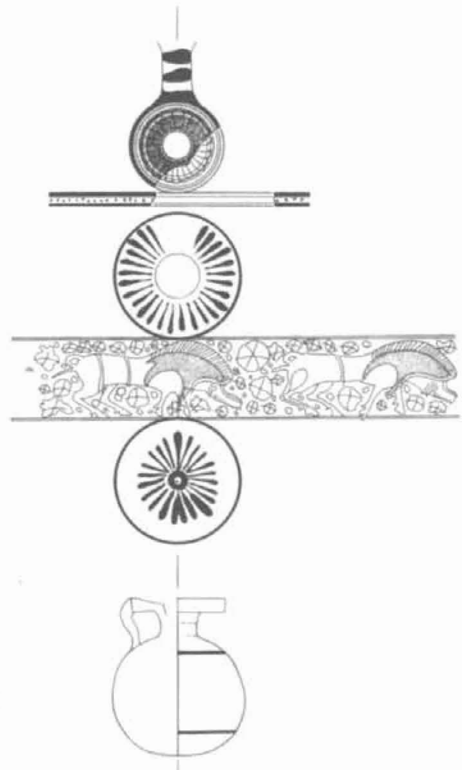


Fig. 5

Fig. 6

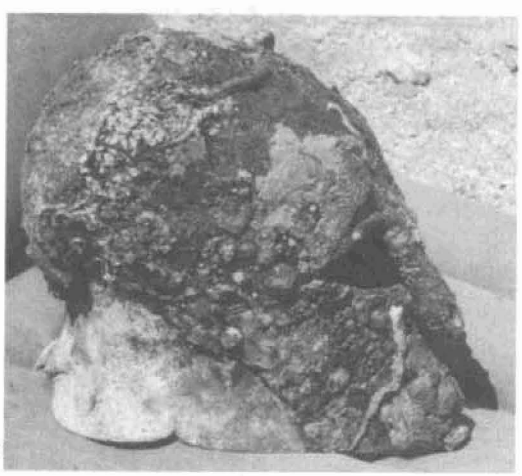


Fig. 7

Fig. 8

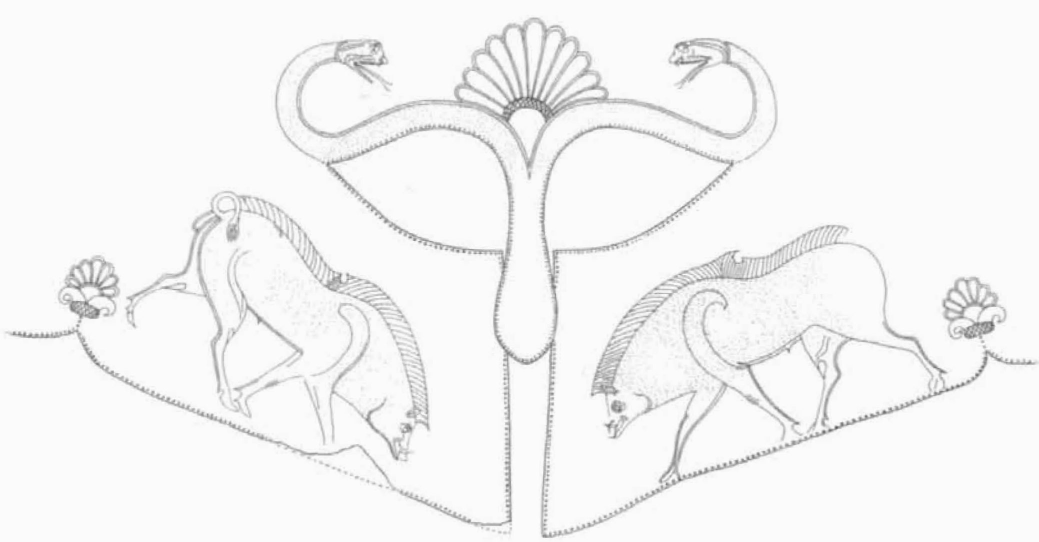


Fig. 9

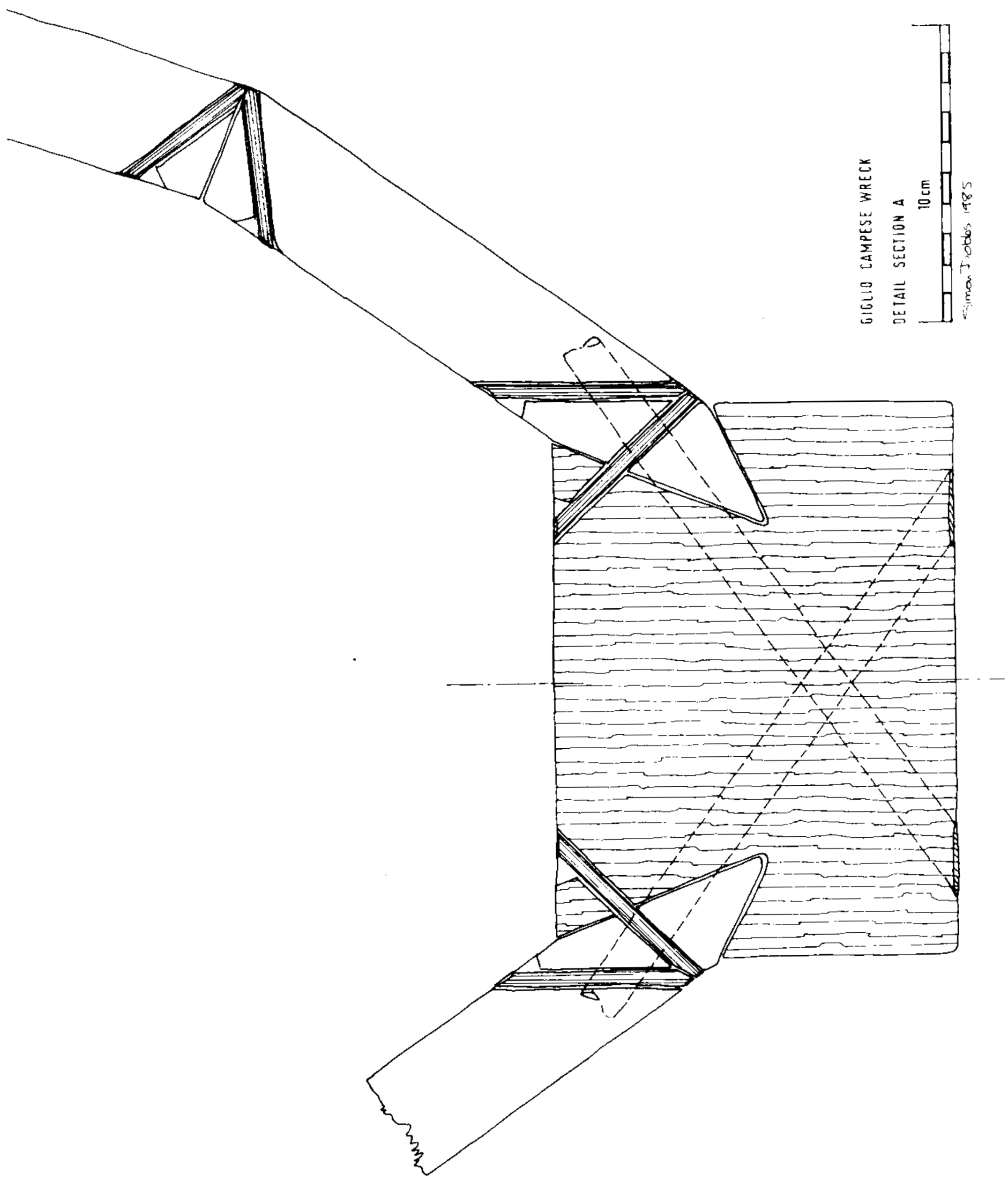

GIGLIO CAMPESE WRECK
DETAIL SECTION A
10cm
Simon Hobbs 1985

Fig. 10

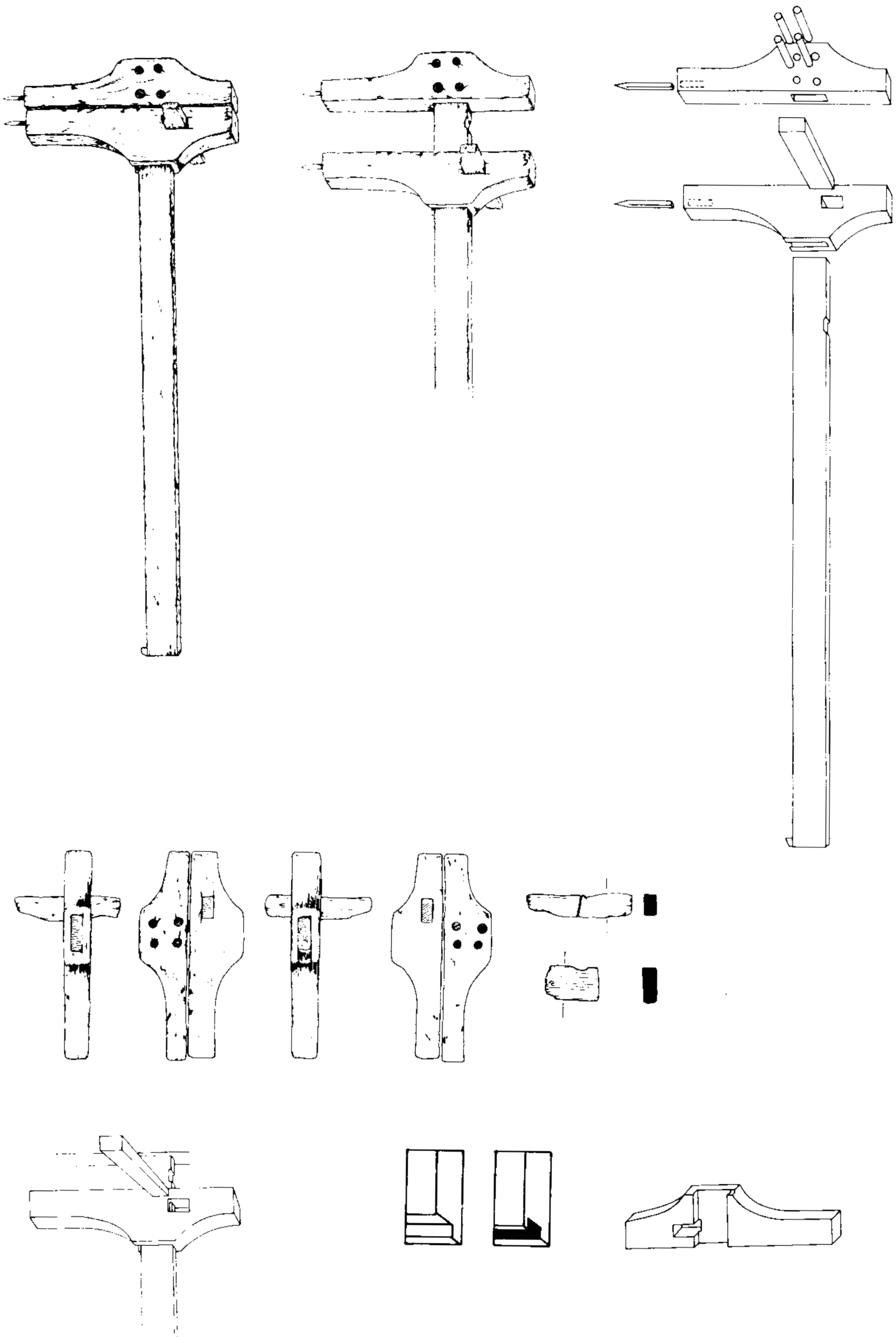
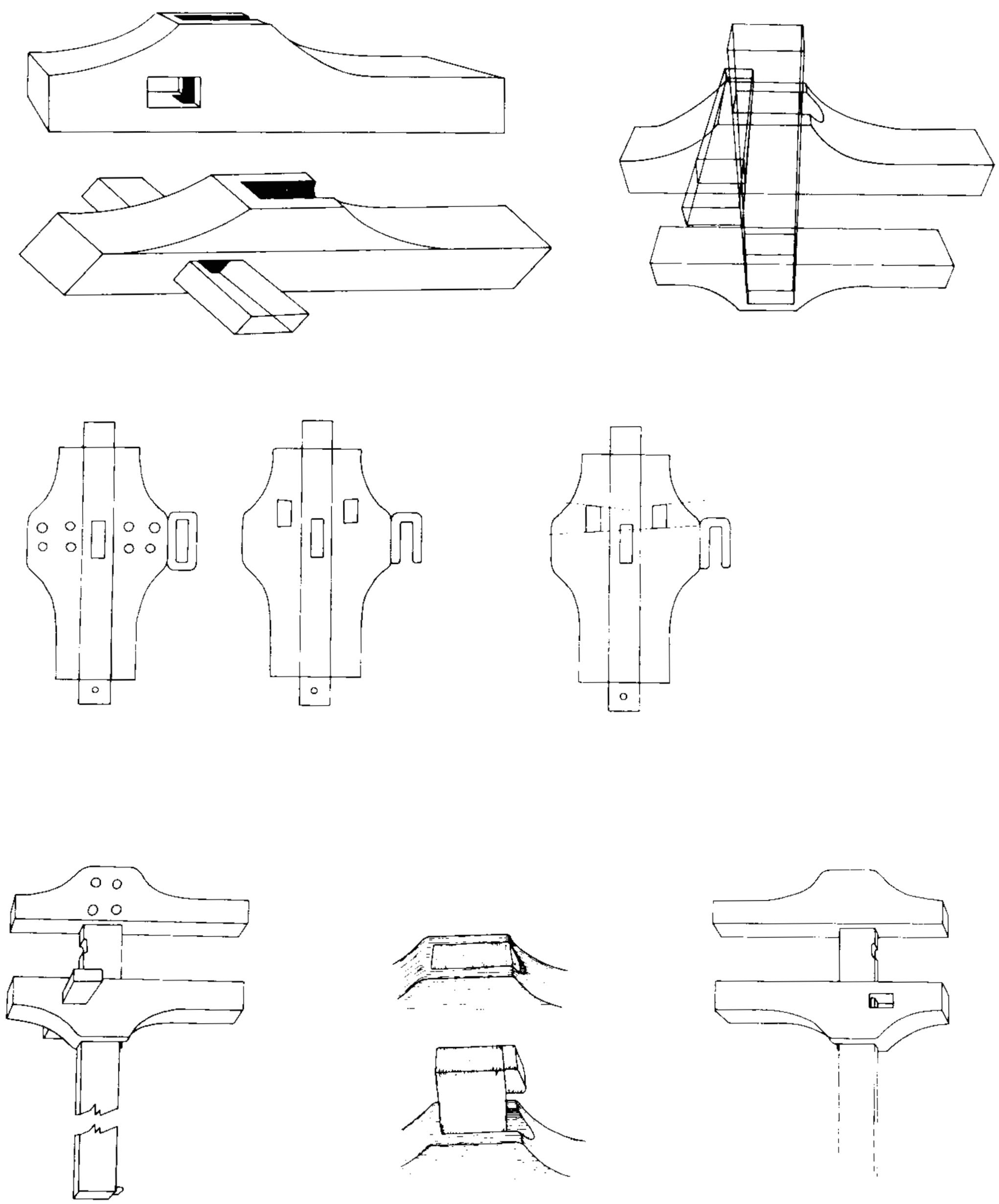


Fig. 11-17



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