VIII. NOTE ON INDIAN WOOD CARVING IN THE FORM OF A GRASSHOPPER FOUND IN LOVELOCK CAVE, NEVADA

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Abstract

A small, crude, wooden carving in the form of a grasshopper was recently found in Lovelock Cave, Nevada. The latter had served as a habitation site for Indians, but had already been abandoned by them in prehistoric times. It was of interest to establish whether the object found was of modern manufacture or whether it had been made by the ancient Indians. A brown substance resembling hardened glue was found in four cavities located on the back of the carving. The brown substance was subjected to infrared survey analysis to establish the nature of the material. By comparison with suitable reference materials, it was found that the substance was a weathered resin closely resembling that of a locally growing pine (Pinus monophylla). This, in the context of local background information, provided good evidence that the object was indeed made by Indians in prehistoric times.

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In January 1966, Professor Robert F. Heizer of the University of California Archaeological Research Facility, Berkeley, brought us a small carved and painted wooden object reported to have been found in June 1965, by a student in the local high school, in Lovelock Cave, Churchill County, Nevada. Mrs. Ethel Hesterlee of Lovelock arranged for the temporary loan of the specimen for study. The carving was apparently made to represent a grasshopper, and the head, body, and rear legs could be distinguished easily, but there were no indications of any wings or antennae. However, there are two pairs of holes where wings or forelegs and antennae could reasonably have been attached to the body and head (pl. 1a). The holes contain a translucent brown substance which, when studied under the microscope, was found to have imbedded in it small fragments of feathers. Assuming that the brown substance was used as an adhesive to affix feathers stuck in the holes to represent the forelegs or wings and antennae, we removed some of the brown substance and prepared it for infrared analysis by grinding it with potassium bromide crystals to make a pressed plate, so that the sample could be analyzed in the solid state. We desired to learn

if the glue was of animal or vegetable origin, and also to find how closely it would be possible to identify its specific nature.

In view of the fact that the cave has been pot-hunted without mercy since 1924, is an excursion spot where local people go to picnic and dig, and that the specimen might be a modern toy or even a hoax, it was believed by us that identification of the red or black paint, or of the gum filling the four holes, might provide a clear lead to a decision on the specimen's authenticity.

The first spectrum showed that the hardened gum substance could not be of animal origin, but resembled available reference spectra of various wood resins. The substance thus was found in all probability to be a pitch derived from trees rather than a conventional modern glue derived from animal sources.

The next step was to compare the pitch from the grasshopper (fig. 1, I) with a sample of local pitch from the cave or its vicinity. By good fortune, the materials from Lovelock Cave in the University of California Lowie Museum of Anthropology include an ancient coiled basket half-filled with pitch. The basket and its contents are thought to be about 2000 to 2500 years old. An infrared survey spectrum of a sample of the pitch from the basket (fig. 1, II) revealed a remarkable similarity with the pitch from the grasshopper (fig. 1, I).[1] It now became interesting to relate these pitches to specific conifers of the region, which were most likely to have furnished the pitches already studied. Consequently, a sample of pitch from a fifty year old close-twined water jug basket (fig. 1, III), presumed to have come from the locally prevalent pinyon pine (Pinus monophylla) was also subjected to infrared analysis. Again, the resulting spectrum was very similar to the two already made. This showed that, if the spectra could be distinguished from other local conifers, all three were pitch from P. monophylla, and also that ancient and modern pitches could not be distinguished easily, or at all, from each other.

To find if pitches from different sources could be distinguished by infrared analysis, Mr. James Calhoun, Director of the Nevada State Museum in Carson City, was kind enough to collect and send us samples of resin from the locally predominant trees: P. monophylla (fig. 1, IV) and Juniperus osteosperma (fig. 1, V). Specimens of this description were collected, and these unweathered samples were then analyzed by the same method as before. The new sample of P. monophylla (fig. 1, IV) gave a spectrum much like the samples analyzed earlier, but certain bands, especially one at 6.6 μ, were more pronounced than in the older samples. Inasmuch as the 6.6 μ band is characteristic of lignin, it is difficult to understand why it is more pro-

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[1] See p. 126 for end notes.

nounced in the fresh pitch. The spectrum of J. osteosperma (fig. 1, V) failed to show any trace of the 6.6 μ band. Other bands of the pine pitch, absent from the juniper specimen, are seen at 11 μ and 12 μ. Conversely, the juniper pitch sample shows bands at 7.6 μ, 9.2 μ, 11.3 μ, and 12.6 μ. which were absent in the pine pitch spectra (fig. 1, IV).

This evidence indicates quite strongly that the brown substance filling the holes of the grasshopper carving is from the pinyon pine. It seems to be well weathered since, in common with other weathered samples, some bands apparently characteristic for the local pine are small, while the corresponding bands are much more prominent in the recently collected, less weathered, sample of P. monophylla. It also appears to be quite well distinguished from juniper pitch, although the resins from both conifers have many features in common.

Since Lovelock Cave was abandoned by the Indians well before the opening of the historic period, and no habitation, Indian or other, has been established in the vicinity of the cave in the half century since its discovery, the relation of the artifact to the locale by virtue of the identification of the pitch represents evidence that the carving is ancient. Construing it as a modern fake or child's toy inadvertently left in the cave by a recent visitor is ruled out by the weathered nature of the pitch.

It is also of interest to note that there were substantial remnants of red and black paint on the figure. A small amount of red paint was carefully removed and subjected to analysis by an electron microprobe. It was found to contain high concentrations of iron. Iron oxide or ochre has been used as red pigment as far back as the Magdalenean era, and since it is still in use today for this purpose, this finding provides no clue as to the antiquity of the artifact.

The wood from which the carving is made has not been identified. It is very light and soft, and is probably cottonwood.

Resinous substances and objects, with archaeological connotations, have previously been studied by infrared spectroscopy. Recently this method has been used for the identification of Baltic amber.[2] Studies of resinous (including amberlike) substances from ancient Egypt, largely by solubility tests and elemental composition, have been described by Lucas.[3]

Notes

1. In the comparisons of spectra, differences at 3.0 μ and 6.1 μ are not significant because adsorbed water causes absorption at these wavelengths.

2. Beck, C. W., Z. Wilbur, D. (or M.) Kossove and K. Kermani, Archaeometry 8, 96, 1965.

3. Lucas, A., Ancient Egyptian Materials and Industries, 4th ed. London: Edward Arnold. 1962.

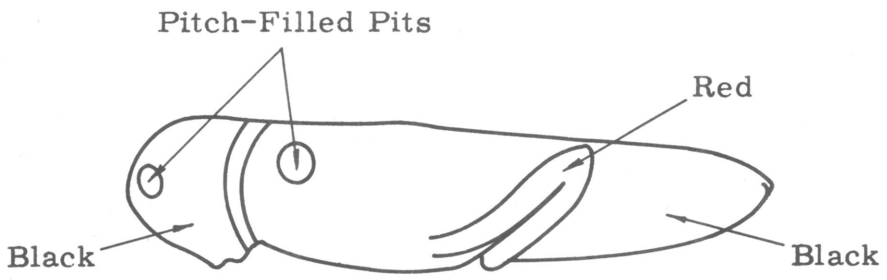
Explanation of Plate 1

a. Outline sketch of carved wooden grasshopper shown in b, indicating colored areas and location of pitch-filled pits. Other side of figure (not shown here) is identical.

b. Side view. Length 9.5 cm.

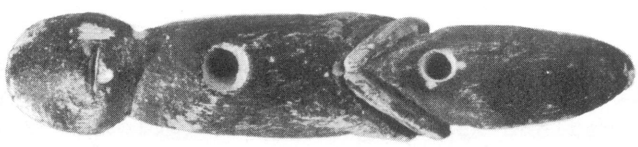
c. Bottom view. Note thin groove to indicate mouth. Conical pit at left (for insertion of support twig?) is 7 mm in diameter and 9 mm deep; conical pit at right is 5 mm in diameter and 9 mm deep.

d. Top view.



a

b



c

d

Plate 1. Carved Wooden Grasshopper from Lovelock Cave

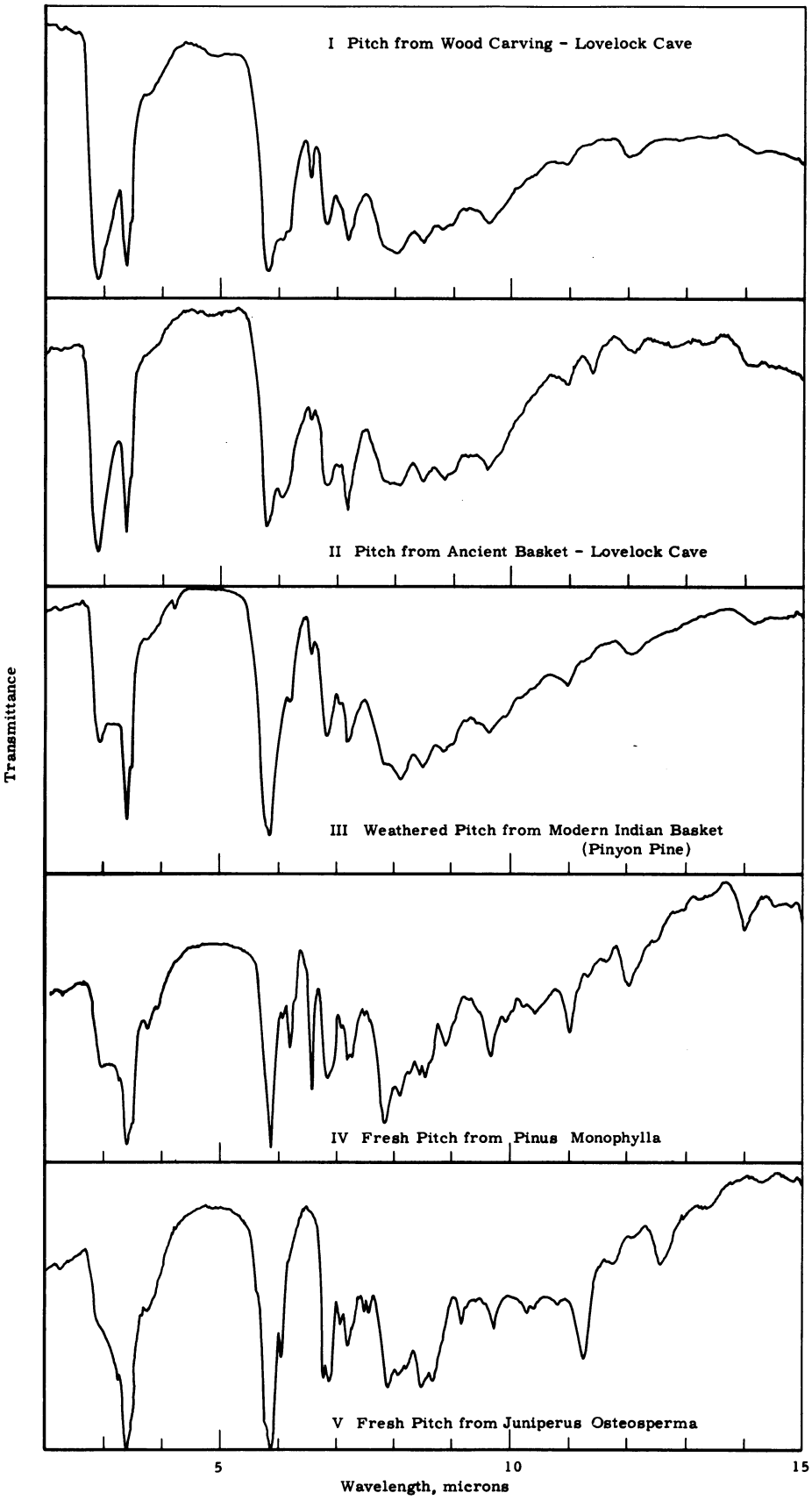


Fig. 1. Infrared Spectra of Pitches (KBr Pressed Plates)