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## NEW LIGHT ON MINOAN BUREAUCRACY

### *A Re-examination of Some Cretan Sealings\**

Excavation by Marinatos of the Minoan "villa" at Sklavokampo<sup>1</sup>, inland and west of Herakleion, produced a series of clay sealings, baked and preserved by the fire which destroyed the site during the LM IB period. Most of the impressions were made by the oval bezels of finely-engraved gold signet-rings and the majority bore representations of the Minoan sport of bull-leaping. But the historically remarkable feature of the Sklavokampo sealings was the excavator's suggestion that, for the first time in Crete, impressions made by the same ring had appeared on sealings from widely separated Cretan sites. The Sklavokampo examples, he claimed, bore imprints which had already been discovered on sealings at Hagia Triadha in the Messara, at Gournia in the area of the Ierapetra isthmus and in the extreme east of Crete at Zakro. He reiterated this surprising fact in connexion with other evidence for the use of papyrus documents and letters in Crete during the Late Bronze Age<sup>2</sup>. Maurice Pope mentioned it again while discussing Linear A accounting systems<sup>3</sup>; he specifically doubted Marinatos' equations with the single exception of the charioteer sealings, of which

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<sup>1</sup> AE 1939—41 (1948) 87ff.

<sup>2</sup> *Minos* 1—2 (1951—2) 39ff.

<sup>3</sup> BSA 55 (1960) 205, n. 10

four came from Sklavokampo (632-5) and one from Hagia Triadha (516)<sup>4</sup>. In face of such conflicting opinions Kenna undertook a re-examination of the sealings and was able to declare:

Similarities between sealings of the palatial centres noted by Marinatos, AE 1939, and other scholars, viz. between Ayia Triadha 497, and Gournia 101; Ayia Triadha 516 and Sklavokampo 632; Zakro 12 and Sklavokampo 625, are confirmed. That seen between Sklavokampo 628 and Gournia 101, however, is open to question<sup>5</sup>.

Similarities hardly required confirmation; what seemed necessary was an unequivocal verification, to support Marinatos, or an unequivocal rejection, to support Pope, of the original equations made between sealings from different sites. There follow here the results of a detailed examination of the sealings in question, with some additional pieces which are relevant to the problem, in the Herakleion Museum, the Pigorini Museum in Rome and the Ashmolean Museum in Oxford.

Two sealings from Gournia, 101 and 102, come first under review (fig. 1). Since their original publication<sup>6</sup>, where only one drawing was used, it has been continually assumed that both bore impressions made by the same ring. Detailed examination proves that this is not the case. For instance the base lines, very close under the bull in flying gallop on 101, do not appear on 102 or, if they do at the worn lower edge of the impression, they are further away under the bull than on 101. On 101 the legs of the bull-leaper are discernible as he comes down off the bull to land behind it, while on 102 the bull's tail very clearly cuts across the area where the leaper appears on 101, leaving no room for him. In fact on 102 he may be distinguished immediately behind the head of the bull as he performs his somersault. The head of the bull on 102 is held lower than on 101 and the scene must represent a slightly earlier stage in the leap when the acrobat may still have hold of the horns, while the bull has not yet tossed its head right back as it has on 101.

101 from Gournia has been equated with 497 from Hagia Triadha; 498 and 499, also from Hagia Triadha, are more fragmentary but

<sup>4</sup> Numbers throughout refer to the Herakleion Museum's catalogue of sealings except where some other Museum is named

<sup>5</sup> Archaeological Reports (1960-61) 30

<sup>6</sup> Boyd Hawes, Gournia (1908) 54ff., fig. 30, 4. (For an excellent photograph of 101 see Marinatos, Crete and Mycenae pl. 111)

are again clearly made by the same ring<sup>7</sup>: The two ribs on the body of the bull on 497 do not appear on 101 but might well have been lost on the latter; for the ring does not seem to have been pressed as firmly into the clay of the Gournia sealing and the impression is in any case more worn. Also two very individual features are shared by 101 and 497. As the leaper comes down to land behind the bull his arm is outstretched and there were on the original ring two small incisions in the gold which perhaps represented the sleeve of a garment or armlets<sup>8</sup>. They appear clearly on both sealings. On the base line immediately below the bull's penis there is a mark which may represent a fault or a gouge out of the gold, a mistake in the engraving or more probably subsequent damage to the ring itself. This, at least, seems to render the equation of 101 and 497—9 most certain. Kenna<sup>9</sup> specifically doubted the link between these and 628 and 629 from Sklavokampo (fig. 3) but on 628 the same fault in the base line seems to occur right on the edge of the remaining part of the impression.

It has been argued that 102 from Gournia bears an impression made by a ring different from 101. A new equation may now be made between 102 and another Sklavokampo sealing, 612 (fig. 6). The position of the bull's head is the same on both impressions and the leaper is in the act of somersaulting over the horns. On the worn lower edge of 102 it may be possible to distinguish the upper of the two base lines at exactly the same distance below the bull's belly as on 612. Another impression on a sealing from Hagia Triadha, Pigorini Museum 71974<sup>10</sup> (fig. 7a), is most probably made by the same ring as 102 and 612. Only detailed examination of the Pigorini sealing beside the Herakleion ones could put this equation beyond doubt but size, proportions, the positioning of the bull's head, the acrobat and the base lines all tell in its favour.

625 from Sklavokampo and 12 from Zakro<sup>11</sup> are more fragmentary but seem to be made by the same ring (fig. 4). The bull moves

<sup>7</sup> Levi, *Le Cretule di Hagia Triadha* (and *Le Cretule di Zakro*) in *ASAA* 8—9 (1925—6) 101, no. 54, fig. 75, pl. xiv (hereafter Levi) (cf. fig. 2 below)

<sup>8</sup> Armlets seem, on the evidence of fresco, to have been a distinctive feature of the bull-leaper's apparel and are mentioned by Marinatos, *Crete and Mycenae* 129, pl. xvii.

<sup>9</sup> n. 5 above

<sup>10</sup> Levi 144, no. 145, fig. 161; Borda, *Arte Cretese-Micinea nel Museo Pigorini*, Roma (1954) 63ff., no. 13, pl. xlv, no. 7

<sup>11</sup> Hogarth, *The Zakro Sealings* in *JHS* 22 (1902) 86, no. 96, fig. 27, pl. ix (hereafter Hogarth)

to the right (in the impression), its head is tossed back and on both sealings the acrobat appears in the same position, which seems to represent a stage in the leap immediately between the two positions depicted on 102 and 101. He has now let go of the horns which he still held on 102 and is somersaulting through the air to end up landing on his feet behind the bull, as on 101. The three positions, in fact, bear comparison with those of the three leapers on the frequently illustrated LM I fresco<sup>12</sup>.

The equation made by Marinatos between the beautiful charioteer sealings, 632—635 from Sklavokampo and 516 from Hagia Triadha (fig. 5), has not been called into question even by Pope and remains the most cogent proof that impressions from the same ring occur on different Cretan sites. For the significance of the bull-leaping motif on this series of impressions duplicated on different sites, it is noteworthy that sealing 516 from Hagia Triadha bears not only the impression of the charioteer ring (516a)<sup>13</sup> but on the side also a second fragmentary impression (516b)<sup>14</sup> with representation of a bull-leaping scene (fig. 11a); its style and arrangement are very similar to 625 from Sklavokampo and 12 from Zakro but it seems to have been produced by a slightly larger ring.

Further possible examples of imprints made by the same signet-ring appearing on sealings from different sites may now be added. One of three impressions on sealing 40 (two examples) from Zakro<sup>15</sup> was made by a ring depicting two lions in full career to the right (in the impression) (fig. 8a). They are passing a palm tree whose upper leaves are clearly shown above their backs. Among the sealings from Hagia Triadha in the Pigorini Museum is one<sup>16</sup> with no catalogue number (fig. 7b); it is somewhat worn and indistinct but bears an impression apparently identical with the Zakro examples. 321, a very worn and fragmentary sealing from the East Hall Borders deposit at Knossos<sup>17</sup>, reveals a similar palm tree and to the right what may well be the necks and manes of the two

<sup>12</sup> n. 9 above; PM III 209, fig. 114, etc.

<sup>13</sup> Levi 125, no. 117, fig. 133, pl. VIII (For the best illustration see Marinatos, *Crete and Mycenae* pl. 111)

<sup>14</sup> Levi 121, no. 110, fig. 126, pl. xi

<sup>15</sup> Hogarth 87, no. 105, pl. 9; PM I 716 fig. 539a

<sup>16</sup> Levi 145, no. 146, fig. 162

<sup>17</sup> PM IV 604, no. D18, where only the simple description "upper part of palm tree" is given; cf. Gill, *The Knossos Sealings, Provenance and Identification in BSA 60 (1965) 80*, no. R37, pl. 14 (hereafter Gill)

lions (fig. 8b). The motif is not otherwise known, a fact which might tend, of itself, to render this equation more probable.

Five sealings from Hagia Triadha, 526 (three examples), 595 and 596 are impressed by a signet ring bearing a representation of men in combat<sup>18</sup> (fig. 9a). Two fragmentary sealings with partial impressions apparently made by the same ring occur at Knossos, 369, said to be from The Little Palace<sup>19</sup> (fig. 9c) and another (fig. 9b) which came to light in an *apothēke* of the Stratigraphical Museum in 1962 among boxes of pottery from the Domestic Quarter of the Palace (n. No. 116)<sup>20</sup>.

A number of sealings from the East Temple Repository at Knossos, 383 (nine examples), 395 and Ashmolean Museum AE. 1199z<sup>21</sup>, are impressed by a signet-ring showing a female figure accompanied by a lion. The type is said to recur among the Zakro sealings; Hogarth notes differences between the Knossos and Zakro examples and Evans describes the single Zakro piece in one place as "an almost exact replica" and later as "a similar figure"<sup>22</sup>. Unfortunately the so-called Zakro sealing, Ashmolean Museum AE. 1199u, has become confused with the Knossos examples and, despite Gill's assertion to the contrary, may well have been so confused in Herakleion before it was presented to the Ashmolean and there recorded as being from Zakro<sup>23</sup>. Some difference in date between the Temple Repositories deposit at Knossos and the destruction deposit at Zakro is in any case stratigraphically assured and would render such an equation between them less likely.

<sup>18</sup> Levi 123, no. 114, fig. 130, pl. viii and 144, no. 144, fig. 160. All five impressions were, pace Levi, definitely produced by the same ring.

<sup>19</sup> PM IV 600, fig. 594. Evans' drawing proves to be misleading; if it is turned through forty-five degrees (fig. 9c), the motif becomes more comprehensible; cf. Gill 87, fig. 4; 91, no. Ec; and 98 where the equation with 526 and 595—6 from Hagia Triadha is noted. Careful study of the Hagia Triadha examples shows that Evans' drawing may be mistaken in making the falling figure on the right face away from his assailant (fig. 9a—d). The scale of Evans' drawing is 3:1, not 2:1 as he states.

<sup>20</sup> This series of sealings, "rediscovered" by Popham in 1962, will be published by the present author in a forthcoming volume of BSA. Some of them have been catalogued by the Herakleion Museum (998—1048); others remain without museum numbers but have been listed by Gill as n. No. 106—135. The sealing under discussion is cited by her as n. No. 116.

<sup>21</sup> BSA 9 (1902—3) 59, fig. 37; PM I 505, fig. 363a (also I 680, fig. 500a; II 831, fig. 546; III 465, fig. 325)

<sup>22</sup> Gill 98; Levi 138; BSA 17 (1910—11) 265, fig. 2; PM II 832, n. 1 and III 465, n. 6

<sup>23</sup> Kenna, Cretan Seals 144, no. 85, pl. 16; Gill 69f., no. L46

Finally the well-known clay signet or matrix from the South-West Basements at Knossos, 283, and its associated sealings from the East Wing (Archives and East Hall Borders deposits), 277—282<sup>24</sup> and Ashmolean Museum 1938. 1015a-b<sup>25</sup>, are almost identical with one of two signet-ring impressions on sealing 85 from Zakro<sup>26</sup> (fig. 10). The second impression on 85 again proves to be a bull-leaping scene<sup>27</sup>. This last equation remains open to question; the Zakro example is broken and worn; it seems to be fractionally smaller than the Knossos pieces; and the outlines of the engraving appear rather less distinctly in the clay, a fact which might be accounted for by a less meticulous stamping or by some other cause (see p. 22 below).

The equations so far made may be tabulated as follows:

Gournia	Hagia Triadha	Knossos	Sklavokampo	Zakro
101	497—499		628—629	
102	Pigorini 71974		612	
			625	12
	516a		632—635	
	Pigorini n. No.	321		40 (x2)
		277—238 and		
		Ashmolean		85
		1938. 1015a—b		
	526 (x3) and	369 and n.		
	595—596	No. 116		

Examination and re-examination of this group of impressions side by side, in the best conditions for study, with the aid of first class lenses with a magnifying power up to ten to one, has not so far produced (except in the case of the charioteer sealings) a consensus of scholarly opinion. In the preceding re-appraisal a categorical affirmation or rejection of the equations has sometimes been avoided.

It is clear, despite the damage and wear to which these friable clay artifacts have been subject through the course of time, that the Bronze Age Cretan would have found similar difficulty in making a firm decision. An impression might have been stamped in poor gritty clay, making it more indistinct; in contact with smooth wet

<sup>24</sup> PM II 767, fig. 498 (also IV 395, fig. 331; IV 597, fig. 591)

<sup>25</sup> Kenna, Cretan Seals 147, no. 41—42S, pl. 17

<sup>26</sup> Hogarth 77, no. 3, fig. 2, pl. vi; PM II 768, fig. 499

<sup>27</sup> Hogarth 86, no. 102, pl. ix; cf. Levi 162, fig. 174, pl. xv

clay the face of a ring-bezel might have slipped and blurred the impression; uneven pressure applied to the ring might have resulted in a weak or partial impression. The Cretan "office-boy" was presumably not inclined to scrutinise each sealing with the precision of the modern scholar. In any case, apart perhaps from some pieces of rock crystal from the graves of the Mavrospelio cemetery near Knossos which seem to have magnifying properties<sup>28</sup>, he was without the aid of lenses.

It may therefore be of less importance to reach a final decision as to whether each impression was made by the self-same ring and sufficient to conclude that at least they were made by practically indistinguishable replicas of the same ring.

The clay signet from the South West Basements at Knossos may provide evidence for the production of such replicas. When Kenna refers to "the matrix from which . . . these seal impressions was taken"<sup>29</sup>, he seems to imply that the sealings from the Archives and the East-Hall Borders deposits were actually impressed by the clay signet. The general smoothness of the field and sharp clarity in outline of the motif on the sealings seem rather to suggest that they were made by an original metal ring. The clay signet is more likely to have been a true matrix, an engraver's pattern piece. It might have been the original pattern for the metal ring which produced the sealings but such matrices are usually in steatite or some other soft stone; several have been found<sup>30</sup>, mostly for the manufacture of metal or glass-paste jewellery but an example from Eleusis bears designs for two metal rings<sup>31</sup>. It might also have been the pattern for replicas of the original ring and, as such, was probably made by stamping a clear impression of the ring in good smooth clay and baking it or allowing it to dry sufficiently hard for another impression to be taken from it. The original ring had its motif engraved into the metal, in the negative; on the first impression or sealing it would appear in relief, in the positive; the second impression, taken not from the ring but from the sealing, would again be in the negative like the original ring. This clay copy of the ring might itself have served, after baking, as a signet for stamping more impressions which would be less distinct than those in the Archives and East Hall Borders deposits but would serve as imitations.

<sup>28</sup> BSA 28 (1926—7) 288; PM III 111

<sup>29</sup> n. 26 above

<sup>30</sup> e. g. from Mallia, House E (*Études Crétoises* xi 137, no. 18, pl. lxxii, 5)

<sup>31</sup> PAE (1953) 80, fig. 5

In an earlier period two seals of clay are known from Gournia. One of them even has a "black painted slip evidently in imitation of black steatite"<sup>32</sup>. In the LM period Herakleion Museum "sealing" 205 from the Corridor of the Stone Basin in the West Wing of the Palace at Knossos is in fact a seal, not a sealing; its motif is in the negative<sup>33</sup>. There is also an unusually large clay seal from a LM I context at Gournia<sup>34</sup>. All these examples are of pyramid or cone shape with the motif on the base. The shape is easy to grip in stamping and 205 in particular has pinched finger-marks in the clay around its roughly conical sides. The clay signet or matrix from Knossos has no such facility for use as a seal; more probably it became the pattern for more gold rings to be made to the same design.

In the process of taking an impression in the negative from a first in the positive there would be a slight blurring of outline and loss of clarity in the definition of the original engraving on the ring and, curiously, a fractional diminution in size. A comparison between 85 from Zakro and the Knossos sealings has already shown these peculiar features (p. 20 above) and the Zakro sealing may well have been impressed with a replica of the Knossos ring made by the process here described.

A motif may recur on engraved gems and rings because it was popular with artists of a certain period or place, because it was considered religiously significant for the amuletic function of the engraved object or because it represented the personal insignia of an individual ruler or lesser official, even of a dynasty or group of officials. This last explanation may well account for the preponderance of the bull-leaping motif among the sealings under discussion. But to comply with any of these three requirements it would hardly have been essential to produce a replica as exact as that implied by the clay signet from Knossos and 85 from Zakro. And a closer examination of the historical significance of this group of sealings, whether made by the self-same rings or by replicas, may prove fruitful.

Almost all Bronze Age sealings from Crete and Mainland Greece, however fragmentary, bear imprinted in the clay some indication of the object to which they were attached or at least the manner in which they sealed it. Methods of sealing for different kinds of object

<sup>32</sup> B. E. Williams in Gournia 54ff., nos. 5—6, fig. 28, 4—5

<sup>33</sup> Gill 72, no. 01, pl. 12

<sup>34</sup> Gournia 54ff., no. 12, fig. 29



vary from period to period and from site to site. Of the pieces under review the clay signet, 283, was naturally not attached as a sealing; 101 is also without any visible sign of fastening and may well represent a random trial stamping or a stamped piece of clay deliberately kept for checking against sealings to ensure their authenticity. The remainder belong to two types of sealing.

One type, first noted at Zakro, was thus described by the excavator:

A great number (of the sealings) are broken but the more perfect, including many bearing two and three impressions, show a groove on one edge, about an eighth of an inch deep and a little more wide, scored with straight and oblique scratches. This is the impress of something cylindrical to which the nodule was pressed while still wet. The appearance of the clay in the grooves shows that this object was not textile and it may most reasonably be supposed to have been a reed, perhaps a papyrus stalk<sup>35</sup>.

Impressions taken in soft plasticine of the edges of these sealings prove this interpretation mistaken (pl. I). The cylindrical or rectangular object over which the clay was pressed to create the "groove" in the sealing was of a material smoother than reed or papyrus stalk. What at first appeared to be "scratches" prove to be the imprint left by a series of very fine cords which were wrapped around the rectangular object. In some cases it is possible to make out the fine entwined fibres of the cord and occasionally the cords curl round in a rough knot. Marinatos has suggested<sup>36</sup> that such fine cord could only have fastened something very light, such as a papyrus document. Evidence for the extensive use of papyrus in Minoan Crete is not as yet forthcoming and a good fibre cord of the size implied by these sealings can support a heavier load. The nature of the rectangular object remains puzzling; possibly it was a pad of some smooth material to protect the object sealed from the damp clay of the sealing or perhaps a peg or fastening of some kind. The sealing type is common at Hagia Triadha, Gournia, Sklavokampo, Tylissos and Zakro.

The second type is a small nodule of clay, often roughly triangular in section; it usually bears only a single seal impression, the two remaining sides revealing the pinched prints of the fingers

<sup>35</sup> Hogarth 76; cf. Levi 72, fig. 2

<sup>36</sup> n. 2 above

which held it as it was pressed over the seal. A hole runs through the clay and, when broken sealings of this type are found, the inside reveals that two ends of cord or tape were sealed, sometimes knotted together and sometimes left with over-lapping ends when the sealing itself formed the fastening. The type is found at Hagia Triadha and Zakro but is most common at Knossos and on the Mainland is represented by the majority of the sealings found at Pylos and Mycenae, where its manner of use has been most exactly described<sup>37</sup>.

Of the sealings under discussion all those from Hagia Triadha, Gournia (except 101), Sklavokampo and Zakro (except 40) are of the first type; those from Knossos and the two examples of 40 from Zakro are of the second type.

Marinatos has proposed that the existence of sealings bearing impressions duplicated at different sites is evidence for the passing of letters between the various Cretan centres. Bronze Age evidence for letters in the eastern Mediterranean is plentiful enough; the Tell-el-Amarna documents or the Hittite correspondence with the king of Ahhiyawa might be cited and, if the story of Proitos and Bellerophon in the *Iliad* goes back as early as the Bronze Age, the (presumably sealed) *σήματα λυγρά* which Bellerophon carried to the king of Lycia *ἐν πίνακι πτυκτῷ* may be added<sup>38</sup>. Considered at face value, the sealings give strong evidence for some correspondence within Crete. But one wonders exactly what the rulers of the palaces in the East at Zakro and Gournia could have found as topics to justify direct correspondence with, for example, the small and distant villa at Sklavokampo. If the sealings in fact represent letters it may be an easier assumption that one centre, perhaps Knossos, was in contact with the others and the sealings all originated from the one site. The evidence of sealing-types already described might provide confirmation if the first type found at sites other than Knossos was commonly used for sealing letters in the form of papyrus rolls or some kind of tablet. The second type of sealing which occurs at Knossos would then be for some particular internal palace use and 101 the "check-piece" for the receiver of letters at Gournia. Unfortunately the two examples of 40 from Zakro do not fit into this scheme. And there are further factors

<sup>37</sup> AJA 63 (1959) 134f.; Bennett, *The Mycenae Tablets II* (1958) 102ff.; Eranos 57 (1959) 1ff; cf. Kadmos 5 (1966) 1ff.

<sup>38</sup> *Iliad* VI 168f.; cf. Jeffery in *A Companion to Homer* (1962) 555

which seem to militate against this group of sealings representing letter-communication between Cretan sites.

If correspondence were involved replica rings, for which strong evidence has been offered, would scarcely be necessary; one man with a single ring would stamp his own messages and the sealings would be found at the "address" to which they had been sent. However close examination of the clay of the sealings under discussion seems to indicate an origin local to the sites on which each was found. All the Sklavokampo sealings are of the same smooth yellow-orange clay. The clay of the Hagia Triadha examples is the same as that of all the sealings from the site but different from that of the Sklavokampo examples, rather darker, micaceous and of a slightly rougher texture. Similarly at Gournia, Knossos and Zakro the sealings in question seem to be of the same clay as the majority of sealings on their own sites<sup>39</sup>. It is rather as though New York used only blue sealing wax, Moscow red and Paris green; if only blue were subsequently found in New York, red in Moscow and green in Paris, it would be safe to conclude that no sealed correspondence had passed between them. In Crete it was not the sealings bearing duplicate impressions which passed from site to site on letters but the ring itself in the hands of its owner or, more probably, its replica in the hands of his representative which travelled between sites. The tentative suggestion of Evans that the clay signet from Knossos might be the work of a forger within the palace, though colourful, may be discounted<sup>40</sup>; the making of replicas must have had "official" sanction.

These rings were of the highest quality workmanship, the property of rulers or at least men of very exalted rank. Letter communication in the Bronze Age seems often to imply a situation in which independent rulers wrote to one another as equals; it is obviously possible that some Bronze Age Trajan might well have written to a Pliny but letters appear to have been the prerogative of royalty in communication with royalty. The Cretan situation, as argued so far, was rather one in which the ruler's minion with a replica of his insignia travelled from site to site or was stationed at each site to seal and stamp some kind of documents or goods.

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<sup>39</sup> This judgement of the clay cannot, unfortunately, receive objective confirmation by scientific tests without doing damage to such friable and precious artifacts.

<sup>40</sup> PM II 767; Williams' suggestion that the large clay seal from Gournia (n. 35 above) was the work of a Minoan counterfeiter is also improbable.

The implication seems to be that sites on which replica impressions have been found were in some relation of subservience to a single central authority. That the sites are so widely scattered to cover practically all of that part of Crete which had extensive occupation in the LM period, from Sklavokampo to Zakro and from Knossos to Hagia Triadha, makes the suggestion of one central authority even more noteworthy. If such a centre existed at any time, Knossos seems the most likely place for it; it was at Knossos that the clay signet for making replica rings occurred and at Knossos that there was something of a cultural centre and evidence in the tablets for an extensive bureaucracy. It was probably by engravers at Knossos that these high quality gold rings were made. Bull-leaping, the favoured motif, may have been most popular at Knossos to judge from its frequent appearance there in fresco painting and other arts and from the Theseus mythology.

An examination of technique and style shows that the four rings (or their replicas) responsible for the impressions 101/497—499/628—629, 102/71974/612, 12/625 and 516b were probably the work of the same craftsman or at least came from the same workshop. Apart from obvious similarity in choice of motif, they all reveal the same uniquely simple but wholly effective treatment of the bull's anatomy in strained motion. The charioteer sealings, 516a and 632—635 are of equal excellence; the close observation of physical detail in the animal makes it probable that this ring was also by the same craftsman and there are other impressions from rings clearly produced in the same "workshop". 630 from Sklavokampo is only fragmentary but 613—624 and 626—627 from the same site must be included here<sup>41</sup> (fig. 12a). They are very like 625 but the bull is depicted full-face, the acrobat is in a slightly different position and the scene surmounts a delicate frieze of running spirals. 108 from the Room of the Niche in the West Wing of the Palace at Knossos<sup>42</sup> (fig. 11b) shows the same treatment of anatomy in the fore and hind haunches of the bull and in its body elongated in the strain of flying gallop; the gentle curve of the belly and clear indication of the penis just above the base line is exactly similar to the examples from Hagia Triadha, Gournia, Sklavokampo and Zakro. The ring which produced sealing 250 from the Landing of the Grand Staircase in the East Wing<sup>43</sup> (fig. 11c) may also have

<sup>41</sup> n. 1 above.

<sup>42</sup> Evans, *Scripta Minoa* I 43, fig. 20a; PM IV 617, fig. 604a.

<sup>43</sup> BSA 8 (1901—2) 78, fig. 43; PM I 686, fig. 504d (also III 219, fig. 153).

come from the same workshop and there are notable similarities between this sealing and a gold ring from Asine in the National Museum in Athens<sup>44</sup>; but the ring is of a somewhat coarser style than those which produced the sealings under discussion. A neat spiral frieze similar to that on 613 etc. from Sklavokampo recurs on the finely engraved lentoid gem which made the impressions on sealings from the Royal Tomb at Isopata near Knossos, 415 (two examples) and Ashmolean Museum 1938. 1082<sup>45</sup> (fig. 12b). Engraving in stone requires rather different techniques from metal but here again the close attention to anatomical detail may mean that the engraver was at least associated with the workshop which produced the rings.

To base any firm historical conclusions on this group of seal impressions duplicated at different sites requires the utmost caution but the tentative inferences already drawn may not be outside the limits of possibility. The picture they create seems to be of a centralised bureaucracy at Knossos, of Knossian rulers using signet-rings of the finest quality with bull-leaping as their chief insignia, perhaps produced in the workshop of a single master-craftsman at Knossos. Very exact replicas of these rings may also have been made there from matrices taken in clay from impressions made by the original rings and such replicas would be for use by the rulers' representatives at other places within their dominion.

### *Chronological Appendix*

At both Sklavokampo and Zakro the sealings under discussion belong to LM IB destruction deposits. At Gournia there seem to have been fires in both LM IA and LM IB; the sealings fall within the LM I period and are most probably of LM IB. At Hagia Triadha no secure stratigraphical evidence has been given for the find-spots of the sealings but there seems to be agreement that the majority of the destruction material is quite consistent with that of LM IB destructions elsewhere. The sealings from the Royal Tomb at Isopata have an LM IIB context<sup>46</sup>.

Stratigraphical evidence from the Palace at Knossos has been in dispute. This stylistically and historically homogeneous group of

<sup>44</sup> B. Frödin and A. Persson, *Asine* (1938) 372, fig. 241, left; CMS I no. 200

<sup>45</sup> Evans, *Prehistoric Tombs of Knossos* 154f., fig. 138 (*Archaeologia* 59 [1906] 554f.); PM I 694, fig. 515 (also IV 562, fig. 530); Kenna, *Cretan Seals* 147, no. 44S, pl. 17

<sup>46</sup> Furumark, *The Chronology of Mycenaean Pottery* (1941) 85

sealings, securely dated on other sites, is accordingly of the utmost value for clarification at Knossos. The apparently LM IB character of many of the rings and gems which impressed sealings from the South West Basements, noted by Kenna<sup>47</sup>, receives striking confirmation. A LM IB date for the ring which produced sealing 108 from the Room of the Niche, tentatively proposed by Kenna<sup>48</sup>, is now assured; the sealing is countermarked with the balance sign and endorsed in Linear B script and the ring must have continued in use at least into the LM II period; for an LM II context for the sealing has been given<sup>49</sup> and should not now be disputed.

The rings, made in LM I and mostly used in LM IB, might naturally have continued in use at Knossos for a while after they had ceased to be used on other sites which were destroyed at the end of the LM IB period. If the rings were made in the first quarter of the fifteenth century it is hardly likely that the use of all (or indeed any) of them for sealing would have continued beyond the early fourteenth — beyond LM III A — the most acceptable date for the disastrous conflagration at Knossos responsible for the charred condition of the sealings. Finally the bull-jumping craftsman cannot have been too far removed in time from the artist of the fresco painting already mentioned<sup>50</sup>; despite assertions of an LM III date<sup>51</sup>, the date, originally suggested by Evans, in the fifteenth century may stand.

<sup>47</sup> Kadmos 4 (1965) 74ff.

<sup>48</sup> Kadmos 3 (1964) 48

<sup>49</sup> e. g. Biesantz, *Kretisch-mykenische Siegelbilder* (1954) 135

<sup>50</sup> n. 9 and n. 13 above

<sup>51</sup> e. g. Palmer, *Mycenaeans and Minoans*<sup>2</sup> pl. 10

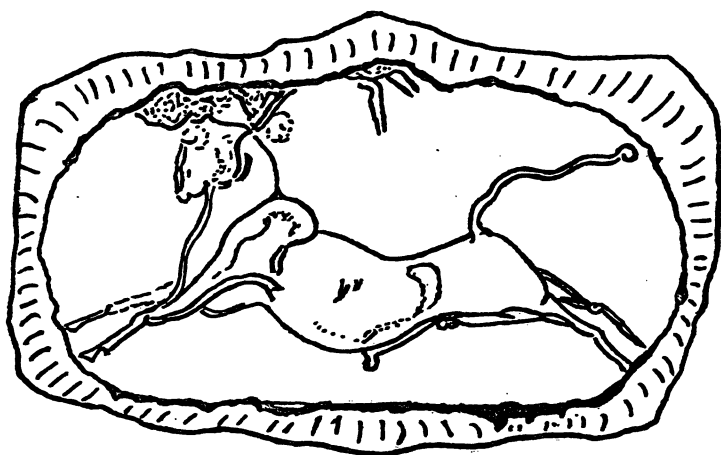
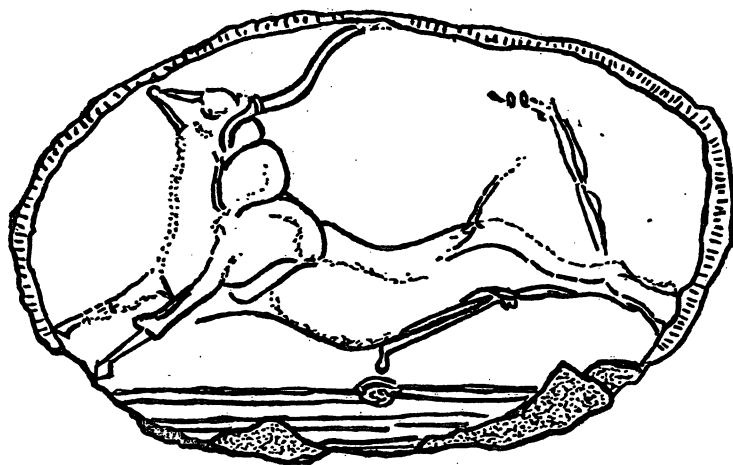


Fig. 1. Herakleion Museum sealings (a) 101; (b) 102, from Gournia (3:1)

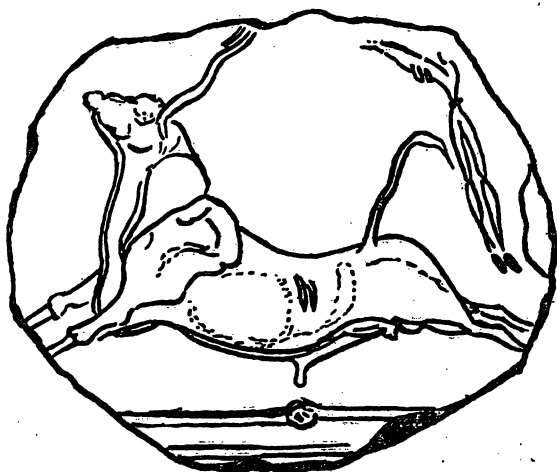
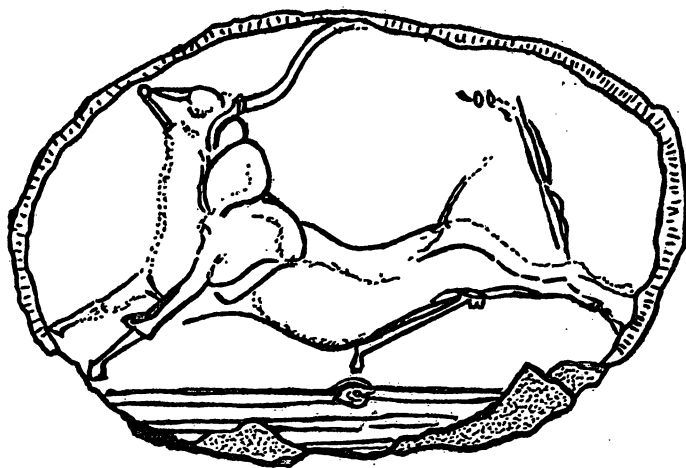


Fig. 2. Herakleion Museum sealings (a) 101, from Gournia; (b) 497—499, from Hagia Triadha, drawn from all three examples (3:1)



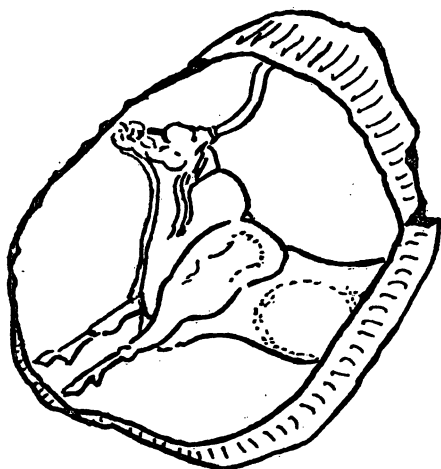
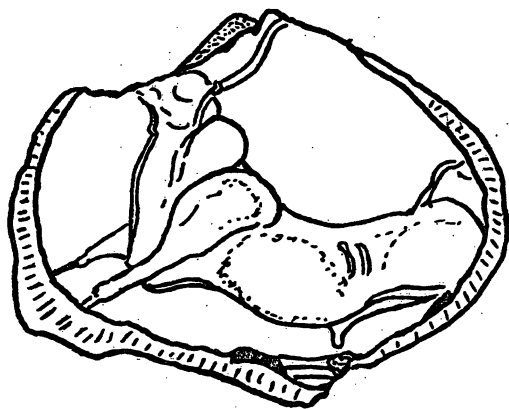


Fig. 3. Herakleion Museum sealings (a) 628; (b) 629, from Sklavokampo (3:1)

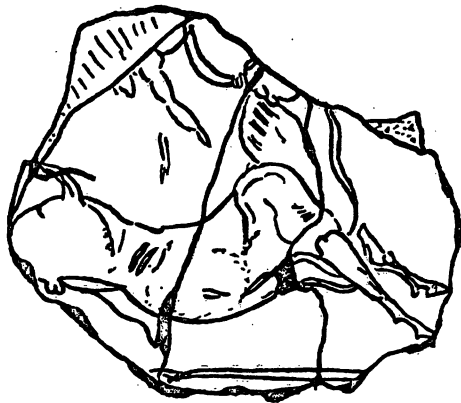


Fig. 4. Herakleion Museum sealings (a) 625, from Sklavokampo;  
(b) 12, from Zakro (3:1)

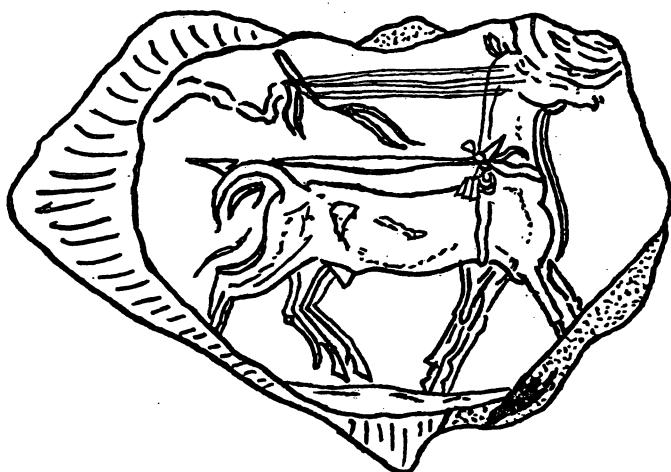
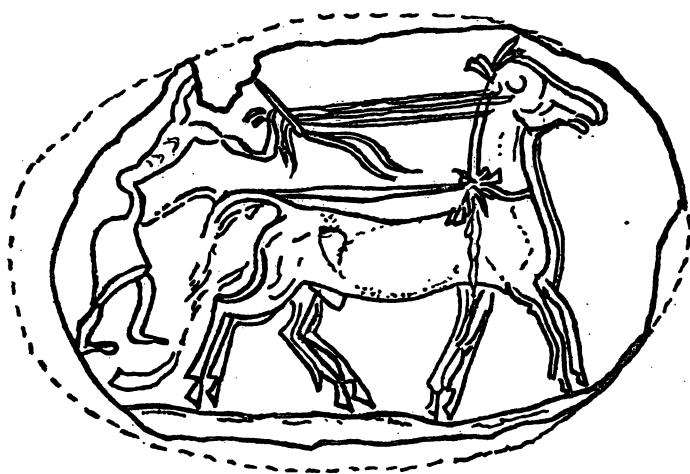


Fig. 5. Herakleion Museum sealings (a) 632—635, from Sklavokampo, drawn from all four examples; (b) 516, side a, from Hagia Triadha (31)



Fig. 6. Herakleion Museum sealings (a) 102, from Gournia;  
(b) 612, from Sklavokampo (3:1)

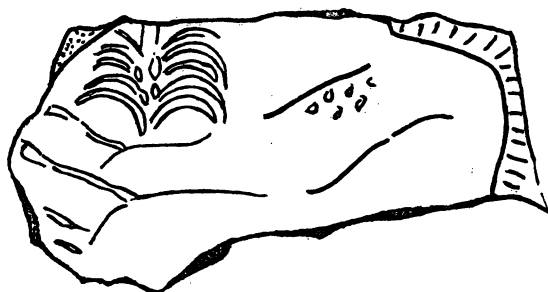
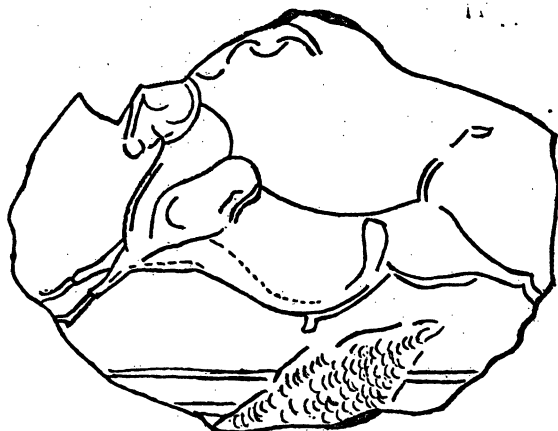


Fig. 7. Pigorini Museum sealings (a) 71974; (b) unnumbered, from Hagia Triadha  
(3:1)

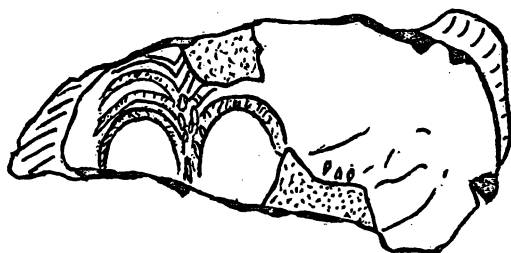


Fig. 8. Herakleion Museum sealings (a) 40, from Zakro, drawn from both examples;  
(b) 321, from Knossos (3:1)

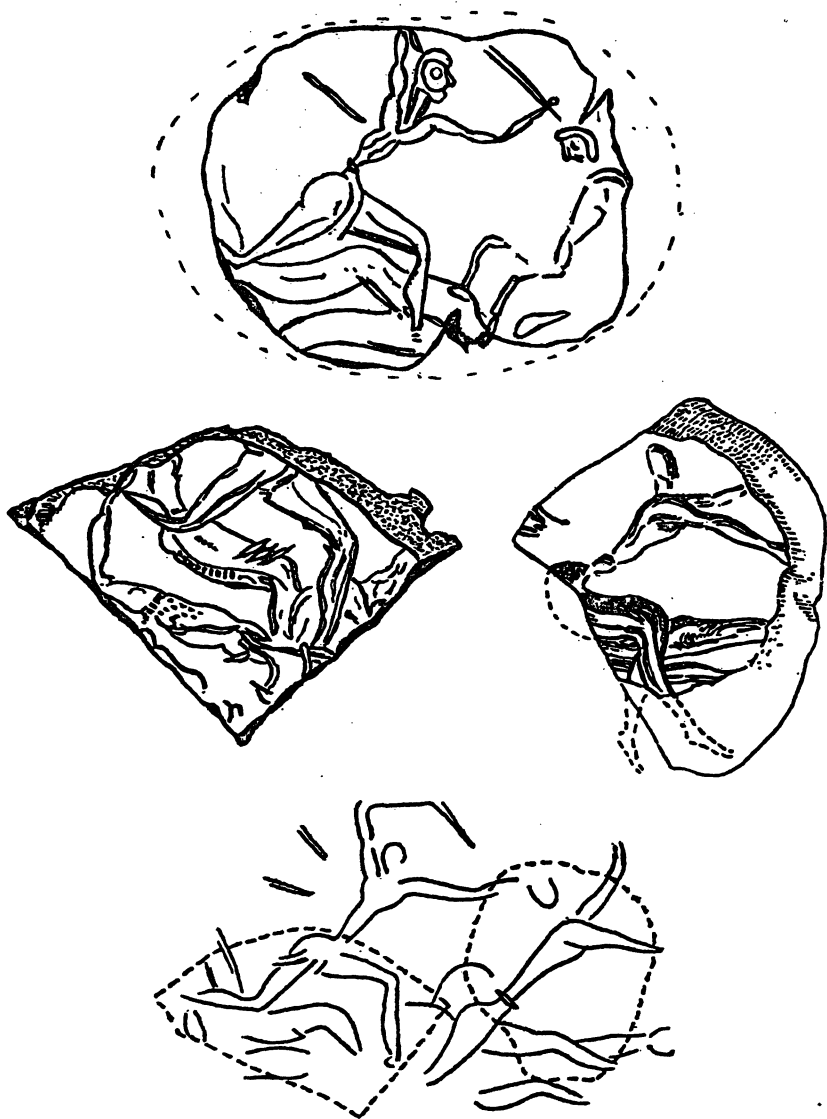


Fig. 9. Herakleion Museum sealings (a) 526 and 595—596, from Hagia Triadha, drawn from all five examples (5:2 approx.); (b) n. No. 116, from Knossos (3:1); (c) 369, from Knossos, reproduced from PM IV 600, fig. 594 (3:1 pace Evans who says 2:1); (d) diagram showing composition of n. No. 116 and 369, from Knossos, reproduced from BSA 60 (1965) 87, fig. 4 (2:1 approx.)



Fig. 10. (a) Sealing-type of Herakleion Museum sealings 277—282, and Ashmolean Museum 1938. 1015 a—b, from Knossos, reproduced from PM II 762, fig. 498. Herakleion Museum "sealing" 283, the clay signet, bears the same design in the negative (3:1 approx.); (b) Herakleion Museum sealing 85, from Zakro reproduced from PM II 763, fig. 499 (not to scale)



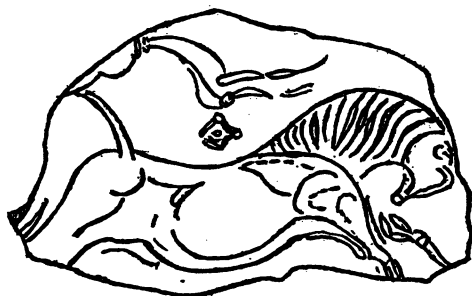
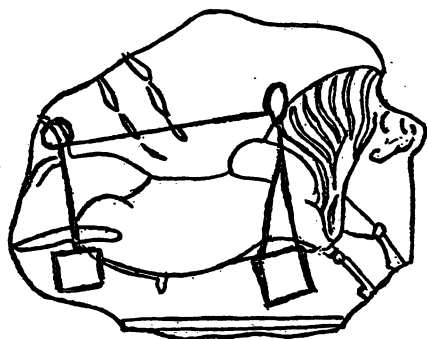
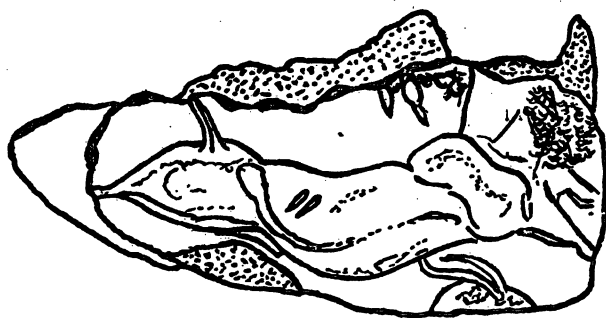


Fig. 11. Herakleion Museum sealings (a) 516, side b, from Hagia Triadha;  
 (b) 108, from Knossos; (c) 250, from Knossos (3:1)

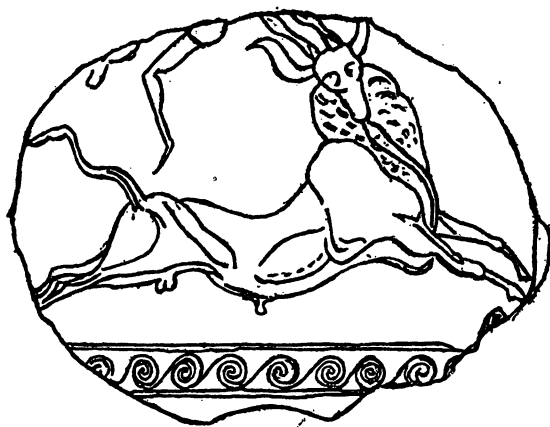


Fig. 12. (a) Herakleion Museum sealings 613—624 and 626—627, from Sklavokampo, drawn from all fourteen examples (3:1); (b) Herakleion Museum sealings 415 and Ashmolean Museum 1938. 1082 from the Royal Tomb at Isopata, reproduced from PM I 694, fig. 515 (2:1)