Analysis and Provenience of Minoan and Mycenaean Amber, V. Pylos and Messenia

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SOON AFTER it was found that infrared spectroscopy offered a means of distinguishing the so-called Baltic amber of northern Europe from the many similar fossil resins found in virtually every European country,[1] the method was applied to the archaeological amber finds of Bronze Age Greece. The results were published in a series of four papers in this journal. The first of these[2] reviewed earlier attempts to determine the provenience of Mycanaean amber finds by Helm and Jonas[3] and the reasons why these were methodologically inadequate. It then described the spectroscopic method of analysis, which has the advantage of requiring only a minute sample of no more than two milligrams, and the spectral features that allow the unambiguous recognition of the Baltic amber or succinite of northern Europe, *i.e.*, a single absorption near 8.7 microns (1150 cm^{-1}) preceded by a broad 'shoulder' that is perfectly flat in well-preserved specimens but assumes an increasingly negative slope as weathering progresses. The introductory paper concluded with the infrared analysis of five amber finds obtained from the late Professor Blegen during a visit to the Palace of Nestor in 1965. One of these (Chora Museum Inv. No. 2335)

[1] C. W. Beck, E. Wilbur, and S. Meret, "Infrared Spectra and the Origin of Amber," *Nature* 201 (1964) 256f.

[2] C. W. Beck, "Analysis and Provenience of Minoan and Mycenaean Amber, I," *GRBS* 7 (1966) 191–211.

[3] O. Helm, "Über die Herkunft des in den alten Königs-Gräbern von Mykenae gefundenen Bernsteins und über den Bernsteinsäuregehalt verschiedener fossiler Harze," *Schriften der naturforschenden Gesellschaft in Danzig.* N.F. 6.2 (1885) 234–39, and in H. Schliemann, *Tiryns* (New York 1885) 369–72; R. Jonas, "Bersteinperlen aus einem mykenischen Kuppelgrabe und die Identifizierung ihrer Substanz mit Succinit," *Schriften der physikalische-ökonomischen Gesellschaft zu Königsberg* 49 (1908) 351–68.

comes from the shaft grave under Room 97 of the northeastern building[4] and is clearly of Baltic succinite. The other four are from the Vayenas tholos (=tholos V), excavated by Lord William Taylour in 1957. Two of these (Chora Museum Inv. Nos. 2022α, 2046β) are not listed in the final report;[5] both are of Baltic succinite. The other two (Chora Museum Inv. Nos. 2043β, 2055α)[6] yielded infrared spectra that are just as certainly not those of Baltic succinite, but could not be correlated with any other European fossil resin at the time. We have since shown that these two spectra match those of Sicilian amber or simetite.[7] Subsequent reports have dealt with the amber finds from Tiryns, Kakovatos, and Mycenae.[8] We now complete the series with a report on the spectroscopic provenience analysis of amber finds from Pylos and related sites in western Messenia.

Typology

The most rational and comprehensive typology of bead shapes remains that of Horace Beck published 68 years ago.[9] Unfortunately, archaeologists have not widely adopted it, perhaps because, like any truly comprehensive typology, it is necessarily quite elaborate. It does, however, have the inestimable virtue of basing its descriptive terms on the unam-

[4] C. W. Blegen and M. Rawson, *The Palace of Nestor at Pylos in Western Messenia* I (Princeton 1966) 24, 312ff.

[5] C. W. Blegen, M. Rawson, W. Taylour, and W. P. Donovan, *The Palace of Nestor at Pylos in Western Messenia* III (Princeton 1973).

[6] Blegen *et al.* (*supra* n.5) 162. Note that on this page three different amber finds are listed with the same Inv. No. 2040 and three others are listed with the same Inv. No. 2043β, showing that a Chora Museum inventory number does not uniquely identify an individual object.

[7] C. W. Beck and H. Hartnett, "Sicilian Amber," in C. W. Beck and J. Bouzek, edd., *Amber in Archaeology* (=*Proceedings of the Second International Conference on Amber in Archaeology, Liblice, 1990* [Prague 1993]) 36–47.

[8] C. W. Beck, G. C. Southard, and A. B. Adams, "Analysis and Provenience of Minoan and Mycenaean Amber, II. Tiryns," GRBS 9 (1968) 5–19; C. W. Beck, C. A. Fellows, and A. B. Adams, "Analysis and Provenience of Minoan and Mycenaean Amber, III. Kokovatos," *GRBS* 11 (1970) 5–22; C. W. Beck, G. C. Southard, and A. B. Adams, "Analysis and Provenience of Minoan and Mycenaean Amber, IV. Mycenae," *GRBS* 13 (1972) 359–85.

[9] H. C. Beck, "Classification and Nomenclature of Beads and Pendants," *Archaeologia* 77 (1927) 1–74.

biguous language of solid geometry. Thus a perforated sphere with a shortened axis, sometimes described as a flattened sphere, is properly and concisely called oblate, while a lengthening of the axis produces a prolate, sometimes described as an elongated sphere or an olive. The system has been usefully adapted to classify the Bronze Age amber beads of Hungary[10] and extended to classify the prehistoric amber beads of Britain from the Mesolithic to the Iron Age.[11] Two other published classifications of amber beads are of limited value because of their narrow scope. Tempelmann-Maczynska[12] deals only with the first five centuries of the present era. She distinguishes handmade from lathe-turned beads and lists 89 types in 26 groups, with a good deal of overlap. Her descriptive terms are allusive rather than geometric, *e.g.*, "heart-shaped," "drum-shaped," "bucket- shaped," *etc.* An attempt to correlate the shapes of the Messenian amber beads with the typology of Xenaki-Sakellariou[13] had to be abandoned on a number of grounds. The Greek author deals with a very limited group of objects, namely those found in the 103 chamber tombs at Myceane excavated by Tsountas in 1887–89, including a few amber beads, all of the same shape.[14] Thus her types do not include many common shapes of amber beads, such as plane-convex or any type with rounded or beveled edges. Moreover, amber beads differ from those of most other materials in that they are often highly unsymmetric and irregular to take maximum advantage of the raw material from which they were carved, and in that originally angular shapes may become rounded by wear and weathering of the soft and reactive fossil resin.[15]

Xenaki-Sakellariou shows only a single view of prolate and oblate beads and describes the latter (her Type 53) "ellipsoid, biconvex" (ἐλλειψοειδής, ἀμφίκυρτος) and the former (her Type 2) simply "round" (στρογγυλός)—terms that are too vague to convey useful information. The lengthy description of her

[10] E. Sprincz and C. W. Beck, "Classification of the Amber Beads of the Hungarian Bronze Age," *JFA* 8 (1981) 469–85.

[11] C. W. Beck and S. Shennan, *Amber in Prehistoric Britain* (Oxford 1991).

[12] M. Tempelmann-Maczynska, *Die Perlen der römischen Kaiserzeit und der frühen Phase der Völkerwanderungszeit im mitteleuropäischen Barbaricum* (Mainz 1985).

[13] A. Ξενακη-Σακελλαριου, Οι Θαλαμωτοι Ταφοι των Μυκηνων (Paris 1985).

[14] Beck, Southard, and Adams (1972: *supra* n.8) 374ff.

[15] Beck, Fellows, Adams (*supra* n.8) 7.

Type 17—"circular, biconvex; perforation vertical to the center; the perimeter angular until [it becomes] convex" (κυκλικός, ἀμφίκυρτος· τρῆμα κατακόρυφο στό κέντρο· ἡ περιφέρεια εἶναι γωνιώδης ἕως κυρτή)—is succinctly conveyed by Blegen (*supra* n.5: 129, Fig. 195:22) in a single word: "carinated."

In order to include some description of the finds in the limited space of TABLE 1 (pages 127–30 *infra*), we have therefore resorted to a compromise between information content and brevity, using the same terms as in the previous papers in this series.

Samples from Messenia

The present report will complete the account of Mycenaean amber with finds collected in the Greek National Museum from the Pylos region. TABLE 1 gives brief descriptions and dimensions of each object and correlates their Inventory Numbers with the ARL Sample Numbers and the spectrum Numbers, which lead to the partial infrared spectra from 1100–1350 cm^{-1} shown in *Figures* 1–5.

Two samples were sent for analysis by the late Professor Spyridon Marinatos in 1967 from his current excavation. They did not yet have inventory numbers and were identified only as "Pylos/Peristeria, Grave 1" and "Pylos/Peristeria, Grave 2." Duplicate infrared spectra (Nos. 1554–57) show that both are of Baltic amber (succinite). A third sample supplied by Marinatos later in the same year was identified only as "Pylos/Peristeria." It yielded infrared spectra Nos. 1603–04, both of which are those of Baltic amber (succinite).

All other samples in this account were collected either from mounted exhibits in the Mycenaean Room or from boxes in the storerooms of the National Archaeological Museum in Athens (NMA) in 1966. They were checked against the newly reorganized exhibits and against the inventory card file in 1995.

Now, as then, a string of 48 graduated amber beads and nine large single beads are mounted on a board (now in Case 8) with Inv. No. 8356. In 1966 their origin was given as Pylos/Routsi; the current label uses the isotopic name Pylos/Myrsinochori. The strung beads range in size from a diameter of 19 mm and a thickness of 9 mm for the smallest bead on the upper left (Bead 1), to a diameter of 52.5 mm and a thickness of 18 mm for the largest center bead (Bead 24), and back down to a diameter of 18

mm and a thickness of 6.5 mm on the upper right (Bead 48). Some of the beads are sharply truncated bicones, others more rounded and nearly biconvex. Samples were taken from 15 of the beads for analysis, the choice falling randomly on beads with previous damage. This avoids alteration of any of the original surfaces and also offers less heavily weathered samples. The infrared spectra, Nos. 1578–92, show that all sampled beads are of Baltic succinite with the exception of Bead 9 (spectrum No. 1581), which gave a spectrum too indistinct for evaluation.

The shapes and dimensions of the large single beads are given in TABLE 1. Bead H was thickly coated with a waxy conservation material; a separate sample of this was taken. The spectra of these beads, Nos. 1593–1601, are all of Baltic succinite with the exception of bead B, which yielded an unclassifiable spectrum (No. 1594). The conservation material is identified by its infrared spectrum (No. 1602) as paraffin wax, a mixture of hydrocarbons, which, although it does introduce extraneous absorption bands into the amber spectrum, contains no carbon-oxygen bonds and therefore does not interfere in the diagnostic region.

The NMA file card for Inv. No. 8356 lists "about 66 beads of various sizes and shapes, circular, biconvex, biconical, flattened, round (στρογγυλός) ... Excavation 1956 ... Marinatos ... Grave 2" and notes that fifty-seven are on exhibit and nine are in storage. The latter were transferred to the Museum of Kalamoatos in 1966 in an effort to make the national heritage more widely accessible by distributing some of the holdings of the National Museum to provincial museums.

In 1966 we had found these additional beads, most of them broken, loose in a box in the storerooms of the National Museum in Athens with the label "Pylos-Routsi, Grave 2, Skeleton 1, 15/10/56" and the Inv. No. 8356. It seems therefore reasonable to infer that all the finds with this Inventory Number share the same location and excavation date. Eight fragments were sampled and analyzed, as shown in TABLE 1. Seven give the spectra (Nos. 1616–22) that are clearly of Baltic succinite. The spectrum (No. 1623) of Fragment L has an intense extraneous absorption of 1220 cm^{-1}, which appears to be due to conservation material; if this is subtracted, the remaining spectrum is that of Baltic amber.

In 1966 another box in the storeroom with nine beads and many fragments was labeled only "Pylos/Routsi" but without Inventory Number. They are still without Inventory Number and cannot be precisely located within the site. Two beads and

seven fragments were analyzed and gave spectra Nos. 1624–32. Six of the spectra are those of Baltic succinite. Fragments E^1 and F^1, however, both much darker in color and distinctly harder than the other fragments in this assembly, yielded spectra (Nos. 1628–29) that are decidedly not those of Baltic amber but identical with the spectra of authentic Sicilian amber (simetite)[16] and of the two amber fragments from the Vayenas tholos mentioned earlier.[17] Lastly, an unbroken, roughly biconvex bead I^1 is also not of Baltic succinite; but though compatible with the spectra of simetite, it is too poorly resolved to make that assignment more than probable.

Another box found in 1966 in the National Museum was labeled "Routsi, Tomb 2, Skeleton 1, 9/10/56," showing that they were found by Marinatos at the same location as those listed under Inv. No. 8356, but six days earlier. They did not have inventory numbers then; nor do they now. This assembly comprises eleven amber beads and numerous fragments. Two beads and eleven fragments were sampled and analyzed, as shown in TABLE 1, which also lists several beads and fragments that were not sampled. In addition, a random sampling of small, loose fragments in this box were used to prepare spectra Nos. 1683–85. All 16 infrared spectra of the beads and fragments are those of Baltic succinite.

Five large amber beads in a box (in 1966) also marked "Routsi, Tomb 2, Skeleton 1, 9/10/56" and also without Inventory Numbers are designated with primed letters A^1 to E^1 in TABLE 1. Four were analyzed and their spectra (Nos. 1587–90) are those of Baltic succinite.

Problems

There was (in 1966) in the Greek National Museum another mounted exhibit, labeled "Blegen-Pylos-Tholos D," of three strung necklaces, one of 14 beads (Inv. No. 7937) and two with 19 and 64 beads respectively, with the common Inv. No. 7936, as well as three large oblate beads with individual Inv. Nos. 7939–41. In 1995 this exhibit had been reduced to the string of 14 beads (Inv. No. 7937), the string of 19 beads (Inv. No. 7936), and only two of the large beads (Inv. Nos. 7939 and 7941). It is

[16] Beck and Hartnett (*supra* n.7).

[17] Beck (*supra* n.2) 208.

impossible to correlate all the beads of either the old or the new exhibit unequivocally with the descriptions, Inventory Numbers, and illustrations by Blegen:[18] there Inv. Nos. 7936–38 and 7941 are described summarily as "flattened spherical beads, 355 ... in various states of preservation: 267 measurable, many only partly preserved"; Inv. No. 7940 is assigned to a trapezoidal spacer bead (Fig. 194:46, 195:18) instead of to the oblate so numbered in 1966; Inv. No. 7939 refers both to a fragmentary spacer bead and to six irregular lumps of amber; and Inv. No. 7937 is assigned to three "carinated beads," a "lozenge bead?," and two different "cylindrical beads," none of which are illustrated. From our drawings in 1966 and 1995, however, we can make the following certain identifications. The string of 14 beads, our "necklace A" (Inv. No. 7937), is that shown by Blegen as Fig. 194:49. Eight beads were analyzed; of their spectra (Nos. 1636–44), seven are certainly and one is probably Baltic amber. The string of 19 beads, our "necklace E" (Inv. No. 7936), is that shown by Blegen as Fig. 194:48. Eight beads were analyzed; of their spectra (Nos. 1645, 1652–58), six are certainly those of Baltic amber, one is probably so, and one is unidentifiable, as is the spectrum (No. 1659) of a collective sample of loose crumbs. The string of 64 beads, which we designated "necklace F" in 1966 and which is no longer in the exhibition, must have been a portion of Blegen's "355 flattened spherical beads" and shares Inv. No. 7936. Seven beads were analyzed; of their spectra (Nos. 1660–66), six are certainly and one is probably Baltic amber. The large, damaged bead we designate as "bead B" is certainly Inv. No. 7941 and probably Blegen's Fig. 194:45. Our "bead C" had Inv. No. 7939 in 1966, but as mentioned above, Blegen lists a fragmentary spacer under that Inventory Number and does not illustrate it. Finally, our "bead D," which had Inv. No. 7940 in 1966 and is no longer in the exhibit, cannot be Blegen's spacer with that Inventory Number. The spectra (Nos. 1633–35) of samples taken from these three beads in 1966 show that all of them are of Baltic amber.

A box found in the storerooms in 1966 and marked "P.T.2 Chora" contained a large crescent-shaped amber object with a curved perforation in the direction of its long axis. The Inv. No. 9094 was written on the piece, which had a thick coating of conservation material. Accordingly, the spectrum No. 1686, which is not that of Baltic amber, may be the result of this treat-

[18] Blegen (*supra* n.5) 128f.

ment rather than of a non-Baltic origin. No identification is possible.

Summary

The infrared spectra of the amber finds of the Pylos region are listed in order of their spectrum numbers in TABLE 1. The spectra themselves are illustrated, over the principal diagnostic region of 1110–1350 cm^{-1}, in *Figures* 1–5, also in order of the spectrum numbers. *Figure* 5 also shows the corresponding region of a spectrum of authentic Baltic amber and the wave-number scale of the partial spectra.

One of the 102 spectra is of the conservation material applied to bead H (Inv. No. 8356) and identified as paraffin wax (Spectrum No. 1602). Of the remaining 101 spectra, 89 are certainly and three are probably of Baltic amber. Six spectra are unidentifiable, in two cases because of probable contamination with conservation materials and in four because of the advanced stage of oxidative degradation (weathering). Only three finds were clearly fashioned from a non-Baltic fossil resin; two of their spectra agree closely, the third reasonably well, with those of Sicilian amber or simetite. The same had earlier been observed in two finds from the Vayenas tholos,[19] and confirms that other ambers were occasionally substituted for the doubtlessly precious imported amber from the north of Europe.[20]

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November, 1995

[19] Beck (*supra* n.2); Beck and Hartnett (*supra* n.7).

[20] We are indebted to the late Professors Carl Blegen and Syridon Marinatos for initiating our study of Mycenaean amber finds, to the Director of the Greek National Museum in 1966, Professor Kallipolitis, for granting permission to sample the finds, and to the present Director, Dr Demakopoulou, for her help in verifying the records in 1995. Thanks are due to former Vassar students Dr Constance A. Fellows for running the infrared spectra and Ms Jean Pietraszek for the computer graphics. This work has been supported by United States National Science Foundation Grants GS 2067, BNS 88-02407, and DBS 92-13800 (Anthropology) and by Vassar College. This report is Contribution No. 83 from the Amber Research Laboratory.

Table 1. Summary of amber finds analyzed

Spectrum	Identification	InvNumber	Description and Dimensions	ARL Nr	Provenience
1554	Pylos/Peristeria Grave 1	-	small fragments sent by S. Marinatos	[GR] 24A	Baltic amber
1555	Pylos/Peristeria Grave 1	-	small fragments sent by S. Marinatos	[GR] 24B	Baltic amber
1556	Pylos/Peristeria Grave 2	-	small fragments sent by S. Marinatos	[GR] 25A	Baltic amber
1557	Pylos/Peristeria Grave 2	-	small fragments sent by S. Marinatos	[GR] 25B	Baltic amber
1578	Pylos/Routsi necklace Bead 1	NMA 8356	biconvex d. 19 th. 9	[GR] 26A	Baltic amber
1579	Pylos/Routsi necklace Bead 4	NMA 8356		[GR] 26B	Baltic amber
1580	Pylos/Routsi necklace Bead 6	NMA 8356		[GR] 26C	Baltic amber
1581	Pylos/Routsi necklace Bead 9	NMA 8356		[GR] 26D	unidentifiable
1582	Pylos/Routsi necklace Bead 14	NMA 8356		[GR] 26E	Baltic amber
1583	Pylos/Routsi necklace Bead 20	NMA 8356		[GR] 26F	Baltic amber
1584	Pylos/Routsi necklace Bead 21	NMA 8356		[GR] 26G	Baltic amber
1585	Pylos/Routsi necklace Bead 24	NMA 8356	truncated bicone d. 52.5 th. 18	[GR] 26H	Baltic amber
1586	Pylos/Routsi necklace Bead 25	NMA 8356		[GR] 26I	Baltic amber
1587	Pylos/Routsi necklace Bead 30	NMA 8356		[GR] 26J	Baltic amber
1588	Pylos/Routsi necklace Bead 33	NMA 8356		[GR] 26K	Baltic amber
1589	Pylos/Routsi necklace Bead 36	NMA 8356		[GR] 26L	Baltic amber
1590	Pylos/Routsi necklace Bead 41	NMA 8356		[GR] 26M	Baltic amber
1591	Pylos/Routsi necklace Bead 44	NMA 8356		[GR] 26N	Baltic amber
1592	Pylos/Routsi necklace Bead 48	NMA 8356	biconvex d. 18 th. 6.5	[GR] 26O	Baltic amber
1593	Pylos/Routsi single bead A	NMA 8356	irreg. truncated bicone d. 30 th. 18	[GR] 26P	Baltic amber
1594	Pylos/Routsi single bead B	NMA 8356	leaf-shaped l. 40 w. 35	[GR] 26Q	unidentifiable
1595	Pylos/Routsi single bead C	NMA 8356	biconvex d. 33.5 th. 10.5	[GR] 26R	Baltic amber
1596	Pylos/Routsi single bead D	NMA 8356	oblate d. 35.5 th. 22,5	[GR] 26S	Baltic amber
1597	Pylos/Routsi single bead E	NMA 8356	biconical d. 39 th. 21	[GR] 26T	Baltic amber
1598	Pylos/Routsi single bead F	NMA 8356	biconical/biconvex d. 41 th. 20.5	[GR] 26U	Baltic amber
1599	Pylos/Routsi single bead G	NMA 8356	biconical/biconvex d. 47 th. 22	[GR] 26V	Baltic amber
1600	Pylos/Routsi single bead H	NMA 8356	oblate d. 41 th. 28	[GR] 26W	Baltic amber
1601	Pylos/Routsi single bead I	NMA 8356	prolate d. 37 l. 41	[GR] 26X	Baltic amber
1602	Pylos/Routsi wax from single bead H	-	conservation material	[GR] 26Y	paraffin
1603	Pylos/Peristeria context not specified	-	small fragments sent by S. Marinatos	[GR] 27A	Baltic amber
1604	Pylos/Peristeria context not specified	-	small fragments sent by S. Marinatos	[GR] 27B	Baltic amber

Table 1. Summary of amber finds analyzed (continued)

Spectrum	Identification	InvNumber	Description and Dimensions	ARL Nr	Provenience
1616	Pylos/Routsi Grave 2, Skeleton 1, fragment A	NMA 8356	lentoid d. 34 th. 13	[GR] 26Z	Baltic amber
1617	Pylos/Routsi Grave 2, Skeleton 1, fragment B	NMA 8356	damaged lentoid rem. d. 46 th. 12	[GR] 16AA	Baltic amber
1618	Pylos/Routsi Grave 2, Skeleton 1, fragment C	NMA 8356	damaged lentoid rem. d. 38 th. 13.5	[GR] 26BB	Baltic amber
1619	Pylos/Routsi Grave 2, Skeleton 1, fragment D	NMA 8356	repaired lentoid d. 38 th. 17.5	[GR] 26CC	Baltic amber
1620	Pylos/Routsi Grave 2, Skeleton 1, fragment E	NMA 8356	damaged lentoid ? rem. d. 21 th. 8.5	[GR] 26DD	Baltic amber
1621	Pylos/Routsi Grave 2, Skeleton 1, fragment F	NMA 8356	damaged lentoid ? rem. d. 28 th. 15	[GR] 26EE	Baltic amber
-	Pylos/Routsi Grave 2, Skeleton 1, fragment G	NMA 8356	indeterminate fragment l. 32 w. 22	-	-
1622	Pylos/Routsi Grave 2, Skeleton 1, fragment H	NMA 8356	sector of a lentoid rad. 12 th. 12	[GR] 26FF	Baltic amber
-	Pylos/Routsi Grave 2, Skeleton 1, fragment I	NMA 8356	indeterminate fragment l. 12 w. 8	-	-
-	Pylos/Routsi Grave 2, Skeleton 1, fragment J	NMA 8356	indeterminate fragment l. 11 w. 8	-	-
-	Pylos/Routsi Grave 2, Skeleton 1, fragment K	NMA 8356	indeterminate fragment l. 19 w. 9	-	-
1623	Pylos/Routsi Grave 2, Skeleton 1, fragment L	NMA 8356	damaged bicone rem. d. 36 l. 17.5	[GR] 26GG	contam. Baltic
1624	Pylos/Routsi without context, fragment A'	NMA 8356 ?	fragment of bicone rem. d. 22 th. 10.5	[GR] 26HH	Baltic amber
1625	Pylos/Routsi without context, fragment B'	NMA 8356 ?	3/4 of bicone d. 20 th. 13	[GR] 26II	Baltic amber
1626	Pylos/Routsi without context, fragment C'	NMA 8356 ?	indeterminate fragment l. 24 w. 20 th. 9	[GR] 26JJ	Baltic amber
1627	Pylos/Routsi without context, fragment D'	NMA 8356 ?	indetermin. fragment l. 24.5 w. 15 th. 13	[GR] 26KK	Baltic amber
1628	Pylos/Routsi without context, fragment E'	NMA 8356 ?	indetermin. fragment l. 25 w. 10 th. 85	[GR] 26LL	Sicilian amber
1629	Pylos/Routsi without context, fragment F'	NMA 8356 ?	indetermin. fragment l. 15 w. 7.5 th. 5.5	[GR] 26MM	Sicilian amber
1630	Pylos/Routsi without context, fragment G'	NMA 8356 ?	1/2 biconvex rem. d. 21.5 l. 6	[GR] 26NN	Baltic amber
1631	Pylos/Routsi without context, bead H'	NMA 8356 ?	disc with rounded edges d. 13.5 l. 8	[GR] 26OO	Baltic amber
1632	Pylos/Routsi without context, bead I'	NMA 8356 ?	irreg. biconvex d. 13 l. 7	[GR] 26PP	Sicilian amber?
1633	Pylos Tholos D = IV bead B	NMA 7941	broken & repaired ? oblate d.30 th. 21.5	[GR] 28A	Baltic amber
1634	Pylos Tholos D = IV bead C	NMA 7939	repaired biconvex d. 34 th. 21.5	[GR] 28B	Baltic amber
1635	Pylos Tholos D = IV bead D	NMA 7940	lentoid, cut edge to center d. 31.5 d. 10	[GR] 28C	Baltic amber
1636	Pylos Tholos D = IV necklace A bead 3	NMA 7937	oblate d. 15 th. 9.5	[GR] 28D	Baltic amber?
1638	Pylos Tholos D = IV necklace A bead 5	NMA 7937	oblate d.17 th. 8	[GR] 28E	Baltic amber
1639	Pylos Tholos D = IV necklace A bead 8	NMA 7937	truncated bicone d. 23 th. 12	[GR] 28F	Baltic amber
1640	Pylos Tholos D = IV necklace A bead 9	NMA 7937	rounded plane-convex d. 25 th. 9	[GR] 28G	Baltic amber
1641	Pylos Tholos D = IV necklace A bead 10	NMA 7937	oblate d. 21 th. 7	[GR] 28H	Baltic amber
1642	Pylos Tholos D = IV necklace A bead 11	NMA 7937	rounded short cylinder d. 15.5 th. 10	[GR] 28I	Baltic amber
1643	Pylos Tholos D = IV necklace A bead 12	NMA 7937	oblate d. 15 th. 12	[GR] 28J	Baltic amber

Table 1. Summary of amber finds analyzed (continued)

Spectrum	Identification	InvNumber	Description and Dimensions	ARL Nr	Provenience
1644	Pylos Tholos D = IV necklace A bead 14	NMA 7937	oblate d. 17 th. 8.5	[GR] 28K	Baltic amber
1645	Pylos Tholos D = IV necklace E bead 4	NMA 7936	oblate d. 11 th. 6	[GR] 28L	Baltic amber
1652	Pylos Tholos D = IV necklace E bead 9(a)	NMA 7936	oblate d. 10 th. 6	[GR] 28M	Baltic amber
1653	Pylos Tholos D = IV necklace E bead 9(b)	NMA 7936	"	[GR] 28N	Baltic amber
1654	Pylos Tholos D = IV necklace E bead 10	NMA 7936	oblate d.14 th.7	[GR] 28O	unidentifiable
1655	Pylos Tholos D = IV necklace E bead 13	NMA 7936	oblate d.13 th. 8	[GR] 28P	Baltic amber
1656	Pylos Tholos D = IV necklace E bead 14	NMA 7936	oblate d.16 th. 6	[GR] 28Q	Baltic amber?
1657	Pylos Tholos D = IV necklace E bead 17	NMA 7936	oblate d.13 th. 7.5	[GR] 28R	Baltic amber
1658	Pylos Tholos D = IV necklace E bead 19	NMA 7936	oblate d. 14 th. 9.5	[GR] 28S	Baltic amber
1659	Pylos Tholos D = IV collective sample of E	NMA 7936	crumbs and dust from necklace E	[GR] 28T	unidentifiable
1660	Pylos Tholos D = IV necklace F bead 6	NMA 7936	oblate ?	[GR] 28U	Baltic amber
1661	Pylos Tholos D = IV necklace F bead 14	NMA 7936	oblate ?	[GR] 28V	Baltic amber?
1662	Pylos Tholos D = IV necklace F bead 28	NMA 7936	oblate ?	[GR] 28W	Baltic amber
1663	Pylos Tholos D = IV necklace F bead 37	NMA 7936	oblate ?	[GR] 28X	Baltic amber
1664	Pylos Tholos D = IV necklace F bead 46	NMA 7936	oblate ?	[GR] 28Y	Baltic amber
1665	Pylos Tholos D = IV necklace F bead 52	NMA 7936	oblate ? d. 12 th. 8	[GR] 28Z	Baltic amber
1666	Pylos Tholos D = IV necklace F bead 60	NMA 7936	oblate ?	[GR] 28AA	Baltic amber
1667	Pylos/Routsi Grave 2 Skeleton 1 bead A	NMA no Nr.	oblate, large perforation d. 16.5 th. 8.5	[GR] 29A	Baltic amber
1668	Pylos/Routsi Grave 2 Skeleton 1 bead B	NMA no Nr.	damaged flat lentoid d. 20 th. 6	[GR] 29B	Baltic amber
1669	Pylos/Routsi Grave 2 Skeleton 1 bead C	NMA no Nr.	truncated bicone d. 19 th. 10.5	[GR] 29C	Baltic amber
1670	Pylos/Routsi Grave 2 Skeleton 1 bead D	NMA no Nr.	flat lentoid d. 21 th. 8.5	[GR] 29D	Baltic amber
1674	Pylos/Routsi Grave 2 Skeleton 1 bead E	NMA no Nr.	damaged flat lentoid rem. d. 25.5 th. 8	[GR] 29E	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 bead F	NMA no Nr.	damaged flat lentoid rem. d. 14 th. 4.5	-	-
1675	Pylos/Routsi Grave 2 Skeleton 1 bead G	NMA no Nr.	lentoid d. 13.5 th. 5.5	[GR] 29G	Baltic amber
1676	Pylos/Routsi Grave 2 Skeleton 1 bead H	NMA no Nr.	truncated bicone d. 15 th. 7	[GR] 29H	Baltic amber
1677	Pylos/Routsi Grave 2 Skeleton 1 fragment I	NMA no Nr.	half of a bead d. 15 w. 9 th. 7	[GR] 29I	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 fragment J	NMA no Nr.	half of a bead d. 19 w. 11 th. 5	-	-
-	Pylos/Routsi Grave 2 Skeleton 1 fragment K	NMA no Nr.	irregular fragment l. 19 w. 10 th. 8	-	-
1678	Pylos/Routsi Grave 2 Skeleton 1 fragment L	NMA no Nr.	irregular fragment l. 11 w. 7 th. 5	[GR] 29L	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 fragment M	NMA no Nr.	irregular fragment l. 10 w. 8 th. 4	-	-
1679	Pylos/Routsi Grave 2 Skeleton 1 fragment N	NMA no Nr.	fragment of a bead d. 11 w. 7 th. 2.5	[GR] 29N	Baltic amber

Table 1. Summary of amber finds analyzed (concluded)

Spectrum	Identification	InvNumber	Description and Dimensions	ARL Nr	Provenience
-	Pylos/Routsi Grave 2 Skeleton 1 fragment O	NMA no Nr.	fragment of a bead d. 12 w. 7 th. 4	-	-
1680	Pylos/Routsi Grave 2 Skeleton 1 fragment P	NMA no Nr.	fragment of a bead d. 11 w. 6 th. 4	[GR] 29P	Baltic amber
1681	Pylos/Routsi Grave 2 Skeleton 1 fragment Q	NMA no Nr.	ring bead d. 10.5 th. 6	[GR] 29Q	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 fragment R	NMA no Nr.	ring bead d. 12.5 th. 6	-	-
1682	Pylos/Routsi Grave 2 Skeleton 1 fragment S	NMA no Nr.	flat lentoid d. 12 th. 4	[GR] 29S	Baltic amber
1683	Pylos/Routsi Grave 2 Skeleton 1 coll. sample	NMA no Nr.	crumbs from this assembly	[GR] 29X1	Baltic amber
1684	Pylos/Routsi Grave 2 Skeleton 1 coll. sample	NMA no Nr.	crumbs from this assembly	[GR] 29X2	Baltic amber
1685	Pylos/Routsi Grave 2 Skeleton 1 coll. sample	NMA no Nr.	crumbs from this assembly	[GR] 29X3	Baltic amber
1686	"P.T.2 Chora"	NMA 9094	peforated crescent l. 48 w. 34 th. 24	[GR] 30	contaminated
1687	Pylos/Routsi Grave 2 Skeleton 1 bead A'	NMA no Nr.	rounded flat disc d. 20 th. 9	[GR] 29A'	Baltic amber
1688	Pylos/Routsi Grave 2 Skeleton 1 bead B'	NMA no Nr.	unsymm. truncated bicone d. 26 th. 14	[GR] 29B'	Baltic amber
1689	Pylos/Routsi Grave 2 Skeleton 1 bead C'	NMA no Nr.	broken and repaired oblate d. 25 th. 13	[GR] 29C'	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 bead D'	NMA no Nr.	lentoid d. 37 th. 15	-	-
1690	Pylos/Routsi Grave 2 Skeleton 1 bead E'	NMA no Nr.	lentoid d. 32 th. 11	[GR] 29E'	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 bead A"	NMA no Nr.	ringbead d. 15 th. 9	-	-
1691	Pylos/Routsi Grave 2 Skeleton 1 bead B"	NMA no Nr.	flat lentoid d. 15 th. 5	[GR] 29B"	Baltic amber
1692	Pylos/Routsi Grave 2 Skeleton 1 bead C"(a)	NMA no Nr.	irregular truncated bicone d. 13 th. 8	[GR] 29C"1	Baltic amber
1693	Pylos/Routsi Grave 2 Skeleton 1 bead C"(b)	NMA no Nr.	"	[GR] 29C"2	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 bead D"	NMA no Nr.	irregular lentoid d. 12 th. 4	-	-
-	Pylos/Routsi Grave 2 Skeleton 1 bead E"	NMA no Nr.	lentoid d. 12 th. 5	-	-
1694	Pylos/Routsi Grave 2 Skeleton 1 bead F"	NMA no Nr.	lentoid d. 13 th. 5	[GR] 29F"	Baltic amber
1695	Pylos/Routsi Grave 2 Skeleton 1 bead G"	NMA no Nr.	broken lentoid d. 22 th. 8	[GR] 29G"	Baltic amber
1696	Pylos/Routsi Grave 2 Skeleton 1 bead H"	NMA no Nr.	lentoid d. 18 th. 7	[GR] 29H"	Baltic amber
-	Pylos/Routsi Grave 2 Skeleton 1 bead I"	NMA no Nr.	truncated bicone d. 17 th. 6	-	-
-	Pylos/Routsi Grave 2 Skeleton 1 bead J"	NMA no Nr.	broken lentoid d. 15 th. 6	-	-
-	Pylos/Routsi Grave 2 Skeleton 1 bead K"	NMA no Nr.	lentoid d. 15 th. 7	-	-

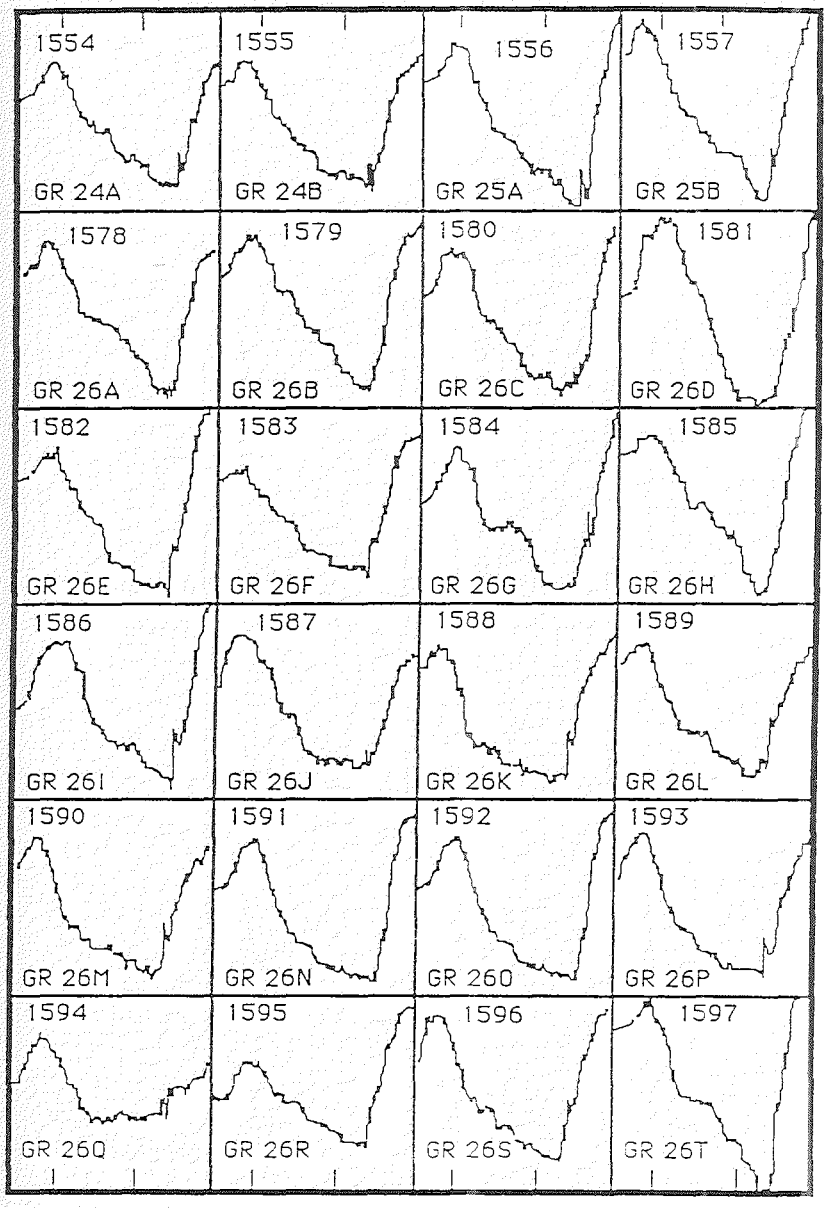

Figure 1. Infrared Spectra 1554–1597

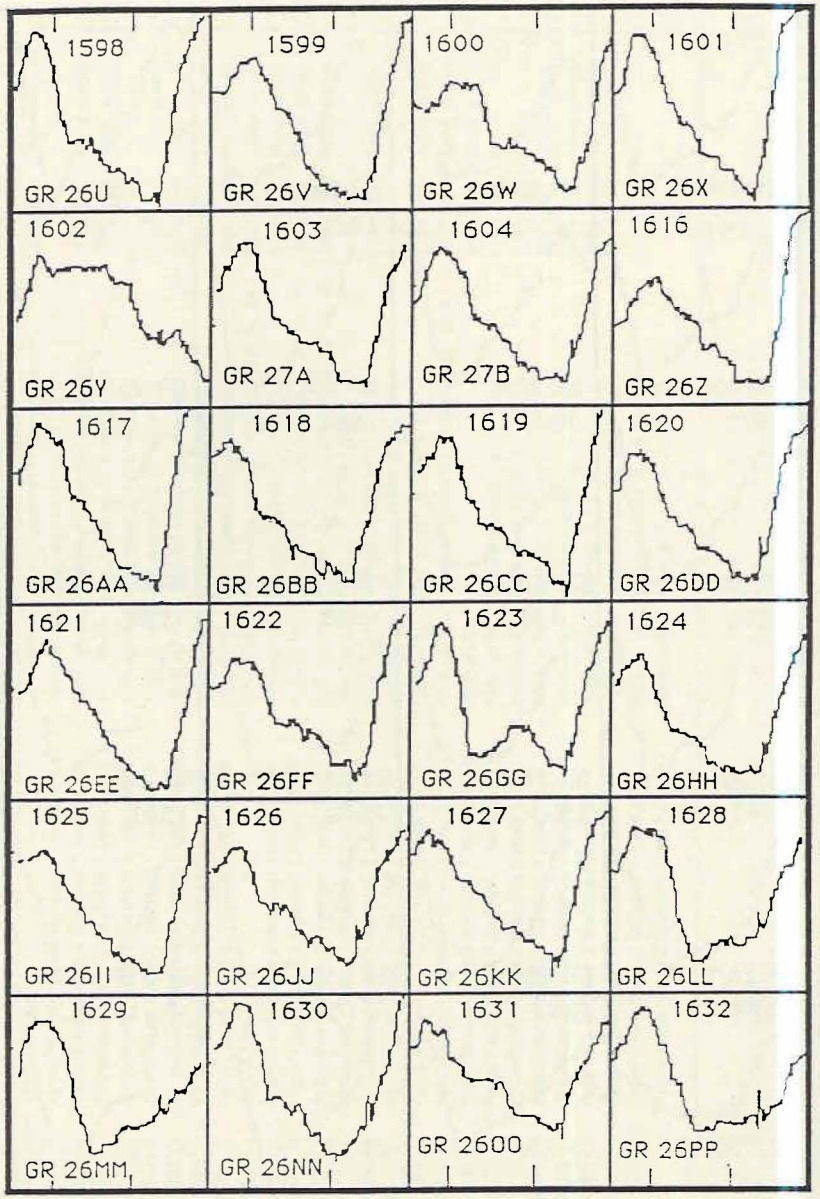

Figure 2. Infrared Spectra 1598–1632

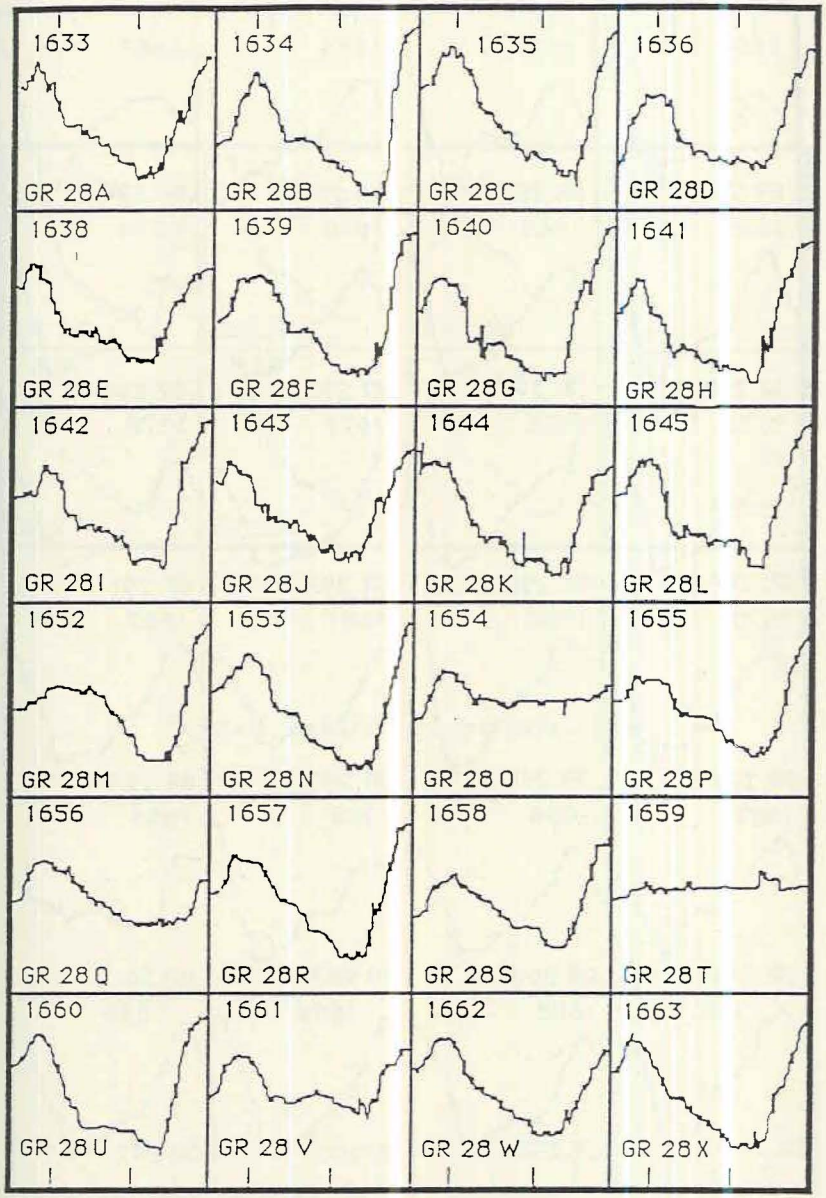

Figure 3. Infrared Spectra 1633–1663

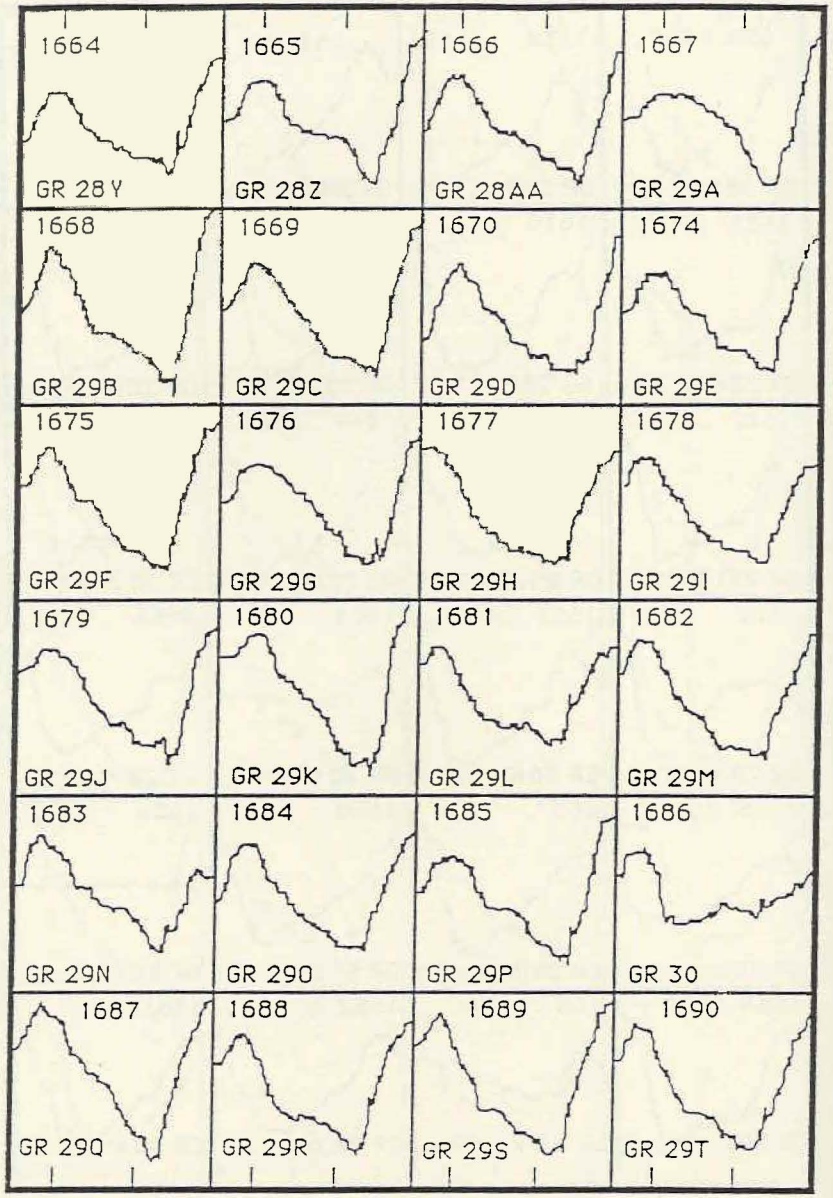

Figure 4. Infrared Spectra 1664–1690

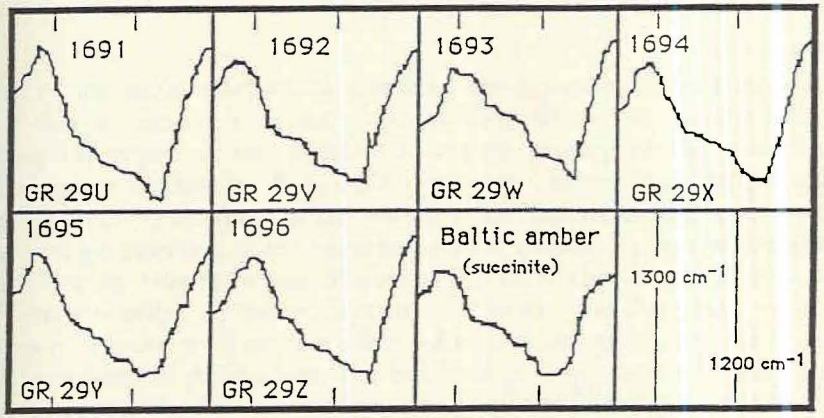

Figure 5. Infrared Spectra 1691–1696