EXCHANGE NETWORKS IN PREHISTORY: THE AEGEAN AND THE MEDITERRANEAN IN THE THIRD MILLENNIUM B.C. *

> "All human action may be viewed at a distance as exchange, both of material and of nonmaterial goods." [1]
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> "The exchange can be conceptualized as a network in which the different participants in the interactions are the network nodes and the exchanges are the links between them." [2]

The importance of exchange as a factor of civilization growth has been analyzed and emphasized by several scholars [3]: exchange of goods and knowledge is vital to the economic and social interaction among cultures and its study can help us to explain the way these respond to external stimuli. Exchange relies on networks, which can be studied through the material remains of the cultures involved. In the present paper I propose to study the networks of exchange between the Aegean and the Mediterranean in the Third Millennium B.C., a period of significant developments and rapid progress throughout the Aegean. First I examine the available evidence and then I attempt to define the exchange networks and determine the nature of contacts.

1. The evidence

The evidence can be classified into two types [4]. The most valid type is provided by foreign objects found in the Aegean or Aegean objects found abroad. This kind of evidence almost certainly provides proof for contact, although stratigraphy and context have also to be considered. The other type of evidence consists of typological similarities in architecture and artifacts of distant regions. Although such similarities may prove helpful when combined with actual imports, they should be treated with caution when not backed by other evidence. They

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1 C. RENFREW, "Trade as Action at a Distance: Questions of Integration and Communication", in J.A. SABLOFF and C.C. LAMBERG-KARLOVSKY (eds.), *Ancient Civilization and Trade* (1975), p. 5.

2 G.D. DEGARMO, "Identification of prehistoric Intrasettlement Exchange", in T.K. EARLE and J.E. ERICSON (eds.), *Exchange systems in Prehistory* (1977), p. 153.

3 See the numerous contributions in SABLOFF and KARLOVSKY, *op. cit.*; EARLE and ERICSON, *op. cit.*; J.E. ERICSON and T.K. EARLE (eds.), *Contexts for Prehistoric Exchange* (1982); A.B. KNAPP and T. STECH (eds.), *Prehistoric Production and Exchange: The Aegean and the Eastern Mediterrannean* (1985); E.M. BRUMFIEL and T.K. EARLE (eds.), *Specialization, Exchange, and Complex Societies* (1987).

4 C. RENFREW, *The Emergence of Civilisation. The Cyclades and the Aegean in the Third Millennium* (1972), p. 440.

should be particularly questionable when refering to very simple forms of artifacts and plans of buildings: a large number of vague affinities does not necessarily suggest contact.

1.1. Architecture and burials

The main architectural evidence consists of fortification walls with semicircular or horse-shoe shaped bastions, which appear in the Aegean in the second half of the EBA (Chalandriani, Panormos, Lerna, Aigina). This particular type of fortification appears in several third millennium sites in the Near East [5] as well as in Spain [6] and Portugal [7], while there are some later examples from South France and Sicily [8]. The appearance of such a particular type of fortification in those remote areas in a short period could hardly be accidental, but the lack of any imported objects suggests nothing more than random contacts. The other possible indication for contacts is the so-called *herring-bone* masonry, which appears in several Aegean sites (*e.g.* Troy, Thermi, Aghios Kosmas, Raphina, Lerna, Tiryns, Peukakia, etc.) already at the beginning of the EBA. This type of construction technique seems to have been employed for the first time in Mesopotamia during the First Transition Period [9] and in Syro-Palestine in Early Dynastic I [10]. In the West it appears in Spain, in both settlements and tombs, in contexts of the later third millennium [11]. Other architectural similarities proposed by some scholars are in reality too vague to be used as proofs for contact [12].

In *burials*, some scholars have suggested similarities between the Minoan *tholos* tombs and the megalithic burial structures of the Iberian peninsula [13] and have proposed that the custom of communal burial was introduced in the area from the East. However, it has now become clear that the Iberian *tholoi* developed locally [14] and the numerous differences in

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5 R. AMIRAN, "The Beginnings of Urbanization in Canaan", in J.A. SANDERS (ed.), *Near Eastern Archaeology in the Twentieth Century. Essays in honor of Nelson Glueck* (1970), p. 93, pls. 9, 10 (Ai, Arad). K. KENYON, *Digging up Jericho* (1957), p. 137, pl. 35A (Jericho). A Canaanite city with similar fortification walls is depicted in a V-VI Dynasty tomb at Deshashe in Egypt: AMIRAN, *op. cit.*, p. 94.

6 In the Southeast: A. ARRIBAS and F. MOLINA, *Madrider Mitteilungen* 23 (1982), p. 29. The most famous settlement is Los Millares: ARRIBAS and MOLLINA, *op. cit.*, fig. 5; A. ARRIBAS, *Zephyrus* 10 (1959), 87; M. ALMAGRO BASCH and A. ARRIBAS, *El poblado y la necropolis megaliticos de Los Millares (Santa Fe de Mondujar, Almeria)* (1963); H.N. SAVORY, *Spain and Portugal. The Prehistory of the Iberian Peninsula* (1968), p. 152; ID., *Madrider Mitteilungen* 13 (1972), p. 30; A. GILMAN, in BRUMFIEL and EARLE, *op. cit.*, p. 23.

7 Around the Tagus estuary: E. SANGMEISTER and H. SCHUBART, *Madrider Mitteilungen* 6 (1965), p. 39-64; ID., *Madrider Mitteilungen* 8 (1967), p. 47-78; ID., *Madrider Mitteilungen* 10 (1969), p. 11-44 (Zambujal); A. do PAÇO and E. SANGMEISTER, *Germania* 34 (1956), p. 211-230; H.N. SAVORY, *Madrider Mitteilungen* 13 (1972), p. 23-37 (Villa Nova de Sao Pedro).

8 France: ARRIBAS AND MOLINA, *op. cit.*, p. 31, n. 27-29 (Lébous, Boussargues, Camp de Laure). Sicily: O. HÖCKMANN, "The Cyclades and the West Mediterranean", in J. THIMME (ed.), *Art and Culture of the Cyclades* (1977), p. 169, n. 30 (Petraro).

9 Mari, Ubaid: H. FRANKFORT, *The Art and Architecture of the Ancient Orient* (1954), p. 20, n. 9. Cf. A. MOORTGAT, *The Art of Ancient Mesopotamia* (1969), p. 19, fig. 14; P. DELOUGAZ, *Studies in Ancient Civilization* 7, Oriental Institute, University of Chicago; V. CHRISTIAN, *Altertumskunde des Zweistromlandes* (vol. 1), p. 171, pl. 146.

10 M. SAGHIEH, *Byblos in the Third Millennium B.C.* (1984), p. 127, 129.

11 ARRIBAS and MOLINA, *op. cit.*, p. 16; GILMAN, *op. cit.*, p. 23-24, 134-137; W. SCHÜLE, *Orce und Galera: zwei Siedlungen aus dem 3. bis 1. Jahrtausend v. Chr. im Südosten der Iberischen Halbinsel* (1980).

12 *E. g.* brick walls on stone foundations, buildings with curvilinear walls, double walls with the interior space filled with rubble and stone. O. HÖCKMANN, "The Cyclades and their Eastern Neighbours", in THIMME, *op. cit.*, p. 156, 161.

13 V. and G. LEISNER, *Die Megalithgräber der Iberischen Halbinsel*, 3 vols. (1943-1965); B. BLANCE, *Die Anfänge der Metallurgie auf der Iberischen Halbinsel* (1971), p. 90.

14 C. RENFREW, "Colonialism and Megalithism", *Antiquity* 41(1967), p. 276-288.

architecture and burial customs [15] make a connection unlikely. The same holds true for the parallels proposed between EM tholoi and some North African tombs [16]. Chamber or rock-cut tombs have been also thought to be indicative of contacts. In the West they first appear in Andalusia and the Tagus estuary and can be classified in two types: the "man-hole", with a top opening covered by a slab, and the passage tombs [17]. However, the similarity in ground plan is not enough to prove influences and the parallels suggested by some scholars (roofing of the chambers with stone slabs and laying the gifts outside the chamber) cannot be accepted, since in the Aegean they are found in cist-graves and not in chamber tombs. In addition, there are differences in construction features and burial gifts [18]. Rock-cut tombs are also common in Italy, in the Copper Age groups of the central (Rinaldone) and south (Gaudo, Macchia a Mare, Laterza) parts of the peninsula. These tombs cannot be related to the Aegean ones either, because of construction differences [19] and the same holds true for the chamber tombs of Conca d'Oro in Sicily [20]. On the other hand, the use of natural caves and rock shelters has Neolithic antecedents [21] and there is no reasonable connection with the Early Cycladic and Early Minoan rock shelters. Cist-graves have been also considered as indicative of contacts. In the West they appear in Sardinia [22] and have been compared to the graves of Aghios Kosmas; however, the vague similarities and the chronological differences make a connection unlikely [23].

1.2. Metallurgy and pottery

Metallurgical parallels have been suggested between Aegean, Italian, and Iberian Copper Age groups. These include such types as triangular daggers with raised midribs (Spain) and riveted daggers (Italy), although both forms can be explained in functional terms [24]. General typological similarities have been noticed between Italian and Aegean daggers [25], but again there are no parallels in specific features. The possibility of imported Minoan daggers in Italy [26]

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15 *E. g.* the burial chambers of the Iberian tombs were lined with orthostats; in some cases access to the tomb was from a hole on the top and there was no passageway or *dromos*; pillars were used to support the vault inside the chamber; the burial chambers were decorated with wall plaster, usually with red geometric designs; the mounds surrounding the tombs were enclosed by revetment walls; the latest *tholoi* had courtyards in the form of theatres. Among the burial gifts, chipped stone tools and implements were very common in the Millaran but not in the Minoan tombs. Notable was the absence of seals from the Iberian tombs.

16 J.D.S. PENDLEBURY, "Egypt and the Aegean", in G. MYLONAS (ed.), *Studies presented to David Moore Robinson* 1 (1951), p. 187.

17 H.N. SAVORY, *Spain and Portugal. The Prehistory of the Iberian Peninsula* (1968), p. 124.

18 The opening of the tomb at the top and the orientation of the entrances towards the east do not appear in the Aegean tombs. Further differences are noticed in the burial gifts: the Portuguese stone amulets, figurines, and combs have no parallels in the Aegean; a few small stone vessels of limestone, marble, and alabaster, recall Early Minoan materials but the shapes are too simple to be useful for comparisons. SAVORY, *op. cit.*, p. 128-131.

19 *E. g.* the shaft entrance contrasted to the *dromos* or vestibule of the Aegean tombs. Only at Macchia a Mare are the tombs approached by a passage through the cliff. R. WHITEHOUSE and C. RENFREW, "The Copper Age of Peninsular Italy and the Aegean", *BSA* 69 (1974), p. 353.

20 S. TINE, *BPI* 69-70 (1960-61), p. 11; ID., *Kokalos* 9 (1963), p. 73.

21 WHITEHOUSE and RENFREW, *op. cit.*, p. 363.

22 C. ZERVOS, *La civilisation de la Sardaigne* (1954), p. 256:304, 309. C. PUXEDDU, *Studi Sardi* 17 (1959-1961), p. 217.

23 RENFREW, *op. cit.*, p. 279.

24 WHITEHOUSE and RENFREW, *op. cit.*, p. 378.

25 Tangless, flat-or round-heeled daggers: WHITEHOUSE and RENFREW, *op. cit.*, p. 372-375, 378, types A2 and B2, as well as the simple type B3 with vague parallels in Anatolia. Some tanged Italian daggers (*Ibid*, types A1, A5, B1, B4, esp. B5) present similarities to Near Eastern daggers. The same scholars consider the silver crutch-headed pins as the only possible foreign form in Italy.

26 K. BRANIGAN, *BPI* 75 (1965), p. 97-109.

does not now appear very likely [27]. On the other hand, metallurgical techniques in the West (casting, melting, and smelting of copper ores) have been thought to be the result of Aegean influences [28]. Earlier metallurgies do, however, exist in those areas and an indigenous development from hot working to casting and smelting is more likely than development under external influences [29]. This is further emphasized by the fact that bronze is not known and the copper objects in Italy have no tin and very rarely arsenic, while there is no tin in Spain before the arrival of the Beakers. The metallurgical connections with the East are more numerous, especially towards the end of the EBA [30]. Similarities in weapons and jewelry betray connections between the Aegean (East Aegean, Cyclades, Crete), the Near East [31], and Mesopotamia [32]. Anatolia seems to have served as an intermediary between Crete, the East Aegean and the Orient [33]. Cyprus, on the other hand, may have been an intermediary between Crete and the Near East [34]. Metallurgical evidence for connections with Egypt is almost non-existant and consists only of vague typological similarities between Early Minoan II and North African types of arrowheads [35].

Numerous *ceramic* similarities have been suggested between the Aegean and the West Mediterranean, but the majority refer to simple utilitarian shapes [36] and elementary surface treatment and decoration techniques [37] and cannot be used as evidence for contacts. The only exceptions may be the lugged jars of the Lipari islands (Piano Quartara) and Sicily (Conca

27 WHITEHOUSE and RENFREW, *op. cit.*, p. 369.

28 B. BLANCE, "Early Bronze Age Colonists in Iberia", *Antiquity* 35 (1961), p. 199.

29 WHITEHOUSE and RENFREW, *op. cit.*, p. 377-378. Cf. RENFREW, *op. cit.*, p. 279.

30 K. BRANIGAN, *Aegean Metalwork of the Early and Middle Bronze Age* (1974), p. 122.

31 C.f. *e.g.* Aegean daggers and daggers from Hama: K. BRANIGAN, *op. cit.*, type IV and C.F.A. SCHAEFFER, *Stratigraphie comparée et chronologie de l'Asie Occidentale* (1948), pl. XXI:2. Also slotted spearheads with rat-tail tang from the Aegean and Ras Shamra IIIA2: BRANIGAN, *op. cit.*, type X and SCHAEFFER, *op. cit.*, pl. X (top left). Finally, compare Aegean tanged daggers and daggers from Byblos IV: BRANIGAN, *op. cit.*, type XVII and M. DUNAND, *Fouilles de Byblos* (1954), pls. LXII:9164, LXXVIII:10831. Cf. SAGHIEH, *op. cit.*, p. 112, fn. 42.

32 There are many parallels to Tell Brak G. Cf. the beads: BRANIGAN, *op. cit.*, type III and K.R. MAXWELL-HYSLOP, *Western Asiatic Jewellery c. 3000-612 B.C.* (1971), fig. 24d; and the ear-rings: BRANIGAN, *op. cit.*, types Ia, II and MAXWELL-HYSLOP, *op. cit.*, pl. 26. Also, see the following parallels with Early Dynastic IIIA/B Ur. Beads: BRANIGAN, *op. cit.*, types I, IV and MAXWELL-HYSLOP, *op. cit.*, figs. 6, 8, 11. Needles: BRANIGAN, *op. cit.*, type IV and MAXWELL-HYSLOP, *op. cit.*, p.13, fig. 10. Hair-rings: BRANIGAN, *op. cit.*, type I and MAXWELL-HYSLOP, *op. cit.*, fig. 14a.

33 Cf. the lead figurines and the fragmentary mould for basket ear-rings and quadruple spiral heads: BRANIGAN, *op. cit.*, p. 121. Cf. also D. STRONACH, *AnatSt* 7 (1957), p. 90-103.

34 Cf. the Early Minoan daggers from Cyprus: H. CATLING, *Cypriot Bronzework in the Mycenaean World* (1964), p. 60-62; BRANIGAN, *op. cit.*, p. 123; ID., *Copper and Bronze Working in Early Bronze Age Crete* (1968), p. 61.

35 PENDLEBURY, *op. cit.*, p. 187.

36 *E.g.* the single-handed cup, which occurs in the Remedello and Gaudo cultures in Italy (WHITEHOUSE and RENFREW, *op. cit.*, p. 366), the Conca d'Oro and Chiusazza cultures in Sicily (M. CAVALIER, "Les cultures préhistoriques des îles Eoliennes et leur rapport avec le monde Egéen", *BCH* 84 [1960], p. 319-346), and in Iberia (conical cups: SANGMEISTER, *Germania* 34 [1956], p. 222; SAVORY *op. cit.*, p. 133). The Italian *askoi* of the Gaudo culture and the bottles from the Rinaldone and Conelle-Ortucchio cultures do not really resemble the Aegean ones (WHITEHOUSE and RENFREW, *l. c.*). Other parallels, like the *kernoi* of the Gaudo culture and the Sardinian cylindrical *pyxides* from the Ozieri (San-Michele) culture seem to have been later: O. HÖCKMANN, "The Cyclades and the West Mediterranean", in THIMME, *op. cit.*, p. 167. The shapes mentioned by Blance (*op. cit.*, p. 199) are too simple.

37 Dark-burnished pottery appears in graves of the Remedello and Laterza cultures in Italy, but the shapes are unknown to the Aegean and the decoration has Neolithic antecedents: WHITEHOUSE and RENFREW, *op. cit.*, p. 367. Light-on-dark wares from Spain have been compared to EM III and Troy I wares (LEISNER, *op. cit.*, 1 [1943], p. 589; HÖCKMANN, *op. cit.*, p. 164) and some wares resembling the Aegean *Urfirnis* have been noted in Spain (H.N. SAVORY, *Madrider Mitteillungen* 13 [1972], p. 33).

d'Oro, Chiusazza, Malpasso) [38], and the grey pattern-burnished wares from Sicily (Chiusazza) and Iberia (Mesas de Asta), which resemble Chacolithic grey ware from Samos [39]. The vague similarities are further weakened by the absence of any real imports: the earliest imported pottery in the West comes from Porto Perone and dates to the Middle Helladic period [40]. In general, the ceramic evidence alone does not suggest anything more than random contacts [41]. The situation with the East is different. There are several connections with Anatolia for which Troy seems to have served as an intermediary [42]. With the Near East, some parallels have been suggested between EC I/II pottery and pottery from Ghasull and Jericho [43], but the affinities are not close enough to suggest influences. The same holds true for Egypt, where the similarities suggested are too vague [44].

1.3. Sculpture and seal engraving

Another line of evidence for contacts is provided by *sculpture*. The suggested parallels with the West are again vague [45] and should be treated with caution in view of the lack of imports. The only plausible connections are suggested by a steatite figurine from Campu-Fiurelli in Corsica, which could have been an import from the Cyclades [46] and some engraved *stelae* from Malta [47], with representations of Cycladic (?) longboats. The parallels with the East are more numerous and more convincing. There are close Egyptian-Minoan [48] and Syrian-Cycladic/Minoan [49] affinities, while Cycladic affinities have been noticed with Anatolian figurines from Selendi and Horoztepe [50]. A possible foreign import in Crete may have been the

38 CAVALIER, *op. cit.*, p. 334, fig. 16.

39 S. TINE, *BPI* 74 (1965), p. 179. There are also some close similarities between the Aegean and the Piano Quartara and Capo Graziano cultures of the Lipari islands: CAVALIER, *op. cit.*, p. 329-335. Eye-designs and light-on-dark decoration from Troy I resemble those of Iberian vases and pattern-burnished decoration from Mesas de Asta presents similarities to Tigani wares: BLANCE, *op. cit.*, p. 197. The mesas de Asta wares have, however, a different repertory of shapes (BLANCE, *op. cit.*, p. 198).

40 WHITEHOUSE and RENFREW, *op. cit.*, p. 360.

41 WHITEHOUSE and RENFREW, *op. cit.*, p. 367.

42 Cf. *e.g.* common shapes such as beaked-spouted jugs, some variations of the *pyxis*, *depata*, tankards. Common surface treatment and decoration techniques: grey ware, red polished ware, mottled Vassilike ware (H. FRANKFORT, *Studies in Early Pottery of the Near East* II. *Asia, Europe, and the Aegean, and their Earliest Interrelations* [1927], p. 89). Cf. also the incised, impressed, and plastic decoration which appear in the Aegean and in Anatolia.

43 *Pyxides*, bird vases, incised decoration: S. WEINBERG, in R.W. EHRICH (ed.), *Chronologies in Old World Archaeology* (1965), p. 307. Cf. K. KENYON, *The Archaeology of the Holy Land* (1960), p. 88, fig. 12.

44 Goblets on high flaring vases: EVANS, *PM* I, p. 48. Also painted decoration: WEINBERG, *op. cit.*, p. 307.

45 Cf. *e.g.* idol types such as *baityloi* and schematic oval figurines with a suggestion of a head from Spain, which present some vague similarities to Cycladic schematic figurines (A. BLANCO FREJEIRO, *Madrider Mitteilungen* 3 [1962], p. 19). Winged heads and bird figurines from the Tarxien phase of Malta present general similarities to Cycladic figurines: HÖCKMANN, *op. cit.*, p. 165, 170.

46 HÖCKMANN, *op. cit.*, fig. 169. Cf. C. ZERVOS, *L'art des Cyclades du début à la fin de l'Age du Bronze, 2500-1100 avant notre ère* (1957), fig. 106.

47 D. WOOLNER, *Antiquity* 31 (1957), p. 60-67. Woolner dates them, however, to the second millennium.

48 EVANS, *PM* I, p. 84; PENDLEBURY, *op. cit.*, p. 187.

49 O. HÖCKMANN, "The Cyclades and their Eastern Neighbours", in THIMME, *op. cit.*, p. 158. The transition from the schematic violin-shaped Cycladic figurines to the Plastiras and Louros types has been attributed to influences from Amuq, where a series of six bronze figurines were found at phase G: R.J. and L.S. BRAIDWOOD, *Excavations in the plain of Antioch* (1960), pls. 56-64; J.D.S. PENDLEBURY, *The Archaeology of Crete* (1939), p. 74.

50 Selendi: K. EMRE, *Anadolu kursun figürleri ve tas kalıpları* (1971), fig. 11F. Horoztepe: T. ÖZGÜC and M. AKOK, *Horoztepe* (1968), pls. IX-X.

ivory head from Trapeza, perhaps of Syrian manufacture [51]. Some other similarities suggested by scholars are too vague to prove influences [52].

Seals provide ample evidence for contacts with the East. There are several theriomorphic seals with oriental or orientalizing motifs found in Early Minoan levels in Crete [53], and some are made of ivory (see section 1.5). Those that are certainly imported are few. A greenstone cylinder seal from Kapros, on Amorgos, may originate in Mesopotamia and date to the Jemdet-Nasr period [54]. Another possible import is an ivory seal from Poliochni, although the possibility of Aegean manufacture is not excluded [55]. Finally, the silver cylinder seal from Mochlos [56] may have been imported from Mesopotamia.

1.4. Stone and bone artifacts

Chipped stone artifacts do not really offer any proof for connections. The only case argued on the past was that of Italian flint daggers from the Remedello culture in Italy, which have been thought to originate in triangular Minoan copper daggers [57]. Such a possibility has not been excluded by Whitehouse and Renfrew [58] who, however, emphasize the difficulties emerging from the absence of imported Minoan copper daggers in Italy. Further, some obsidian implements originally thought to have come from the Lipari islands were shown to originate in Giali, while no obsidian found in the West Mediterranean came from the Aegean [59]. On the other hand, characterization studies have shown that there is no evidence for Aegean obsidian in the Near East or Egypt [60]. *Stone vases* offer the only concrete evidence for contacts with the East and the majority of the evidence comes from Crete, where Warren lists 27 certain or 32 possible examples [61]. Although the contexts of most of these vases are uncertain or later [62], two diorite vases can be safely dated to the EBA [63]. Of particular interest is an Egyptian stone

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51 H.W. and J.D.S. PENDLEBURY and B. MONEY-COUTTS, *BSA* 36 (1935-36), pl. 19:7. Cf. C. RENFREW, *The Emergence of Civilisation. The Cyclades and the Aegean in the Third Millennium* (1972), p. 448.

52 J.D.S. PENDLEBURY, *The Archaeology of Crete* (1939), p. 74; HÖCKMANN, *op. cit.*, p. 160. Cf. RENFREW, *loc. cit.*

53 EVANS, *PM* IV, p. 486; V.E.G. KENNA, *Cretan Seals* (1960), p. 13; RENFREW, *op. cit.*, p. 447. Cf. P. YULE, *Early Cretan Seals: A Study of Chronology* (1980), p. 8-11, pl. 35. A sealing with a representation of a spider from the Mainland (Lerna) has Mesopotamian parallels (M. HEATH, *Hesperia* 27 [1958], p. 118).

54 C. RENFREW, *AJA* 71 (1967), p. 7, 18, no. 19, pl. 4. Cf. H. FRANKFORT, *Cylinder Seals* (1939), p. 301, pl. Id.

55 L. BERNABO-BREA, *Poliochni. Città preistorica nell' Isola di Lemnos* II (1976), p. 298. Cf. C. RENFREW, *The Emergence of Civilisation. The Cyclades and the Aegean in the Third Millennium B.C.* (1972), p. 445, pl. 23:3.

56 R.B. SEAGER, *Explorations in the island of Mochlos* (1912), p. 22:n.

57 K. BRANIGAN, *BPI* 75 (1966), p. 99-100.

58 *Op. cit.*, p. 365.

59 WHITEHOUSE and RENFREW, *op. cit.*, p. 361-362.

60 C. RENFREW, J.R. CANN, and J.E. DIXON, *BSA* 60 (1965), p. 228.

61 P. WARREN, *KretChron* 19 (1965), p. 28-29.

62 P. WARREN, *Minoan Stone Vases* (1969), p. 108-109; G.A. REISSNER, *Antiquity* 5 (1931), p. 203; PENDLEBURY, *loc. cit.*, p. 54; J. VERCOUTTER, *L'Egypte et le monde égéen préhellénique* (1956), p. 407.

63 A fragment of an open bowl from the EM deposit at the South Front of the Palace at Knossos was found in EM II contexts: WARREN, *op. cit.*, p. 110:C1. Also a *pyxis* from the large Tholos at Ayia Triadha (*op. cit.*, p. 111:G4) has EM II-MMIb/II associations. Although the dates of manufacture and *floruit* of these vessels cannot be precisely fixed, it is certain they were made before the end of the Old Kingdom. In addition to these two vases, fragments of three vases from the "Late Neolithic" houses at the Central Court of Knossos are probably the only other examples of Old Kingdom vases found in early contexts on Crete:

vase found on Kythera [64], which bears a hieroglyphic inscription with the name of the Pharaoh Userkaf (ca. 2490 B.C.) and comes from his Sun Temple at Abusir; also a faience bowl and beads from Mochlos have been considered as Egyptian imports, but in view of similar finds in Anatolia they may be of Anatolian manufacture [65].

Some *bone pins* with bird-shaped heads and cylindrical bone tubes from Iberia bear similarities to bone objects from the Cyclades, while bossed bone plaques from the Sicilian Castellucio culture and Altamura in Italy [66] and others from the Tarxien cemetery in Malta [67] present similarities to a find from Lerna IV [68] which could be the only Western object found in the Aegean. These plaques seem to date to the end of the EBA.

1.5. Raw materials

To the list of imports we should also add raw materials. *Ivory* finds are known mainly from Crete, where we have several seals and amulets; in the rest of the Aegean, we have only sporadic finds (table 1). The main problem concerning Minoan ivory is its origin. Elephants did not exist in Egypt in the third millennium and the Egyptians either acquired ivory from Nubia [69] or used hippopotamus ivory [70]; in later times they purchased the material from various sources, including the Middle East [71]. In Syria elephants lived until the 15th or even the 8th century B.C. and we know that during the New Kingdom Cyprus served as an intermediary between Syria and Egypt [72]. As the Minoan connections with the Near East seem stronger than those with Egypt (see section 2.3), it would perhaps seem more plausible to suggest that the main source of the material was Syria. The other problem concerning ivory is whether the material came to Greece in the form of raw material or as already-made artifacts. Renfrew [73] suggests that the workmanship of most of the Minoan ivory seals must be local, despite apparent Eastern influences.

A great deal of discussion has been made about the possibility of the Aegeans importing copper, silver, and tin from the West Mediterranean [74]. However, copper [75], lead and silver [76]

WARREN, *op. cit.*, p. 29. The rest of the early Egyptian stone vases were found in later or uncertain contexts, as were the examples from the Mainland: J.D.S. PENDLEBURY, *Aegyptiaca. A catalogue of Egyptian objects in the Aegean area* (1930), nos 97, 149. Cf. W. HELCK, *Die Beziehungen Ägyptens und Vorderasiens zur Ägäis bis ins 7. Jahrhunderts v. Chr.* (1979), p. 14.

64 W.S. SMITH, *Interconnections in the Ancient Near East* (1965), p. 8, fig. 10. Cf. HELCK, *op. cit.*, p. 15.

65 R.B. SEAGER, *Explorations in the island of Mochlos* (1912), p. 54-55. Cf. RENFREW, *op. cit.*, p. 448. The origin of several faience beads found in Malta is uncertain (WHITEHOUSE and RENFREW, *op. cit.*, p. 361). Mention should also be made of an Egyptian *kernos* of Dynasty I: it was originally thought to have been made of Parian marble but this has been seriously doubted (H. FRANKFORT, *Studies in Early Pottery of the Near East* II. *Asia, Europe, and the Aegean and their Earliest Interrelations* [1927], p. 107). Cf. RENFREW, *op. cit.*, p. 445.

66 L. BERNABO-BREA, *Sicily before the Greeks* (1957), p. 114, pl. 41.

67 J.D. EVANS, *Prehistoric Antiquities of the Maltese Islands* (1971), fig. 50.

68 WHITEHOUSE and RENFREW, *op. cit.*, p. 360. Cf. J.L. CASKEY, *Hesperia* 23 (1954), p. 22, pl. 9g.

69 W. HELCK and E. OTTO, "Elfenbein", *Lexikon der Ägyptologie* I (1975), 1225.

70 RENFREW, *op. cit.*, p. 446.

71 A. LUCAS and J. HARRIS, *Ancient Egyptian Materials and Industries* (1962), p. 32.

72 HELCK and OTTO, *loc. cit.*

73 *Op. cit.*, p. 447.

74 E. SANGMEISTER, *Studien zu den Anfänge der Metallurgie* (1968); ID., in *Actes du VIIIe Congrès International des Sciences Préhistoriques et Protohistoriques* 1 (1971), p. 127; K. SPINDLER, *Madrider Mitteilungen* 10 (1969), p. 76; O. HÖCKMANN, "The Cyclades and the Western Mediterranean", in THIMME, *op. cit.*, p. 163.

75 RENFREW, *op. cit.*, p. 313-314; N.H. GALE and Z.A. STOS-GALE, *Science* 216 (1982), p. 11-19; N.H. GALE, Z.A. STOS-GALE, and G.R. GILMORE, *AnatSt* 30 (1985), p. 143-174.

ores were already known in the Aegean and there is no serious reason to suggest an Aegean quest for metals in the West Mediterranean.

Finally, suggestions about other imported materials in Troy (lapis lazuli, jade) have not been substantiated [77].

2. The networks

The exchange networks of the Early Bronze Age Aegean can now be analyzed with the help of the evidence presented in section 1. For the purpose of our analysis we can distinguish two exchange networks: a network of information exchange and a network of exchange of material goods (Pl. XLV, a-b). Here we shall attempt to define these networks on the basis of the following parameters [78]:

1. Content
2. Magnitude
3. Spatial distribution
4. Chronological distribution
5. Directionality
6. Facilities
7. Organization

2.1. Content

Exchange of goods

The range of the imported objects seems to be rather narrow (table 1) and is further restricted if we accept that the ivory seals and amulets were manufactured on Crete. The imported items were valuable goods and their contexts (mostly funerary) suggest that they were considered personal belongings. Their distribution is very uneven: only in few tombs do they appear in quantities [79], while in most of the tombs they are found in small numbers or do not occur at all, an indication that consumption of the material was controlled by few individuals. The relatively high frequency of ivory finds and the variety of artifacts for which the material was used would suggest that it was traded and not simply exchanged. On the other hand, the stone vase from Kythera with the name of Userkaf seems to have been a personal gift, while the other stone vases and the few isolated imports (bone plaque, cylinder seals) could have reached the Aegean as prestige gifts, as well. The figurine from Corsica, if indeed an Aegean product, would be the only Aegean object in the West and could have reached the area as a prestige gift or as a personal acquisition of a traveller. The imported items would, therefore seem to have been occasional imports, and only ivory seems to have been the object of trade. On the other hand, systematic trade should have taken place for perishable goods. Although there is no evidence preserved in the archaeological record, there is some written information from the archives at Ebla. The Ebla documents give us a good idea of the exchanged

76 C. RENFREW, *AJA* 71 (1967), p. 4; N.H. GALE and Z.A. STOS-GALE, *BSA* 76 (1981), p. 169-224; N.H. GALE, Z.A. STOS-GALE, and J.L. DAVIS, *Hesperia* 53 (1984), p. 389-406; P. SPITAELS, "The Early Helladic Period in Mine no. 3 (Theatre Sector)", in *Thorikos VIII, 1972/1976* (1984), p. 151-174.

77 C. RENFREW, *The Emergence of Civilisation. The Cyclades and the Aegean in the Third Millennium* (1972), p. 445.

78 Cf. F. PLOG, "Modelling Economic Exchange", in EARLE and ERICSON, *op. cit.*, p. 129.

79 Noteworthy is the find of more than 20 ivory amulets and seals in tomb E, at Arkhanes: J. SAKELLARAKIS, *PraktArchEt* 1975, p. 294-302.

commodities in the East Mediterranean: agricultural products, livestock and animal skins, perfumes, dyes, and textiles. Trade of slaves could also have been conducted: the Ebla documents give information about slave markets and testimonies in the ancient Greek sources [80] talk about Carian pirates in the Aegean before the Middle Bronze Age.

Aegean Imports		
Object	*Find location*	*Origin*
Ivory seals	Crete	Near East/Egypt ?
Ivory seal	Poliochni	Mesopotamia ?
Ivory pommels (2)	Mainland Crete	Near East ?
Ivory amulets (20)	Crete	Near East ?
Ivory implements (3)	Troy	Near East ?
Greenstone cylinder seal	Cyclades	Mesopotamia
Silver cylinder seal	Crete	Mesopotamia
Stone vases (2-5)	Crete	Egypt/Near East
Stone vase	Cythera	Egypt
Bossed bone plaque	Mainland	Sicily/Malta
Aegean Exports (?)		
Figurine	Corsica	Cyclades (?)

Table 1

Information exchange

The network of information exchange can be detected in influences in architecture and artifacts. This network (Pl. XLV, a, table 2) seems more extensive than that of the exchange of goods. Foreign influences can be detected in architecture, pottery and sculpture, but are more apparent in metallurgy and seal engraving. The Aegean seems to have received technological (architectural construction, metallurgical techniques) and artistic influences (pottery decoration, manufacture and engraving of seals, perhaps sculptural conventions).

Possible Aegean influences abroad can also be discerned. Knowledge about architectural construction may have been transmitted to the West together with scanty artistic inspiration apparent in pottery and decoration of bone objects, as well as sculpture.

80 THUC., *Hist.* 1. 7-8. Cf. HEROD., 1. 171-173.

Foreign influences in the Aegean		
Type	*Distribution*	*Origin*
Fortifications	Mainland/Cyclades	N. East
Herring-bone masonry	Mainland/E. Aegean	N. East
Metal weapons	East Aegean	Anatolia/N. East
Jewelry	Cyclades/East Aegean/Crete	Anatolia/N. East
Pottery	Cyclades/East Aegean/Crete	N. East
Sculpture	Cyclades, Crete	Anatolia/N. East/Egypt
Seals	Crete, Mainland	N. East/Mesopot./Egypt
Aegean influences abroad		
Fortifications	Iberia/S. France/Sicily	Cyclades/Mainland
Herringbone	Iberia/S. France/Sicily	Cyclades/Mainland
Pottery	Italy/Sardinia	Crete/Cyclades
Pottery	Lipari/Sicily	Mainland/East Aegean
Sculpture	Malta	Cyclades
Flint daggers (?)	Italy	Crete
Bone pins and tubes	Iberia	Cyclades

Table 2

2.2. Magnitude

The magnitude of the interactions is defined in terms of the number of imported objects and imitated types. However, there is very little statistical information and, as a result, there can be no safe conclusions about the magnitude of the network. On the basis of the available evidence (table 1 and 2), it seems that the network of information exchange was much more intense; especially in metallurgy and seal engraving, the range of influences received by the Aegean is quite wide. On the other hand, the network of good exchange was not as intense and specialized primarily in ivory and secondarily in prestige gifts (seals, amulets, stone vases). The magnitude of the two networks with their components is schematically presented in Pl. XLV, b.

2.3. Spatial distribution

The two exchange networks seem to have concentrated on Crete and the East Aegean (Pl. XLV, a). Good exchange is extensively attested only on Crete, where we have the majority of the ivory finds and the stone vases; in the Cyclades, the Mainland, and the East Aegean the imported finds are few and isolated. The information exchange network shows, on the other hand, a much wider distribution: metallurgical influences are found in Crete and the East

Aegean, while artistic elements in pottery and seal engraving reach the Cyclades and the Mainland. Outside the Aegean, the Near East seems to have been the major source of both goods and information: Syrian, Palestinian, and Canaanite influences, although sporadic, can be discerned in practically all categories of exchange items. Anatolia seems to have been in direct contact with the Aegean, as indicated by metallurgical and sculptural influences; Egypt could have been the source of the few stone vases and some ivory finds.

In the West, the Cyclades seem to have indirectly transmitted information to Iberia, Malta, Sardinia, and Corsica, while the possible ceramic affinities between Crete and Italy suggest some sort of sporadic contact.

2.4. Chronological distribution

The earliest stratified evidence comes from Crete: a large number of ivory finds comes from EM IIa contexts [81]. The duration of the contacts seems to have spanned the entire third millennium and they seem to have become more intense after the middle of the millennium: the Egyptian stone vases found on Crete can be dated to Dynasties IV to VI, between ca. 2600 and 2200 B.C. and other correlations among the Aegean, Anatolia, the Near East, and Mesopotamia [82] can be generally dated to the second part of the millennium.

2.5. Directionality

The directionality of exchanges is defined in terms of the presence or absence of objects from one area to the other [83]. Although the flow of goods can be demonstrated to be towards one or the other direction, it is still uncertain whether the objects were directly or indirectly received from their place of origin and we always need to view the overall picture by distinguishing among areas with different distributions of imported objects [84]. The distribution of imported objects and influences in the Aegean and the absence of Aegean exports and influences in the Near East and Egypt suggests that both networks were unidirectional and directed towards the Aegean (the only exception may have been trade of perishable goods). The distribution of common Aegean/Near Eastern types in Anatolia and Cyprus would suggest that there were two main routes of contacts (Pl. XLV, a): a sea route, along the south coast of Anatolia and Cyprus to the Syro-Palestinian ports and a land route, from the northeast Aegean through inland Anatolia to north Syria and Mesopotamia [85]. The central role of the Syro-Palestinian ports has been emphasized by the archives at Ebla, which describe how the city coordinated the flow of goods among Egypt, Cyprus, and Mesopotamia; the fact that Early Minoan daggers have been found on Cyprus indicates that the Minoans could have used the

81 SAKELLARAKIS, *op. cit.*

82 See above, notes 31-32. There are also some helpful connections between Anatolia and the Near East: pottery from Amuq H has been found in EBA 1 and 2 levels at Tarsos: M. MELLINK, *AJA* 69 (1965), p. 110; flasks from EBA 2 Tarsos have been found in Early Dynastic Ur: RENFREW, *op. cit.*, p. 216; an EBA II jug was found at a Dynasty IV stratum at Giza. Cf. also the metallurgical (Alaca Hüyük) and architectural (Alisar Hüyük) interactions. There are also connections between Troy II/III and the Akkadian/Post-Akkadian periods: a *depas* from Kültepe 12 is paralleled to another one from the akkadian Dynasty (P.Z. SPANOS, in *Transactions of the IV International Colloquium on Aegean Prehistory, Sheffield* [1977]) and Postakkadian pottery was found at Troy III (MELLINK, *op. cit.*, p. 116; J. JAKAR, *AnatSt* 29 [1979], p. 55).

83 PLOG, *loc. cit.*

84 C. IRWIN-WILLIAMS, "A Network Model for the Analysis of Prehistoric Trade", in EARLE and ERICSON, *op. cit.*, p. 143.

85 M. COSMOPOULOS, "Die Ägäis und der Orient in der Frühbronzezeit II", in *XIe Congrès de l'Union Internationale des Sciences Préhistoriques et Protohistoriques*, Mainz (1987).

island as an intermediary station and the Minoan and Cycladic similarities with Ugarit and Byblos would indicate that the Aegean ships docked there. On the other hand, testimonial sources (the *Lamentations of Ipu Wer; Annals of Snefru*) indicate that the Egyptians also sailed to Byblos and, presumably, Ugarit. As there is no indication of *direct* contact between the Aegean and Egypt [86], it is possible that the only contacts took place in the Syro-Palestinian ports.

To the West contacts seem to have been unidirectional: from the Aegean to Italy, Sicily, Corsica, Sardinia, and Iberia. Very little evidence exists for movements towards the Aegean.

2.6. Facilities

What were the physical means through which contacts were made possible ? Land transportation was probably conducted by carriages, perhaps pulled by asses and horses [87]. Sea transportation was greatly facilitated by a variety of crafts, ranging from simple dugouts to longboats and sailing ships [88], which would make sailing to the Near East possible.

2.7. Organization

By whom were the exchanges of the EBA Aegean organized ? The fact that most of the imported objects were considered personal belongings of certain wealthy or distinguished individuals (see section 2.1) may suggest that it was those people who organized the trade. The seals found with imported objects reinforce this possibility, as they may have served as prestige symbols [89]. The limited indications for trade (ivory and probably perishable goods) and the lack of any evidence about "instutionalized transactions of commodities and services channeled from an area of high supply to one of high demand" [90] would confirm Renfrew's suggestion that the type of trade conducted was *freelance* based on reciprocity. Exchange of information with the West could have been the result of casual interaction; with the East, it may have been carried on through trade activities.

3. Conclusion

It is proposed here that exchange in the EBA Aegean relied on two networks. The largest network was that of *exchange of knowledge and information*, which was the result of indirect or direct but random exchange: to the West it was conducted through the slow and gradual

86 The study of the wind patterns suggests that direct voyage from Crete to Egypt was possible because of the southward winds but the opposite would be very difficult: R.W. HUTCHINSON, *Prehistoric Crete* (1962), p. 95. Cf. C. LAMBROU-PHILLIPSON, this volume. The number of Egyptian finds and influences is not enough to prove that Cretan traders reached Egypt or the opposite.

87 Faunal remains of *equines* have been found in Early Helladic levels on the Mainland at Lerna (N.-G. GEJVALL, *Lerna, a pre-classical site of Argolid* I *The Fauna* [1969], p. 56) and Voidokilia (Prof. G.S. Korres, personal communication).

88 V. McGEEHAN LIRITZIS, *IJNA* 17.3 (1988), p. 255. The completion of the excavation and the publication of the underwater site at Dokos is eagerly awaited: if it turns out to be a shipwreck, it will give us valuable information about Early Helladic seafaring. Cf. the contributions by VICHOS, PAPATHANASSOPOULOS, and TSOUCHLOS in the present volume.

89 C. RENFREW, "Trade as action at a Distance: Questions of Integration and Communication", in SABLOFF and LAMBERG-KARLOVSKY, *op. cit.*, p. 52.

90 C.C. LAMBERG-KARLOVSKY, "Third Millennium Exchange and Production", in SABLOFF and KARLOVSKY, *op. cit.*, p. 345.

"culture creep" process [91] or "stimulus diffusion" [92]; from the East it was brought through commercial transactions and was responsible for new technical and artistic knowledge acquired by the Aegeans. The other network consisted of *exchange of material goods* with the East and those exchanges relied either on freelance trade of ivory and, presumably, perishable goods, or random exchange of prestige gifts.

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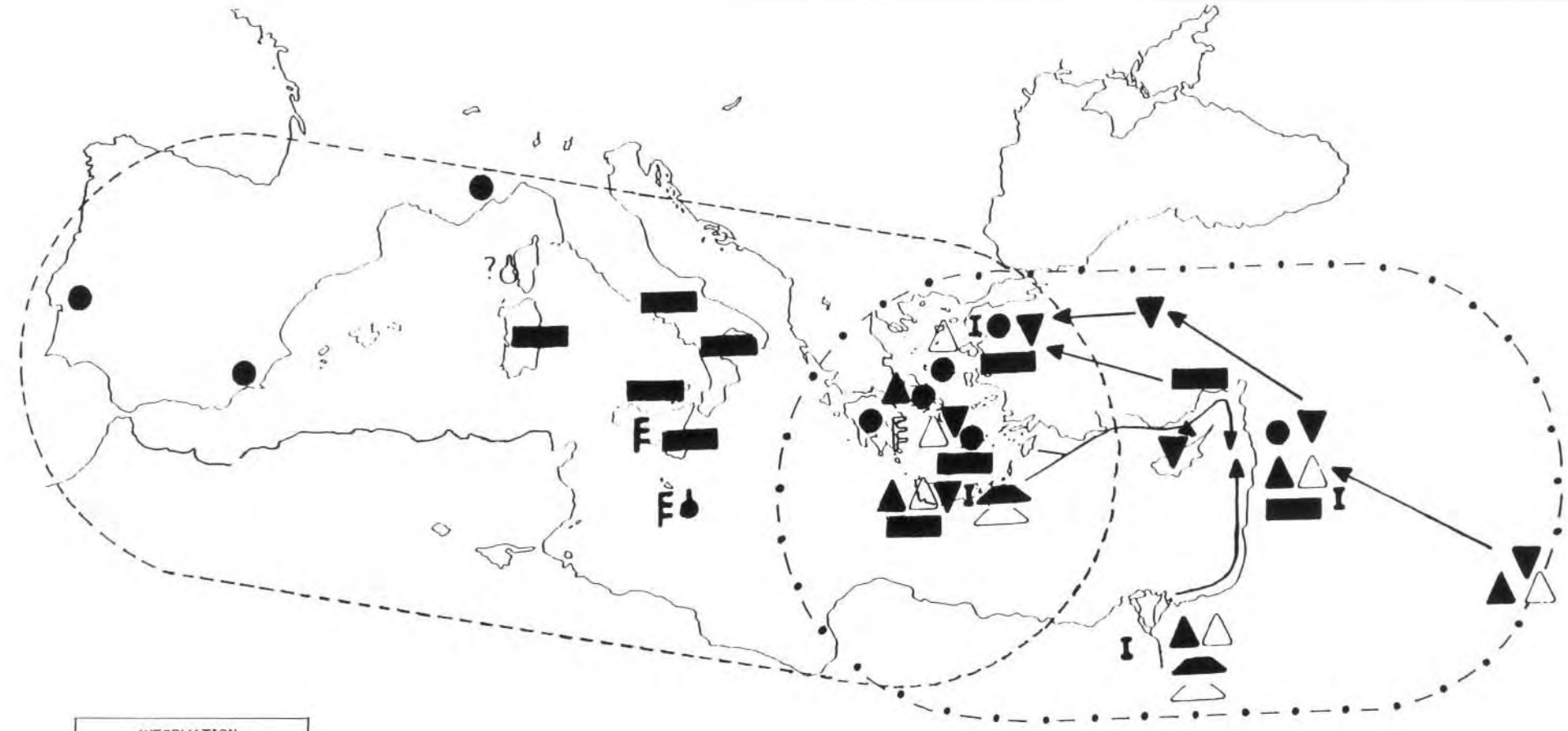
91 J.D. EVANS, *Institute of Archaeology Annual Report* 13 (1956), p. 67.
92 C. RENFREW, *Antiquity* 41 (1967), p. 280.

LIST OF ILLUSTRATIONS

Pl. XLV, a : Exchanges in the Third Millennium Mediterranean.
Pl. XLV, b : Exchange networks.



b Exchange networks

A : Architecture
B : Bone artifacts
I : Ivory
M : Metallurgy
P : Pottery
S : Sculpture
SEA : Seals
STV : Stone Vases

a Exchanges in the Third Millennium Mediterranean

----- Information Exchange

Seals
Metal
Stone Vases
Sculpture
Architecture
Pottery
Bone artifacts

— • — • Good Exchange

Seals
Stone Vases
Sculpture
Ivory
Bone artifacts