BEADS

Journal of the Society of
Bead Researchers

2007 Vol. 19

THE SOCIETY OF BEAD RESEARCHERS

Officers for 2007

BEADS (ISSN: 0843-5499) is published annually by the Society of Bead Researchers, a professional non-profit corporation which aims to foster serious research on beads of all materials and periods, and to expedite the dissemination of the resultant knowledge. Subscription is by membership in the Society. Membership is open to all persons involved in the study of beads, as well as those interested in keeping abreast of current trends in bead research.

There are four levels of membership: Individual - $20.00 ($30 outside North America); Sustaining - $45.00; Patron - $75.00; and Benefactor - $150.00 (U.S. funds). All levels receive the same publications and benefits. The Sustaining, Patron, and Benefactor categories are simply intended to allow persons who are in a position to donate larger amounts to the Society to do so. Members receive the annual journal, *Beads,* as well as the biannual newsletter, *The Bead Forum.*

General inquiries, membership dues, address changes, and orders for additional copies of this journal (available for $23.00 postpaid in North America or $25.00 overseas) should be sent to:

Alice Scherer
Society of Bead Researchers
P.O. Box 13719
Portland, OR 97213
U.S.A.
E-Mail: alice@europa.com

Books for review and manuscripts intended for the journal, as well as items for the newsletter (such as brief articles, announcements of recent publications and summaries of current research) should be addressed to:

Karlis Karklins, SBR Editor
1596 Devon Street
Ottawa, Ontario KIG OS7
Canada
E-Mail: karlis44@aol.com

Printed in Canada

Design and Production: David Weisel

Cover. *Turkish POW:* Beadwork snake crocheted in a diamond pattern with SYRIAN PRISONER 1918 inscribed on the belly. Length: 217 cm (photo: Jane A. Kimball).

BEADS

Journal of the Society of Bead Researchers

2007 Vol. 19

KARLIS KARKLINS, editor

CONTENTS

INFORMATION FOR AUTHORS

1. Papers submitted for publication must by typed double-spaced, justified left, with 1 in. margins. Submissions should not exceed 50 pages including references cited. The hard copy should be accompanied by the text as an e-mail attachment or on a 3-1/2 disk or CD in Word Perfect 8/9 (.wpd) or Rich Text File (.rtf).

2. All manuscripts must be prepared with the following internal organization and specifications:
   a. First Page: place title and author's name(s) at top of the page.
   b. Abstract: an informative abstract of 150 words or less is to comprise the first paragraph.
   c. Acknowledgements: these are to be placed at the end of the article, before the references cited.
   d. Author's Affiliation: place author's name, affiliation, and address adjacent to the right margin immediately following the references cited.
   e. Tables: each table must have a short title and be typed double-spaced on a separate page. Do not embed tables or illustrations in the body of the report.
   f. Figure Captions: list the captions for black and white illustrations (Figures) sequentially on a separate page using Arabic numerals; color illustrations (Plates) should be listed separately using Roman numerals.

3. Number all pages consecutively from the title page through the references cited.

4. All headings should be situated three (3) spaces below the preceding text and flush with the left margin.
   a. Primary headings are to be capitalized and bold.
   b. Secondary headings are to be typed using bold upper and lower case letters.
   c. Tertiary headings are to be the same as the secondary headings with the addition of italics.
   d. Quaternary headings are to be in regular (not bold) upper and lower case letters.

5. Reference citations and the references cited should follow the style of *American Antiquity* <http://www.saa.org/Publications/StyleGuide/styleGuide.pdf>.

6. Illustrations:
   a. All drawings and photographs should be of publishable quality, with black and white photographs having sharp contrast.
   b. Black and white photographs must be submitted as glossy 5x7 or 8xl0 in. prints, or as high-resolution (300 dpi or higher) scans or digital images (.jpg, .gif, or .bmp files).
   c. Color illustrations will be considered if of sufficiently high quality to warrant the high cost of reproduction. They should be submitted in the form of 35mm slides, 4x5 in. prints or transparencies, or high-resolution (300 dpi or higher) scans or digital images (.jpg, .gif, or .bmp files).
   d. Figure and plate numbers are to be penciled lightly on the backs of drawings and photographs, and on the mounts of color slides and the sleeves of larger transparencies.
   e. Photographs of objects, and maps, site plans, etc., should include a metric or metric/inch scale.
   f. When several items are shown in a single frame, each object is to be designated by a lower case letter, and the caption should include references to these letters.
   g. Illustrations obtained from museums or other institutions must be accompanied by a letter from the appropriate institution granting permission to publish and indicating that reproduction fees, if any, have been paid by the author.

7. Each manuscript will be reviewed by at least one member of the Editorial Advisory Committee. Articles of a specialized nature will also be reviewed by one or more persons who have expertise in the thematic content, cultural or geographical region, or time period dealt with in the manuscript.

8. If review remarks are such that substantial changes are required before a manuscript is acceptable for publication, the revised paper will be re-reviewed by the original reviewer prior to its final acceptance.

9. Manuscripts will be judged on the accuracy of their content, appropriateness for an international audience, usefulness to other researchers, and consistency with the research and ethical goals of the Society.

10. Each author or set of co-authors will receive five complimentary copies of the journal. Book reviewers will receive one copy.

IN MEMORIAM
MARY ELIZABETH GOOD, 1930-2007

Bead researcher Mary Elizabeth Good died December 18, 2007. A native of Tulsa, Oklahoma, she was 77 years old. Mary Elizabeth was well-known and respected as an early researcher of trade beads in North America. Her first publication, "Guebert Site: An 18th century Historic Kaskaskia Indian Village in Randolph County, Illinois" (1972), is considered a classic in bead studies. It set the standards for careful description, outstanding color photography (by Mary Elizabeth), and exhaustive comparative analysis.

Her later work included "History of the Eufaula Lake Area from 1719" (included in Perino and Caffey 1980), *Early Sixteenth Century Glass Beads in the Spanish Colonial Trade* (with Marvin T. Smith, 1982), a chapter on Creek beads in Oklahoma in the Proceedings of the 1982 Glass Trade Bead Conference (edited by Charles Hayes, 1983), and a chapter on beads from the Lasley Vore site in Oklahoma (in *La Harpe's Post*, edited by George Odell, 2002).

Educated in journalism and history at the University of Tulsa, Mary Elizabeth became an active avocational archaeologist. She was very active in the Tulsa Archaeological Society which she joined in 1963, and served as its secretary-treasurer from 1964 to 1966, and then as its president from 1968 to 1969. The society awarded her an honorary life membership for her years of dedicated service. Mary Elizabeth was also involved in the Oklahoma Anthropological Society which she served as corporate secretary-treasurer and as a director. She received their Golden Trowel Award in 1973.

A charter member of the Society for Historical Archaeology, Mary Elizabeth worked for years at the Thomas Gilcrease Museum in Tulsa and assisted Gregory Perino in many projects. She was recognized by the Society for American Archaeology with their national Crabtree Award for Avocational Archaeology in 1993. In later years, she was the editor of *Proofs* magazine, and her editorial skills served her well in her writing efforts.

Mary Elizabeth was also an award-winning photographer. Her photographic skills are evident in many of her archaeological reports. She was dedicated to accuracy. I remember that she worked tirelessly with the printer to get the color reproduction accurate in *Early Sixteenth Century Glass Beads in the Spanish Colonial Trade.*

She also worked for years with the National Muzzle Loading Rifle Association, serving as a director, and was made an honorary life member of that organization. She was a participant in shooting matches and other historical events, and published gun-related articles in the *Gun Report* and *Muzzle Blasts*. She was nationally known in muzzle-loading circles. Her late husband, Lee Good, served as Director of the J.M. Davis Arms and Historical Museum in Claremore, Oklahoma.

Mary Elizabeth Good was also active in the Society of Bead Researchers. She served as Chair of the Publications Committee from 1989 to 1993, and as President of the Society from 1994 to 1996.

She was a good friend to all who knew her. A voluminous correspondent in the days before the Internet, she freely shared her knowledge with everyone. Mary Elizabeth was a popular speaker, appearing at the Cottonlandia Glass Bead Conference (1978), the 1982 Glass Trade Bead Conference, and Bead Expo (1992). The bead community has lost an important member.

SELECT BIBLIOGRAPHY OF MARY ELIZABETH GOOD

Good, Mary Elizabeth

1972 Guebert Site: An 18th Century, Historic Kaskaskia Indian Village in Randolph County, Illinois. *Central States Archaeological Societies, Memoir* 2.

1976 Glass Beads from the First Hermitage. *In* An Archaeological and Historical Assessment of the First Hermitage, edited by Samuel D. Smith, pp. 237-248. *Tennessee Department of Conservation, Division of Archaeology, Research Series* 2.

1977a Historical Review: Bird Creek Basin from 1800. U.S. Army Tulsa District Corps of Engineers, Tulsa.

1977b Glass Bead Manufacturing Techniques. *In* Beads: Their Use by Upper Great Lakes Indians, edited by Reinder VanTil, pp. 27-34. *Grand Rapids Public Museum Publication* 3.

1980 History of the Eufaula Lake Region from 1719. In *The Eufaula Lake Project, A Cultural Resource Survey and Assessment*, by Gregory Perino and Jerry Caffey, pp. 169-256. U.S. Army Tulsa District Corps of Engineers, Tulsa.

1983 A Comparison of Glass Beads from Upper Creek Indian Towns in the Southeast and Oklahoma. *In* Proceedings of the 1982 Glass Trade Bead Conference, edited by Charles F. Hayes, pp. 159-166. *Rochester Museum and Science Center, Research Records* 16.

1989 Review of *Artifacts of the Spanish Colonies of Florida and the Caribbean, 1500-1800. Volume 1: Ceramics, Glassware, and Beads*, by Kathleen Deagan. *Beads: Journal of the Society of Bead Researchers* 1:98-100.

Good, Mary Elizabeth, Lee Good, and George Odell

2002 Metal Artifacts from the Lasley Vore Site. Appendix 7 in *La Harpe's Post: A Tale of French-Wichita Contact on the Eastern Plains*, by George H. Odell, pp. 281-290. University of Alabama Press, Tuscaloosa.

Good, Mary Elizabeth and Frieda Vereecken-Odell

2002 Glass Beads from a Protohistoric Wichita Indian Site in Tulsa County, Oklahoma. Appendix 6 in *La Harpe's Post: A Tale of French-Wichita Contact on the Eastern Plains*, by George H. Odell, pp. 271-280. University of Alabama Press, Tuscaloosa.

Smith, Marvin T. and Mary Elizabeth Good

1982 *Early Sixteenth Century Glass Beads in the Spanish Colonial Trade*. Cottonlandia Museum, Greenwood, Mississippi.

Marvin T. Smith
Sociology and Anthropology
Valdosta State University
Valdosta, GA 31698
E-mail: mtsmith@valdosta.edu

WORLD WAR I TURKISH PRISONER-OF-WAR BEADWORK[1]

Jane A. Kimball

Drawing on the rich tradition of textile crafts in the Ottoman Empire, Turkish soldiers incarcerated in British prison camps in the Middle East during and immediately after World War I made a variety of beadwork items to relieve the boredom of their prolonged imprisonment and to barter or sell for food and other amenities. Best known are the bead crochet snakes and lizards, but the prisoners also used loomed and netting techniques to produce necklaces, belts, purses, and other small items.

INTRODUCTION

Turkish soldiers captured by British, Australian, and French troops in World War I used Bohemian glass seed beads to create a unique group of war souvenirs for their captors. Unfortunately, there is little historical documentation on these pieces. The chief surviving sources of information are family legends of a relative's war service passed down to later generations and inscriptions on individual pieces.

British and Australian soldiers who served in the Middle East brought prisoner-made beadwork purses and necklaces home for their sweethearts and wives and beadwork snakes as toys for their children. The first catalog of the Imperial War Museum in London published in 1918 has a section, "War Toys and Mascots," with a photograph captioned "Snakes made, with coloured beads by Turkish Prisoners of War" (Imperial War Museum 1918:28)(Fig. 1).

WORLD WAR I CONFLICTS IN THE MIDDLE EAST

To investigate the origins of these beadwork pieces, it is useful to review the history of World War I conflicts in the Middle East. When the Ottoman Empire joined the Central Powers against the Allies in the fall of 1914, the British launched major campaigns to preserve their pre-war trade routes to Russia through the Dardanelles and to India through the Suez Canal. Turkish forces were successful in routing British, Australian, and French troops at their first major encounters at Gallipoli and in the Dardanelles in 1915. The Allies successfully secured the Suez Canal in 1916. Other major campaigns, including those made famous by Lawrence of Arabia, resulted in British victories at Jerusalem and Baghdad in 1917 and at Damascus in 1918. Accurate records of captured Ottoman soldiers were not kept, and estimates of prisoners of war taken by Russian, British, and Commonwealth troops vary from 150,000 to 250,000 (Erickson 2001:238; Ferguson 1999:295).

Prisoner-of-War Camps for Captured Ottoman Soldiers

The Russian army sent some 50,000 soldiers captured during the 1915 Turkish invasion into the Caucasus to prison-of-war camps in Russia. British, Australian, and French troops sent Turkish soldiers captured in the Gallipoli and Dardanelles campaigns in 1915 and 1916 to camps at Salonika, on Cyprus, and several islands in the Aegean.[2] Initially housed in tents encircled by barbed wire, most prisoners were eventually transferred to camps in Egypt (Figs. 2-3). The Allied victory in 1916 for control of the Suez Canal resulted in the capture of 3,950 Turkish soldiers who joined other prisoners at camps near British and Australian military bases in Egypt. By July 1917, there were about 14,000 Turkish prisoners in Egypt, 14,000 in India and Burma, and 5,000 in Cyprus "with a few in England, at Malta, at Aden and in Mesopotamia" (Hansard 1917). Prisoners captured in the Mesopotamian campaign in 1917 were sent by boat or rail to Basrah and then transported to prison camps at old British military bases in India and Burma. British victories in Jerusalem and the Sinai in 1918 netted approximately 70,000 prisoners who were sent by rail to prisoner-of-war camps near Cairo.

A variety of existing and new buildings housed Ottoman prisoners for the duration of the war. For example, the facilities at Maadi Camp near Cairo consisted of "old buildings originally erected as a school of music and subsequently used as a factory… and barracks built recently for prisoners of war" (International Committee of the Red Cross 1917:18). Many of the camps came to resemble semi-permanent villages with a variety of services provided by the prisoners for each other as well as those furnished by camp authorities.

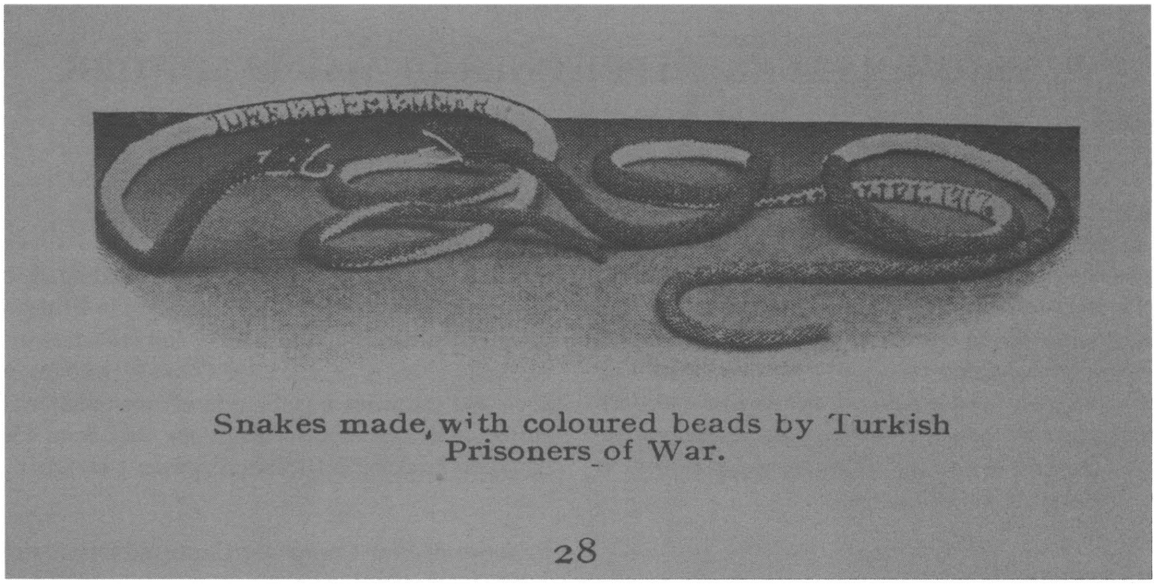


Figure 1. Beadwork snakes in the collection of the Imperial War Museum, London, 1918 (photo: Imperial War Museum).

Figure 2. Turkish prisoners at Seddul Bahr captured during the 1915 Dardanelles campaign (photo: British War Department).

Figure 3. Turkish prisoner-of-war camp near Cairo, Egypt, ca. 1918 (photographer unknown).

Crafts in Prison Camps

To relieve the boredom of prison life and to give the prisoners an opportunity to earn money for food, clothing, cigarettes, and other amenities, prison authorities provided materials for prisoners to make craft pieces for sale or barter to prison guards, to soldiers billeted near the camps, and for sale in local curio shops.[3] Turkish prisoners incarcerated at Salonika, on the island of Cyprus, and at various prisoner-of-war camps in Egypt made a wonderful array of objects from glass seed beads.[4]

The diaspora of Ottoman prisoners of war captured in Allied campaigns in the Middle East during World War I is illustrated in Fig. 4 (Krause 2002:46). I have added circles to represent prisoner-of-war camps where beadwork was made. The size of each circle is proportionate to the amount of beadwork estimated to have been made in that area.

INSCRIBED BEADWORK SNAKES

Made in lengths from 33 cm to 550 cm, inscribed beadwork snakes are among the most interesting pieces made by Ottoman prisoners of war. Because many of them were brought home as toys for children, vigorous play has resulted in damage ranging from missing beads to severance of heads and separated sections of bodies. The backs of the snakes were crocheted with seed beads in zig-zag and diamond patterns (Pl. IA, top). Most prisoner-of-war snakes were made with 2-mm seed beads. The Kettlewell snake (see below) is unusual in that it was made with 1.0-mm beads.

The colors used were black, white, amber, dark green, light green, sage green, dark blue, light blue, red, pink, and yellow. Adele Recklies (2005:36-42) describes the techniques used in making these snakes. Inscriptions were usually worked into the bellies of the snakes (Pl. IA, bottom). More unusual are inscriptions such as SOUVENIR worked into the pattern on the back. The snakes were stuffed with a variety of materials, the most common being cotton string, yarn, thread, or small pieces of cotton cloth. Inscriptions on surviving snakes are sometimes flanked by British or French flags or by a variety of abstract designs. Some snakes have beaded tongues, and most have either a triangle or an "A" design on their chins. Both designs may signify Allah, the triangle being an abstraction of the letter A (Pl. IB, top).

Almost all inscriptions are in English because Turkish prisoners made them for British and Australian soldiers to take home as war souvenirs. The most common inscriptions are TURKISH PRISONER or TURKISH PRISONERS with or without a date. Less common inscriptions include a place name or SOUVENIR. Rare examples inscribed PRISONER DE GUERRE were probably made by prisoners captured by the French at Gallipoli because the inscriptions on the two examples I have seen include the date 1916. Rarer yet are snakes with Turkish inscriptions in Arabic script.

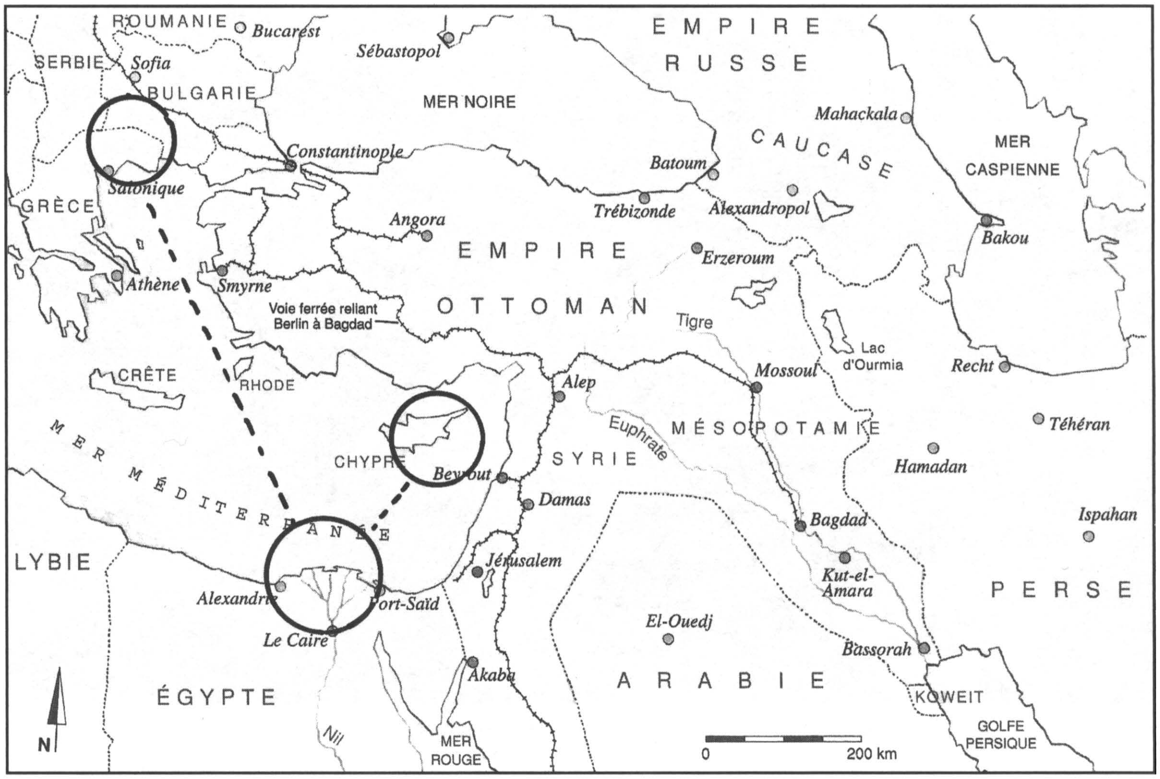


Figure 4. Map of the Ottoman Empire during WWI. The circles represent the locations in which Turkish prisoner-of-war beadwork was made (drawing: Jean-François Krause).

As almost no Ottoman prisoners could write English and many were illiterate, it is interesting to speculate about how the prisoners produced the inscriptions on the snakes they created. Camp authorities probably provided generic inscriptions such as TURKISH PRISONERS on slips of paper to those interested in making beadwork souvenirs (Flora Book 2007: pers. comm.). When a soldier wanted to commission a special snake, he would have to provide a customized inscription for a prisoner to copy in beadwork. Few snakes were inscribed with the names of the prison camps in which they were made, with particular military campaigns, or with the names of individual soldiers who commissioned them. Most inscribed prisoner-of-war snakes were made at Salonika, on Cyprus, and in Egypt.

Salonika and Cyprus

Some inscribed snakes have family provenance and inscriptions to confirm they were made at Salonika and on the island of Cyprus from 1915-1918. The Kettlewell snake is a very rare early Turkish prisoner-of-war beadwork piece with family provenance. It was a gift from a Turkish prisoner to Maurice Kettlewell, a British army cook in a prisoner-of-war camp at Salonika, in gratitude for Kettlewell's concern for the welfare of the prisoners. The snake has TURKISH PRISONERS 1915 on the white belly. The date and the location at which it was made indicate this snake was made by a prisoner captured in the Gallipoli or Dardanelles campaigns. Kettlewell brought his snake, which is 145 cm long, home when he returned from the war and displayed it proudly on the sideboard in his drawing room in Yorkshire. His children were allowed to play with it gently under strict supervision, and it has survived today largely intact (Pl. IB, bottom).

Very few snakes are inscribed with the names of military campaigns or battles. The inscription on one snake, TURKISH PRISONERS DARDANELLES ASHIRABA CYPRUS 1916 (Pl. IC, top), puzzled me for a long time until I realized that ASHIRABA was meant to be Achi Baba, a hill on the Gallipoli Peninsula that the Ottoman army defended several times from attacks by British troops. The Turkish soldier who made this 180-cm-long snake was probably captured at Gallipoli and sent to a prison camp in Cyprus where he made it in 1916.

A beadwork snake made on Cyprus in 1918 was brought home to northeast England by Ernest Hislop who served in the Collingwood Battalion of the Royal Naval Division at Gallipoli. He then served in the Howe and Hood Battalions of the Royal Naval Division and afterwards in France. There he received the Military Medal and shrapnel wounds in both legs for his part in clearing German snipers from the French village of Niergnies near Cambrai as part of the offensive to capture the Hindenburg Line in 1918. Like most soldiers, Hislop would not talk about his war experiences even to his wife and children. The snake he brought home was probably bought from a British or French soldier in France and was tucked away for years with his military papers and other war souvenirs in an attaché case. Measuring 176 cm in length, it has TURKISH PRISONERS CYPRUS 1918 on the belly (Pl. IC, bottom).

Egypt

Most inscribed Turkish prisoner-of-war snakes and other beadwork pieces were made in Egypt at camps near Cairo. In January 1917, a delegation from the International Committee of the Red Cross visited several British prisoner-of-war camps in Egypt to describe the excellent conditions under which the English held Turkish prisoners in the hope of obtaining assurance from German authorities that British prisoners of war would be treated equally well. The published reports of their visits provide interesting contemporary views of prison-camp life (International Committee of the Red Cross 1917).[5] Although descriptions of individual camps concentrated on living quarters, clothing, food, hygiene, and medical care, they sometimes included information on recreational activities available to the prisoners. Only the report on Maadi camp, located 16 km south of Cairo with a population of 5,556 Turkish prisoners, refers to "articles of coloured beads—handbags, purses, necklaces, bracelets, etc –which show considerable artistic taste… and sell readily in curiosity shops at Cairo." One section of 1,200 prisoners netted 2,500 francs in a single fortnight from the sale of their beadwork pieces (International Committee of the Red Cross 1917:25).[6]

Major British victories in 1917 and 1918 swelled the populations of the prisoner-of-war camps near Cairo. Instead of establishing new camps for the thousands of Ottoman soldiers captured in the Palestine and Sinai campaigns, British authorities transported them by rail to established camps in Egypt. Heliopolis Camp, northeast of Cairo, housed 3,906 prisoners at the time of the Red Cross visit in January 1917, but the prison population had increased to 30,000-35,000 prisoners by 1918 (Pye 1918:134). A snake made there is inscribed SOUVENIR OF 1914.15.16.17 in black beads on the back, while the white belly bears the wording T. PRISONERS OF W. HELIOPOLIS. It is 165 cm long (Pl. ID, top).

In January 1917, when the Red Cross delegation visited Bilbeis Camp 65 km northeast of Cairo, they reported a population of 540 prisoners. Prisoners from the Suez Canal and Palestine swelled the camp population and by 1918, the camp held an estimated 35,000-40,000 Ottoman prisoners (Pye 1918:156). A rare prisoner-of-war snake with a Turkish inscription SOUVENIR OF THE OTTOMAN PRISONERS in Arabic script as well as an English inscription TURKISH PRISONER 1917 was presented to a British officer in 1917. It has survived with an accompanying note:

> Bead Snake Made by Turkish Prisoners of War captured in the Sinai Campaign 1917 for Capt. J.P. Williams, Adjunct, Belbeis [sic], Egypt (P of W Camp) and presented by them to him on relinquishing the post to be invalided home in September 1917.

A Nottingham coal miner brought home a 217-cm-long beadwork snake inscribed SYRIAN PRISONER 1918 (*see* cover). A prisoner captured in Palestine probably made it in a prisoner-of-war camp in Egypt.

Some inscribed snakes were commissioned by individual soldiers in Egypt. Leslie Burrowes, an Australian soldier in the 10th Light Horse Regiment, enlisted on October 20, 1914, and was wounded in the jaw and face at Gallipoli. When he recovered in 1916, he was sent to the Western Front in France where he was wounded again. In 1917, he was sent to the Middle East where he was wounded once more. Burrowes was hospitalized in Cairo for a chronic illness and, while he was recuperating, commissioned a large beadwork snake with a lizard in its mouth from a Turkish prisoner of war at a nearby camp. The snake is beaded in a diamond design with green, turquoise, and pink beads, with black borders on an amber bead background with a white belly inscribed TURKISH PRISONER 67 L. BURROWES.[7] Sadly, after the war, Burrowes' facial disfigurements precluded the resumption of a "normal life" for this brave soldier, and family members remember him as a wandering individual who would show up sporadically for brief visits (Lesleyanne Hawthorne 2007: pers. comm.).

Thomas Scott Hake was a private in the Australian 8th Light Horse. He had eye problems that sent him to hospital at Cairo in 1917 and 1918, where he probably commissioned a large beadwork snake from a prisoner in one of the camps near Cairo. The inscription includes his name and regiment: TURKISH PRISONER 1918 TPR. T. S. HAKE 8TH L. H. This snake is very long: 342 cm (Pl. ID, bottom).

The Australian War Memorial has a collection of World War I prisoner-of-war beadwork pieces brought back by Australian soldiers.[8] Several of the snakes have unusual patterns and were probably made in prisoner-of-war camps near Cairo.

Many snakes and other beadwork pieces inscribed with variations of TURKISH PRISONER (with or without a date) were sold in curio shops and by street vendors in Cairo and in Alexandria and Port Said, the ports from which most British and Commonwealth troops serving in the Middle East were repatriated after the war. One such seller, adorned with several beadwork snakes, is dressed in an old British uniform, possibly discarded from a local military hospital (Fig. 5).

Although the repatriation of captured Ottoman soldiers held in British and Australian prisoner-of-war camps began in 1919, some prisoners were not returned to their countries of origin until 1921, and inscribed prisoner-of-war beadwork pieces continued to be made through 1920.

A short, unattributed newspaper article, "The Turkish Serpent," with a photograph of a Turkish beadwork snake, was published in either 1919 or 1920 (Fig. 6):

> The brilliantly-marked snake seen in the accompanying photograph is not quite what it appears to be. Concerning it a nautical reader writes: "The snake measures almost five feet in length, and is curled up as though in readiness to strike, but is actually quite harmless, being *made entirely of coloured beads*—about fifty thousand of them—cunningly strung together! This exquisite piece of work was done by a Turkish prisoner-of-war during his spell of captivity in Egypt (1916-1919). Apart from being a craftsman, he must have possessed amazing patience and industry, for this spare-time job kept him occupied for over two years!
>
> Some time after the Armistice, in 1918, I happened to be serving on board the vessel which took him, along with hundreds of others, from Alexandria to Constantinople for repatriation. During the voyage I spent about an hour each day with him, bargaining for the serpent; which I greatly admired. Priced 'hardened,' as they say on the Stock Exchange, while the ship was passing through the Dardanelles, but shortly before coming to anchor near the Golden Horn we reached an agreement, and the bead snake became my property in return for the sum of ten shillings and a few packets of 'Woodbines.'

The Turkish soldier grossly exaggerated the time it took him to make the snake, and the sailor made a good deal when he exchanged it for ten shillings and some cigarettes.

Figure 5. Street vendor displaying his Turkish prisoner-of-war beadwork, ca. 1918 (photographer unknown).

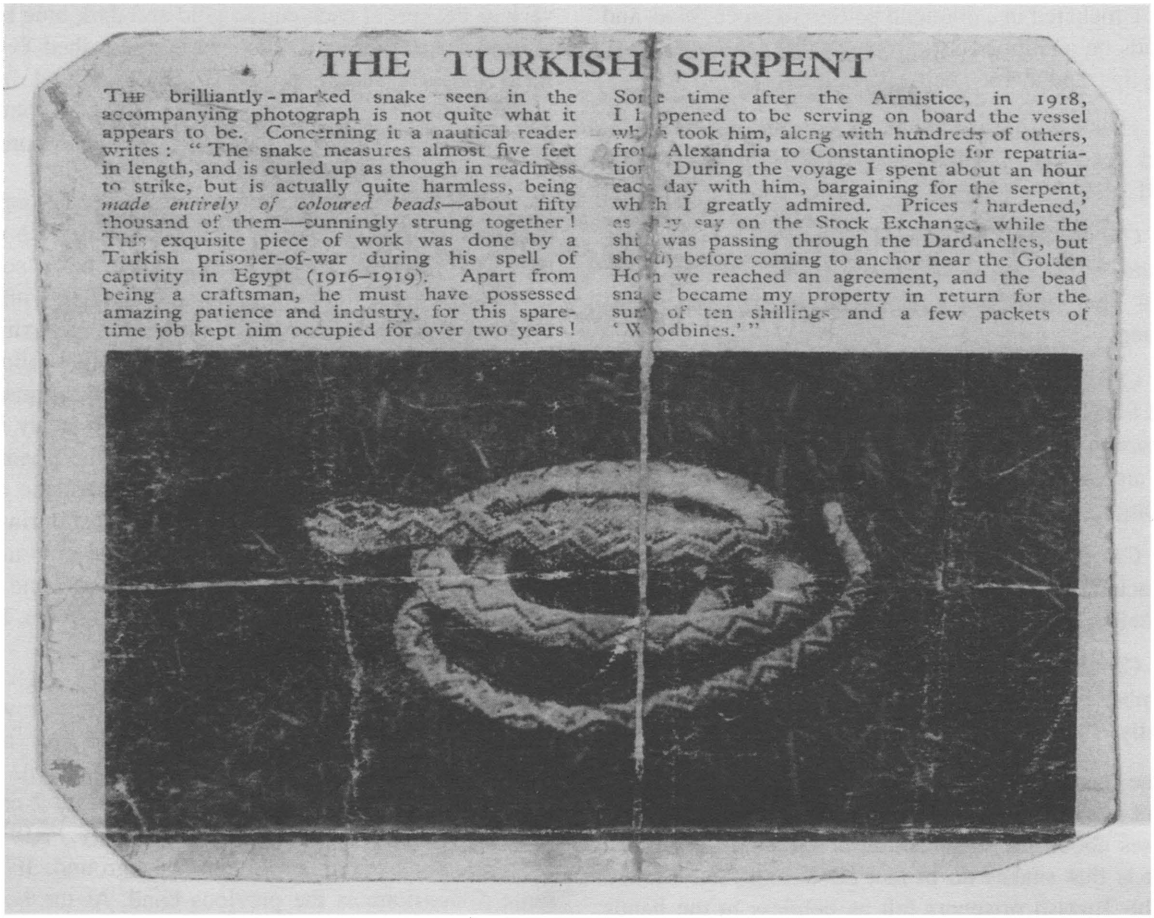
Great Britain

About one hundred Turkish prisoners (mostly civilians) were interned at Knockaloe Camp on the Isle of Man. Island lore passed down through local families suggests that a few beadwork snakes might have been brought to Knockaloe by Turkish prisoners or made there and given or bartered to local civilians (Yvonne Cresswell 2007: pers. comm.).

Frank C. Quayle (1990), a local historian, commented that:

> Turkish prisoners with a detailed knowledge of wild life in their native land, produced a great variety of beaded snakes.... So realistic were these snakes in execution and colouring that I have seen people back away from them as if they were alive.

He does not, however, specifically mention beadwork snakes being made at Knockaloe Camp, and I have not been able to document with certainty that snakes or other prisoner-of-war beadwork was made on the Isle of Man.



THE TURKISH SERPENT

The brilliantly-marked snake seen in the accompanying photograph is not quite what it appears to be. Concerning it a nautical reader writes: "The snake measures almost five feet in length, and is curled up as though in readiness to strike, but is actually quite harmless, being *made entirely of coloured beads*—about fifty thousand of them—cunningly strung together! This exquisite piece of work was done by a Turkish prisoner-of-war during his spell of captivity in Egypt (1916–1919). Apart from being a craftsman, he must have possessed amazing patience and industry, for this spare-time job kept him occupied for over two years! Some time after the Armistice, in 1918, I happened to be serving on board the vessel which took him, along with hundreds of others, from Alexandria to Constantinople for repatriation. During the voyage I spent about an hour each day with him, bargaining for the serpent, which I greatly admired. Prices 'hardened,' as they say on the Stock Exchange, while the ship was passing through the Dardanelles, but shortly before coming to anchor near the Golden Horn we reached an agreement, and the bead snake became my property in return for the sum of ten shillings and a few packets of 'Woodbines.'"

Figure 6. Newspaper article about "The Turkish Serpent" (photographer unknown).

Two published sources that describe the extensive crafts program at World War I prisoner-of-war camps on the Isle of Man do not mention or illustrate any beadwork from Knockaloe (Baily 1959; Cresswell 1994). Many craft pieces made in the prisoner-of-war camp at Knockaloe are inscribed with the name of the camp, but no snakes with Knockaloe inscriptions have been found.

It is possible that Manxmen brought home the snakes associated with families on the Isle of Man as gifts for their loved ones. Manxmen answered the call for army service in great numbers proportionate to the population of the island and served in the British army with the Cheshire Regiment at Salonika and as medical doctors in Egypt at hospitals near Cairo (Sargeaunt 1920:45-56). Many war souvenirs were not appreciated by the families to whom they were given and were often consigned to attics or basements where they languished for decades. By the time house clearances brought them to museums or to the antiques market, specific details of their origins had been forgotten.

My extensive collection of World War I war souvenirs includes many identified pieces from other British prisoner-of-war camps but no beadwork pieces.

OTHER TURKISH PRISONER-OF-WAR BEADWORK

Crocheted beadwork lizards, glass bottles covered with crocheted beads, loomwork beaded bands, necklaces and belts, and netted and loomwork beadwork purses are other interesting pieces made by World War I Turkish prisoners of war.

Among the most endearing beaded objects are the crocheted lizards, each of which has a personality of its own. They are primarily decorated in diamond patterns but examples with zig-zag decoration and spotted backs also exist. Most examples are not inscribed, but some bear dates from 1916 to 1919 on their bellies. Six examples are shown in Pl. IIA, top. From left to right:

1. Crocheted in a diamond pattern in green, blue, and pink beads on an amber background with green eyes, pink and blue lips, and a green belly; 12 cm long.

2. Crocheted in a diamond pattern in amber, white, and black beads on an amber background with a white belly inscribed 1919; 15 cm long.

3. Crocheted in a diamond pattern with pink, blue, white, and amber beads on a green background with red eyes and blue lips. The white belly is inscribed 1917; 17 cm long.

4. Crocheted in a diamond pattern with pink, green, red, and black beads on an amber background with a zig-zag pattern in red and green on the sides. The rear legs and tail are missing. The white belly bears the date 1917; 14 cm long.

5. Crocheted in a zig-zag pattern in blue beads on an amber background with red and white eyes, black lips, and a white belly; 18.5 cm long.

6. Crocheted with a spotted back in turquoise beads on an amber background with white eyes, blue lips, and a white belly; 19 cm long.

Some beadwork lizards found their way into the mouths of beadwork snakes (Pl. IIA, bottom). There are two hypotheses about the juxtaposition of these two creatures. The first is that snakes do in fact eat lizards. The second is that the Turkish prisoners felt as helpless in the hands of their British captors as the captured lizards were in the mouths of the snakes.

Glass bottles covered in crochet beadwork were made in Greece before, during, and after World War I. The bottles illustrated in Pl. IIB were made at Salonika during the war. They are inscribed SOUVENIR SALONIQUE, and one is inscribed with a 1916 date. Both are decorated with flowers and crossed flags with geometrical borders at the top and bottom. They were probably made by Turkish soldiers captured by the French at Gallipoli who were sent to a prisoner-of-war camp at Salonika. The bottles are 21-23 cm high and 6 cm in diameter.

Turkish prisoners also made loomwork beaded bands, necklaces, and belts with inscriptions similar to those found on the snakes. Some pieces include strands of beads as additional decorative features.

The upper beaded belt in Pl. IIC (top) is decorated with diamonds within a zig-zag pattern with diamonds at each end. The center exhibits small diamonds and is inscribed TURKISH PRISONERS 1916. It is 65 cm long (excluding the tassels) and 5 cm wide. The other belt is decorated with various designs at each end in gold and dark blue beads on a turquoise background. The center is inscribed TURKISH PRISONERS. Three beadwork tassels depend from the bottom of the belt. It is 65 cm long (excluding the cotton ends) by 15 cm wide (including the suspended decorations).

An elaborate belt executed in variously colored beads exhibits two British flags as well as an American one (Pl. IIC, bottom). There are also depictions of birds, some sort of quadruped, possibly a lizard, and a building with a cross above it, perhaps a church. The central portion exhibits the wording TURKISH 1917 above PRISONERS followed by what appears to be the Arabic date 1333 which equates with 1915 in the Gregorian calendar. The discrepancy in dates is uncertain. Perhaps 1915 was the year the prisoner was captured. The American flag is also problematic as there were no American troops in the Middle East during World War I. While it may be that the belt was commissioned by a British soldier to give to an American friend, it was, nevertheless, collected in Britain. It is 60 cm long by 5 cm wide.

A band with light and dark blue borders with the inscription PRISONER TURKISH 1916 on a green background is shown at the top of Pl. IID (top). It is 35 cm long (excluding the loops at each end) by 2 cm wide. The central band is inscribed TURKISH PRISONERS 1916 in black letters on a pink background. It has the same dimensions as the previous band. At the bottom of Pl. IID (top) is a necklace in blue, turquoise, and light blue beads with a turquoise border. It is inscribed TURKISH PRISONER in pink, bronze, and translucent off-white beads. Three beadwork embellishments in turquoise, amber, and black beads dangle from the bottom edge. The piece is 38 cm long by 13 cm wide (including the hanging decorative beads).

Netted beadwork purses were made in a variety of colors. Most have a loomwork band near the top inscribed with some variation of TURKISH PRISONER OF WAR with or without a date. Two examples are shown in Pl. IID (bottom). The one on the left is executed in blue and pink beads with a loomwork band at the top inscribed I P of WAR 1918 put on upside down. There are two netted triangular projections at the top in amber and pink beads with cotton-thread tassels and a handle in green and white beads. The item is 18 cm high (excluding the handle) by 15 cm wide. The purse on the right is done with green and amber beads with a loomwork band at the top inscribed T P of WAR 1918. The netted triangles at the top are in green and amber beads and the handle is in green and amber beads. The purse is 20 cm high (excluding the handle) by 13 cm wide.

Loomwork beaded purses provide canvases for various beadwork images. Some depict birds and other animals. One example shows two birds eating berries from a tree on a black background inscribed TURKISH PRISONERS 1918 in turquoise beads at the top and a band of beads ending with a snake-like head in green, white, black, and turquoise beads at the bottom. The handle is made from black and pink beads. The purse measures 24 cm high (excluding the handle) by 15 cm wide (Pl. IIIA, top, left).

Another purse exhibits a Scottish lion rampant in amber beads with pink lips and a mane of dark blue beads. Inscribed at the top on the obverse is 1918 TURKISH and 1918 PRISONERS is on the verso. The purse is 16 cm high (excluding the tassel and handle) by 14 cm wide (Pl. IIIA, top, right).

Worked in crimson and gold beads, a peacock and another bird facing each other adorn yet another purse. This side also bears the wording SOUVENIR 191[6] (Pl. IIIA, bottom, left). The verso is in light and dark blue beads and shows a Greek cross along with the inscription TURKISH PRISONER (Pl. IIIA, bottom, right). The piece is 14cm high by 14 cm wide.

A depiction of a building, possibly a prison or a hospital, outlined with blue beads adorns the purse on the right in Pl. IIIB (top). It bears the inscription 1918 and TURKISH PRISONERS. Netted triangles of white, amber, and green beads with crochet thread tassels decorate the opening. The handle is made of blue, amber, and white beads. The piece is 17.5 cm high (excluding the handle) by 14.5 cm wide.

A purse decorated with a ship may have been one that transported prisoners from Salonika and Cyprus to prison camps near Cairo (Pl. IIIB, top, left). The ship is done in white beads with amber and red accents and sits on a sea of light and dark blue beads. The large white border at the top exhibits two crosses and the inscription TURKISH. The verso depicts the figure of a large black dog with a blue muzzle and the wording PRISONERS 1918. This image puzzled me for a long time before I realized it was a war dog with a primitive gas mask made from a blue French uniform. A French soldier with a war dog wearing a similar mask is shown in Pl. IIIB (bottom). The purse is 17 cm high (excluding the handle) by 16 cm wide. The handle is formed of amber beads.

Another purse with a nautical theme depicts a dreadnought battleship (Fig. 7). It has an Arabic inscription thought to include the date 1915 and may be associated with the Dardanelles campaign. Worked in black and white beads with red flags, it is 10.5 cm high and 8.5 cm wide. Both sides are the same.

Figure 7. Loomwork purse depicting a dreadnought warship with an Arabic inscription including the date 1915; H: 10.5 cm (photo by author).

WOODEN OBJECTS INLAID WITH BEADS

Some Turkish prisoners used small glass beads to decorate wooden objects. An opium pipe in the form of a sphinx engraved TURKISH PRISONER on the bottom was doubtless made in Egypt (Fig. 8). Small turquoise beads form the eyes. It is 11 cm long by 4.5 cm high by 2.5 cm wide.

A carved wooden walking stick depicting snakes with lizards in their mouths is decorated with nails and inlaid small white and turquoise seed beads (Fig. 9). It is inscribed TURKISH PRISONER SALONICA 1919. It is 93 cm long.

CONCLUSION

Turkish beadwork was unique among all the prisoner-of-war objects made during World War I. Using traditional folk-art techniques, Turkish prisoners near military bases in the Middle East were able to better their lives in captivity by selling popular beadwork souvenirs in the form of snakes, lizards, purses, beadwork bands, necklaces, and belts for British and Australian soldiers to take home as war souvenirs. The pieces that survive today are a moving tribute to the brave Ottoman soldiers who created a wonderful array of beautiful objects in the midst of their crumbling empire.

Figure 8. Wooden opium pipe in the form of a sphinx with inlaid turquoise beads for eyes; L: 11 cm (photo by author).

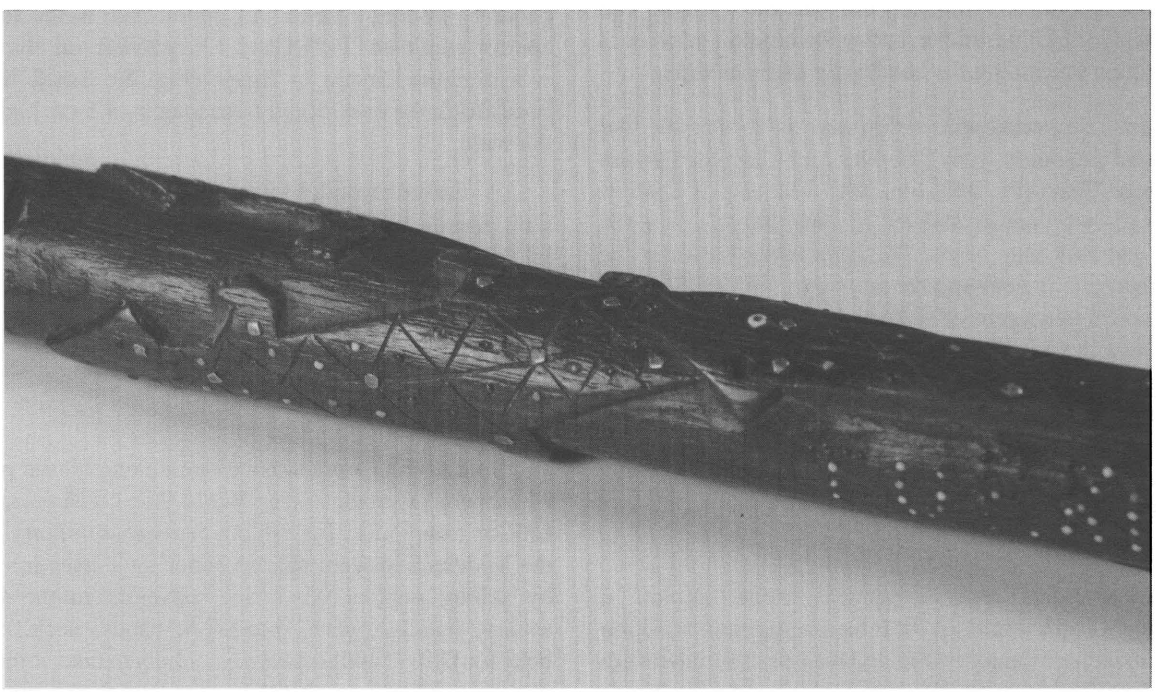


Figure 9. Detail of a wooden walking stick carved with images of snakes swallowing lizards. Inlaid with turquoise and white beads; L: 93 cm (photo by author).

ACKNOWLEDGEMENTS

Flora Book, beadwork artist and collector of Turkish prisoner-of-war beadwork; Yvonne Cresswell, Curator, Social History, Manx National Heritage, Isle of Man; Valerie Hector, beadwork artist, researcher, and collector; Lesleyanne Hawthorne, owner of the Burrowes snake; Jean François Krause, creator of the Ottoman Empire map; Nancy Kushigian for her support and computer expertise in putting this article together; David Pickler, creator of the website "Beadwork Snakes and Lizards;" Adele R. Recklies, author; and Dianne Rutherford, Research Centre, Australian War Memorial.

ENDNOTES

1. A shorter version of this paper was published by Rezan Has Museum in the proceedings of the International Bead & Beadwork Conference held November 22-25, 2007 at Kadir Has University in Istanbul, Turkey (Kimball 2007).

2. In the Aegean, Turkish prisoners were incarcerated at Mudros on the island of Lemnos and on Rhodes, Imbros, Tenedos, and Chios.

3. Prisoner-of-war handicrafts date back at least to the Napoleonic Wars, when French prisoners in Britain developed an active cottage industry producing objects from bone, straw, and wood. The Great War spawned prisoner handicrafts on a much larger scale. Belgian soldiers and civilians interned in Germany, British soldiers, sailors, and civilians interned in Germany and Holland, German civilians interned on the Isle of Man, and German soldiers in various camps on the Western Front made a variety of handicrafts. Examples of these and Turkish prisoner-of-war beadwork and other crafts are illustrated in *Trench Art: An Illustrated History* (Kimball 2004).

4. Turkish soldiers imprisoned in World War I in different areas developed their own craft specialties. Prisoners in Russia and at Salonika carved small wooden tobacco boxes. Ottoman soldiers captured in Mesopotamia were transported to camps in Burma and India where they made a variety of objects from scrap aluminum.

5. The delegation visited prisoner-of-war camps at Heliopolis, Maadi, the Citadel in Cairo, Ras-el-Tin, Sidi Bishr, Hospital No. 2 at Abbassiah, and the Egyptian Red Cross hospital at Cairo.

6. A large number of soldiers in this camp were captured during the Gallipoli Campaign. Twelve hundred Ottoman soldiers captured near the Suez Canal in the Sinai Peninsula were also transported to Maadi Camp.

7. A photograph of the Burrowes snake was included on David Pickler's website "Beadwork Snakes and Lizards" (http://mysite.wanadoo-members.co.uk/beadworksnake/index.jhtml) which unfortunately no longer exists.

8. A selection of Turkish prisoner-of-war beadwork pieces held by the Australian War Memorial can be seen on the Memorial's website: (http://cas.awm.gov.au/). Search the "Collection Database" under "Turkish beadwork." More information on Turkish prisoner-of-war beadwork prepared for an exhibition on Lawrence of Arabia can be found at: http://blog.awm.gov.au/lawrence/?p=156.

REFERENCES CITED

Baily, Leslie
1959 *Craftsman and Quaker: The Story of James T. Baily, 1876-1957*. George Allen and Unwin, London.

Cresswell, Yvonne (ed.)
1994 *Living with the Wire: Civilian Internment in the Isle of Man during the Two World Wars*. Manx National Heritage, Douglas, Isle of Man.

Erickson, Edward J.
2001 Ordered to Die: A History of the Ottoman Army in the First World War. *Contributions in Military Studies* 20. Greenwood Press, Westport, Connecticut.

Ferguson, Niall
1999 *The Pity of War*. Basic Books, New York.

Hansard Parliamentary Debates
1917 5th series, vol. 96, col. 386. London.

The Imperial War Museum
1918 H.M.S.O. London.

International Committee of the Red Cross
1917 *Turkish Prisoners in Egypt: A Report by the Delegates of the International Committee of the Red Cross*. Red Cross Society, London.

Kimball, Jane A.
2004 *Trench Art: An Illustrated History*. Silverpenny Press, Davis, California.

2007 Turkish Prisoner of War Inscribed Beadwork of the Great War. In *International Bead & Beadwork Conference*, edited by Valerie Hector and Jamey D. Allen. Kadir Has University, Istanbul.

Krause, Jean François
2002 L'Empire Ottoman á la veille de la Grande Guerre, 1914-18. *Ie magazine de la Grande Guerre* 9 (Août/Septembre).

Pye, Ernest
1918 *Prisoner of War, 31,163, Bedros M Sharian*. Fleming H. Revell, New York.

Quayle, Frank C.
1990 Knockaloe Moar. *Isle of Man Family History Society Journal* 12(4); *http://www.isle-of-man.com/manxnotebook/famhist/v12n4.htm*.

Recklies, Adele R.
2005 *Bead Crochet Snakes: History and Technique*. Reckless Beading Press, New York.

Sargeaunt, B.E.
1920 *The Isle of Man and the Great War*. Brown and Sons, Douglas, Isle of Man.

Jane A. Kimball
Librarian Emerita
University of California
710 Neilson Street
Berkeley, CA 94707
E-mail: silverpenny@mindspring.com

EIGHTEENTH-CENTURY GLASS BEADS FROM THE ENGLISH SLAVING FORT AT BUNCE ISLAND, SIERRA LEONE

Karlis Karklins

While countless tons of European glass beads flowed into West Africa over the centuries, there is still relatively little information concerning what specific nations were importing over time. It was therefore of great interest to learn about two collections of beads surface collected at the site of a British slaving fort that operated on Bunce Island in the Sierra Leone estuary of coastal Sierra Leone from the late 17th to the early 19th century. Although it is impossible to assign the beads to a specific period in the fort's history, it is clear that they are of 18th-century origin and were part of the goods traded by the British. The present study describes the small but diverse collection of beads and places them in historical context.

INTRODUCTION

Bunce Island, measuring only about 550 by 110 m, is located at the limit of navigation in the estuary of the Sierra Leone River some 25 km to the northeast of Freetown, the capital of Sierra Leone, in West Africa (Fig. 1). Although not well known, it is significant as it was the site of the principal British slaving post in the region for over one hundred years, from the late 17th to the early 19th century. Although it was captured and burned on several occasions by pirates and others, it remained in British hands for the entire period. This is in contrast to the situation elsewhere in West Africa where many of the forts often changed hands and were occupied by various nationals, or competing forts were situated close to each other so artifacts recovered from them often represent a number of trading sources. Thus artifacts recovered from archaeological contexts on Bunce Island have the potential to show us what specific types of goods were being traded to the indigenous population by the British during the 18th century. While it would be beneficial to discuss all the recovered material, this article will primarily deal with the glass trade beads surface collected at the site on two separate occasions.

THE STORY OF BUNCE ISLAND

Situated at the southwestern corner of West Africa, Sierra Leone (originally Serra Lyoa) was named by Portuguese explorers in the middle of the 15th century (Fyfe 1962:1). In the years that followed, the Portuguese who traded here were joined by entrepreneurs from many nations, all of whom came to obtain ivory and slaves for which they proffered such European commodities as cotton cloth, firearms, tobacco, brandy, rum, and beads (Fyfe 1962:9; Kup 1961:25).

The traders included the English who began arriving in earnest in the early part of the 17th century. Having obtained a trading monopoly from the local king, a London-based firm by the name of Wood and Company had already established a trading fort in the Sherbro region by 1628. There followed The Royal Adventurers of England Trading into Africa, chartered by Charles II in 1660, which lost no time in building forts in the Sherbro region and on Tasso Island near the mouth of the Rokel River. This concern was taken over by the Gambia Adventurers in 1668, which soon began construction of a roughly square fortification at the downstream end of Bunce Island, an area that was raised approximately 4.6 m above the rest of the island. The Royal African Company took over the fort in 1678 (Kup 1961:97; Lawrence 1969:71; Opala 2007:145). In 1713, Bunce functioned as a satellite fort under the control of the Chief Agent at Sherbro. Six years later, it became the headquarters for the Royal African Company (Fyfe 1962:4).

At this time the fort had of a stone wall 2.5 m high with three circular bastions facing the navigable channel with the rest of the compound enclosed by a palisade. Within the enclosure was a masonry governor's house, a stone slave building, the employees' dwellings, and a slave yard. Outside lived the free laborers or *grumettas* (DeCorse 2007:7; Lawrence 1969:71-72). Although 17 cannon guarded the fort, they did not repel a force under

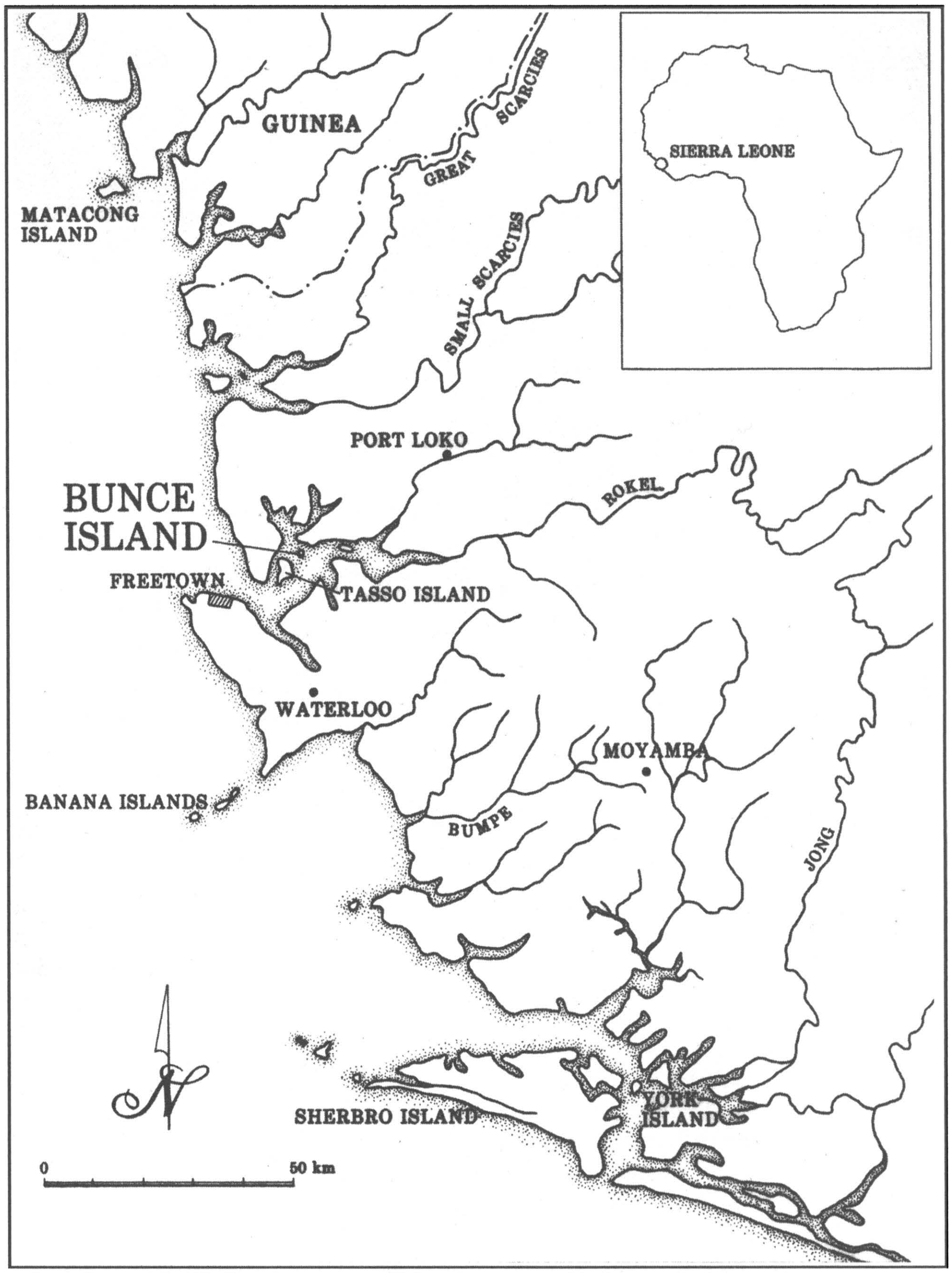


Figure 1. Map of western Sierra Leone showing the location of Bunce Island (Drawing: D. Kappler).

the command of the Afro-Portuguese slaver José Lopez da Moura which captured and burned it to the ground in October of 1728 (Opala 2007:145). As the fort had never been very profitable, this was the last straw and the Royal African Company summarily withdrew from Sierra Leone, which then came under the control of pirates and private traders (Kup 1961:109-110, 112).

The fort on Bunce remained in ruins until the 1740s when it was purchased by George Fryer, a British merchant, who then sold it to Grant, Oswald, and Company of London in 1748 (Opala 2007:145). Under this new management, Bunce began to prosper and would soon become one of the principal slave-trading establishments in the region (Opala 2007:145). Considered the finest fort that the English possessed on the coast, Bunce nevertheless fell, practically undefended, to the French in 1779, and was again laid waste. Operating in a dilapidated condition, the fort entered a period of decline (Kup 1961:116-117).

The company of John and Alexander Anderson, another London-based concern, took possession of Bunce Island in 1764 (Opala 2007:146). They soon had business back on track and the venture prospered for three decades but then things began to unravel. The French once again attacked the fort in 1794, and the following six years saw the company's ships harassed by French privateers (Fyfe 1962:60-61). Then, in 1807, the English Parliament forbade British subjects from engaging in the slave trade and Sierra Leone became a Crown Colony the following year (Opala 2007:160). This sounded the death knell for the fort on Bunce Island (Fig. 2).

When the island became the site of a temporary recruiting station for the Royal African Corps and the West Indian regiments in 1811, only a handful of fort employees still lived there (Fyfe 1962:118). The Andersons sold the island in 1817 to their agent, Henry Williams, who established a sawmill there. Providing "African teak" for the shipbuilding trade, the sawmill appears to have functioned until the early 1840s at which time the business folded and the site was finally abandoned (Opala 2007:160). The old fort soon fell into ruins and now only an occasional visitor disturbs its moldering stones.

THE INVESTIGATION OF BUNCE ISLAND

Interest in the ruins on Bunce Island began in the late 1940s when M.C.F. Easmon, a doctor and amateur historian, succeeded in having the fort designated as Sierra Leone's first historic site. The overgrown structures were cleared of vegetation and surveyed, and even a model of the ruins was prepared but it appears little else was subsequently done to investigate or develop the site (Opala 2007:161).

The investigation of Bunce Island was renewed in 1976, when Joseph Opala, a Peace Corps volunteer on the staff of the Institute of African Studies at Fourah Bay College, undertook an archaeological survey of the site as part of a project funded by the U.S. Embassy. He updated the plans made during Easmon's survey and also surface collected artifacts on the beach below the fortifications. These consisted primarily of European ceramics (Opala 1977). No beads were recovered. Subsequent work focused on structural details and the preparation of a computer-generated reconstruction of the fort as it appeared in 1805 (Opala 2007:162-163).

Despite the fact that the fort on Bunce Island is a significant historical and archaeological site, no excavations have been undertaken as of this writing. All the material recovered to date is in the form of surface material found eroding from the beach. The first person to report on such material was James J. Johnston (1973) of the U.S. Foreign Service who was stationed in Freetown in 1971-1972. He collected a variety of items, including glass beads, during several visits to the island. The material was found eroding from an old trash deposit located on the beach below the fort's stone defense wall at the east end of the island. Finding that many of the beads had correlatives at Native American sites, Mr. Johnston donated a portion of his finds to the University of Arkansas Museum in Fayetteville, Arkansas.

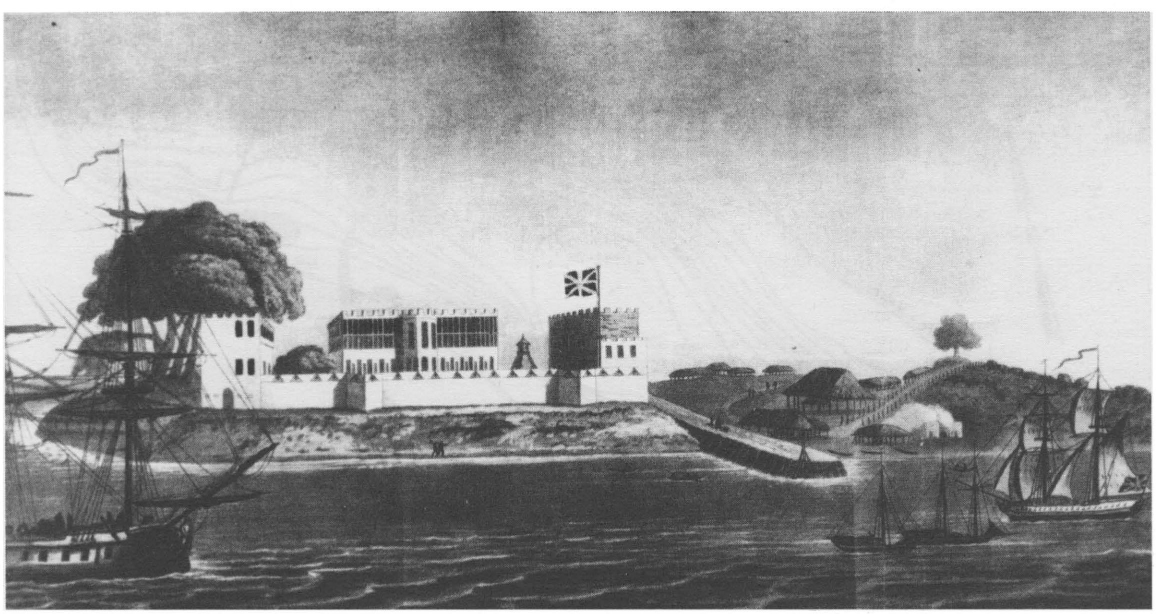


Figure 2. "Bance Island, in the River Sierra Leone. The property of John & Alexander Anderson esq[rs], London." Drawing by R. Cooking from a sketch by J. Corry (Corry 1807: opp. 40).

A formal archaeological assessment of the island was undertaken in October of 1993 by Christopher R. DeCorse (1994) with the assistance of Leland Ferguson. The work was performed at the invitation of the American Embassy, with the permission of the Sierra Leone Monuments and Relics Commission, and was intended to provide a preliminary assessment of the cultural resources of the island with an eye to the possible development of the site as a national resource.

Work concentrated on the northern end of the island where the fort is located. The west end could not be examined as it was heavily overgrown. Artifacts were only found on the beach and to provide horizontal control, the entire beach was divided into 10-m-square units (Fig. 3). As one might expect, artifacts were concentrated adjacent to the fortifications and represent secondary refuse deposits (Figs. 4-5). Diagnostic artifacts included ceramic sherds, smoking pipe and bottle fragments, coins, and beads. Save for the beads, many of the objects were found to be of 18th-century British manufacture, though some Dutch and Chinese ceramics were also recovered. Due to time constraints, only a cursory analysis could be performed. The bead data are presented in Appendix A.

A more extensive investigation of Bunce Island was performed in 2006, again by Christopher DeCorse (2007). This involved a thorough survey of the surface structures with emphasis on the fort location. While surface artifacts were encountered, none were collected, it being deemed that sufficient data had been obtained from the material collected in 1993.

THE BUNCE ISLAND BEADS

The beads described here are part of those collected in 1971-1972 by James J. Johnston. The University of Arkansas Museum kindly loaned the author a representative sample of the beads for analysis.

The 155 specimens comprising the study collection represent 36 distinct varieties; 23 of these are of drawn manufacture, 12 are wound, and 1 is mold-pressed. The recorded varieties are identified using the classification system devised by Kenneth and Martha Kidd (1970) and expanded by Karklins (1985). Varieties not recorded by the Kidds are marked by an asterisk (*) in the identifying code followed by a sequential letter in parentheses for ease of reference in text.

Colors are designated using the names and codes in the *Color Harmony Manual* (Container Corporation of America 1958). The equivalent color code in the Munsell color

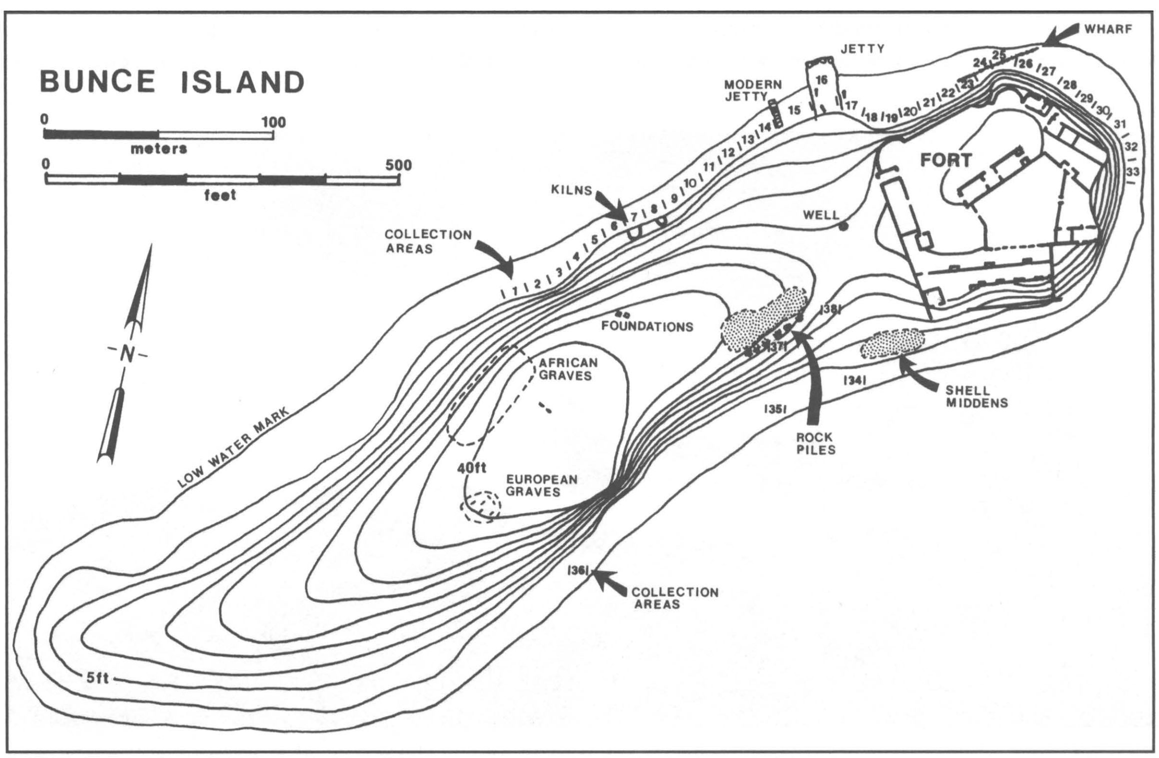


Figure 3. Topographical view of Bunce Island showing the 1993 collection areas (courtesy: C.R. DeCorse).

Figure 4. Bunce Island viewed from the southwest. The modern jetty is visible on the right, the stones of the old jetty are in the center, and the ruins of the fort are in the vegetation to the left (photo: C.R. DeCorse).

Figure 5. Close-up of the old jetty on Bunce Island in 2006, showing part of the beach where the majority of the beads were found. A cannon rests against the jetty (courtesy: V. Viditz-Ward).

notation system (Munsell Color 1976) is also provided for the benefit of those who may not be familiar with the manual. Patinated beads were moistened with water to reveal their true color. Diaphaneity is described using the terms opaque (op.), translucent (tsl.), and transparent (tsp.).

The size categories used were established by Kidd and Kidd (1970) and refer to bead diameter. They have the following numerical values: very small, under 2 mm; small, 2- 4 mm; medium, 4 - 6 mm; large, 6 - 10 mm; and very large, over 10 mm. As this sizing system provides only a minimum of information, the exact diameter and length range of each variety is also presented to increase the comparative value of this report.

In the descriptions that follow, reference is made to the color illustrations by plate, row, and row position; e.g., Pl. IIIC, R. 1, #1 designates the first bead in Row 1 of Plate IIIC.

Drawn Beads

These are composed of short sections of tubing drawn out from a hollow gather of molten glass. Their ends were either left as unaltered breaks or rounded by subsequent heating and agitation.

Ia2. Tubular; op. black; broken ends; medium size; 1 specimen (Pl. IIIC, R. 1, #1).

Length: 19.8 mm   Diameter: 5.9 mm

Ia*(a). Tubular; op. sunlight yellow; well-rounded ends; large size; 1 specimen (Pl. IIIC, R. 1, #2).

Length: 13.1 mm   Diameter: 8.5 mm

Ia*(b). Tubular; op. dark palm green; broken ends; large size; 1 specimen (Pl. IIIC, R. 1, #3).

Length: 21.0 mm   Diameter: 8.9 mm

Ia19. Tubular; tsp. bright navy; broken ends; numerous linear bubbles in the glass; striated surfaces; small to large size; 6 specimens (Pl. IIIC, R. 1, #4; R. 2, #1).

Length: 8.5-34.1 mm   Diameter: 3.5-9.7 mm

Ib*(a). Tubular; op. white body decorated with 3 op. dark rose-brown stripes; well-rounded ends; large to very large size; 4 specimens (Pl. IIIC, R. 2, #2).

Length: 9.4-13.6+ mm   Diameter: 9.5-13.9 mm

Ibb*(a). Tubular; op. white body decorated with 4 op. light gold on op. redwood stripes; well-rounded ends; large size; 4 specimens (Pl. IIIC, R. 2, #3).

Length: 10.8+-20.8+ mm   Diameter: 7.0-7.2 mm

IIa6. Round; op. black (tsp. rose wine on thin edges); large size; 1 specimen (Pl. IIIC, R. 2, #4).

Length: 5.7 mm   Diameter: 6.4 mm

IIa13. Round; op. white; large size; 1 specimen (Pl. IIIC, R. 2, #5).

Length: 7.8 mm   Diameter: 8.0 mm

IIa15. Oval; op. white; large size; 3 specimens (Pl. IIIC, R. 2, #6).

Length: 11.8-13.3 mm   Diameter: 7.1-8.8+ mm

IIa*(a). Oval; tsp. bright blue; large size; 17 specimens (Pl. IIIC, R. 3, #1).

Length: 11.3-16.6 mm   Diameter: 6.5-9.9 mm

IIa57. Oval; tsp. bright navy; large size; 4 specimens (Pl. IIIC, R. 3, #2).

Length: fragmentary   Diameter: 7.3+-9.5+ mm

IIb*(a). Round to barrel shaped; op. black (tsp. rose wine on thin edges) body decorated with 6 op. white stripes; large size; 7 specimens (Pl. IIIC, R. 3, #3).

Length: 6.3-9.5 mm   Diameter: 7.8-9.7+ mm

IIb*(b). Round to barrel shaped; op. black (tsp. rose wine on thin edges) body decorated with 8 op. white stripes; large to very large size; 11 specimens (Pl. IIIC, R. 3, #4-6).

Length: 6.5-11.3 mm   Diameter: 6.8-10.7 mm

IIb*(c). Barrel shaped; tsp. bright blue body decorated with 6 op. white stripes; large size; 1 specimen (Pl. IIIC, R. 4, #1).

Length: 9.2 mm   Diameter: 8.3+ mm

IIb*(d). Barrel shaped; tsp. bright blue body decorated with 8 op. white stripes; large size; 1 specimen (Pl. IIIC, R. 4, #2).

Length: 8.3 mm   Diameter: 7.8 mm

IIb*(e). Round to barrel shaped; tsp. bright navy body decorated with 24 thin op. white stripes; large size; 14 specimens (Pl. IIIC, R. 4, #3).

Length: 8.3-11.2 mm   Diameter: 7.2-9.8+ mm

IIb'*(a). Barrel shaped; op. black (tsp. dark rose brown on thin edges) body decorated with 6 spiral op. white stripes; very large size; 1 specimen (Pl. IIIC, R. 4, #4).

Length: 10.8 mm   Diameter: 12.1+ mm

IIIa2. Tubular; op. redwood outer layer; tsp. light gray core; ends slightly to well rounded; medium size; 2 specimens (Pl. IIIC, R. 4, #5).

Length: 8.7-9.8 mm Diameter: 3.5+-4.0+ mm

IIIa3. Tubular; op. redwood outer layer; tsp. apple green core; ends slightly to well rounded; surfaces greatly eroded; large size; 5 specimens (Pl. IIIC, R. 4, #6).

Length: 7.6+-24.3 mm Diameter: 5.3-7.1 mm

IIIb*(a). Tubular; op. light gold outer layer decorated with 3-4 op. redwood stripes; tsl./op. oyster white core; ends slightly to well rounded; large size; 6 specimens (Pl. IIIC, R. 5, #1).

Length: 9.6-21.0 mm Diameter: 6.0-7.8 mm

IIIb*(a). Tubular; tsp. cinnamon outer layer decorated with 10 thin op. white stripes; op. white middle layer; tsl. mustard tan core; ends slightly to well rounded; large size; 7 specimens (Pl. IIIC, R. 5, #1).

Length: 18.8-20.7 mm Diameter: 7.0-8.1+ mm

IIIk*(a). Tubular; chevron bead with 4 starry layers: 1) tsp. bright navy outer layer, 2) op. white, 3) op. redwood, 4) op. white (bluish tint) core; glass is very eroded; large to very large size; 3 specimens (Pl. IIIC, R. 5, #3).

Length: 13.3+-25.0+ mm Diameter: 7.5+-10.8+ mm

IVa5. Round to barrel shaped; op. redwood outer layer; tsp. apple green core; large size; 8 specimens (Pl. IIIC, R. 5, #4-5).

Length: 6.9-11.0+ mm Diameter: 7.3+-9.0+ mm

Wound Beads

These were made by winding a strand of molten glass around a metal mandrel until the desired size and shape were achieved. The beads were sometimes pressed with small paddles to impart facets, or decorated with glass appliqués.

WIb*(a). Round; op. black; very large size; 6 specimens (Pl. IIID, R. 1, #1-2).

Length: 10.1-11.6 mm Diameter: 11.0-15.1 mm

WIb5. Round to oblate; tsl. pale blue; very large size; 12 specimens (Pl. IIID, R. 1, #3-5).

Length: 6.5-18.5 mm Diameter: 10.0-20.2 mm

WIb*(b). Round to oblate; op. dark green; very large size; 1 specimen (Pl. IIID, R. 2, #1).

Length: 11.8 mm Diameter: 11.7 mm

WIb14. Oblate; op. bright Dutch blue; the beads are fused together; very large size; 2 specimens (Pl. IIID, R. 2, #2).

Length: 6.9 mm Diameter: ca. 11.0 mm

WIb16. Round to barrel shaped; tsp. bright navy; eroded surfaces; large to very large size; 3 specimens (Pl. IIID, R. 2, #3-4).

Length: 7.0-13.3 mm Diameter: 7.4-13.0 mm

WIc*(a). Oval; op. black; eroded surfaces; very large size; 8 specimens (Pl. IIID, R. 3, #1-2).

Length: 16.3 mm Diameter: 13.4-16.8 mm

WIc3. Oval; tsl. pale blue; eroded surfaces; very large size; 2 specimens (Pl. IIID, R. 3, #3).

Length: 13.5+-29.0 mm Diameter: 11.5+-18.8+ mm

WIIc2. Pentagonal faceted; tsp. light gray; eroded oblate specimen exhibiting a series of pressed pentagonal facets; very large size; 1 specimen (Pl. IIID, R. 4, #1).

Length: 6.9 mm Diameter: 11.6 mm

WIIf*(a). Ridged tube (pentagonal cross-section); tsp./tsl. bright navy; eroded surfaces; each bead exhibits 5 pressed rectangular facets that extend from one end to the other; very large size; 2 specimens (Pl. IIID, R. 4, #2).

Length: 9.9-11.1 mm Diameter: 13.2 mm

WIIIb*(a). Round to oblate; op. black body decorated with an op. white lattice design composed of 3 interwoven glass strands; shiny to dull surfaces; very large size; 6 specimens (Pl. IIID, R. 4, #3).

Length: 10.3-12.7 mm Diameter: 14.0-14.4 mm

WIIIb*(b). Round; op. black body decorated with 12 eyes (the 4 around either end are tsp. aqua green on op. white; the inlays of the 4 equatorial eyes are missing); large size; 1 specimen (Pl. IIID, R. 4, #4).

Length: 8.4 mm Diameter: 8.5 mm

WIIIb*(c). Barrel shaped; tsp. bright blue; the eroded surface exhibits a series of rounded ridges and oval medallions set parallel to the perforation which probably represent colored glass inlays that have leached out; large size; 1 fragmentary specimen (Pl. IIID, R. 4, #6).

Length: 6.6 mm Diameter: 8.3+ mm

Mold-Pressed Beads

Produced by pressing melted glass in a two-piece mold. The surface could subsequently be altered by grinding.

MPIIc*(a). Long octagonal barrel (Beck's [1928] type XIV. D.1.b.); tsl./op. redwood; the molded facets appear to have been smoothed by grinding; eroded surface; very large size; 1 very fragmentary specimen (Pl. IIID, R. 4, #5).

Length: indeterminate Diameter: ca. 19.5 mm

Observations

While the total bead sample is relatively small (232 specimens), it is possible to make a few observations concerning the Bunce collection. Undecorated drawn beads are a major feature with tubular and heat-rounded forms appearing in about equal quantities. Red and blue varieties predominate. Striped beads are also common with heat-rounded forms outnumbering tubular specimens. Black and blue beads with straight white stripes predominate but white beads with red or gold/red stripes and yellow or yellowish-brown beads with red or white stripes are also present. There are also two varieties of blue chevron beads with 4-5 layers.

The wound bead category is dominated by very large monochrome specimens that are generally round to oblate but also range to oval and doughnut forms. Complex forms include ridged tubes and pentagonal-faceted specimens. The majority are pale to dark blue in color but white, gray, black, and dark green specimens are also present. Decorated wound beads are in a minority with black specimens decorated with a white latticework being the most common. Much less common are beads decorated with eyes, spiral stripes, or other inlaid designs.

DeCorse (2007:247) identified one very small faceted bead as possibly being made of quartz crystal but it may well be glass.

DATING THE BUNCE ISLAND BEADS

Being surface finds, it is impossible to attribute any of the beads from Bunce Island to a specific phase of the fort's occupation. It is, however, possible to assign a general date to them based on comparisons with beads from well-dated archaeological sites. As such bead assemblages are rare in West Africa, it is necessary to compare the Bunce material to that from sites in eastern North America to arrive at a probable date. This is an acceptable procedure, research having revealed that beads were reaching West Africa, the Caribbean, and eastern North America at about the same time during the 18th century (Karklins 1991:41) as a result of the triangular slave trade which linked these areas with Europe.

As a group, the Bunce beads fall neatly into Quimby's (1966) middle historic period which extends from ca. 1670 to ca. 1760. It is defined by such bead types as the striped drawn varieties, and the large and very large wound beads in oval, pentagonal-faceted, and ridged-tube forms, as well as those with lattice-like decoration. The presence of small projections on the ends of some of the drawn specimens and the elongated form of others is indicative of *a speo* manufacture which was used to heat-round beads from at least the early 17th century to the latter part of the 18th century (Karklins 1993).

While a few Bunce varieties extend well into the 19th century—such as the four-layer chevron (IIIk*), the black eye bead (WIIIb*), and the long octagonal barrel (MPIIc*)—the general indication is that the majority of the varieties may be attributed to the 18th century.

The material collected by DeCorse (1994:7-8) corroborates such a postulation. Many of the recovered ceramics, as well as the bottle and clay smoking pipe fragments, are clearly of 18th-century British origin, though such British ceramics as white salt-glazed stoneware, creamware, pearlware, and Nottingham and brown stoneware are specifically attributable to the second half of the 18th century. While nothing definitely associated with the 17th century was found, several early 19th-century items were identified, specifically whitewares and other refined white-bodied earthenwares, as well as a clay smoking pipe with a likely 19th-century bowl form.

Furthermore, Mr. Johnston (1973) recovered "two coins, a William III [1698-1701] penny and a quarter of a Spanish 8 reales, minted in Mexico [post-1732-1772], and an anti-slavery medal from late in the 18th century" which further supports an 18th-century provenience for the beads.

BEAD USE IN SIERRA LEONE

How the beads traded at Bunce may have been used by the native population is revealed by several historical accounts. Probably the best description of these peoples' adornments was penned by John Matthews while visiting Sierra Leone in 1786:

> Their dress is very simple and easy. The boys and girls never wear any thing but a *tuntungeé*, which is a thin slip of cloth passed between the legs. The different manner of wearing it denotes the sex. The

girls have a string tied round their waist, and the ends of the *tuntungeé* are tucked under it, and left to hang down before and behind, with a belt or girdle of beads, or loose strings of them tied round their waist; the boys have the short end forward, the other part is brought round their loins, tucked under, and left to hang down behind only. After marriage the women lay aside the *tuntungeé*, (except among the Nalloes, who never wear any thing else) and wear a cloth round their waist, which reaches down about the middle of the leg; though they are very fond of wearing it over their breasts, not in order to hide them, but to make them flat, which (as it is a sign of womanhood) gives them additional consequence. They are also very fond of ornaments, such as beads formed into necklaces, bracelets, &c. silver rings, lockets and chains, manillas, (which are hoops of silver made flat or round to wear on the wrists), strings of coral and use a variety of paints. An African lady, when full drest, makes no contemptible figure:—over her common country cloth, which we may term her under petticoat, she wears one of red taffity; a black silk handkerchief tied by two corners round her neck, hangs down before like a child's bib, and covers her bosom; another of the same colour is tied round her head: she has gold earrings in her ears, round her neck a string of large coral; and a silver or gold locket and chain. On each wrist two or three manillas, and five or six silver rings on each finger; her forehead is painted with various angles and triangles of white or red, and her hair neatly and curiously plaited; and sometimes close shaved in small circular or crescent formed spots.—Behind her follows her waiting-maids, (who are generally the prettiest girls she can procure, from ten to fifteen years old), decorated with coral and beads, and a piece of taffity or fine chintz thrown over their left shoulders like a highlander's plaid (Matthews 1788:107-109).

A bit more information is provided in Catherine Hutton's account of her pretended visit to Africa in the early 1800s:

> The inhabitants are Mandingoes, and are a mixture of Pagans and Muhamedans; but the former are by far the most numerous, and the government is in their hands.... The habit of the Mandingoes is the loose frock, not unlike a surplice, made of cotton cloth; with drawers, which reach half way down the leg, sandals, and a white cotton cap. The dress of the women consists of two pieces of cotton, each about two yards long and one broad; the one wrapped round the waist, and forming a petticoat, which reaches to the ancles; the other thrown negligently over the shoulders and bosom. This is the dress worn in all the countries in this part of Africa; but the head-dress varies according to the taste of the females of different nations, and the ornaments within their reach. On the Gambia, they wear a narrow fillet of cotton, wrapped many times round the head. In Bandou, the head is encircled by strings of white beads, and a small plate of gold is worn on the middle of the forehead. In Kasson the head is decorated in an elegant manner with white shells. In Kaarta and Ludamar, the hair is raised very high, by means of a pad, and adorned with coral (Hutton 1821, 3:24).

While traveling among the Timannee (Temne) who lived in the area to the east of Bunce Island, Major Alexander Gordon Laing (1825:82) noted the following:

> The dress of the females, near the waterside, is simple enough. They wear before marriage a narrow piece of cloth, called tuntunge, or a covering of beads called a patie, fastened before and behind to a strip of cloth, or to strings of beads, encircling their loins; [a]fter marriage, the patie and tuntunge are laid aside, and the more decent attire is adopted of two yards of blue bast, wrapt round the body like a petticoat [Fig. 6]. They are fond of decorating their heads, necks, wrists, and ancles with beads; those most prized by them are the small coral, and a yellow pound bead, known among them by the name of masarabunto.

Further to the east, Laing encountered the Koorankos (Koranko). Of their dress and adornments he wrote:

> The costume of the females resembles that of the Timannees, being merely a tuntunge or patie of beads before marriage, and a cloth more scanty than that used by the Timannees after marriage; this cloth or pang is wrapt round the middle, and only impends as far as the ham of the leg. They are great proficients in the art of dressing hair, and ornament each other's heads with great skill. The front part of the head is left plain, the hair or wool being combed back, and gathered into large balls, one over each temple, the summits of which are decorated by a cowry, or a bead of mock coral; from these balls a succession of neat plats are suspended round the back of the head, to the ends of which are attached beads or cowries, and among the dancers hawk's bells (Laing 1825:198-199).

While in Falaba, in what is now eastern Sierra Leone, Laing (1825:310-311) recorded the ornaments of the local women:

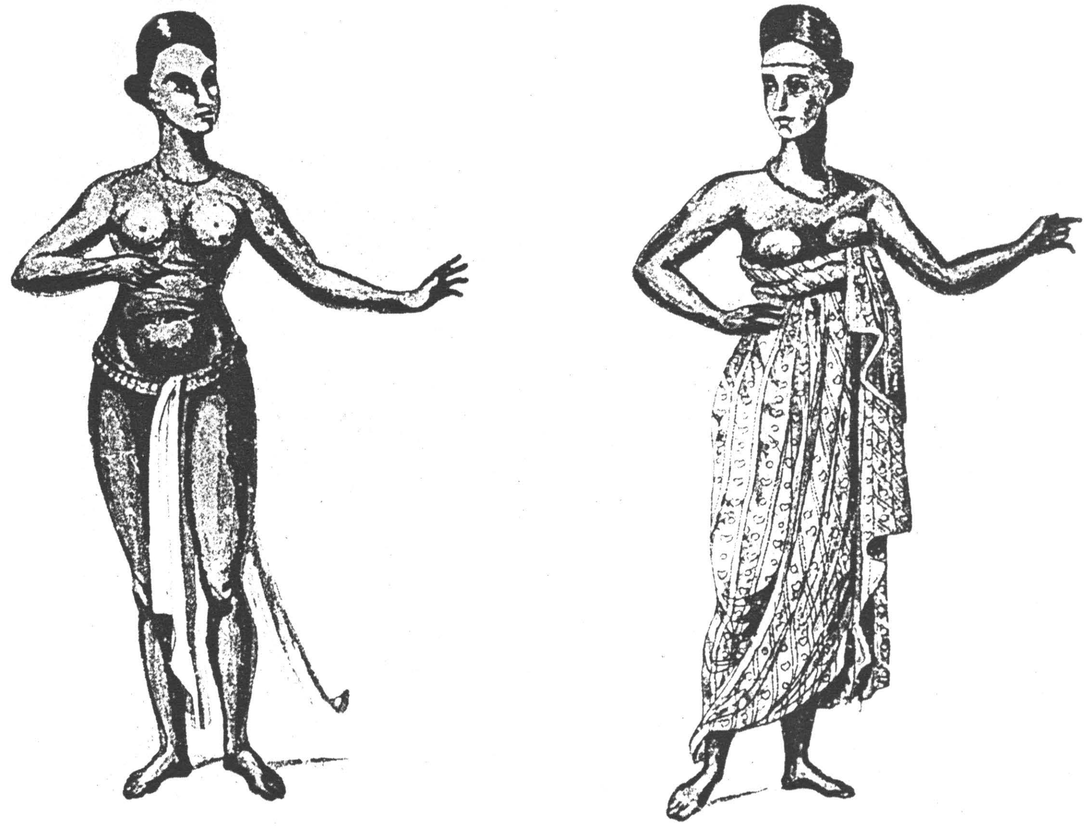


Figure 6. Timannee females, before (left) and after (right) marriage (Laing 1825: opp. 81).

> The wool, or hair, was divided, and arranged into a number of small balls, which were tipt, or surmounted, by beads, cowries, and pieces of red cloth, the interstices being smeared nearly an inch thick with fresh butter, a most disgusting practice, adopted as a substitute for palm oil; the ancles and wrists were beautifully ornamented with strings of pound beads of various colours, laced tightly together in depth about fifteen or twenty strings.

From the above it is clear that glass beads were popular among the native women as adornments for the head, neck, waist, and ankles, as well as to adorn some unmarried womens' tuntunges. Interestingly, no mention is made of bead use by men and children but the likelihood is that they were adorned with beads to some degree as well.

CONCLUSION

While many of the objects collected on Bunce Island were manufactured in England, the beads are doubtless of Venetian origin with the possible exception of the single mold-pressed specimen which may have been produced in Bohemia. Available to every European trading nation, they have a wide distribution and are found on sites controlled or supplied by various nations. Correlatives found at several similarly dated sites in West and South Africa, the Caribbean, and the eastern United States are presented in Table 1. The beads collected in 1993 have not been included as many of those that seem to be new varieties are not described in enough detail to allow for accurate comparisons.

As can be seen, a number of the varieties have counterparts at several far-flung sites, most notably the Dutch trading fort at Elmina, Ghana; the major trading center of St. Eustatius in the Caribbean which was off and on in the hands of the Dutch, French, and English; and two Native American village sites in the southeastern United States supplied primarily by the French and/or Americans. This suggests that it is going to be difficult to identify a distinctly British trade bead assemblage for West African sites on the basis of the beads themselves. Nevertheless, it is hoped that archaeological excavations will be conducted on the various historical structures on Bunce Island so that a more precise view of what the British were trading there may be attained.

Table 1. Comparative Site Data for the Bunce Island Beads.

Description	Archaeological Sites (*see* key at end of table)							
	1	2	3	4	5	6	7	8
Ia2. Tubular; op. black		X		X			X	X
Ia*(a). Op. sunlight yellow				X				
Ia*(b). Op. dark palm green		X						
Ia19. Tsp. bright navy		X		X		X	X	X
Ib*(a). White; 3 brown stripes						X		
Ibb*(a). White; 4 gold/red stripes								
IIa6. Round; op. black			X	X		X	X	X
IIa13. Round; op. white						X	X	X
IIa15. Oval; op. white						X	X	X
IIa*(a). Oval; tsp. bright blue							X	
IIa57. Oval; tsp. bright navy		X			X		X	X
IIb*(a). Black; 6 white stripes						X	X	
IIb*(b). Black; 8 white stripes	X	X				X		
IIb*(c). Tsp. bright blue; 6 white stripes								
IIb*(d). Tsp. bright blue; 8 white stripes							X	
IIb*(e). Tsp. bright navy; 24 white stripes				X				
IIb'*(a). Op. black; 6 spiral white stripes							X?	X?
IIIa2. Op. redwood exterior; tsp. gray core								X
IIIa3. Op. redwood exterior; tsp. green core				X		X	X	X
IIIb*(a). Op. light gold exterior; 3-4 op. red stripes								
IIIb*(b). Tsp. cinnamon exterior w/ 10 white stripes								
IIIk*(a). Tubular; chevron	X	X						
IVa5. Op. red exterior; tsp. green core	X	X	X	X			X	
WIb*(a). Round; op. black		X		X				
WIb5. Tsl. pale blue	X				X	X	X	

Table 1. Continued

Description	Archaeological Sites (*see* key at end of table)							
	1	2	3	4	5	6	7	8
WIb*(b). Op. dark green								
WIb14. Op. bright Dutch blue								
WIb16. Tsp. bright navy		X		X		X		
WIc*(a). Oval; op. black		X						
WIc3. Tsl. pale blue				X		X		
WIIc2. Pentagonal faceted; tsp. light gray	X	X	X	X		X	X	X
WIIf*(a). Ridged tube; tsp./tsl. bright navy	X	X		X	X	X	X	
WIIIb*(a). Round; op. black; white lattice		X		X	X	X	X	
WIIIb*(b). Op. black ; eyes	X?							
WIIIb*(c). Tsp. bright blue; inlays								
MPIIc*(a). Long octagonal barrel, tsl./op. redwood								
TOTAL	7	13	3	13	4	14	16	10

Key: Site name and location; date; ethnic affiliation; reference.

1. Diakhité cemetery, Senegal; 18th to mid-19th centuries; French (Opper and Opper 1989).
2. Elmina, Ghana; 1637-1873; Dutch (personal observation).
3. Oudepost I, South Africa; 1669-1732; Dutch (Karklins and Schrire 1991).
4. St. Eustatius, Netherlands Antilles; 18th-19th centuries; Dutch/English/French (Karklins and Barka 1989).
5. Manilla wreck; mid-18th century; Dutch (Karklins 1991).
6. Trudeau village, Louisiana; 1731-1764; French (Brain 1979).
7. Guebert village, Illinois; 1719-1833; French/American (Good 1972).
8. Susquehannock sites, Pennsylvania; 1690-1760s; English (Kent 1984).

APPENDIX A. BEADS COLLECTED DURING THE 1993 SURFACE SURVEY

The 1993 surface survey of Bunce Island by DeCorse and Ferguson produced 77 specimens, all but one of which were glass (DeCorse 1994:22-25, 2007:246-249). As with the beads collected by Johnston, they were all found on the beach adjacent to the north side of the fort.

The following inventory was derived from the field catalog prepared by DeCorse. Kidd and Kidd variety numbers have been assigned to the beads where possible. Unfortunately, the beads were recorded in haste due to time and other constraints in the field so information critical for proper classification (e.g., shape, color, and size data) is often not provided. The problem was further compounded by a lack of photographs of the specimens. So that the reader knows on what information the Kidd and Kidd codes are based, the descriptions of the beads are generally as they appear in the field catalog.

Beads with counterparts in the Johnston collection are marked with a pair of crosses (++) at the end of the description. Those which are probable or close matches are marked with a single cross (+).

Drawn Beads

Ia3(?). Tubular, transparent (1 specimen).

Ia*. Tubular, transparent blue (2 specimens).

Ia*(?). Drawn, transparent blue (2 specimens). It is uncertain whether these are tubular or heat-rounded.

Ia19. Tubular, transparent navy blue (4 specimens). One specimen is listed as being 17 mm long by 6 mm in diameter. (++)

Ia*. Tubular, 5, 4, 3 mm in diameter (4 specimens).

Ib*. Tubular, opaque black with opaque white stripes (1 specimen).

Ibb*(?). Opaque white with 5 opaque yellow stripes with double opaque red stripes (1 specimen). (+)

IIa7. Oblate, opaque black, 3 mm and 6 mm in diameter (2 specimens). (+)

IIa13/14. Heat rounded, barrel-shaped, opaque white (1 specimen). (++)

IIa15. Heat rounded, oval, opaque white; typical of examples from Elmina (DeCorse 1989)(1 specimen). (++)

IIa*. Heat rounded, transparent blue (1 specimen).

IIa*. Heat rounded, oblate, transparent blue (1 specimen).

IIa57. Heat rounded, oval, navy blue (1 specimen). (++)

IIa(?). Drawn, heat rounded, 8 mm diameter (1 specimen).

IIb*. Oblate or barrel-shaped bead (heat rounded), opaque black with 6 opaque white stripes (2 specimens). (++)

IIb*. Barrel shaped, transparent blue with opaque white stripes (photographed) (1 specimen). (+)

IIb'*. Oblate or barrel shaped, opaque black with opaque white, slightly spiral stripes (1 specimen). (+)

IIIa3. Tubular, transparent light green core with opaque red exterior (17 specimens). The largest specimens are 25 mm long with 6-7 mm diameters; the smaller ones are 12 mm long with 3-4 mm diameters. (++)

IIIa3(?). Drawn, transparent light green core, opaque red exterior (5 specimens). [It is uncertain whether these are tubular or heat-rounded.] (++)

IIIk*(?). Chevron, star-shaped opaque white core, transparent purple, opaque red, opaque white, opaque purple surface layer (1 specimen).

IVa5/6. Heat rounded, transparent light green core with opaque red exterior (1 specimen). (++)

IVa6. Heat rounded, barrel-shaped, transparent light green core with opaque red exterior (1 specimen). (+)

IVa6/7. Oblate or oval (heat tumbled), transparent light green core with opaque red exterior (2 specimens). (+)

Wound Beads

WIb*. Round, opaque black, 14 mm diameter (3 specimens). (++)

WIb2. Round, opaque white (2 specimens). One specimen is ca. 10 mm long by 10 mm in diameter; the other is 22 mm long, 22 mm in diameter with a 4 mm perforation.

WIb4. Oblate, translucent white with bluish cast; 17 mm long, 15 mm diameter (3 specimens). (+)

WIc1. Large oval, opaque white; 30 mm long, 18 mm diameter (1 specimen).

WIc3. Oval, opaque white with slight blue cast; large (27 mm long, 17 mm diameter)(1 specimen). (++)

WId*(?). 5 mm length x 11 mm diameter, opaque black, one end of perforation larger than other (1 specimen).

WId*. Doughnut-shaped, translucent white with bluish cast, large perforation (5 specimens).

WId*. Doughnut-shaped, opaque white with bluish cast (2 specimens).

WId*. Doughnut-shaped, 12 mm diameter with 5 mm diameter perforation; transparent with distinct bluish cast (1 specimen).

WId*. Doughnut-shaped, translucent with bluish cast (1 specimen).

WIIIb*. Round, opaque black, 12 mm diameter, probably had yellow trailed decoration (1 specimen). (+)

WIIIb*. Oval, opaque turquoise with spirals of opaque white dashes, alternating with spiral of gold patinated glass (1 specimen).

Non-Glass Bead

Possibly faceted crystal quartz, straight perforation, ca. 1.0 mm diameter (1 specimen).

ACKNOWLEDGEMENTS

I would like to thank the University of Arkansas Museum in Fayetteville, Arkansas, for kindly loaning me a sample of the beads donated to them by Mr. James J. Johnston. Mr. Johnston is thanked for providing background information concerning the beads and some of the associated artifacts. Gratitude is expressed to Dr. Christopher R. DeCorse of Syracuse University for urging me to complete this project which had slipped into research limbo and for providing valuable comments and research materials.

REFERENCES CITED

Beck, Horace C.

1928 Classification and Nomenclature of Beads and Pendants. *Archaeologia* 77:1-76. Reprinted in *Beads: Journal of the Society of Bead Researchers* 18 (2006).

Brain, Jeffrey P.

1979 Tunica Treasure. *Harvard University, Papers of the Peabody Musuem of Archaeology and Ethnology* 71.

Container Corporation of America

1958 *Color Harmony Manual*, 4th ed. Chicago.

Corry, Joseph

1807 *Observations Upon the Windward Coast of Africa*. G. and W. Nicol, London. Reprinted in 1968 by Cass, London.

DeCorse, Christopher R.

1994 Bunce Island, Sierra Leone: Preliminary Archaeological Reconnaissance. Unpublished manuscript. Sierra Leone Monuments and Relics Commission, Freetown.

2007 Bunce Island Cultural Resource Assessment and Management Plan. Report prepared on behalf of the United States Embassy, Sierra Leone. Submitted to the Sierra Leone Monuments and Relics Commission, Freetown.

Fyfe, Christopher

1962 *A History of Sierra Leone*. Oxford University Press, Oxford.

Good, Mary Elizabeth

1972 Guebert Site: An 18th Century, Historic Kaskaskia Indian Village in Randolph County, Illinois. *Central States Archaeological Societies, Memoir* 2.

Hutton, Catherine

1821 *The Tour of Africa*. Vol. 3. Baldwin, Cradock, and Joy, London.

Johnston, James J.

1973 European Influence in Africa and America. Arkansas Archeological Society, *Field Notes* 104-105:7.

Karklins, Karlis

1985 Guide to the Description and Classification of Glass Beads. In *Glass Beads*, 2nd ed., pp. 85-118. Parks Canada, Studies in Archaeology, Architecture, and History.

1991 Beads from the mid 18th-Century Manilla Wreck, Bermuda. *The International Journal of Nautical Archaeology* 20.1:33-42

1993 The *a Speo* Method of Heat Rounding Drawn Beads and its Archaeological Manifestations. *Beads: Journal of the Society of Bead Researchers* 5:27-36.

Karklins, Karlis and Norman F. Barka

1989 The Beads of St. Eustatius, Netherlands Antilles. *Beads: Journal of the Society of Bead Researchers* 1:55-80.

Karklins, Karlis and Carmel Schrire

1991 The Beads from Oudepost I, a Dutch East India Company Outpost, Cape, South Africa. *Beads: Journal of the Society of Bead Researchers* 3:61-72.

Kent, Barry C.

1984 Susquehanna's Indians. *Pennsylvania Historical and Museum Commission, Anthropological Series* 6.

Kidd, Kenneth E. and Martha A. Kidd

1970 A Classification System for Glass Beads for the Use of Field Archaeologists. *Canadian Historic Sites: Occasional Papers in Archaeology and History* 1:45-89.

Kup, A.P.

1961 *A History of Sierra Leone, 1400-1787.* University Press, Cambridge.

Laing, Major Alexander Gordon

1825 *Travels in the Timannee, Kooranko, and Soolima Countries, in Western Africa.* John Murray, London.

Lawrence, A.W.

1969 *Fortified Trade-Posts: The English in West Africa, 1645-1822*. Jonathan Cape, London.

Matthews, John

1788 *A Voyage to the River Sierra-Leone, on the Coast of Africa.* B. White and Son, London.

Munsell Color

1976 *Munsell Book of Color, Glossy Finish Collection.* Macbeth Division, Kollmorgen Corporation, Baltimore.

Opala, Joseph

1977 Archaeological Resources on Bunce Island. Manuscript on file. Sierra Leone National Museum, Freetown.

2007 Bunce Island: A British Slave Castle in Sierra Leone. *In* Bunce Island Cultural Resource Assessment and Management Plan, by C.R. DeCorse, pp. 143-174. Report prepared on behalf of the United States Embassy, Sierra Leone. Submitted to the Sierra Leone Monuments and Relics Commission, Freetown.

Opper, Marie-José and Howard Opper

1989 Diakhité: A Study of the Beads from an 18th-19th-Century Burial Site in Senegal, West Africa. *Beads: Journal of the Society of Bead Researchers* 1:5-20.

Quimby, George I.

1966 *Indian Culture and European Trade Goods.* University of Wisconsin Press, Madison.

Karlis Karklins
1596 Devon Street
Ottawa, Ontario K1G 0S7
Canada
E-mail: karlis44@aol.com

AN ARCHAEOLOGICAL APPROACH TO UNDERSTANDING THE MEANING OF BEADS USING THE EXAMPLE OF KOREAN NATIONAL TREASURE 634, A BEAD FROM A 5TH/6TH-CENTURY ROYAL SILLA TOMB

James W. Lankton and Marjorie Bernbaum

An ancient bead is a document from the past—a message in a bottle—written in some lost symbolic language. Archaeologists try to understand that language by integrating scientific and technological approaches with the social, economic, political, and symbolic/religious context in which the bead was found. As an example, we use Korean National Treasure 634 (NT634), a dark blue glass bead adorned with mosaic decorations of a bird, a flowering tree, and a human face, found in a 5th/6th-century Korean tomb. This bead suggests its meaning by how and where it was made, and what its images may represent.

WHY STUDY BEADS?

The late Peter Francis, Jr., was famous for saying "We don't study beads, we study people" and in many ways the question "Why study beads" is no different from asking "Why study people?" Beads have been an important part of man's material culture from almost the very beginning of our modern human existence. There is increasing appreciation within anthropology and archaeology that the "material" aspects of our lives are inseparable from the traditionally non-material and that the political, social, and material worlds are mutually constituted—people shape material objects, but so too do the material objects shape the people. Neither people nor their material culture have full meaning when considered in isolation. For a more complete consideration of some of these theoretical issues in archaeology, *see* Meskell (2005).

Of course, in archaeology, our goal *is* to study the people. Archaeologists are anthropologists, attempting to explain and interpret "the past realities represented by the archaeological record... in terms of the social, political and economic conditions that affected the society whose artifacts we are studying" (Clark 1995:288). We try to integrate technical, social, economic, environmental, political, and cognitive/symbolic data in order to understand how past societies functioned, and also how and why they changed over time. But it is not just the past that interests us; at the same time that we attempt to see the past through the present, we try as well to appreciate the present through the past—one of the primary concerns of today's socially engaged archaeologists.

Beads are artifacts that cut across many aspects of human existence. We impress, we celebrate, we honor with beads. Sometimes we just have fun experimenting with new shapes, sizes, materials, and methods, and sometimes we turn to beads for communion with the things we hold most sacred in the most difficult hours of our lives. But what about in the past? How do we know what beads meant to past peoples? Beads are seldom mentioned in ancient texts, perhaps because their various roles in society were so commonly understood and accepted that no explanation was necessary, but certainly not because they were not important. This we know from archaeology. For example, the developing picture of very early bead traditions in North and South Africa and the Near East suggests that from the beginning, bead use implied a "deliberate, shared, and transmitted nonutilitarian behavior" that could not have survived were it not "intended to record some form of meaning" (Bouzouggar et al. 2007:9969). In North Africa, *Nassarius* shells to be made into beads were transported from sources up to 200 km away, implying not only their enormous cultural importance but also the formation of long-distance social and exchange networks as much as 100,000 years ago. The growth of complex societies and the availability of and desire for precious ornaments, often imported over long-distance exchange routes, went hand in glove with the rise of social stratification and specialization (Bellina and Silapanth 2006:379).

BEADS 19:32-41 (2007)

HOW WE STUDY BEADS

From archaeology we have data on the deposition of beads from both habitation and mortuary contexts, one of the most important ways in which beads help us learn about past societies. In fact, beads, along with pottery, are among the most numerous artifacts uncovered during many archaeological investigations. Because pottery was generally produced locally, particularly the most common wares, it is very helpful in our learning about the economic and social life of early communities. Utilitarian pots seldom lasted for more than a few years, so that people always needed new pots in the latest styles. The broken potsherds, swept aside or deposited in middens, are still there thousands of years later, to be discovered by some archaeologist finding treasures in ancient trash. Beads are different and, in some ways, more difficult to study (Table 1). The thousands of archaeological studies of excavated ceramics have not been matched by similar studies of beads. Rather, beads are often grouped with what are known as the "small finds" of the excavation—a chapter in the site report but often not much else. Beads were often made in one place and used up to thousands of kilometers away. Beads may also be frustratingly similar in appearance and even manufacturing technique, in spite of widely different production areas. In addition, beads could remain in circulation for long periods. On some occasions beads were handed down from one generation to the next, and then perhaps lost or given as grave offerings several hundred years later. But there they are—beads in their thousands from many major archaeological excavations. Like ceramics, beads or their fragments last for a long time. Even glass, that most fragile of materials, may decompose quite slowly depending largely on soil and burial conditions. But beads can be very reluctant to give up their secrets: they have message and meaning with the message often hidden in their structure and the meaning far below the surface.

Table 1. Methodologies to Interpret the Meaning of Beads.

PHYSICAL CHARACTERISTICS
Material
    Chemical composition
Shape
Dimensions
    Length, width, perforation
Color
    Chemical composition of the colors
Design

PRODUCTION
Location of manufacture
Dating
Composition
Method of manufacture
    Drawn, wound, variations
    Contemporary experimentation
    Examination of wasters

EXCHANGE How did the bead get to where it was found?
CONTEXT Where was it found? The object's relationship to other objects at the site Why is the bead there? Iconography   Comparative The contemporaneous political, social, and economic milieu

Measurement, Classification

Attributes such as size, shape, and color can be quite useful in comparing beads from one place with those from another or, perhaps more so, in comparing beads from different contexts within a single archaeological site. Horace Beck presented his "Classification and Nomenclature of Beads and Pendants" in 1926, to be published two years later (Beck 1928), and in many ways it is still the standard, if almost never used, reference work. Peter Francis, Jr., revised Beck's work, adding the important category of how the beads were made, but even Peter came to believe that there was no one classification system broad and detailed enough to encompass the infinite variety of beads.

There is the additional issue that many types of morphological variation may not really translate into differing archaeological meanings. For example, among the most common types of beads at many sites in Asia and elsewhere are the small, drawn monochrome glass beads that have come to be called Indo-Pacific, using the term suggested by Peter. These Indo-Pacific beads vary in size, shape, and color. It takes a long time to carefully measure the beads for length, diameter, and perforation dimensions, to describe the shapes, and to match the colors to some accepted standard like the Munsell color charts. Even at thirty seconds per bead, if you have 10,000 beads, you are still talking about several months time. Is it worth it? Perhaps not, particularly as much of the variation is due to rather random production variability beyond the control of the beadmaker. For Indo-Pacific beads the bead diameters depend largely on how fast the cane is drawn, and it is likely that even the same cane could have a variable diameter, so that small changes would have no real meaning. Bead shape was determined by how long the beads were left in the ovens used to round off the sharp edges of the broken canes and, because of variable conditions in the oven, even beads from exactly the same production lot might have quite different morphologies.

The colors of glass beads depended on a number of factors, many of which could not be strictly controlled. Not just the coloring agent itself—often a metallic oxide of copper, iron, or cobalt—but also the intimate conditions within the bead furnace helped to determine the final color: red, blue, green, or one of the thousands of shades in between. So what to do? The simplified and straightforward suggestions of Robert Brill at the Corning Museum of Glass: maybe ten shapes, a few size ranges, and color descriptions that correspond to actual production differences seem expedient (Brill 1999, 1:13-17). We have used this system to catalog the numerous glass finds at Khao Sam Kaeo, an early glassworking—and perhaps glassmaking—center in southern Thailand, and it is both quick and flexible. Brill's emphasis on "what the glassmakers were trying to make" (Brill 1999, 2:9) provides a very useful reminder for anyone who wants to study beads. What these measurements often don't tell us is where the beads are from or how they got to the place where they were recovered—the details of production and exchange.

Production and Exchange

What if we want to know more? Certainly any information we can find on how the beads were made is extremely important. In this case, both macroscopic and microscopic examinations are critical. For glass beads, the most common processes were drawing and winding, with a big difference between the two in terms of the type of production, technical processes, and the craftworkers involved. For stone beads, differences in technique may be traced to different beadmaking traditions, often practiced in different geographical areas and certainly having different cultural meanings in both production and consumption.

One of the most fascinating issues in archaeology is how ancient people repeatedly and preferentially sought out materials and objects with exotic origins. As suggested above, long-distance exchange routes developed at least in part to provide access to these coveted materials and objects, often ornaments and beads. In Southeast Asia, long-distance trading networks developed very early, first for shell ornaments important to inland communities, and then, by the mid-first millennium B.C.E., for new luxury goods such as glass and carnelian beads and nephrite earrings (Bellina and Glover 2004). Local production, using either local or imported raw materials, sometimes replaced foreign goods in these networks. Although the people who lived in these distant times may be beyond memory, goods they coveted have their own lost languages or messages waiting to be deciphered. For glass and stone beads, such things as method of manufacture, size, shape, and color are part of this language, but we can also look at the chemical compositions of the beadmaking materials. While useful work in analyzing chemical composition to source such stones as carnelian is still in the early stages, for glass the situation is quite different and our knowledge of early glass compositions has increased greatly over the past 20 years. Thousands of published chemical analyses of ancient glass are now available, and can be compared with new data to help answer questions about manufacturing traditions and exchange patterns, although this work, done in many centers and designed to answer many different questions, often leaves us comparing oranges with apples, both in terms of the analytical methods and the types and sources of the material analyzed. During the past five years emphasis on trace elements present at less than one-tenth of one percent has led to real benefits in helping to understand where and how early glass was made. In the future, the measurement of different forms of the same chemical element, allowing the calculation of isotope ratios for such elements as lead, silicon, strontium, and neodymium, will play an increasingly important role.

Context and Dating

A frequent question is "can we date beads?" No and yes are perhaps the best answers. No, because there are no techniques currently in use for beads that are analogous to such standards as radiocarbon dating (that is, unless the beads contain enough carbon to permit radioisotope measurement). But also yes, since many types of glass were made for relatively short periods and, to the extent that the production period is known, we can say that the bead was probably made during a particular span of years. More often, this type of knowledge can be very helpful in dating not the beads but the site. Information about use or, in archaeological terms, consumption, comes from knowledge of the various contexts in which the beads were excavated. Obviously, such knowledge is lost when beads are without their original context, either because of careless work during the archaeological process, being misplaced in museum or university storerooms, or, most commonly, when the beads were obtained through uncontrolled digging, whether legal or illegal. When beads are found in archaeological excavations we know that a particular context cannot be older than the most recently made objects found there. Unfortunately, the same is not true when a very old bead is found at a site, since both finished glass beads and raw materials were often either reused or deposited long after initial manufacture.

KOREAN NATIONAL TREASURE 634

Let us now see how the concepts and methods just outlined help us to determine the message and meaning of a very special bead, Korean National Treasure 634. It is shown in Plate IVA along with the carnelian, rock crystal, and jasper beads with which it was found and is probably the best known bead in Korea. The arrangement of the beads as shown in the plate is speculative but all the beads were found together.

On display at the Gyeongju National Museum, NT 634 was excavated in 1973 from a royal tomb of the Silla Kingdom, dating to the late 5th to early 6th centuries. With the same burial was a pair of superb gold earrings surely fit for a Silla princess. Unfortunately, no human bones remained, most likely the result of the same acidic soil conditions that led to the excellent preservation of NT 634. The comma-shaped bead, or *goguk*, is a form seen earliest in the 7th-8th centuries B.C.E. and while no one is completely sure what the form represents, *gokok* are found only in very high prestige contexts.

NT 634 is of medium size, a little less than 2.0 cm in diameter, but its unusual design attracts immediate attention. The bead is unique—it is the only one of this design ever found in a known Korean context. On the surface of this dark blue glass bead are four birds, possibly ducks or geese, four trees or branching flowers, and four faces. These designs are actually slices of mosaic glass cane applied to the surface of the bead in millefiori technique, then partially melted together so that the edges of the mosaic slices are no longer visible. Although there is some slight distortion in the patterns, it seems likely that each group of designs came from a single cane; in other words, the beadmaker had available a bird cane, a tree cane, and a face cane. NT 634 has been assigned many origins, most commonly Roman (e.g., Francis 2002:89), and has been compared to the "Roman" mosaic face beads of both the early 1st century C.E. or so and the late 4th century, although the similarity to either of these groups is marginal at best.

NT 634 was found in association with other highly prestigious offerings, perhaps representing ornaments that the deceased wore during her lifetime. Not only is NT 634 a treasure now, it was probably a treasure then as well. Even more, because the tomb was in southeastern Korea, an area not associated with either glassmaking or mosaic glassworking, the bead was most likely imported, possibly along the long-distance routes of either the overland or maritime Silk Road. There is stylistically Roman glass in both northeastern China and Korea during the 4th to 6th centuries, so why cannot NT 634 be from Roman territory as well? And if not, where is it from? Korea, sitting out there in northeast Asia, was a great distance from practically everywhere.

What does the bead itself tell us? We know the diameter, and know by inspection that the two ends of the perforation appear to be about the same size so that the basic bead may have been drawn rather than wound. The most dramatic aspect is the mosaic design. Rather than being exact replicas of one another, the four versions of each mosaic pattern are all slightly different. This may be the result of each slice being removed from the same cane at a slightly different angle. Close comparison of the mosaic face canes in Pl. IVA, b and d, reveals that one cane slice was applied with one face upward while the next one was flipped over with the result that the two faces are mirror images of each other.

The distortion of the mosaic slices on NT 634, shown in Pl. IVA, follows a specific pattern, with the designs pulled toward the ends of the perforation in a symmetrical way. If the mosaic slices had been placed on the surface of a heated bead and then marvered into place, they would not show this distortion pattern, so what could cause this?

Sometimes we can learn how ancient peoples made things by contemporary experimentation. Jamey Allen has studied Jatim beads which are most associated with Jawa Timur, far-eastern Java (Allen 1998). Several years ago he proposed a mechanism for making the millefiori Jatim beads wherein mosaic slices were applied not to a finished bead, but to a glass tube. After the designs were marvered into place, the tube was then pinched off into individual beads. The result of this "pinching" process, whether accomplished by an actual pincer or by rolling the hot decorated tube over some type of sharp metal edge, would be that the millefiori decoration was symmetrically distorted toward the perforation at the pinched ends. While Allen demonstrated this process using polymer clay, Patrick Stern, a glassworker based in London, was able to replicate many of the features of Jatim beads in hot glass using techniques very similar to those that Allen had suggested. So now we have a possible explanation for the mosaic cane distortion pattern observed on NT 634, as well as a suggestion regarding where such a technique might have been practiced: far-eastern Java.

NT 634 as a Jatim Bead

The identification of NT 634, the Gyeongju face bead, as a Jatim bead rests on how the bead was made as much as on its actual physical appearance. Moreover, NT 634 is not the only Jatim bead found in Korea. There are at least ten other examples in more classic Jatim styles, including both *pelangi* and millefiori beads, and all of those from controlled excavations have been found in high-status Silla tombs in the Gyeongju area, with dates ranging from the late 4th to the mid-6th centuries (Lankton et al. 2005). Pl. IVB illustrates three of these Jatim beads found in Korea: a small *pelangi* bead in yellow and green and three millefiori mosaic beads. For each of these, the characteristic cane distortion is visible at one end only, suggesting that the original tube may have been rather short, with as few as two or three beads being made from each decorated tube. The full story of Jatim beads is clearly beyond the scope of this article but, for our purposes here, let us just say that the association of Jatim beads with far-eastern Java as the production area is quite strong, with evidence ranging from misshapen and partially melted examples found near Jember, to the fact that the vast majority of Jatim beads have been found in a rather limited area in eastern Java (Adhyatman and Arifin 1996; Francis 2002:135). Jatim beads were recovered from megalithic tombs by Dutch archaeologists working in eastern Java at the turn of the 20th century (Heekeren 1958:46), and have been found as well in the Indonesian excavations conducted since then. Prehistoric archaeology in far-eastern Java is still in its infancy, however, and although little is known about the people who produced these exquisite glass beads, we can attempt to reconstruct some of their technology by working backwards from the finished products. What the chemical analyses of a number of Jatim beads tell us is that the glass types used were those current throughout Southeast Asia during the 4th to 7th centuries. At the Jatim production sites, however, the glassworkers made technological choices quite distinct from those at other beadmaking sites. In particular, the Jatim workers appeared to preferentially blend together different types of glass, creating mixed compositions found almost exclusively in Jatim beads. Because of this, we also know that the mosaic canes themselves were also made by these same, or closely allied, craftworkers: the decorative canes were also made from this mixed glass, essentially ruling out any exotic source for the mosaic work (Lankton et al. 2008). Although NT 634 itself has not been studied chemically, its morphological and technological similarity with analyzed Jatim beads makes it very likely that the glass compositional types are similar as well.

Based on the archaeological and archaeometric investigations mentioned above, we know quite a bit about the technological milieu in which NT 634 was made, and these too are ways that this bead tells its story. We have gone from Korea to eastern Java in one quick jump. We know there were Javanese beads in Korea in the 5th to 6th centuries, but do we know how they got there, or why? Although the archaeological study of far-eastern Java is rather limited, the area was mentioned in Chinese texts as early as 443 C.E., and continued to be mentioned into the 7th century as the kingdom of Po-li. The exact location of Po-li is not known, although somewhere in far-eastern Java, perhaps extending into Bali, is a strong possibility (Wolters 1967:160-161). This location for Po-li is shown in Fig. 1, along with possible maritime trade routes within Southeast Asia and extending to China, Japan, and Korea. It is likely that the early polities in far-eastern Java were quite wealthy, with links both to the West and to China, since they were strategically located to control the trade in such luxuries as nutmeg and cloves from the Moluccas. Although we think of such products as spices for the table, in the first millennium, nutmeg and cloves were important pharmaceuticals and may be what is mentioned as the "perfumes and drugs," along with manufactured articles, sent from Po-li to the Chinese court in 522 C.E. (Wolters 1967:18). In fact, Po-li sent at least five "embassies" to China between 473 and 639 C.E. (Wolters 1967:164), although the apparent goal of these visits was more related to the shared Buddhist faith of the rulers of Po-li and the Chinese court, rather than to commercial enterprise (Wolters 1967:166).

Were the Jatim beads made in Po-li? The timing is right, the location is right, but what about a connection with Korea? Here there are, in fact, several possibilities. Jatim beads were not the first, nor the only, Southeast Asian products on the Korean peninsula. Earlier Korean tombs, particularly in the southern kingdoms of Gaya and early Silla, contain hundreds of glass beads. On the basis of compositional and technological study, these appear to have been made in South or Southeast Asia, beginning in the first century C.E. (Lankton et al. 2006). By the 7th century there are Japanese records documenting the purchase of Southeast Asian ivory and aromatic woods through the services of Silla middlemen (Holcombe 2001:189), although Silla trade, either direct or indirect, with Southeast Asia may have begun much earlier.

The second possibility is that Koreans traveled to Southeast Asia. The Chinese pilgrim I-Ching, writing in the 7th century, mentions that two Korean monks had died in an Indonesian harbor, evidently waiting for a ship to take them to Buddhist pilgrimage sites in India (Wolters 1967:185). This anecdote is similar to the stories of many monks from the Far East wanting to visit the land of Buddha's birth, and tells us as well about the dangers they faced. Although these particular Korean monks lived in the 7th century, they were probably not the first to travel to India, and others before them may also have passed through Indonesian kingdoms on their travels.

The third possibility is less direct, but perhaps better documented. Like the kingdom of Po-li, Silla also sent

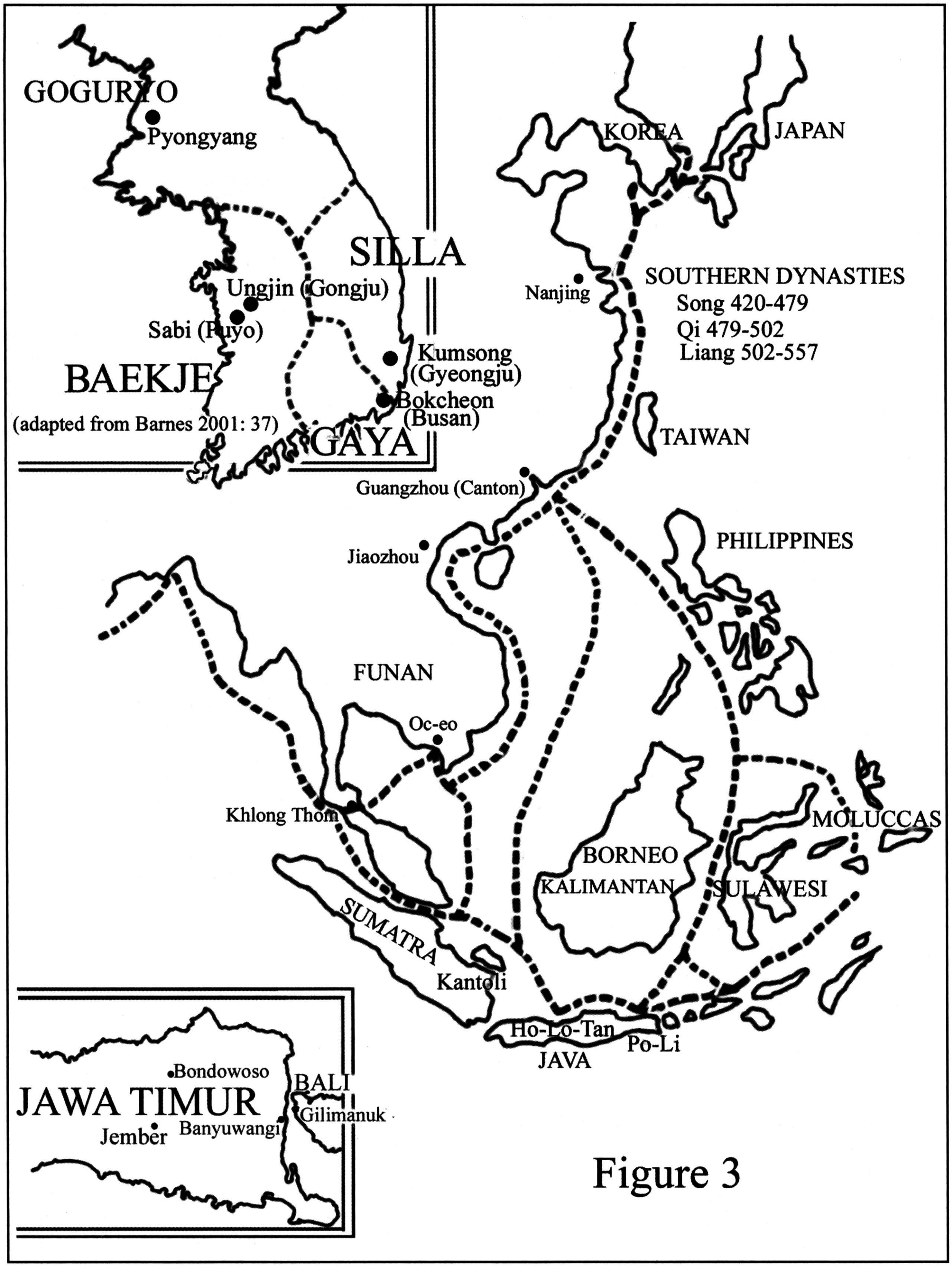


Figure 1. Southeast Asia, East Java (Jawa Timur), and Korea in the 5th and 6th centuries, with possible maritime trade routes (partially adapted from Glover and Henderson [1995:142]).

embassies to the Chinese court. In the year 521, a Silla envoy accompanied a group from the neighboring kingdom of Baekje to the Liang Dynasty court near Nanjing. Recalling that a Po-li embassy to this same court has been dated to 522, is it possible that some sort of Silla–Po-li connection was made at this time? A connection strong enough to involve the gift or purchase of a number (perhaps more than a dozen but less than one hundred) of Jatim beads—precious gems to be distributed to the members of the Silla royal family, including our princess of NT 634, buried with her beads and golden earrings?

The Face

NT 634 reveals its messages in several ways but perhaps the most fascinating of all is the message in the faces of the bead. The face cane decorating NT 634 is very distinctive, as are the flower and bird canes. While somewhat similar bird canes are found on a few other Jatim beads (although none with an archaeological provenance), Lankton has seen a similar face cane only once—on a Jatim bead (Pl. VA) in the Liese Collection at the Bead Museum in Glendale, Arizona. The faces on the two beads are very similar, but are not from the same cane, since the colors are different. In addition, the Bead Museum specimen appears to have some type of ear ornament, a detail not found on NT 634. The Bead Museum bead also includes several bird canes which, again, are similar to but not identical with those on NT 634. Furthermore, there are fragments of other, non-figurative mosaic canes, all found on a number of Jatim beads. While the original provenance of the face bead in the Liese Collection is not known, the microscopic condition of the glass and the beadmaking technology are consistent with other early Jatim beads. Chemical analysis could possibly confirm the antiquity of this bead since, as mentioned above, the glasses used in early Java are quite distinctive. One reason for concern is that this bead entered the marketplace after 1973, when NT 634 was discovered and photographs published. During a visit to study the face bead in Glendale and speaking with the museum staff, we asked the question: "So, whose face is it, anyway?" The similarity of the faces on the two beads makes it unlikely that the features were randomly selected; rather, the faces may be portraits. They incorporate specific iconography to represent someone very important when and where the Jatim beads were made. Karen Karn, Collections Manager at the Bead Museum, had thought about this before and felt the face represented the Buddha; this idea clicked right away, but how to prove it? Certainly, Po-li was a kingdom known for Buddhist devotion, and there would have been no figure more worthy of portrayal on very special versions of the Jatim beads, but what evidence do we have that NT 634 portrays the Buddha?

One of the few artifacts found near Jember, the area in far-eastern Indonesia thought to be a production center for Jatim beads, is a bronze Buddha statue, 42 cm tall, dating possibly from the 5th to 7th centuries. This particular image is famous as representing the Sri Lankan version of Buddhism important in Southeast Asia during this early period. Peter Sharrock at the School of Oriental and African Studies in London has compared the faces on NT 634 with those of a number of Buddha images dating to this same period, and Fig. 2 compares drawings of the two face beads with published images of early Buddha statues, including that found near Jember. Similarities include the aquiline nose, the hair-line, the open eyes, the joined "swallow" eyebrows, the extended earlobes, and the beauty folds on the neck. Among the most striking aspects of these early Sri Lankan-influenced representations of the Buddha is the *siraspata* or *ketumala*, flames emanating from the Buddha's *usnisa* or cranial bump. Sculptural representations of the *siraspáta* were part of these early Buddha images found in Southeast Asia, although in most cases the *siraspata* has broken off, as in the Buddha statues shown in Fig. 2. Close inspection of both NT 634 and the face bead in the Liese Collection reveals three flame-like projections coming from the top of the head, colored red and yellow on NT 634 and red and white on the museum specimen. These are clearly not meant to represent hair, nor are they accidental. Rather, they correspond exactly with the position of the *siraspata*, often represented as a tripartite flame. The earrings on the museum specimen are unusual for the Buddha, being more associated with Bodhisattva images from the Mahayana Buddhist tradition. Although it is possible that the museum bead represents a Bodhisattva instead of the Buddha, this would be unexpected in the Theravada Buddhist tradition of Sri Lanka. Rather, one suspects that the mosaic glass artist working in eastern Java was either not fully familiar with all of the conventions of Buddhist representation, or perhaps wanted to add his own unique mark to his work.

Buddhism in Korea and NT 634

One of the earliest Korean histories is the *Samguk Yusa*, translated as *Overlooked Historical Records of the Three Korean Kingdoms* (Kim 2006), and compiled in the 13th century by Ilyeon, a Buddhist monk of the Koryo Kingdom. The *Samguk Yusa* provides some details regarding the adoption of Buddhism in early Korea. While traveling Buddhist monks may have brought their faith to the Silla Kingdom as early as the late 4th century, the real promotion of Buddhism appears to have started in 514 C.E., with King Bopheung's ascension to the throne. Although accepted by the royal family, the new religion was resisted by members

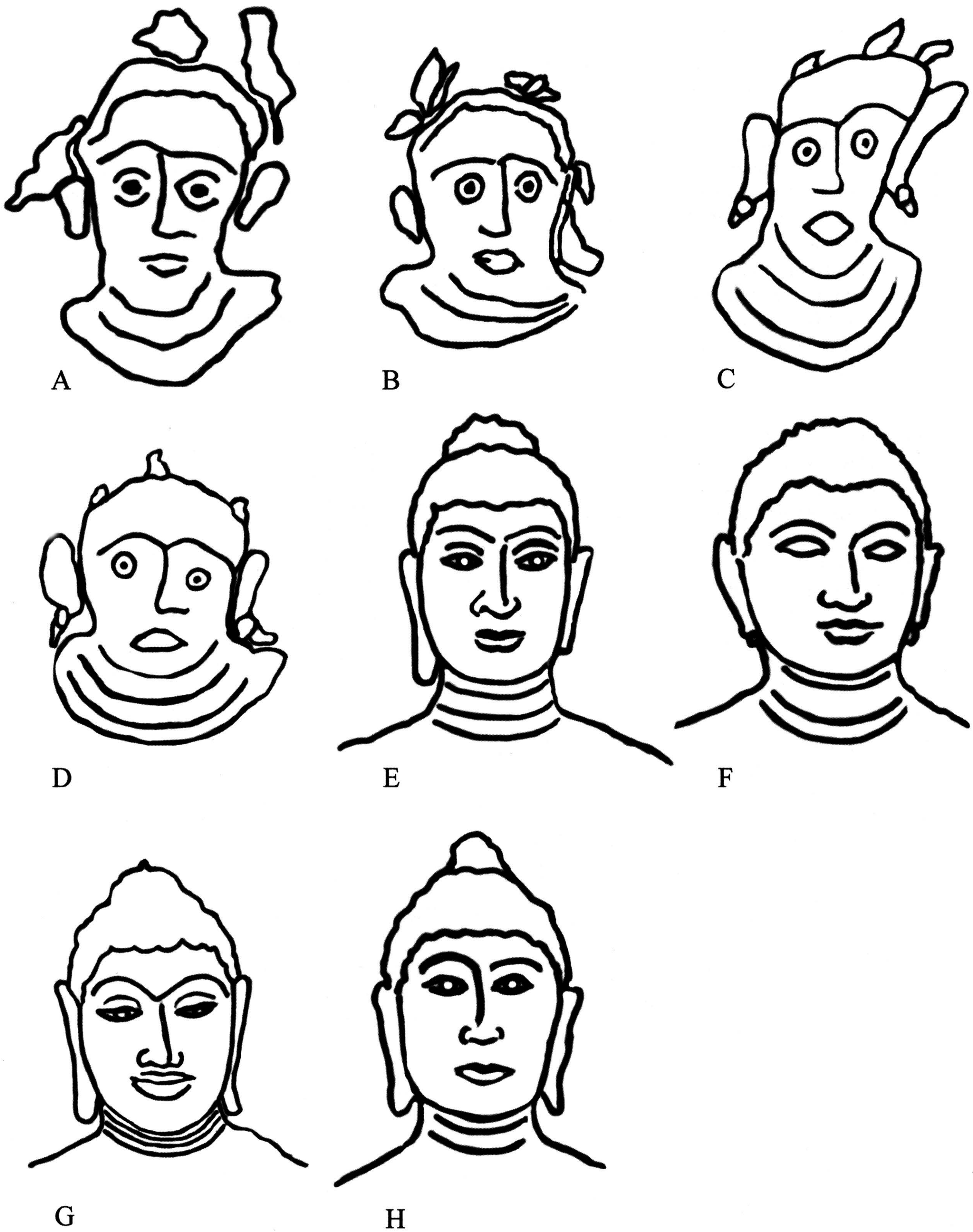


Figure 2. The mosaic face canes of NT 634 and the face bead in the Liese Collection compared to Buddha images from Southeast Asia (drawing: J. Lankton).

of the Silla aristocracy (Barnes 2001:43) until 527, with the dramatic martyrdom of Yeomchok, a minor official in the government palace. When Yeomchok, a devout Buddhist willing to sacrifice his life for his beliefs, was decapitated on trumped-up charges, blood "as white as milk" spouted from his neck, and his severed head flew to the top of a nearby mountain to mark the site of a future Buddhist temple. We can imagine that the years leading up to 527, exactly the time during which NT 634 was brought to Korea, were a period of intense belief and probable struggle over the newly introduced religious ideas. The fact that both NT634 and the other Jatim beads found in Korea were from royal tombs may be due not simply to the high value placed on these exotic and beautiful beads, but also to the meaning of these beads as religious signifiers important in Buddhist ritual and belief—a belief not yet shared by the rest of the Silla aristocracy.

Although the origins of Buddhism in Korea are often ascribed to China, the maritime routes from southern China and Southeast Asia were important as well, as supported by the many embassies to southern China from the Three Kingdoms, including Silla, on the Korean Peninsula and, in at least the 7th century if not earlier, by Korean monks going by sea to India. In the 5th and 6th centuries, international trade was strongly linked to the spread of Buddhism and it is likely that monks traveled in both directions, often on commercial ships, spreading their religious teachings throughout Asia. Among the various goods traded were Buddhist holy objects: the seven treasures from India or elsewhere that were necessary for the proper conduct of ritual ceremonies (Holcombe 2001:92). Glass beads were an excellent substitute for several of these treasures, from the blue of lapis lazuli copied in cobalt-blue glass to glass replicas of red coral and carnelian and the brilliant transparency of rock crystal. NT 634 was most likely also a Buddhist gem, with its dark blue translucence suggesting the cosmic deep of the night sky or the ocean, and the distinctive portrait faces representing the Lord Buddha himself. It is easy as well to find roles for the bird and the flower or tree, perhaps the heavenly goose *hamsa* and the Bodhi tree under which Buddha achieved enlightenment.

SUMMARY

We have considered many ways to learn from beads, ranging from the archaeological context in which they were found to physical measurement and description, chemical analysis, and where possible, the comparative study of the iconography. For us today, NT 634 is a priceless relic, both as a symbol of the vibrant cultures present on the Korean peninsula over one thousand years ago, and as an artifact illustrating the growth of long-distance maritime exchange during the 4th to 6th centuries; exchange both "material" and ideological, responding to and resulting in the spread of the Buddhist faith throughout Asia. In this exchange, beads and other precious objects were an essential element, helping traveling monks introduce Buddhism to new people and locations, and allowing these new adherents to practice their faith. Through such beads as these, glassworkers in far-eastern Java were intimately linked to elite groups on the Korean peninsula. These are just some of the things that NT 634 means to us today. But consider for a moment: What did it mean to the Silla princess?

ACKNOWLEDGEMENTS

Author Lankton gratefully acknowledges his many debts in the preparation of this manuscript: To Peter Francis, Jr., for showing how exciting and wide-ranging bead research could be; to Karen Karn for suggesting Buddha in the first place; to Peter Sharrock for his excellent review of Buddha images in early Southeast Asia; to Patrick Stern for helping to understand the glass technology behind Jatim beads; and to Mara Adhyatman, Jamey Allen, Ian Glover, Barbara and Bob Pringle, and Deborah Zinn for their helpful comments on earlier versions of this paper. In particular he thanks the Grants Committee of the Bead Society of Los Angeles for their encouragement and financial support for much of the research reported here. JWL further thanks the Korea Foundation for support through a Korea Foundation Field Research Fellowship during the final preparation of this paper, a version of which was initially presented on November 23, 2007, at the International Bead and Beadwork Conference in Istanbul, Turkey, with the title "How does a Bead Mean? An Archaeologist's Perspective."

REFERENCES CITED

Adhyatman, Sumarah and Redjeki Arifin

1996 *Manik-Manik di Indonesia: Beads in Indonesia.* 2nd ed. Djambatan, Jakarta.

Allen, Jamey D.

1998 *Magical Ancient Beads.* Times Editions, Singapore.

Barnes, G.L.

2001 *State Formation in Korea.* Curzon Press, Richmond, Surrey.

Beck, Horace C.

1928 Classification and Nomenclature of Beads and Pendants. *Archaeologia* 77:1-43. Reprinted in *Beads: Journal of the Society of Bead Researchers* 18 (2006).

Bellina, B. and I.C. Glover
2004 The Archaeology of Early Contact with India and the Mediterranean World, from the Fourth Century BC to the Fourth Century AD. In *Southeast Asia from Prehistory to History*, edited by Ian C. Glover and P. Bellwood, pp. 68-88. Routledge Curzon, London and New York.

Bellina, B. and P. Silapanth
2006 Khao Sam Kaeo and the Upper Thai Peninsula: Understanding the Mechanisms of Early Trans-Asiatic Trade and Cultural Exchange. In *Uncovering Southeast Asia's Past*, edited by E.A. Bacus, I.C. Glover, and V.C. Pigott, pp. 379-392. National University of Singapore Press, Singapore.

Bouzouggar, A.N. Barton, M. Vanhaeren, F. d'Errico, S. Collcutt, T. Higham, E. Hodge, S. Parfitt, E. Rhodes, J-L. Schwenninger, C. Stringer, E. Turner, S. Ward, A. Moutmir, and A. Stambouli
2007 82,000-Year-Old Shell Beads from North Africa and Implications for the Origins of Modern Human Behavior. *Proceedings of the National Academy of Sciences* 104:9964-9969.

Brill, Robert H.
1999 *Chemical Analyses of Early Glasses*. Vols. 1 and 2. The Corning Museum of Glass, Corning.

Clark, J.E.
1995 Craft Specialization as an Archaeological Category. *Research in Economic Anthropology* 16:267-294.

Dupont, P.
1959 Les Buddha dits d'Amaravati en Asie du Sud-est. *Bulletin de l'Ecole française d'Extrême-Orient* XLIX:633-636.

Fontein, J., et al.
1971 *Ancient Indonesian Art: Of the Central and Eastern Javanese Periods*. Asia Society, New York.

Francis, Peter, Jr.
2002 *Asia's Maritime Bead Trade, 300 B.C. to the Present*. University of Hawai'i Press, Honolulu.

Girard-Geslan, Maud et al.
1998 *Art of Southeast Asia*. Harry N. Abrams, New York.

Glover, Ian C. and Julian Henderson
1995 Early Glass in South and Southeast Asia and China. In *China and Southeast Asia: Art, Commerce and Interaction*, edited by R. Scott and J. Guy, pp.141-69. Percival David Foundation of Chinese Art, London.

Heekeren, H.R. van
1958 *The Bronze-Iron Age of Indonesia*. Nijhoff, The Hague.

Holcombe, Charles
2001 *The Genesis of East Asia, 221 B.C.-A.D. 907*. Association for Asian Studies and University of Hawai'i, Honolulu.

Kim, D.-Y.
2006 *Overlooked Historical Records of the Three Korean Kingdoms*. Jimoondang, Paju, Korea.

Lankton, James W., L. Dussubieux, and T. Rehren
2008 A Study of Mid-First Millennium CE Southeast Asian Specialized Beadmaking Traditions. In *Papers from the 10th International Conference of the European Association of Southeast Asian Archaeologists,* edited by E.A. Bacus, I.C. Glover, and V.C. Pigott, pp. 335-356. National University of Singapore Press, Singapore.

Lankton, James W. and I.S. Lee
2006 Treasures from the Southern Sea: Glass Ornaments from Gimhae-Yangdong and Bokcheondong, Compositional Analysis and Interpretation. In *Archaeology: Traces of Time and Space,* edited by A.K. Kim, S.W. Ahn, and S.B. Jung, pp. 329-354. Hakyeon Munhwasa, Seoul.

Lankton, James W., I.S. Lee, and J.D. Allen
2005 Javanese (Jatim) Beads in Late Fifth to Early Sixth-Century Korean (Silla) Tombs. In *Annales du 16e Congrès de l'Association Internationale pour l'Histoire du Verre,* edited by H. Cool, pp. 327-330. AIHV, Nottingham.

Meskell, L. (ed.)
2005 *Archaeologies of Materiality*. Blackwell, Malden, MA.

Wolters, O.W.
1967 *Early Indonesian Commerce: A Study of the Origins of Srivijaya*. Cornell University Press, Ithaca.

James W. Lankton
Honorary Senior Research Fellow
UCL Institute of Archaeology
31-34 Gordon Square
London WC1H 0PY, UK
E-mail: jwlnet@yahoo.com

Marjorie Bernbaum
Albuquerque, New Mexico, USA
E-mail: mbernbaum@comcast.net

WESTERN INDIAN (MEWAR) CHALCOLITHIC BEADS WITH SPECIAL REFERENCE TO BALATHAL

Alok Kumar Kanungo, Virendra Nath Misra, and Vasant Shinde

During the last few years, Indian archaeologists have concentrated their efforts on the investigation of sites of the 3rd to 2nd millennia B.C. in the Mewar region of western India. Unfortunately, most of the excavations have been focused on understanding the cultural sequence, settlement patterns, architecture, and pottery at the sites and have neglected the study of such important artifact categories as beads. As no final reports have been published and the excavations have been carried out by different agencies, reconstructing the bead culture of this area is very difficult. We know quite a bit about the beads of the urban Harappans but know practically nothing about those used by the contemporary rural Chalcolithic people. This paper discusses the beads recovered from a number of Chalcolithic sites, with emphasis on the oldest village in India—Balathal.

INTRODUCTION

The Mewar region in Rajasthan is bounded by the Aravalli Range to the north, north Gujarat to the south and west, and the Malwa plateau to the east. This is one of the prime zones of the development of cultural evolution in India. The research potential of the region was recognized when V.N. Misra carried out extensive surveys in the region in the 1960s and discovered archaeological sites of various cultural periods (Misra 1967). Since then a number of Protohistoric sites have been discovered there. With the discovery of Chalcolithic cultures of a later date, scholars categorized them as a degenerate form of the Harappan culture due to the lack of magnificence in their cultural patterns and some saw this as a result of the migration of the Harappans. Many, however, are of the opinion that the Chalcolithic cultures in Mewar evolved indigenously from already existing Mesolithic and Neolithic cultures.

THE CHALCOLITHIC CULTURE IN MEWAR

Excavations and new C^{14} dates have revealed the contemporaneity of Chalcolithic cultures with the Early, Mature, and Late Harappan periods, as well as the Mesolithic period. A coexistence of urban and rural life with luxury and utilitarian items, respectively, in those days is not surprising, as even in the present day both urban and rural people live together and know each other, yet their material cultures differ substantially. As far as beads are concerned, the bead center at Khambat has been exploited by the urban and rich since Harappan times whereas the Chalcolithic people produced their own stone beads of comparatively poor quality. Nevertheless, a few beads were obtained from the Harappans by higher-class people.

The term "Chalcolithic" is derived from chalco (copper) and lithic (stone) denoting the use of both materials with the former on a restricted scale. Having a limited knowledge of copper, these cultures developed a long, slender, lithic blade industry from the short, thick blades of Mesolithic times and these helped in the production of drills for beadmaking.

There are essentially two separate Chalcolithic cultures in Rajasthan. The first is the Ahar culture which inhabited the Banas river system. The second is the Ganeshwar-Jodhpura culture which was first identified at the site of Ganeshwar (Chakravarty and Srivastava 1985:147-149). Of the two, the latter culture was the more advanced. Both these cultural groups, Ahar (masters of black-and-red ware) in the southeast and Ganeswar-Jodhpura (copper rich) in the northeast, as well as the Pre/Early and Mature Harappans to the northwest and north of Mewar and groups of Mesolithic hunter-gatherers throughout the region, traded with each other, most notably for copper and products such as pottery and beads.

Ahar Culture

The Ahar culture, also known as the Banas culture, derives its name from the site of Ahar, located on the outskirts of the city of Udaipur, where the culture was first identified (Sankalia et al. 1969). Since then 111 sites of this culture have been discovered and almost all are located in

Mewar. Their distribution within the district is as follows: Chittaurgarh - 41; Bhilwara - 24; Udaipur - 25; Dungarpur - 6; Tonk - 5; Ajmer - 4; Jaipur - 4; and Dhaulpur - 2 (Misra 2007). By the 3rd millennium B.C., this culture had spread over a large area of Rajasthan and Madhya Pradesh from Ahar in the east to Iran in the west, and from Ajmer in the north to Navadatoli in the south. Five sites of this culture, namely **Ahar** (IAR 1954-1955, 1955-1956, 1961-1962; Sankalia and Ansari 1969), **Gilund** (IAR 1959-1960:41-46; Possehl et al. 2004; Shinde and Possehl 2005; Shinde et al. 2005), **Balathal** (Misra 1997; Misra and Mohanty 2001; Misra et al. 1995, 1997), **Marmi** (Misra et al. 1993), and **Ojiyana** (IAR 1984-1985:68; Meena and Tripathi 2000, 2000-2001, 2001-2002a, 2001-2002b), have been excavated to varying degrees (Fig. 1). They can be characterized as chiefdom societies, which generally constructed either

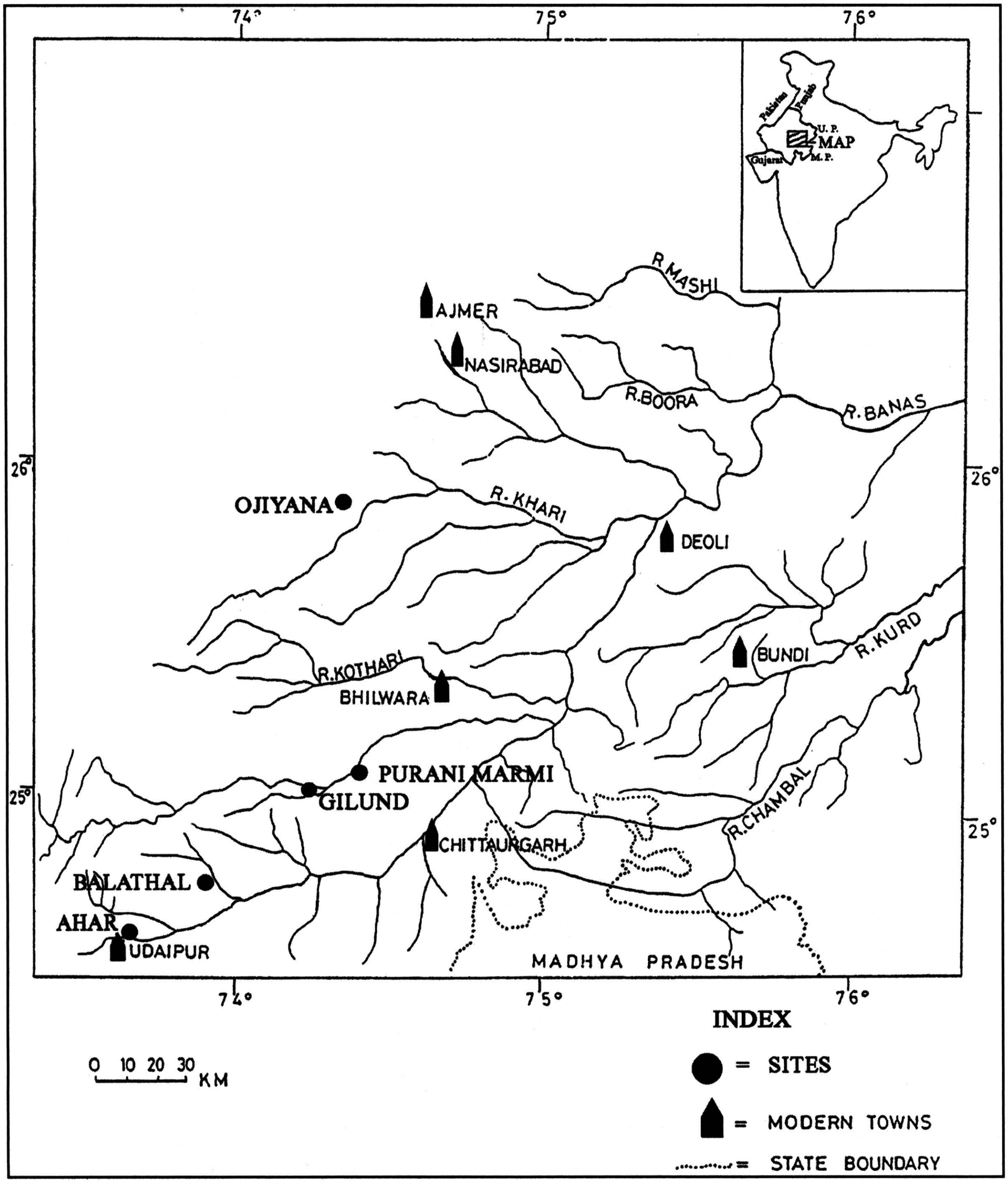


Figure 1. The location of the discussed Ahar sites in western India (drawing: A.K. Kanungo).

rectangular or round mud-brick or wattle-and-daub houses and had various types of public architecture. The excavations have provided a complete cultural sequence for the region and thrown light on its various aspects including socio-economic organization, trade, and contacts. Culturally the assemblage includes painted wheel-thrown ceramic traditions, a specialized blade/flake industry, limited use of copper, and subsistence based on farming, stock-raising, pastoralism, and limited hunting.

Prior to the excavations at Balathal, it was thought on the basis of data from Inamgaon, Navdatoli, Kayatha, and other sites that the Harappans played an important role in the origin and development of village-based agricultural communities of the Ahar-Banas Chalcolithic complex and the Central Indian Chalcolithic. Excavations at Chalcolithic sites in the Deccan and Central regions, however, provided evidence for already well-established settlements rather than the gradual development of village life. There was a rather abrupt introduction of pottery, copper, and ornament-manufacturing technologies (Shinde and Posshel 2005:295). The exploration of the five Ahar sites mentioned above revealed that a distinctive regional Chalcolithic culture had developed in the Mewar region during the latter half of the 3rd millennium B.C. (Fig. 2).

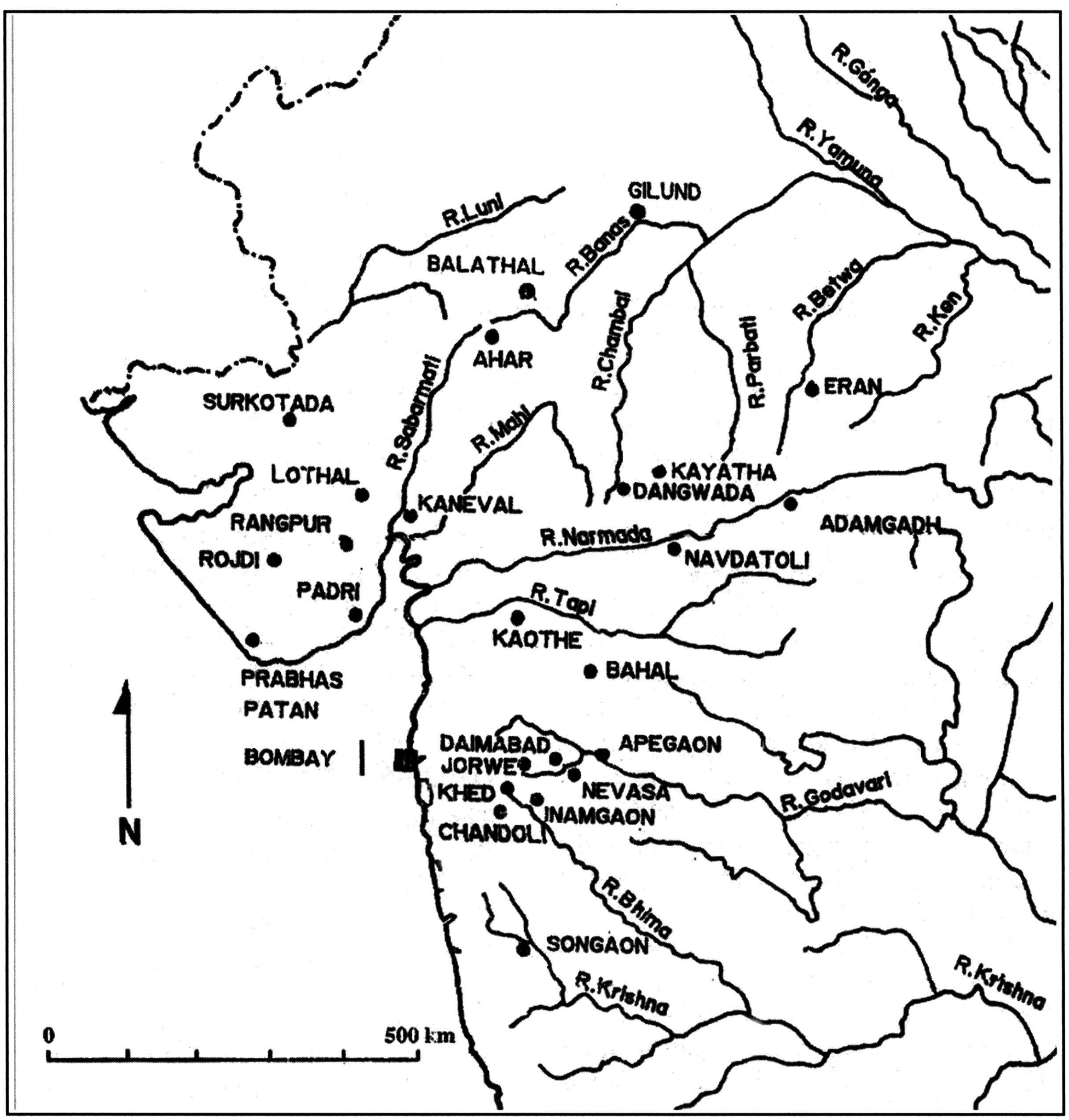


Figure 2. Important Chalcolithic sites in central and western India (drawing: A.K. Kanungo).

The sites of the Chalcolithic Ahar culture may be divided into three phases: Early (3000-2500 B.C.), which saw the rise of the culture; Mature (2500-2000 B.C.), during which it was at its peak in terms of development, and Late (2000-1500 B.C.), when it declined and collapsed (Possehl et al. 2004)(Table 1).

Sites of the Ahar Culture

The site of **Ahar** (500 x 275 m with a 12.8-m-thick deposit) was first excavated on a limited scale by the Department of Archaeology, Rajasthan, in 1954-1956, and then by Deccan College in 1961-1962 (Sankalia et al. 1969). Being in the vicinity of the extensive copper deposits of the Aravalli Range, Ahar is presumed to be one of the primary centers where agriculture and copper working played an important role (Hooja 1988; Kashyap 1999; Sankalia et al. 1969). The people practiced animal husbandry and cultivated rice. The occupation of the site has been divided into Period I (Chalcolithic) with three sub-phases (Ia, Ib, and Ic), and Period II (Iron Age). Although there is no sterile layer separating the two periods, chronologically there is a gap.

Ahar is identified as a copper-smelting and tool-manufacturing site based on the finding of copper slag and implements such as celts, blades, knives, rings, bangles, and kohl sticks derived from local copper ore. Also present are terra-cotta animal figurines including bulls, elephants, and a horse, most of which belong to sub-phases Ib and Ic. There are also shell bangles and beads of steatite, shell, crystal, terra cotta, and lapis lazuli. Most of the terra-cotta beads[1] range from biconical to oblate forms and many of them bear incised decorative patterns, eight of which are identical to those found in western Asia (Fig. 3).

An interesting find at Ahar associated with Phase Ib is a tiny terra-cotta container with rope decoration around the body which contained 11 beads (Fig. 4). Of these, five were of faience, four of shell, and one each of agate and carnelian (Sankalia et al. 1969:163). Glass beads have also been recovered at Ahar but their age is uncertain. The excavator identified them as Early Historic: "Glass, though technically reported from the horizons of phase IC, has to be assigned to period II as the topmost horizons of the former were very much disturbed due to pits" (Sankalia et al. 1969:163). If, however, the beads do belong to the Chalcolithic phase, the antiquity of glass in the region can be pushed back by a thousand years, but only further research will resolve this.

Gilund (25° 01' 56" N and 74° 15' 45" E) is located on the right bank of the Banas River roughly 100 km to the northeast of the city of Udaipur in the Rajsamand district and was excavated by the Archaeological Survey of India in 1959-1960 (IAR 1959-60:41-46) and again by Deccan College and Pennsylvania University from 1999-2004 (Possehl et al. 2004; Shinde and Possehl 2005; Shinde et al. 2005). This is the largest site of the Ahar culture being about 10 hectares in extent with two prominent mounds. The eastern one is 15 m high while the one to the west is 8 m high. The site has been identified as an important center of the Ahar culture in both economic and political terms

Table 1. Chronology at Ahar, Balathal, and Gilund (*after* Sinha 2003).

Ahar (Hooja 1988)		**Balathal (Misra 2001)**		**Gilund (Possehl and Shinde 2004: 20; Shinde et al. 2005)**	
Chalcolithic					
Period	Date (B.C.)	Period	Date (B.C.)	Period	Date (B.C.)
Ia	2580-2170	IA	3000-2500	I Early	3000-2500
Ib	2170-2080	I Middle	2500-2000		
Ic	2080-1500	I Late	2000-1700		
Stratigraphic Break					
Early Historic					
II	6th c. B.C.+	II	3rd c. B.C. - 1st c. A.D.	II	Early Historic (Sunga/Kushana)
Stratigraphic Break					
	Late Medieval			III	Medieval

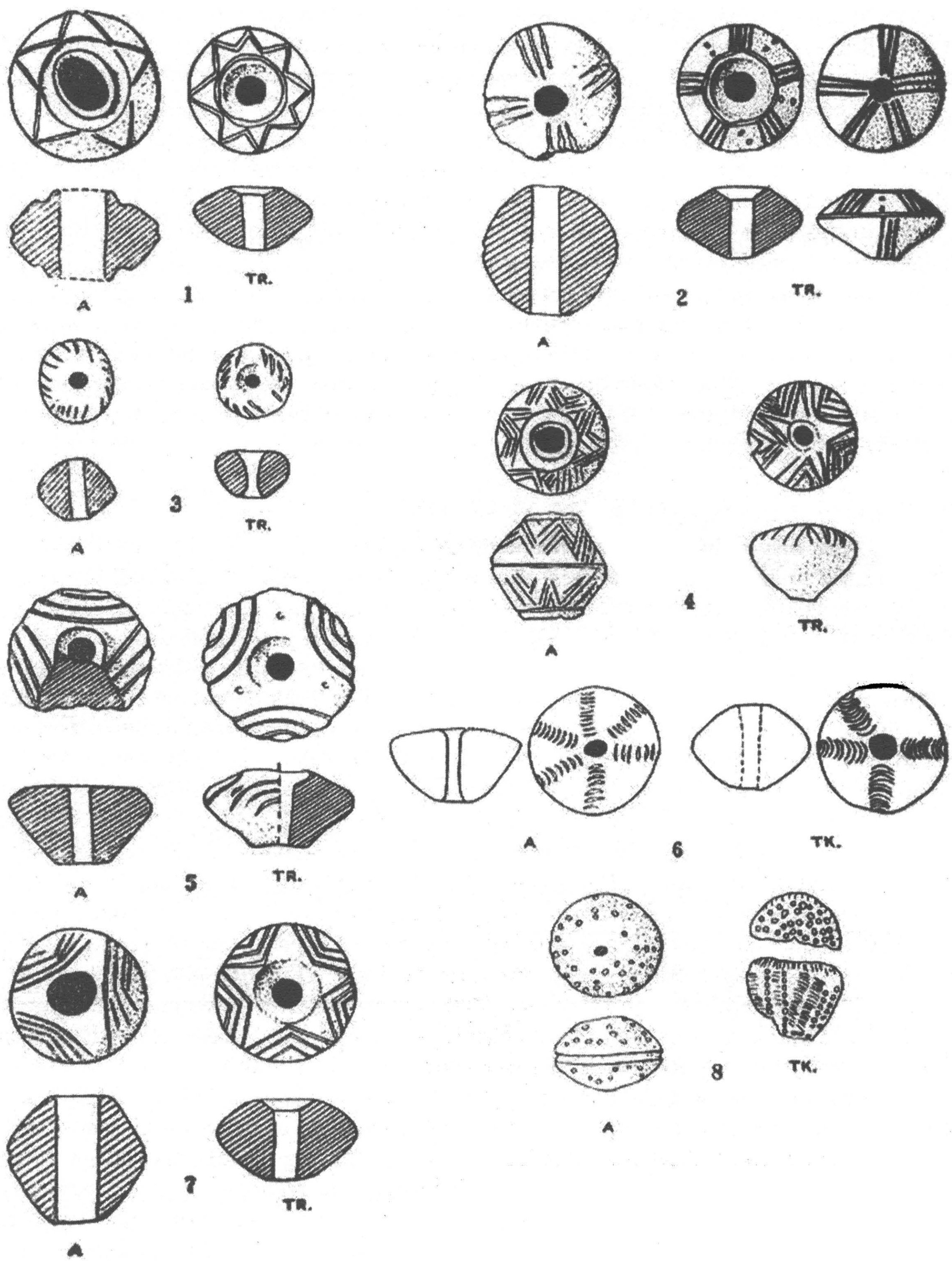


Figure 3. Incised terra-cotta beads or spindle whorls from Ahar (A); Troy, Turkey (TR); and Anau, Turkmenistan (TK) (*after* Sankalia et al. 1969).

with impressive mud-brick public architecture and separate mud/mud-brick fortifications. Artifacts from many far-flung regions have been found here testifying to the extensive trade contacts of these people. There is also evidence of graffiti with affinities to Harappan script. The excavations have provided excellent evidence of granaries and silos, the

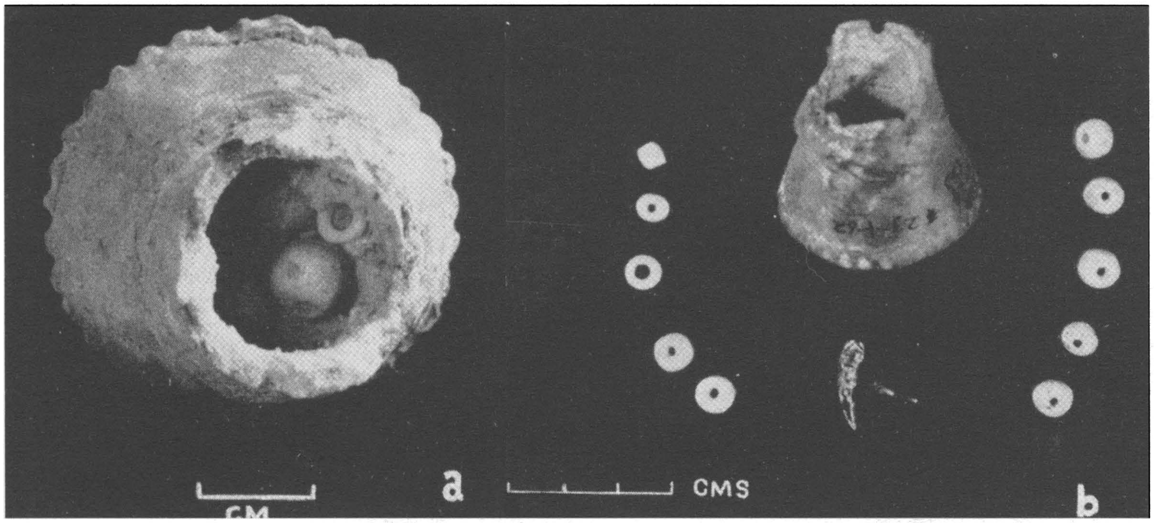


Figure 4. Tiny terra-cotta container and the beads found in it at Ahar (*after* Sankalia et al. 1969).

first use of kiln-burnt brick by the Chalcolithic people, a cart track, and terra-cotta seals, suggesting contact with Sind, Baluchistan, and the Bactria-Margianna Archaeological Complex (BMAC) of Afghanistan and Central Asia.

The presence of a carnelian-bead workshop at the site was hypothesized with the discovery of a large quantity of agate/carnelian beads (Pl. VB, left) and beadmaking debitage scattered in the level dated to the mid-3rd millennium B.C. (V. Shinde 2008: pers. comm.). This blossoming craft must have depended on north Gujarat for the raw materials (DasGupta 2006:73). Other important finds are the biconical to oblate terra-cotta beads (Pl. VIA) which have the same incised decorative patterns as the ones from Ahar and are related to those from western Asia. At least seven beads from the Mature phase of Chalcolithic Gilund have incised designs that are identical to those on the Ahar beads. The finding of two turquoise beads (Pl. VB, right) associated with the Mature Chalcolithic phase provides additional evidence for contact with western Asia.

The **Ojiyana** (25° 53' N; 74° 21' E) village is located about 30 km southwest of Beawar and 11 km north of Badnor, on the Beawar-Bhilwara road. This ancient site lies on the slope of a small hill situated to the northwest of the present village. It was excavated by the Archaeological Survey of India for two seasons during 1999-2001 (Meena and Tripathi 2000, 2000-2001, 2001-2002a, 2001-2002b). The strategic location of the site and the recovered artifacts reveal that Ojiyana played an important role in the hinterland trade with other contemporary Chalcolithic communities. The 7.5-m-thick cultural deposit is divided into three phases based on the pottery and structural evidence. The finds include a large number of steatite beads, as well as beads of shell, bone, faience, terra cotta, carnelian, and agate (Pl. VIB). Other ornaments and pieces of copper are also present. The carnelian, agate, and limestone beads may be imports as these materials are not available locally. Surprisingly, no quartz beads were found though the raw material is available in abundance. Perhaps beads were not produced at this site.

Steatite beads by far outnumber those of all other materials, suggesting they were a popular ornament among the inhabitants (Meena and Tripahti 2001-2002b). The common forms are micro beads, globular specimens, and thin and thick discs.

Many of the incised designs on the terra-cotta beads are identical to those found at Ahar and Gilund (**Fig. 5**). Another interesting discovery is a big decorated bead of faience (Pl. VIIA, top), identical examples of which were found at Harappa and Mohenjo-daro. The presence of this Harappan bead at an Ahar culture site suggests that these two contemporary cultures had some degree of interaction.

The large and elevated mound of **Marmi** (25° 6' N; 74° 25' E) is about 18 km up the Banas river (northeast) from Gilund and is located 500 m east of the village of Marmi in the Rasin Tehsil sub-division of the Chitorgarh District. Excavation has produced hundreds of terra-cotta bull figurines of the Chalcolithic period (Misra et al. 1993). Two short cylindrical beads of shell and two globular beads of terra cotta were found on the southern slope of the mound. Their similarity with beads from other Chalcolithic sites in Rajasthan and Madhya Pradesh suggests that they probably belong to the Chalcolithic period.

The site of **Balathal** (24° 43' N; 73° 59' E), is located 30 km south of Gilund, in the Udaipur District, and was first

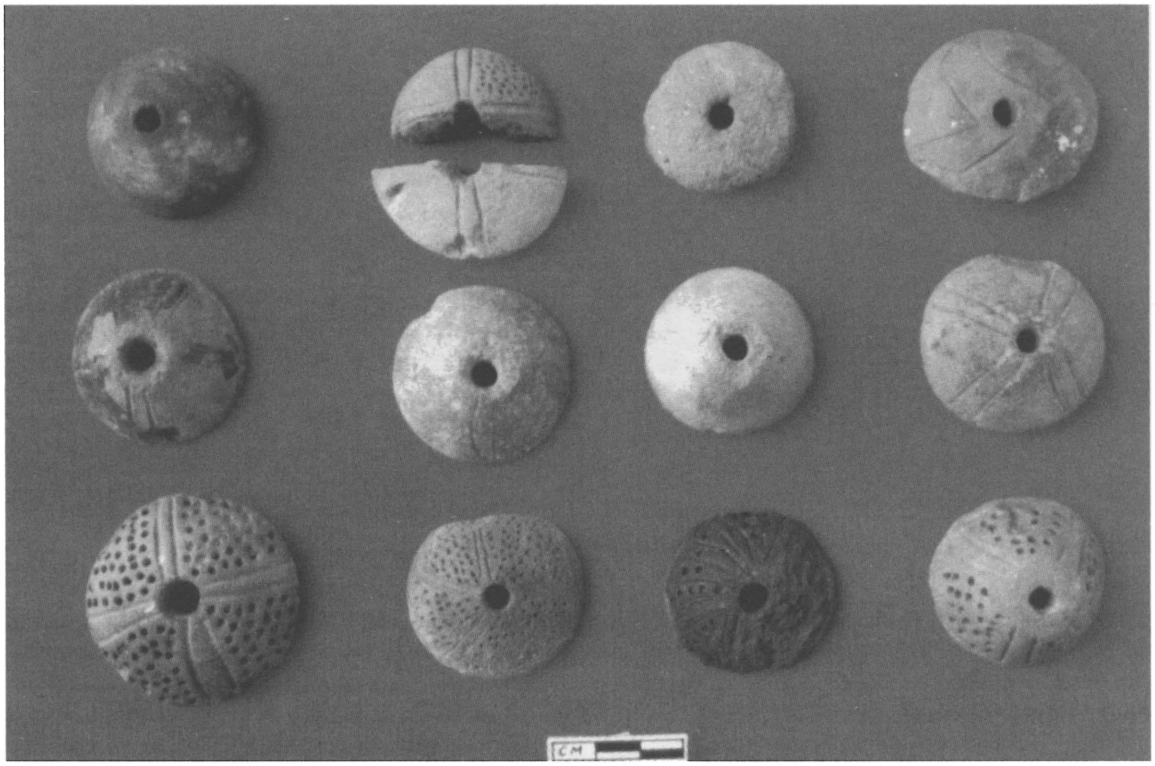


Figure 5. Incised terra-cotta beads/spindle whorls from Ojiyana (*after* Meena and Tripathi 2002b).

discovered by V.N. Misra (1967). The site was subsequently visited by R. Hooja (1988). Balathal was excavated by Deccan College and the Institute of Rajasthan Studies between 1993 and 2000 on a large scale with a view to reconstructing the socioeconomic organization of the early farmers of this region.

The site covers an area of 2 ha (150 m N-S by 135 m E-W) and the cultural deposit is 7 m thick. The deposit is divisible into two cultural periods: Chalcolithic (the lower 4.5 m dating to 2800-1800 B.C.) and Early Historic (the upper 1.5 m dating to 300 B.C.-A.D. 100). There was a hiatus between the occupations which is represented by a sterile dark grey layer about 1.0 m thick. The Chalcolithic period itself has been divided into two phases. Phase A is represented by the lower 1.0-1.5 m of the deposit and Phase B by the upper 3.0-3.5 m of the deposit in the different trenches.

A total of 23 layers were recorded at Balathal. Layers 6 to 23 belong to the Chalcolithic period and layers 1 to 4 to the Early Historic. Layer 5 is sterile. Layer 4 consists of a deposit of white ash 20-25 cm thick which was probably produced by the Early Historic people burning off the vegetation growing on the deserted site before they settled on it. This layer too is virtually sterile and the limited amount of potsherds and other objects found in it may be intrusive from Layer 3 (Misra 1997, 2001, 2005).

The excavations at Balathal have pushed the Ahar culture back to 3000 B.C., making it contemporary with the Pre/Early Harappans of Rajasthan and Gujarat. They have revealed that during Phase A there existed an early peasant farming community with an indigenously developed, organized village life. The presence of non-local copper objects, steatite beads, and ceramics does, however, reflect the presence of some degree of cultural contact with more developed communities like the Harappan and Ganeswar people. Hence, while the sedentary settlement pattern and agriculture were probably home grown, the technology to some extent was borrowed. The subsequent leap in development around 2500 B.C. was thus probably a result of interaction with the Harappans, which affected all aspects of life including agriculture, technology, architecture, social organization, and local developments in Phase B.

Of the 30 C^{14} dates from the Chalcolithic levels, 25 are fairly homogenous and stratigraphically reasonably consistent. In their uncalibrated form they range from 3020±90 B.C. to 1810±110 B.C. and in calibrated form from 3700 B.C. to around 1800 B.C. (Misra 2005). Table 2 provides the dates of the Chalcolithic layers, either from the same trench or from a nearby trench in the same row, where beads were found.

Table 2. Dating of the Bead-Producing Chalcolithic Layers at Balathal (selected from Misra 2005).

Lab No.	Trench	Layer	Depth	5570 Error	5730 Error	Calibration 1	Calibration Summary
PRL-2041	D11	6	2.91	3860±60	3970±60 B.P. 2020±60 B.C.	B.C. 2306 B.P. 4254	B.C. 2460-2200 B.P. 4410-4150
BS-1782	D4	7	3.0	3990±120	4110±120 B.P. 2160±120 B.C.	B.C. 2487, 2481,2473 B.P. 4436, 4430, 4422	B.C. 2830-2310 B.P. 4780-4260
BS-1749	R13	8	5.65	4080±150	4200±150 B.P. 2250±150 B.C.	B.C. 2618, 2611, 2596, 2593, 2582 B.P. 4567, 4560, 4545, 4542, 4531	B.C. 2880-2460 B.P. 4830-4410
BS-1586	D2	10	3.73	3790±80	3900±80 B.P. 1950±80 B.C.	B.C. 2202 B.P. 4151	B.C. 2400-2050 B.P. 4350-4000
PRL-1843	HX2	11	2.83	4000±70	4120±70 B.P. 2170±70 B.C.	B.C. 2551, 2541, 2491 B.P. 4500, 4490, 4440	B.C. 2620-2460 B.P. 4570-4410
BS-1747	E4	11	4.05	4830±90	4970±90 B.P. 3020±90 B.C.	B.C. 3641 B.P. 5590	B.C. 3700-3520 B.P. 5650-5470
BS-1802	E4	12	4.8	4210±110	4340±110 B.P. 2390±110 B.C.	B.C. 2877 B.P. 4828	B.C. 2910-2600 B.P. 4860-4550
PRL-1981	OC1	13	NA	2520±80	2600±90 B.P. 650±90 B.C.	B.C. 763, 676, 674 B.P. 2712, 2625, 2623	B.C. 800-410 B.P. 2750-2360
PRL-1846	HX2	14	3.16	4180±60	4310±80 B.P. 2360±80 B.C.	B.C. 2866, 2805, 2781, 2769, 2762, 2717, 2710 B.P. 4815, 4754, 4730, 4718, 4711, 4666, 4659	B.C. 2880-2630 B.P. 4830-4580
PRL-1925	HX2	15	3.8	3700±170	3810±170 B.P. 1860±170 B.C.	B.C. 2129, 2082, 2043 B.P. 4078, 4031, 3992	B.C. 2400-1830 B.P. 4350-3780
PRL-1937	OB	16	2.05	3860±90	3980±90 B.P. 2030±90 B.C.	B.C. 2305 B.P. 4254	B.C. 2470-2150 B.P. 4420-4100
PRL-1928	HX2	18	4.68	4420±180	4550±180 B.P. 2600±180 B.C.	B.C. 2027, 1992, 1982 B.P. 3976, 3941, 3931	B.C. 3360-2880 B.P. 4150-3780

An interesting discovery was made in Layers 8 and 9 of the SE quadrant of Trench R13. About 30 cm to the south of a fireplace, dated to 2880 B.C., a large globular pot was found buried in the floor in a vertical position. Removal of the earth from the pot revealed six smaller pots (Fig. 6). They were meticulously packed, being placed either sideways or upside down. The six vessels clearly constituted a dining set which, being of social importance, was carefully stored inside the large pot. It is significant that one of the vessels was also used for storing steatite disc beads and Job's tears (*Coix* sp.)(Figs. 7-8), both of which are common necklace components. This whole set would appear to be equivalent to a modern-day chest used for storing family valuables (Misra 2001).

The ornaments of the Chalcolithic people at Balathal consisted of necklaces made of beads of carnelian, agate, jasper, steatite, faience, and terra cotta, and bangles of copper, shell, and terra cotta (Misra 1997). Terra-cotta items include round, *arecanut*, barrel, and disc beads, *damaru*-shaped pendants, and ear studs (Misra et al. 1997). A copper pendant shaped like a six-petalled flower (Fig. 9) and a beautifully made polished-bone pendant of similar form (Fig. 10) are notable finds associated with Phase B. The face of the bone pendant has a central perforation, which is surrounding by

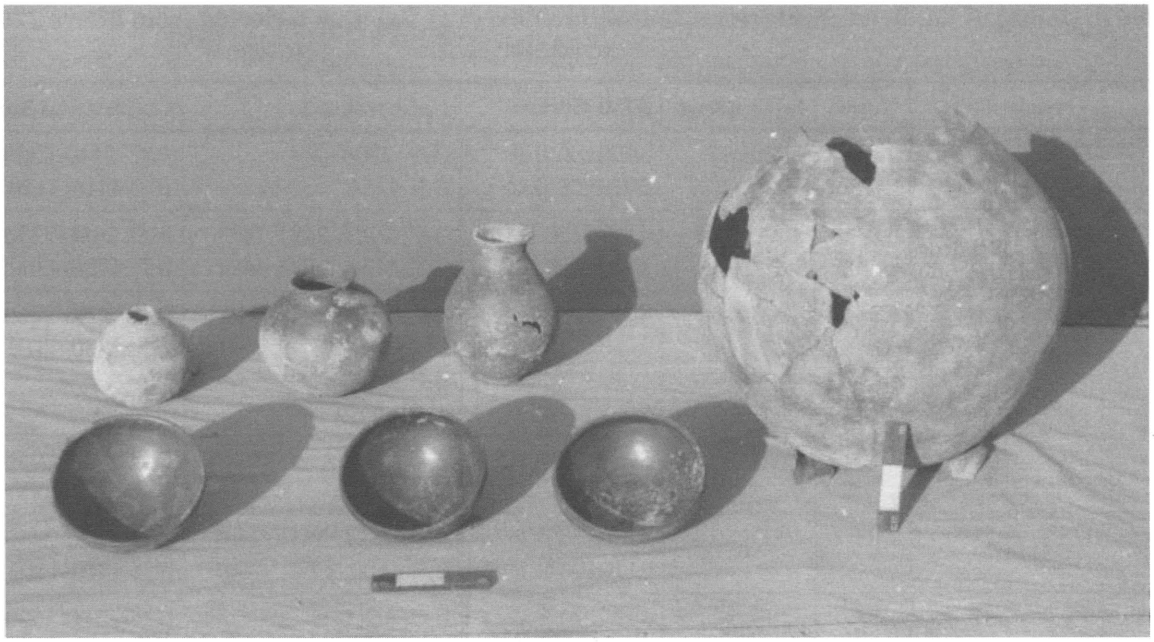


Figure 6. Set of pots found at Balathal (photo: V.N. Misra).

two concentric rows of dot/circle decoration. The circles are symmetrical indicating the use of a circular drill bit. The back side is plain. Although eight glass beads were found in the Chalcolithic level, there is the possibility that they could have intruded from the overlying Early Historic deposit.

Evidence of the disposal of the dead through cremation or burial in regular cemeteries has only been found at Balathal. Five human skeletons were uncovered within the settlement; four from the Chalcolithic deposit and one from the Early Historic. Only burial No. 5 found in Trench D4, Layer 6, 60 cm below the top of the layer, had beads in association. The burial is a woman about 35 years old oriented east-west. She rested on a compact surface made of burnt cow dung with a few small stones placed irregularly on the surface. The head rested on a flat stone which was supported by a smaller stone. A few stones were placed below the left hip and knee area. All the bones were perfectly articulated. Two carnelian beads (fashioned as eye beads) were found in situ on the abdomen. A copper pin was near the right hand.

TECHNOLOGY AND CRAFT AT BALATHAL

A few copper fragments and beads of steatite and semi-precious stones such as carnelian and agate are associated with the early phase of the Ahar tradition at Balathal, revealing the presence of copper smelting as well as tool- and bead-manufacturing technologies right from the beginning of the settlement (Misra et al. 1997). The artifacts are rare, however, and we do not really understand the origin of these crafts and their technologies. It may be that they were borrowed from the more technologically developed Ganeshwar people or the Pre/Early Harappans of North Gujarat and Rajasthan. No definite evidence of bead production at Balathal has been uncovered, though a few unfinished and partially perforated beads suggest that some part of the bead production cycle was taking place at the site. The large quantity of steatite and terra-cotta beads suggests that they are local products; they are a regular feature at most western Indian Chalcolithic sites.

Since the frequency of beads made from such semi-precious stones as carnelian and agate is very low and not

Figure 7. Beads inside one of the Balathal pots (photo: V.N. Misra).

Figure 8. Some steatite and Job's tear beads from the Balathal pot (photo: V.N. Misra).

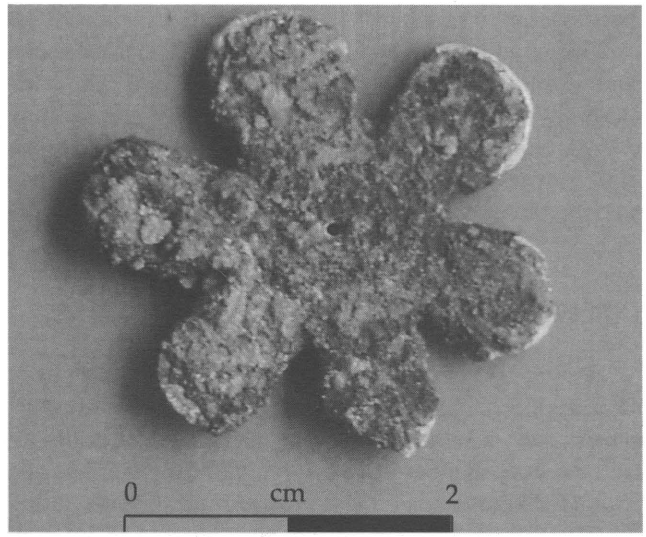


Figure 9. Six-petalled copper pendant from Balathal (photo: A.K. Kanungo).

much has been found to support local manufacture, it is likely that they were obtained through trade with the neighboring cultures, including the Ganeshwar-Jodhpura traditions and other Chalcolithic communities, the Pre/Early Harappans of Gujarat, and the hunting-gathering groups and nomadic pastoralists.

There is definite evidence of commerce between the Ahar people and the Harappans of Gujarat in terms of the flow of marine products such as coral objects (Pl. VIIA, bottom) and conch shell as well as semi-precious stones and beads of carnelian into the Ahar region and the movement of black-and-red ware and copper objects and ingots from the Ganeshwar region into Gujarat via the Ahar region with the hunting-gathering and nomadic pastoral elements acting as intermediaries.

The kind of craft specialization seen at Balathal suggests the presence of a stratified society where people had a surplus economy as well as the desire to obtain and the ability to pay for various commodities, many of which were imported. Many prestigious items such as fine ceramics, copper, and

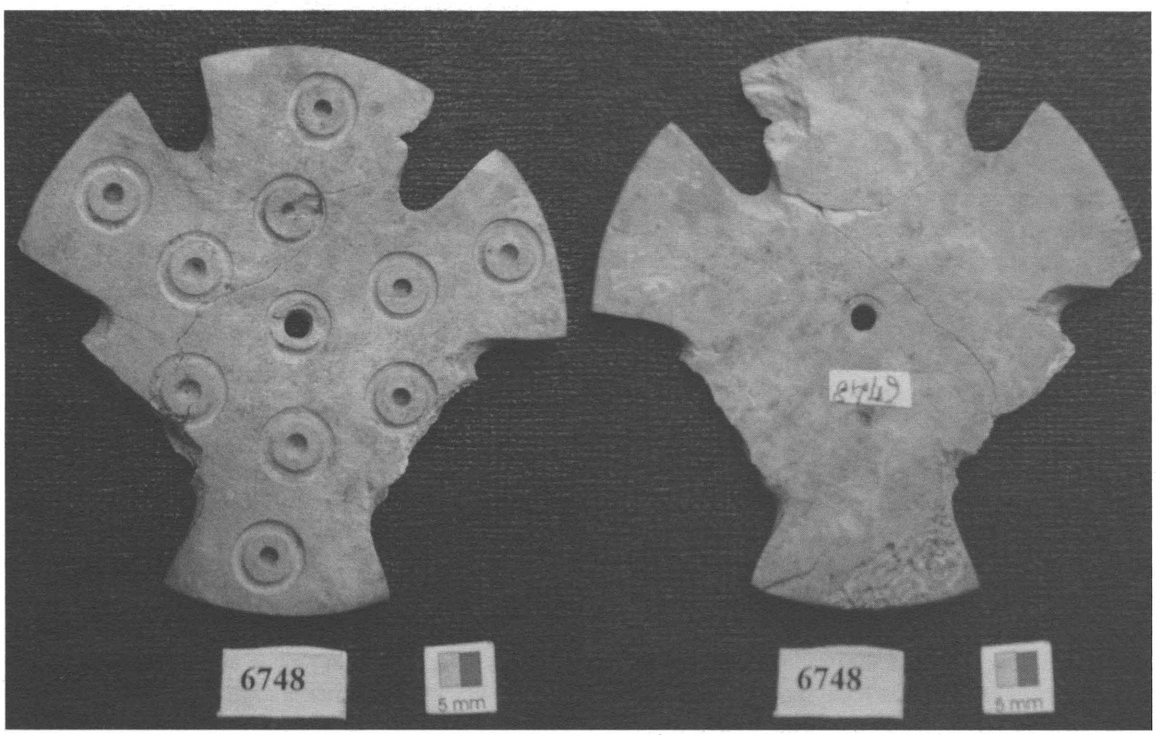


Figure 10. Bone pendant with six projections (two are missing) from Balathal (photo: A.K. Kanungo).

carnelian and jasper beads were luxury items intended for the higher members of the society and clearly indicate social stratification. During the Mature phase, the number of crafts increased and there is a wide variety of artifacts representing many levels of technological ability and social stratification. This is especially true for beads where both common and precious stone were used.

CONCLUSION

Beadmaking was an important industry at most Chalcolithic sites and a variety of beads of semi-precious stones, shell, and terra cotta were manufactured locally. In fact, the large number of beads found at Ahar led Sankalia et al. (1969) to conclude that it was a bead-manufacturing site. While no definite evidence of bead production has been found at Balathal, the presence of a few unfinished and unpolished stone beads at the site suggests that some stage of the bead production cycle was taking place there. A few unfinished beads and the carnelian debitage associated with the phase dated to the mid-3rd millennium B.C. at Gilund indicates probable lapidary work at this site as well.

The most common beads encountered are those made of steatite. They were probably manufactured locally as the Aravalli Range is rich in this material, though it is also possible that it was obtained from the Harappans as they had established industries for the production of steatite beads. Steatite and faience, which are diagnostic of Proto-Historic habitation sites, are scarce at Ahar but plentiful at Balathal, Gilund, and Ojiyana.

After steatite, terra cotta is the next most popular material for beads during all phases of the Proto-Historic period. The incised terra-cotta beads of Ahar and Gilund are so far unique in India. The preference for clay may be due to the fact that forming and baking clay is easier and takes less skill than working stone, and the patterns familiar to the inhabitants could be easily incised on them. Eight of the decorative patterns found on beads from Ahar and seven patterns on specimens from Gilund have similar counterparts on examples from western Asia.

Carnelian, chalcedony, and agate were probably imported from the Gujarat region while shell beads and bangles may either have been imported from there or manufactured locally as Sankalia et al. (1969) has reported shell debitage and shell artifacts in various stages of manufacture at Ahar. Two turquoise beads from the Mature Phase at Gilund throw light on the trade relations of the Ahar people as turquoise is not a local material and comes from Central Asia or Afghanistan and would have reached the site via the Harappans. Similarly, a small tubular lapis lazuli bead of brilliant ultramarine blue found associated with Phase Ic at Ahar is also notable as its nearest source is Afghanistan and it could only have reached the site via trade with the Harappans (Sankalia et al. 1969) or perhaps through intermediaries such as nomadic pastoralists and Mesolithic peoples. It is not possible, however, to generalize on the basis of one or two specimens. The presence of the occasional carnelian bead is also suggestive of trade especially as a Harappan barrel bead has been found at Balathal. Faience beads which were typically manufactured by the Harappans have also been found at Balathal and Gilund.

The semi-precious stones, copper, and shell artifacts represent high-value commodities and were used by the politically and economically richer strata of Ahar society while steatite and terra-cotta beads were used by the common people for ornamenting themselves and probably their animals as is done in the region today.

APPENDIX A. CLASSIFICATION OF THE BEADS AND PENDANTS FROM BALATHAL

A large number of beads, along with a few pendants, came from the Chalcolithic layers at Balathal. Unfortunately, many of them could not be obtained for the present study. What follows is a classification of the beads which were available for study. The beads have been divided into six groups on the basis of material: 1) crystalline stone; 2) cryptocrystalline stone; 3) glass/faience; 4) bone/shell/ivory/coral; 5) terra cotta; and 6) steatite. Their shapes have been identified using parameters set by H.C. Beck (1941: Pl. XI, XII), W.G.N. van der Sleen (1974:34-35, 39, 44-46), and Lois Sherr Dubin (1987:342-43).

Crystalline Stone

Amazonite and quartz comprise this group.

Amazonite

Four amazonite beads were recovered at Balathal (Pl. VIIB); three from Layer 14 and one from Layer 15. Two are disc shaped (#1132 and 9785), one is cylindrical (#4103), and the fourth is barrel shaped (#2431). Nos. 1132 and 4103 are polished but lack perforations. Although no production debitage was uncovered, the unperforated nature of the two specimens suggests that if the whole bead production process was not taking place at the site, at least the drilling was. This is not surprising as in many cultures, the drilling is done at the end-user's place whereas the initial shaping and polishing are performed elsewhere (Kanungo 2006).

Plate IA. *Turkish POW:* **Top:** Patterns on the backs of Turkish prisoner-of-war beadwork snakes. **Bottom:** Various inscriptions found on the bellies (photos by author unless otherwise noted).

Plate IB. *Turkish POW:* **Top:** "A"s or triangles on the lower jaws of some snakes. **Bottom:** The early Kettlewell snake with a beaded lizard in its jaws; TURKISH PRISONERS 1915 on belly. L: 145 cm.

Plate IC. *Turkish POW:* **Top:** The Dardanelles snake from Cyprus dated 1916; L: 180 cm. **Bottom:** The Hislop snake from Cyprus, 1918; L: 176 cm.

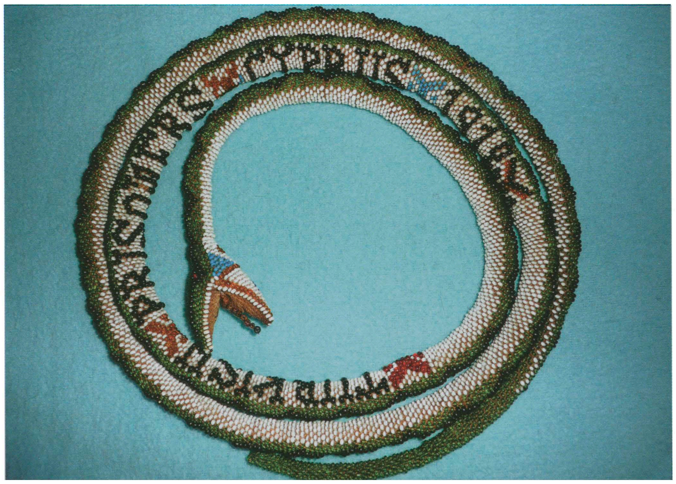
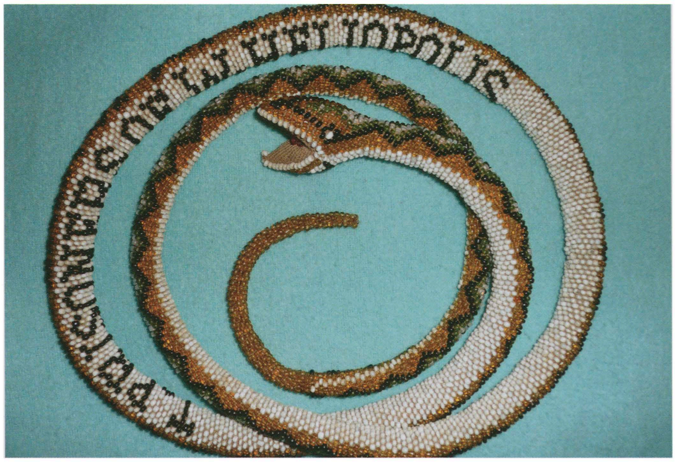


Plate ID. *Turkish POW:* **Top:** The Heliopolis Snake; L: 165 cm. **Bottom:** The very long Hake Snake. Belly inscription reads TURKISH PRISONER 1918 TPR. T.S. HAKE 8TH L. H. L: 342 cm.



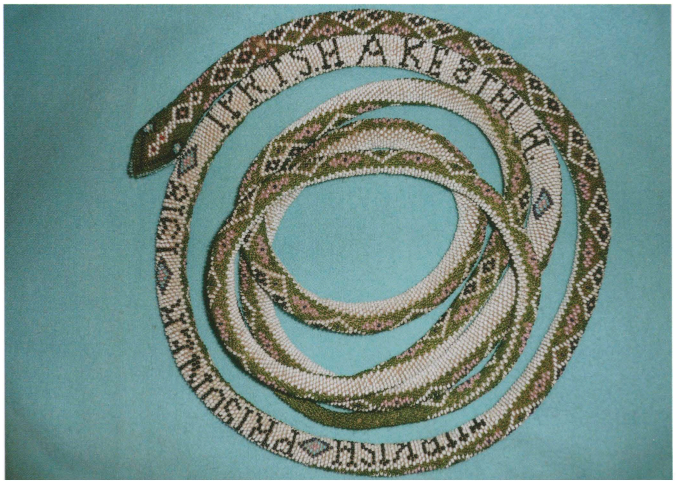


Plate IIA. *Turkish POW:* **Top:** Beadwork lizards crocheted in diamond and zig-zag patterns as well as with spots; max. L: 19 cm. **Bottom:** The lizard in the mouth of the Kettlewell snake.

Plate IIB. *Turkish POW:* Crocheted beadwork bottles decorated with flowers and flags, both are inscribed SOUVENIR SALONIQUE. The tallest bottle is 23 cm high.

Plate IIC. *Turkish POW:* **Top:** Loomwork beaded belts with inscriptions; L: 65 cm. **Bottom:** Elaborate loomwork belt with British and American flags; L: 60 cm (photo: K. Karklins).

Plate IID. *Turkish POW:* **Top:** Two loomwork beaded bands and a necklace (bottom; L: 38 cm). **Bottom:** Netted beadwork purses with loomwork bands at the top from 1918; H: 18-20 cm.

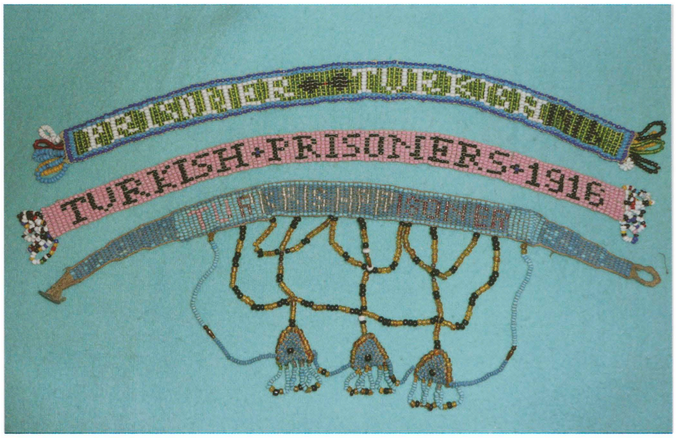


Plate IIIA. *Turkish POW:* **Top:** Loomwork beaded purses depicting birds (left; H: 24 cm) and a Scottish lion rampant (right). **Bottom:** Loomwork purse with birds and a Greek cross; H: 14 cm.

Plate IIIC. *Bunce:* Drawn beads surface collected on Bunce Island, Sierra Leone, by James J. Johnston (photo: R. Chan).

Plate IIIB. *Turkish POW:* **Top:** Loomwork beaded purses depicting a ship (left) and a building (right). **Bottom:** Verso of the ship purse in the above frame showing a war dog with a gas mask.

Plate IIID. *Bunce:* Wound and mold-pressed beads surface collected on Bunce Island by James J. Johnston (photo: R. Chan).

Plate IVA. *NT 634:* Korean National Treasure 634.

a) Hypothetical restringing of the carnelian, jasper, and rock crystal beads and the carnelian comma-shaped pendant (*gogok*) found with NT 634;

b) face and bird canes, with the face distorted toward the perforation;

c) bird and flowering-tree canes;

d) face and bird canes, with the bird cane cut off at the perforation

(photos by J. Lankton; courtesy of Gyeongju National Museum).

Plate IVB. *NT 634:* Jatim beads found with 5th/6th-century Korean (Silla) burials. The largest bead is 22.7 mm in diameter.

a) Small green and yellow *pelangi* bead from a royal tomb at Noseo-ri, Gyeongju;

b-f) two Jatim millefiori mosaic beads from the Sikrichong tomb in Gyeongju (in both cases, the mosaic canes are distorted toward only one end of the perforation);

g-i) Jatim millefiori mosaic bead from Inwangdong, Gyeongju, with a star pattern relatively common on Jatim beads (as with the two beads above, the cane distortion is toward only one end of the bead (courtesy of National Museum of Korea [a-f] and Yeungnam University Museum [g-i]).

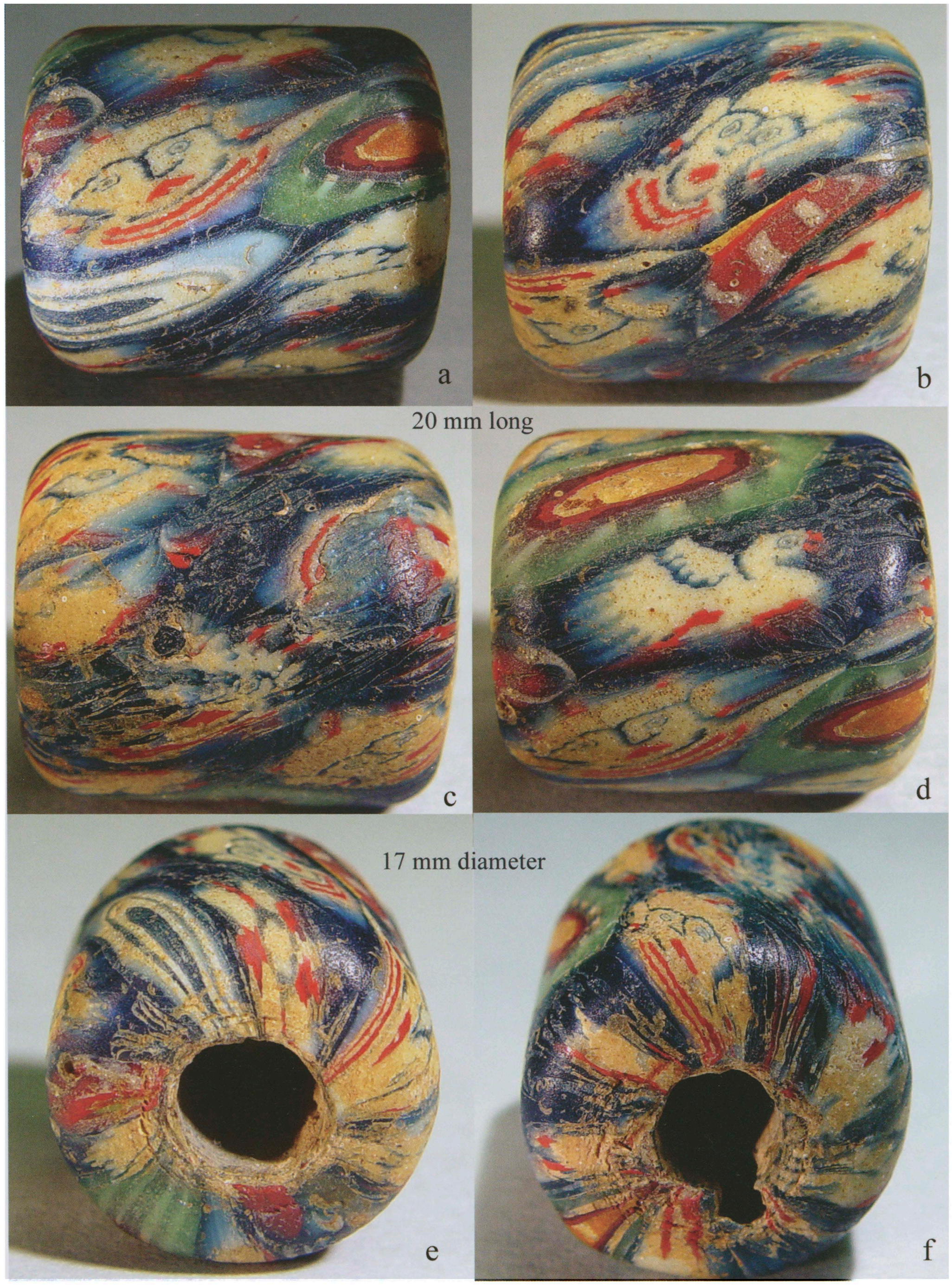
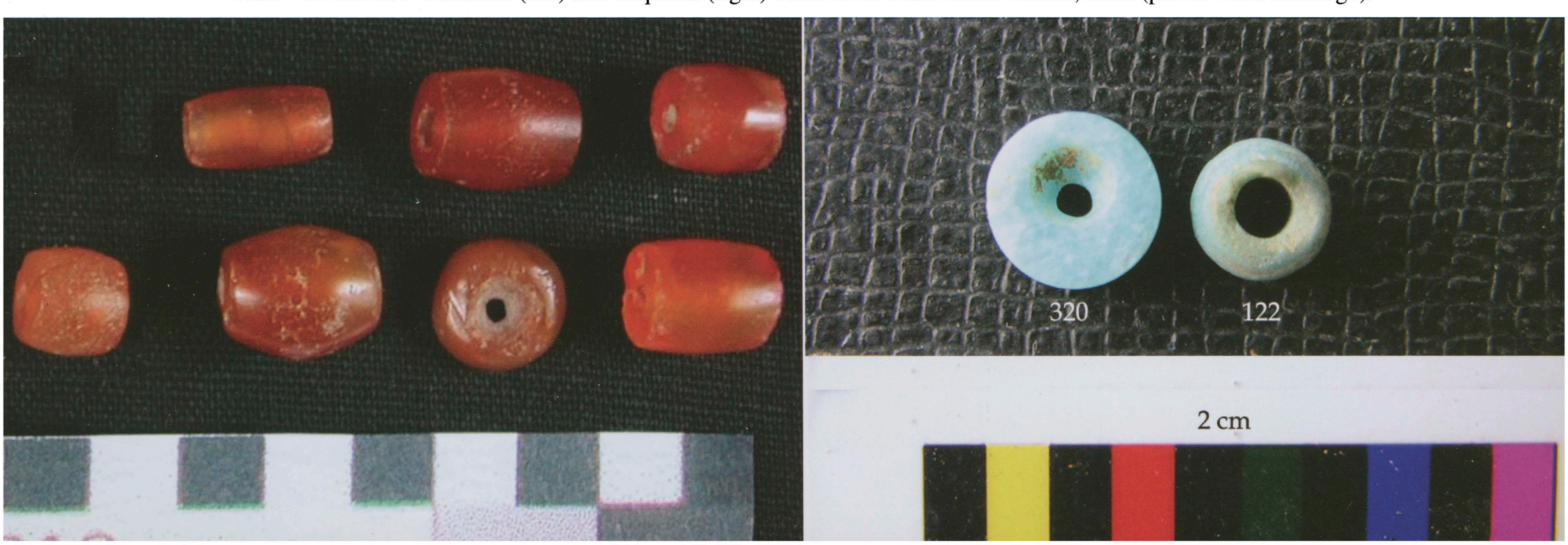


Plate VA. *NT 634:* Jatim face bead in the Liese Collection at the Bead Museum, Glendale, Arizona.
a-b) Side views showing mirror-image faces;
c-d) side views with complete and distorted bird canes;
e-f) end views showing cane distortion toward the perforation.

Plate VB. *Mewar:* Carnelian (left) and turquoise (right) beads from Chalcolithic Gilund, India (photo: A.K. Kanungo).



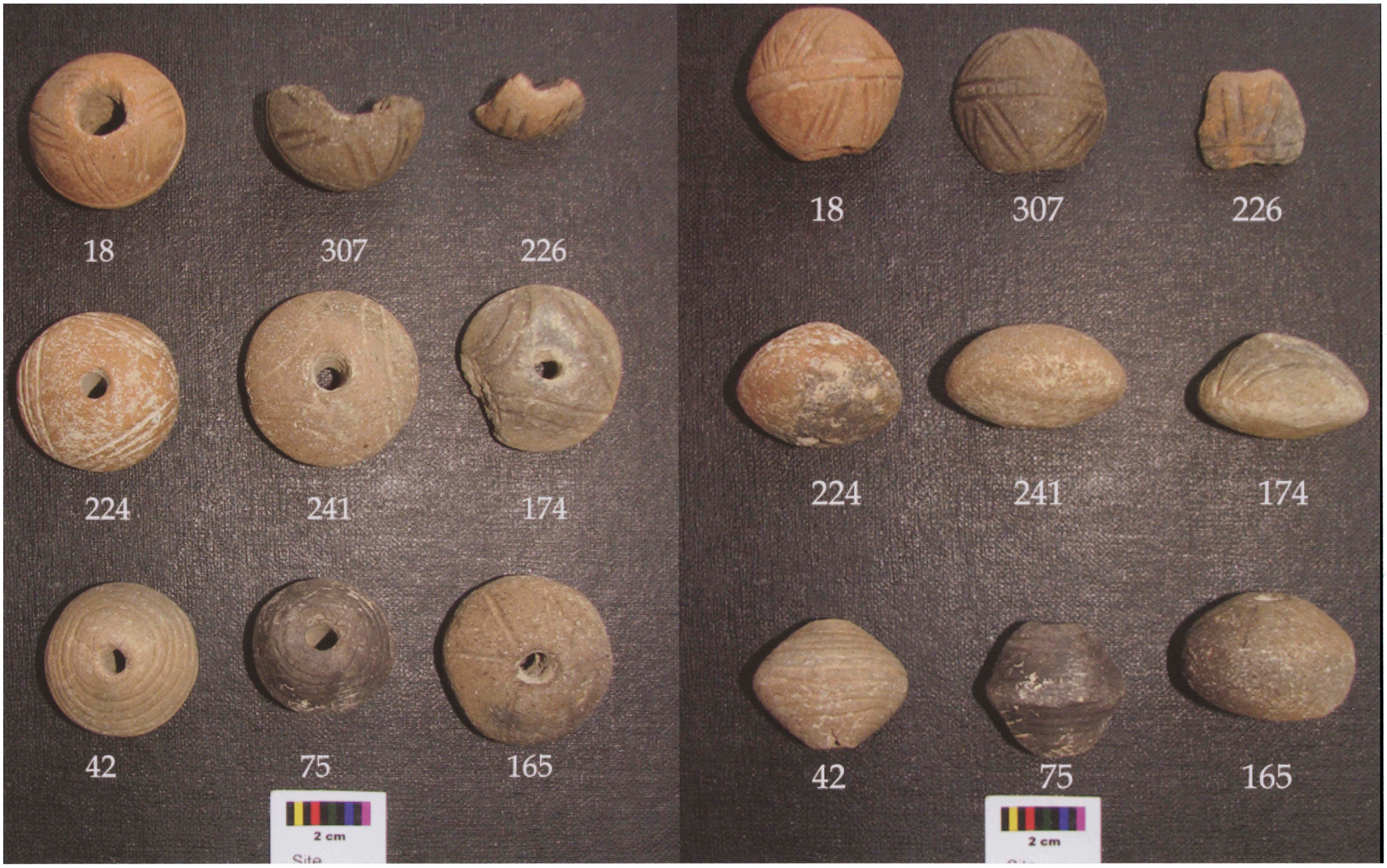
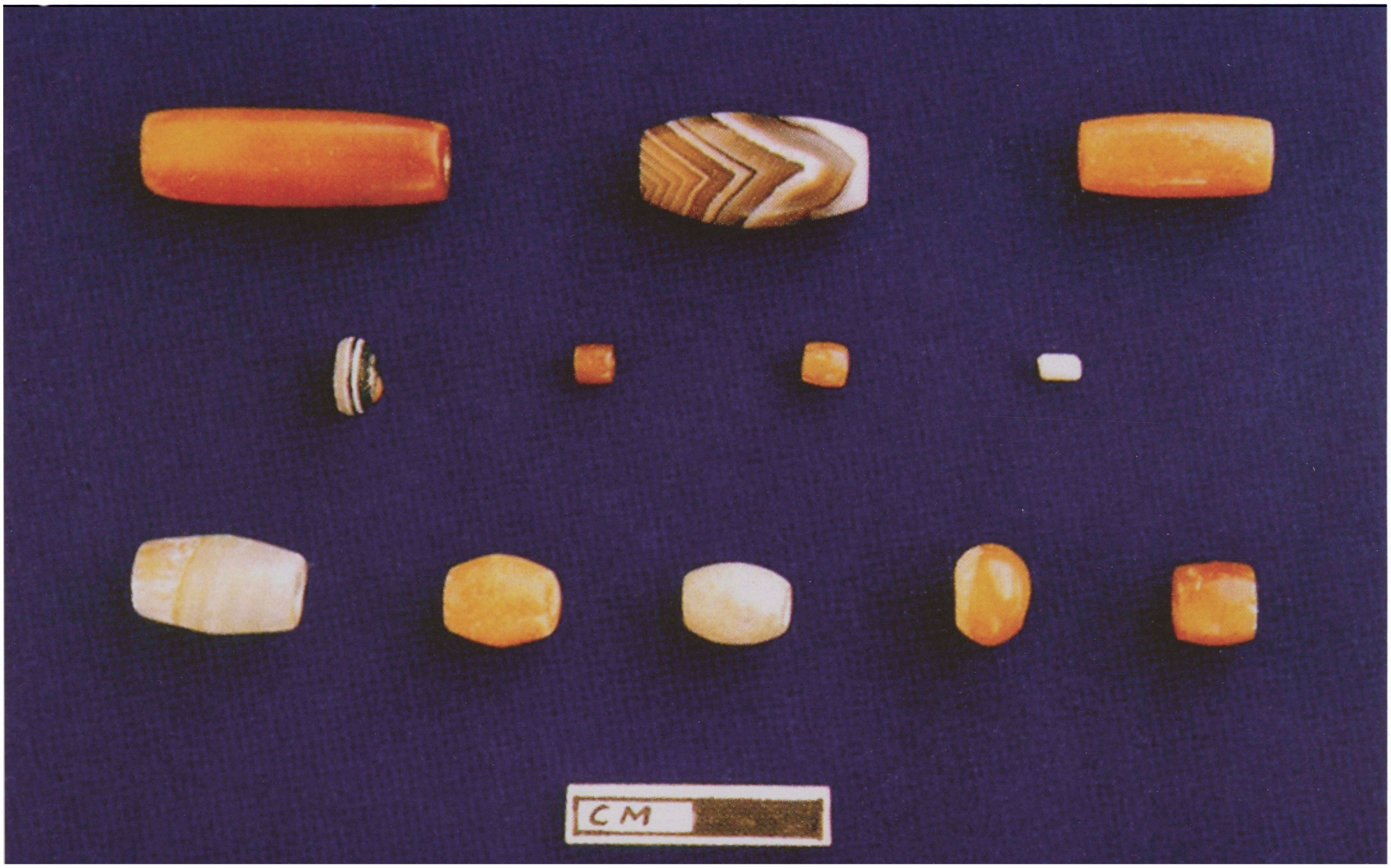


Plate VIA. *Mewar:* Incised terra-cotta beads/spindle whorls from Gilund (photo: A.K. Kanungo).

Plate VIB. *Mewar:* Beads of carnelian, agate, and faience from Ojiyana (*after* Meena and Tripathi 2002b).



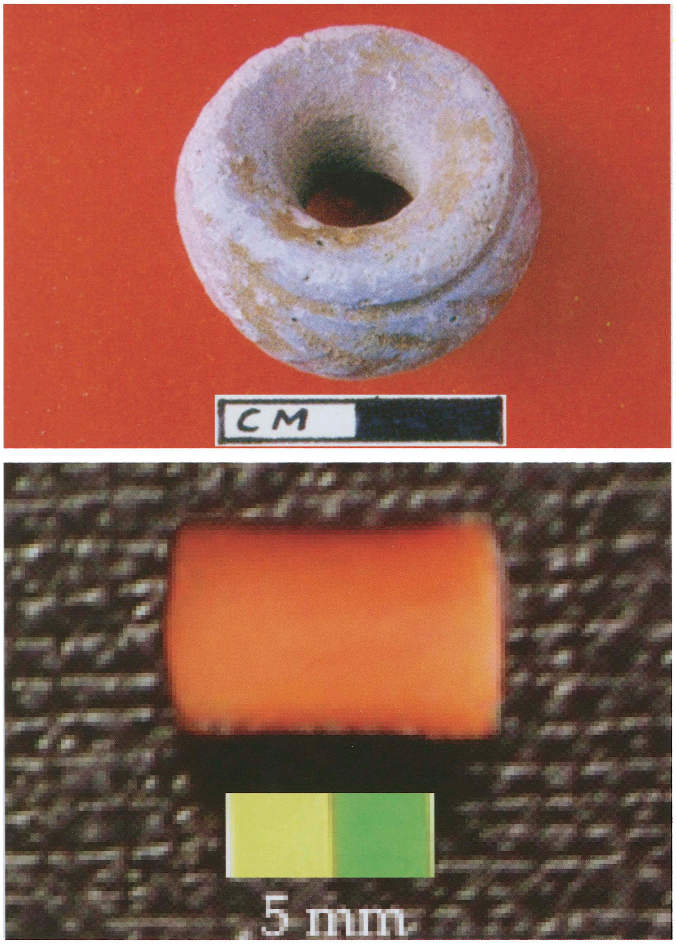
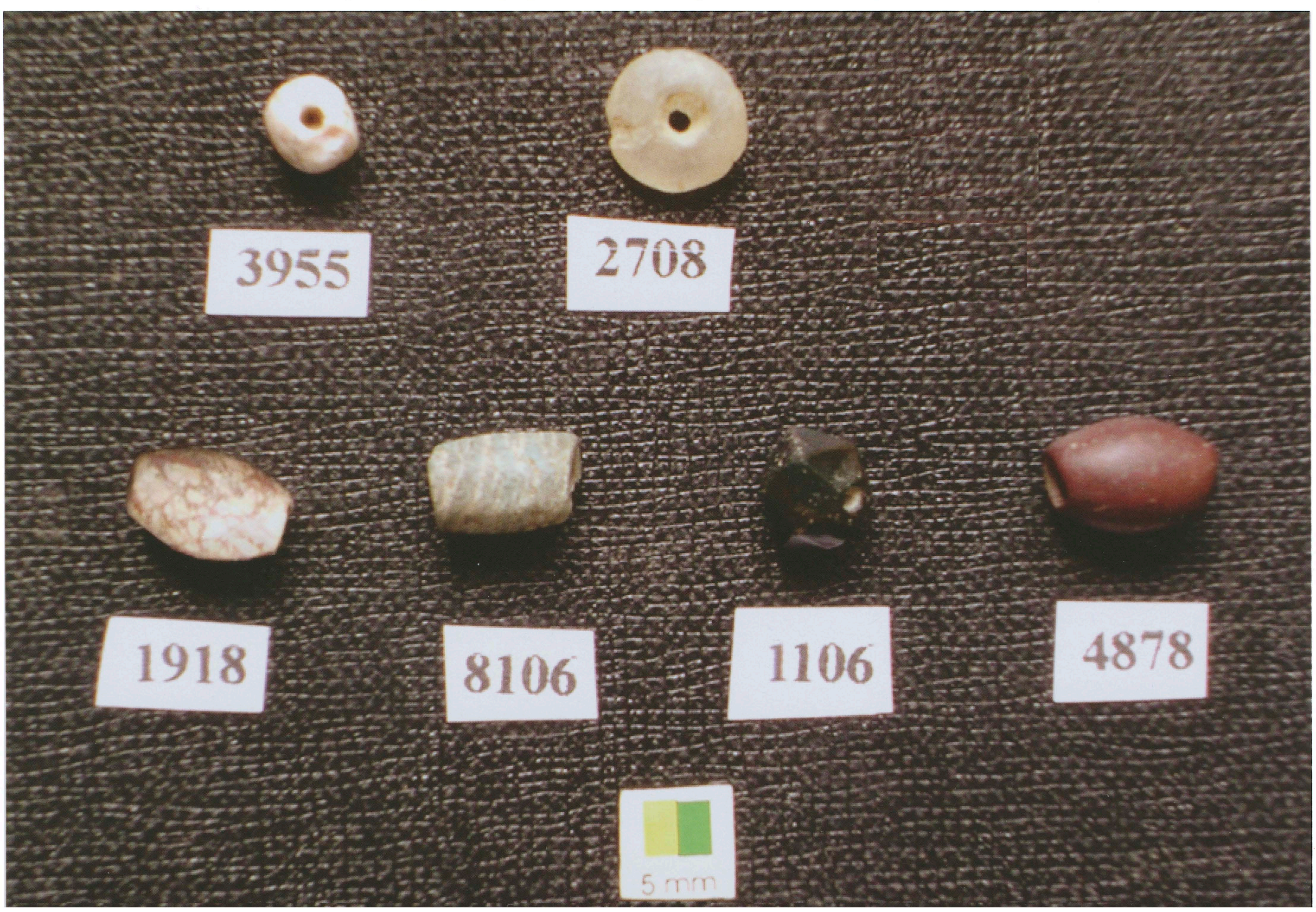


Plate VIIA. *Mewar:* **Top:** Harappan-type faience bead from Gilund (*after* Meena and Tripathi 2002b). **Bottom:** Coral bead from Balathal (photo: A.K. Kanungo).

Plate VIIB. M*ewar:* Amazonite beads from Balathal (photo: A.K. Kanungo).

Plate VIIC. *Mewar:* Beads of chert, quartz, agate, and jasper from Balathal (photo: A.K. Kanungo).



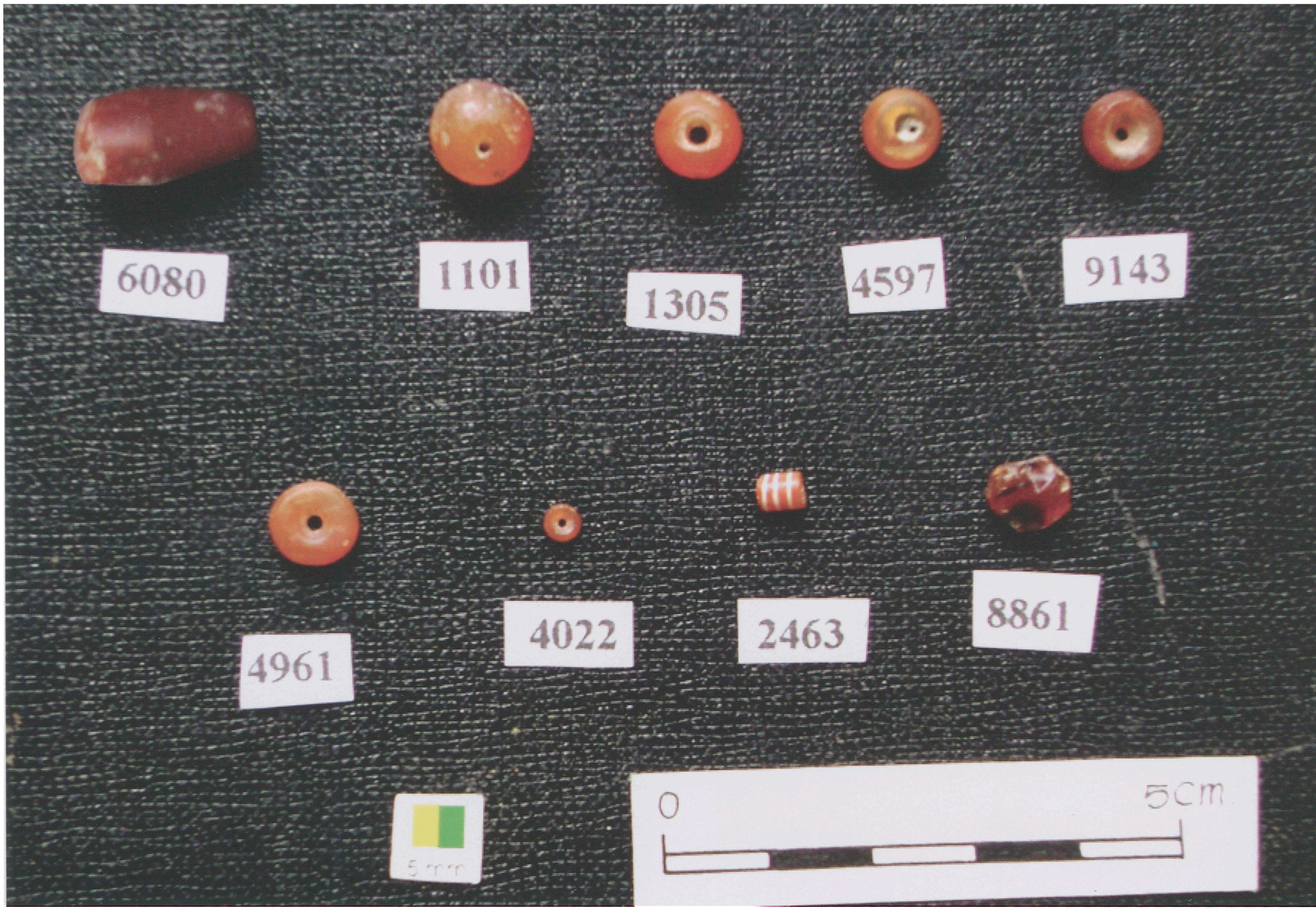
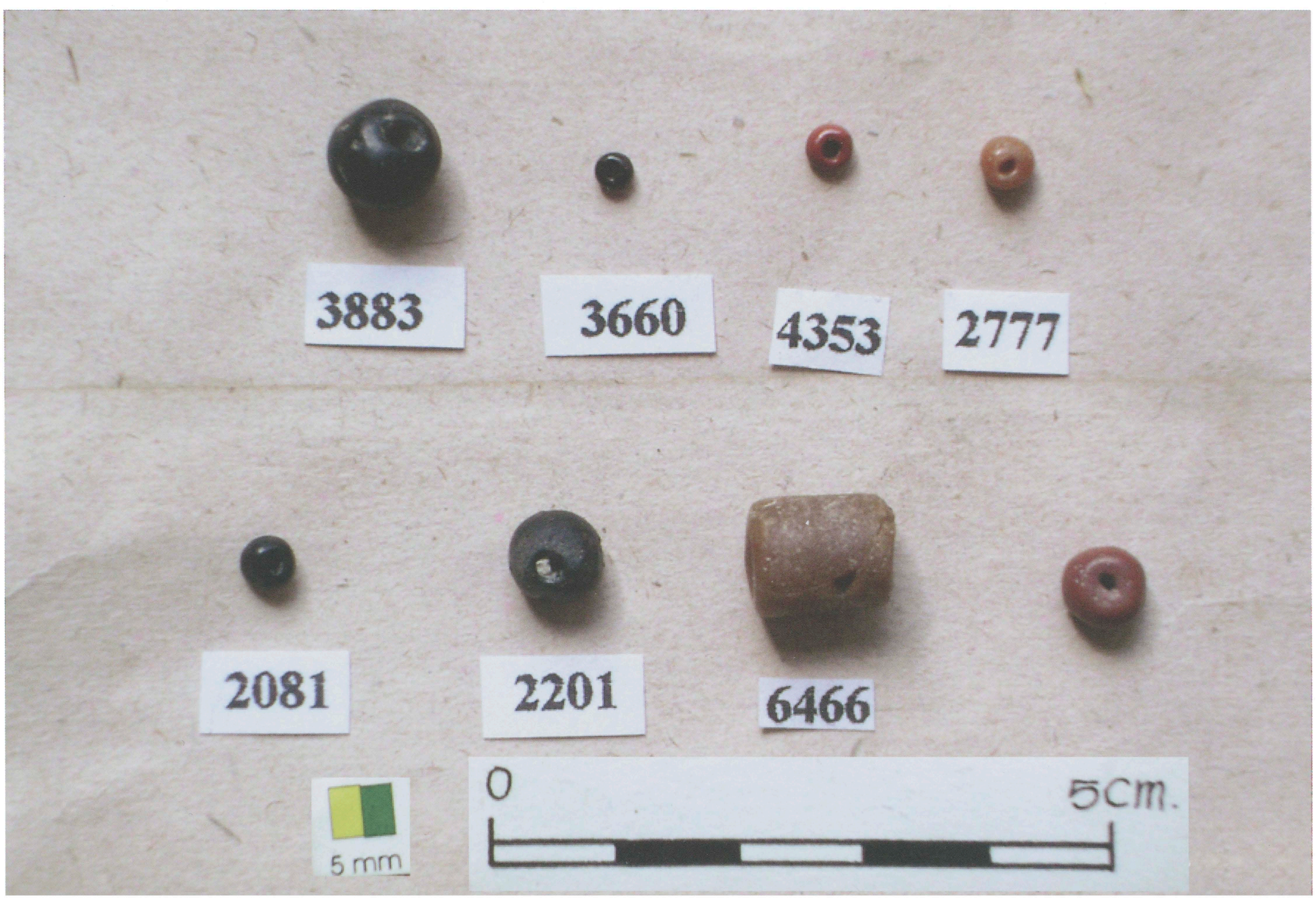


Plate VIIIA. *Mewar:* Carnelian beads from Balathal (photo: A.K. Kanungo).

Plate VIIIB. *Mewar:* Glass beads from Balathal (photo: A.K. Kanungo).



Quartz

A very interesting oblate-biconical quartz bead (#2708) was found in Layer 14 (Pl. VIIC). The perforation is oblique and made without the help of a bow drill. The shape, material, and perforation appear to be more representative of the Mesolithic period than the Chalcolithic. This bead might have come to Balathal through contact with Mesolithic peoples from a site like Bagor in the Bhilwara District of Rajasthan where such beads have been found and are believed to have been produced (Kanungo 2005:6; Misra 1973).

Cryptocrystalline Stone

This group includes agate, chert, carnelian, and jasper (Pl. VIIC). The carnelian beads are further divided into two groups: etched and plain.

Chert

A single unpolished chert bead was found in Layer 13. It is spherical (#3955) and the perforation is drilled from both ends.

Agate

Agate is represented by a single barrel-shaped specimen (#8106) from Layer 14. The hourglass perforation was drilled from both ends. One end is broken.

Jasper

There are four jasper beads, three from Layer 14 (#1106, 8360, and 4878) and one from Layer 17 (#1918). Two of the Layer 14 beads are barrel shaped (#1106 and 4878) while the third is a beautiful multifaceted specimen (#8360). The bead from Layer 17 is barrel shaped with a mottled surface (#1918). Both ends of bead #1106 are flattened.

Carnelian

Eight carnelian beads and one bead rough-out are in the collection (Pl. VIIIA). Of these, seven are plain and one is etched. One bead each was found in Layers 6 and 11, three in Layer 14, two in Layer 16, and one in Layer 17. The rough-out is from Layer 15. The perforations are generally hourglass shaped and drilled from both ends.

The bead from Layer 6 is biconical and broken at one end (#6080). As the broken part is well polished, the bead appears to have been used for a long time after breakage, revealing how precious such beads were to the Balathal people.

The specimen from Layer 11 is a plain bicone (#9143). Of the four beads from Layer 15, one is disc shaped and drilled from one end (#4022). Another, with a broken end, is cylindrical with three visible etched lines (#2463). The third specimen is a faceted short bicone (#4597), while the fourth is an unperforated and unpolished rough-out (#8861). The latter specimen suggests that some aspect of beadmaking was performed at Balathal.

Both beads from Layer 16 are spherical. The ends of one specimen are flattened giving it an oblate appearance (#1305). The other bead (#1101) is drilled from one end. The bead from Layer 17 is a biconical disc (#4961).

Glass and Faience

Since both of these materials—glass and faience—are man made, require heating in their manufacture, and are made of similar siliceous raw materials, they have been grouped together.

Glass

Eight glass beads were recovered from the Chalcolithic levels at Balathal (Pl. VIIIB). Though many of them appear to be from the sloping portion of the mound or from trenches in which there was disturbance with the possibility of intrusion of artifacts from the upper Early Historic deposits, there are a few beads which came from undisturbed Chalcolithic contexts. Layer 6 yielded two beads. One is cylindrical, reddish maroon in color with numerous elongated linear bubbles and a rough surface (#6466). The other is spherical and dark brown in color. Layer 11 contained a typical furnace-wound black spherical bead (#3883). Layer 13, which is indeed mixed with Layer 5 material, yielded two disc-shaped beads, one black (#3660), the other red (#4353). Layer 13 also produced two orange-colored disc-shaped beads (#3029 and 3704) identified in the field as being composed of "paste." Layer 14 contained a reddish-brown spherical bead (#2777). Layer 16 produced two black spherical beads. One is micro (#2081); the other displays typical wind marks (#2201).

Although the beads came from the Chalcolithic level, the excavator, Prof. V.N. Misra, feels that there is a possibility that they could have intruded from the overlying Early

Historic deposit. Furthermore, Prof. Jonathan M. Kenoyer (2008: pers. comm.), an expert on ancient Indian beads, feels that most of the specimens look like Early Historic beads. The same possibility applies to Ahar where a few glass beads were also found in the Chalcolithic level but the excavator felt that they could have percolated down from the Early Historic deposits (Sankalia et al. 1969:163).

Faience

The Chalcolithic levels at Balathal produced seven faience beads or fragments thereof (Fig. 11). There are two globular specimens, one from Layer 6 and another from Layer 7 (#6677). The rest are all tubular and very delicate and friable. One came from Layer 15, two from Layer 16, and two from Layer 17.

Bone, Ivory, Shell, and Coral

Beads of bone, ivory, shell, and coral are represented by 16 specimens (Pl. IXA).

Bone

There are two bone specimens. Found in Layer 10, one is a beautifully polished long drop pendant with a perforation at the large end drilled from one side (#529). The other, from Layer 13, is a cylinder disk (#2982) that has split in two.

Ivory

Of the two ivory beads, one came from Layer 8 and is biconical (#6609). The other, from Layer 14, is oblate (#6089). Both have hourglass perforations.

Shell

There are 12 shell specimens. Going stratigraphically, Layer 7 produced a biconical disc (#8864). A bead from Layer 8 is too fragmentary for its shape to be determined (#8237). A perforated gastropod shell came from Layer 13 (#3034). Of the two beads from Layer 14, one is an unperforated disc (#3149), while the other is a *Venus* shell perforated from the outside (#3064). Layer 16 produced three beads. One is an incomplete but beautifully incised trapezoidal pendant (#1307). Another is a disc (#3335), while the third is a bicone (#1844). An *Oliva nebulosa* shell from Layer 17 was ground at the spire to achieve the perforation (#1308). A tubular burnt bead came from Layer 18 (#9094), a long bicone was found in Layer 19 (#1401), and a disc-shaped bead (#9142) was uncovered in Layer 20.

Coral

One of the most interesting finds is a semi-cylindrical coral bead (Pl. VIIA, bottom) from Layer 6 that flares

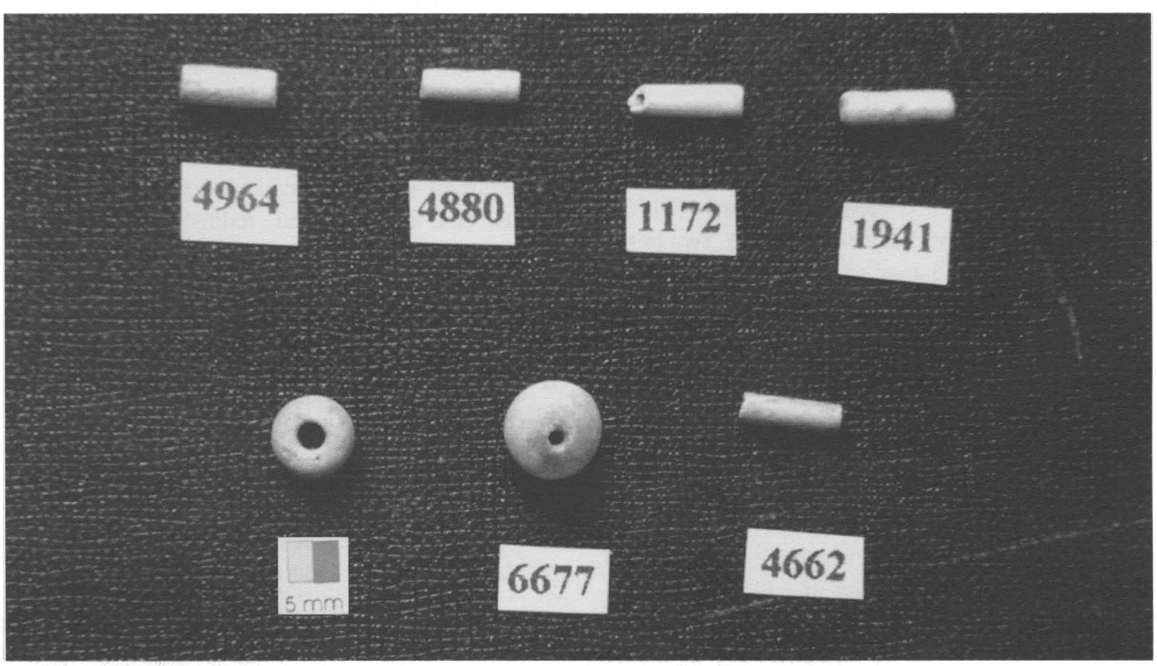


Figure 11. Faience beads from Balathal (photo: A.K. Kanungo).

slightly towards the ends (#8892). Coral might have come to the site from the Gujarat coast through contact with the Harappans.

Terra Cotta

In all, 19 terra-cotta beads/spindle whorls and pendants were found at Balathal (Pl. IXB). These have been divided into four categories: 1) *arecanut*-shaped; 2) *Ghata*; 3) other forms; and 4) pendants.

Arecanut-Shaped Bead

A single *arecanut*-shaped bead was found in Layer 14. This is in the form of the fruit of the betel-nut or *arecanut* palm (#1156). The bead is wheel-thrown and exhibits a black slip.

Ghata bead

Ghata is a very popular form among Indian beads. It is vase shaped with a disc-like rim, a constricted neck, and a truncated conical profile. The single recovered specimen (#3060) from Layer 13 is broken, wheel-thrown, and grooved at one end.

Other Forms

There are 14 terra-cotta beads/spindle whorls of other forms. Of the two broken, handmade, oblate specimens, one is from Layer 6 (#5848) and the other is from Layer 16 (#4715). There are also three handmade disc-shaped beads. The one from Layer 16 is plain (#4082), while the one from Layer 7 has a circular incised groove around the perforation at one end (#4808). The third specimen, from Layer 14, exhibits flat faces giving it an octagonal outline (#4114).

There are four large biconical specimens (almost certainly spindle whorls if not intended for animals), all broken, each from a different layer: Layer 8 (#585), Layer 9 (#940), Layer 16 (#1383), and Layer 17 (#1290). The latter specimen is a truncated bicone with a red slip.

Only one barrel-shaped bead was found. It came from Layer 18 (#1900). It is handmade, unfinished, and broken, probably while being perforated in a partially dried state. Likewise only one tubular specimen was uncovered (#4987). From Layer 18, it too is handmade and broken at both ends.

There are two irregular-rounded handmade beads, one from Layer 6 (#5709) and the other from Layer 17 (#2313). An attempt has been made to perforate the latter from both ends, probably while the clay was in a semi-dried state.

The remaining bead (#8943) is broken in such a way that its shape is undeterminable.

Pendants

Three possible terra-cotta pendants were found at Balathal. Two are shaped from pot sherds and both have notched edges. One, which is broken with three prongs remaining, is made from red ware (#9175). The other is made from red-slipped ware (#4896). It is possible that the latter functioned as a spindle whorl.

The third pendant is wheel-shaped with a slight collar on one side (#4375). The other side exhibits two concentric rows of punctate designs.

Steatite

Steatite beads were very numerous, 1,287 specimens being recovered. Mostly disc shaped, they were found in all layers of the Chalcolithic levels at Balathal. There was a sizable number of cylindrical beads, a few barrel-shaped and spherical specimens, two bicones (#2406 and 4732), a spacer (#1196), and a grooved specimen (#4651). A spectacular quantity of these beads was found inside a pot in Layer 8.

ACKNOWLEDGEMENTS

The senior author is grateful to the Deccan College Post-Graduate and Research Institute for permission to study the excavated beads and for the excellent research atmosphere; to the Bead Society of Los Angeles for financial support; to Prabodh for sharing the Gilund beads which he has been working on; to Dr. Rabi Mohanty, one of the excavation directors at Balathal, for his support and encouragement during the preparation of this article; to Trupti More, Bhagyashri Kamble, and Subhash Jadhav of the Deccan College Library for archival support; and to Dr. Shahida Ansari for incredible patience and faith in my ability which saw me through this work.

ENDNOTE

1. Although many of the terra-cotta objects identified as beads may well be spindle whorls, especially the larger, cruder specimens with proportionately large perforations, the author has not attempted to segregate them or to exclude them from this article because such a segregation based on relative body and perforation size would be meaningless in a part of the world where there has been a large-scale use of such large beads to adorn the necks of animals (e.g., *see* Kanungo 2008).

REFERENCES CITED

Beck, Horace C.

1941 The Beads from Taxila. *Memoirs of the Archaeological Survey of India* 65.

Chakravarty, P.L. and V.S. Srivastava (eds.)

1985 *The Researcher (A Bulletin of Rajasthan's Archaeology and Museums)*14-15.

DasGupta, D.

2006 A Study of Site Catchment Analysis of Gilund: A Chalcolithic Settlement in the Banas Basin, Rajasthan. *Man and Environment* 31(2):70-74.

Dubin, Lois Sherr

1987 *The History of Beads*. Harry N. Abrams, New York.

Hooja, R.

1988 The Ahar Culture and Beyond. *BAR International Series* 412.

IAR

1954-1985 *Indian Archaeology: A Review*. Archaeological Survey of India, New Delhi.

Kanungo, Alok K.

2005 Virendra Nath Misra: Archaeologist and Human Being. In *Gurudakshina: Facets of Indian Archaeology (Essays presented to Prof. V.N. Misra)*, edited by A.K. Kanungo, pp. 1-30. *British Archaeological Reports International Series* 1433.

2006 Naga Ornaments and the Indian Ocean. *Bulletin of the Indo-Pacific Prehistory Association* 26:154-162.

2008 Glass in India. In *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, edited by Helaine Selin. Springer, New York.

Kashyap, A.

1999 Harappan Impact on the Chalcolithic Cultures of Central India. Master's thesis. Deccan College, Pune.

Meena, B.R. and A. Tripathi

2000 *Recent Excavations in Rajasthan*. Archaeological Survey of India, Jaipur.

2000-2001 Excavations at Ojiyana. *Puratattva* 30:67-73.

2001-2002a Further Excavations at Ojiyana. *Puratattva* 31:73-78.

2001-2002b Excavations at Ojiyana: An Unique Copper Age Site in Aravali. *Pragdhara* 12:45-66.

Misra, V.N.

1967 *Prehistory and Protohistory of the Berach Basin, South Rajasthan*. Deccan College, Pune.

1973 Bagor - A Late Mesolithic Settlement in North-West India. *World Archaeology* 5(1):92-110.

1997 Balathal: A Chalcolithic Settlement in Mewar, Rajasthan, India: Results of First Three Season's Excavation. *South Asian Studies* 13:251-273.

2005 Radiocarbon Chronology of Balathal, District Udaipur, Rajasthan. *Man and Environment* 30(1):54-60.

2007 *Rajasthan: Prehistoric and Early Historic Foundations*. Aryan Books International, New Delhi.

Misra, V.N. and R.K. Mohanty

2001 A Rare Chalcolithic Pottery Cache from Balathal, Rajasthan. *Man and Environment* 26(2):67-74.

Misra, V.N., V. Shinde, R.K. Mohanty, K. Dalal, A. Mishra, L. Pandey, and J. Kharakwal

1995 Excavations at Balathal: Their Contribution to the Chalcolithic and Iron Age Cultures of Mewar, Rajasthan. *Man and Environment* 20(1):57-80.

Misra, V.N., V. Shinde, R.K. Mohanty, and L. Pandey

1993 Terracotta Bull Figurines from Marmi: A Chalcolithic Settlement in Chitorgarh District, Rajasthan. *Man and Environment* 18(2):149-152.

Misra, V.N., V. Shinde, R.K. Mohanty, L. Pandey, and J. Kharakwal

1997 Excavations at Balathal, Udaipur District, Rajasthan (1995-97), with Special Reference to Chalcolithic Architecture. *Man and Environment* 22(2):35-59.

Possehl, G.L., V. Shinde, and A. Ameri

2004 The Ahar-Banas Complex and BMAC. *Man and Environment* 29(2):18-29.

Sankalia, H.D., S.B. Deo, and Z.D. Ansari

1969 *Excavations at Ahar (Timbavati).* Deccan College, Pune.

Shinde, V.S. and G.L. Possehl

2005 A Report on the Excavations at Gilund, 1999-2001. In *South Asian Archaeology 2001, Vol. 1*, edited by Catherine Jarrige and Vincent Lefèvre, pp. 293-309. Éditions Recherche sur les Civilisations, Paris.

Shinde, V.S., G.L. Possehl, and M. Ameri

2005 Excavations at Gilund 2001-2003: The Seal Impressions and Other Finds. In *South Asian Archaeology 2003*, edited by Ute Franke-Vogt and Hans-Joachim Weisshaar, pp. 159-169. Linden Soft, Aachen.

Sinha, S.

2003 *A Study of Cultural Interactions in Central and Western India during the Third and Second Millennia B.C.* Doctoral dissertation. Deccan College, Pune.

van der Sleen, W.G.N.

1974 *A Handbook on Beads.* Liberty Cap Books, York, PA.

Alok Kumar Kanungo
Virendra Nath Misra
Vasant Shinde
c/o Department of Archaeology
Deccan College Post-Graduate and Research Institute
Pune 411 006
India
E-mail: alok_kanungo@yahoo.com

CHEMICAL COMPOSITION OF LATE 18TH- AND 19TH-CENTURY GLASS BEADS FROM WESTERN NORTH AMERICA: CLUES TO SOURCING BEADS

Laurie E. Burgess and Laure Dussubieux

The Sullivans Island glass bead collection at the Smithsonian's National Museum of Natural History contains over 56,000 beads which date from the late 18th to the late 19th century. Excavated in the 1930s from a site on the Columbia River in the Plateau region of North America, this collection contains examples of most known bead varieties for this time period. Many of the beads conform to varieties that have been attributed to Bohemia, Venice, and China—three of the principal bead-producing centers at the time. One hundred and twenty-four beads were subjected to Laser-Ablation Inductively-Coupled Mass-Spectrometry (LA-ICP-MS) analysis at the Smithsonian's Materials Conservation Institute to see if the chemical composition of the glass could be correlated with a place of origin. The results revealed several distinct compositional groups, some of which could be linked to geographical areas.

INTRODUCTION

Now submerged beneath the waters of the Columbia River in Washington state, the burial site known as Sullivans Island was located at the head of a series of rapids called the Cascades (Cox 1832; Strong 1959). Smithsonian archaeologist Herbert Krieger conducted excavations on the island in 1934 while investigating sites threatened by the construction of the Bonneville Dam (Krieger 1935; Phebus 1978). The Sullivans Island site yielded over 56,000 glass trade beads along with thousands of other historic-period objects, including a high number of copper pendants, bracelets, and other ornaments. The beads and other objects indicate a date range from the late 18th to the late 19th century (Burgess 2004). This assemblage is one of a handful of major 19th-century bead collections from North America and is curated by the Department of Anthropology, National Museum of Natural History, Smithsonian Institution.

The breadth of the Sullivans Island collection is in part due to the location of the island at the Cascades, one of the richest salmon fisheries on the Columbia River. Strong (1959) found that phoenix buttons occur in greater quantities in productive fishing areas, and this holds true for other objects as well. In addition to being a major fishing area, the Cascades also formed a barrier to water travel. Since it was necessary to portage around the Cascades, the falls served as a crossroads for items moving up and down the river, both in prehistoric and historic times. A number of historical accounts refer to the difficulties encountered by fur traders and settlers when dealing with tribes during the long portage. Minor et al. (1985) write that in the early parts of the 19th century, no one could portage without having to hand over goods to the local inhabitants. In 1814, a Northwest Trading Co. group was attacked and lost an amazing amount of material which, according to Minor et al. (1985:60), would have accelerated cultural changes in the Cascades area. Goods obtained by the inhabitants through seizure or, later, through trade likely contributed to the wealth of Sullivans Island, and to the breadth of the bead collection. New settlers continued to use the portage through the 1850s, bringing with them "tons of clothing, tools, dishes and utensils" (Minor et al. 1985:60).

This assemblage of beads from a key area of the Plateau region contains varieties that have generally been ascribed to Venice, Bohemia, and Asia, namely China. Attributing geographical sources to archaeological glass beads has been a challenging proposition, but is an area where chemical-composition studies may prove helpful. Historical records have provided most of the known information on the sources of glass beads, but chemical analysis of glass has shown some promise in this area (Glascock and Speakman 2002). The majority of 19th-century glass beads were made in Venice, a major glassmaking center for centuries, with other varieties originating in Bohemia and other European locales. Glass beads were also made in Asia and certain varieties of glass beads are attributed to China (Francis 1986, 2002; Ross 1990, 2000). The bead varieties thought to be manufactured in China tend to appear frequently in the Pacific Northwest and in Alaska. The Sullivans Island collection from the Plateau region, which abuts the Pacific

Northwest, provides an opportunity to sample a substantial number of beads that have been tentatively attributed to each of the three major centers of bead production.

This study was undertaken to identify potential differences between the composition of 19th-century glass beads potentially from China and beads thought to be from European sources, namely Venice and Bohemia (Burgess and Dussubieux 2005). Glascock and Speakman (2002) have used laser ablation-inductively coupled-mass spectrometry (LA-ICP-MS) to identify the composition of Venetian and Bohemian glass beads. For the Sullivans Island study, the major research question was to see if glass attributed to China would exhibit a different chemical composition than glass thought to have a Venetian or Bohemian origin. It was hoped that the LA-ICP-MS analysis would provide some chemical markers that could help differentiate between various bead sources for this collection and for other 19th-century bead collections.

Chemical studies of glass trade beads have been undertaken in the recent past to help establish chemical chronologies for beads or determine the place of origin (Hancock et al. 1994, 1997, 1999; Hancock et al. 2000; Kenyon, Hancock, and Aufreiter 1995; Kenyon, Kenyon, Hancock, and Aufreiter 1995; Sempowski et al. 2000, 2001). Until recently, instrumental neutron activation analysis (INAA) was the technique most used because of its nondestructive nature. After a "cooling-down" period, beads could be returned to their owners unchanged (Glascock and Speakman 2002; Hancock et al. 1994, 1999). Despite its many advantages, INAA requires access to a reactor and the number of elements that can be identified using this technique is limited. Far more elements can be measured with LA-ICP-MS which is a multi-elemental analytical technique, allowing the identification of more than 50 major, minor, and trace elements in the glass with no visible damage (Gratuze et al. 2001). Temporally sensitive trace element patterns related to the use of copper as a coloring agent in turquoise-blue glass beads have been identified using this technique (Billeck and Dussubieux 2006).

In North America, chemical analyses have primarily been conducted on beads from archaeological sites located in Canada and the northeastern United States, although LA-ICP-MS studies have been performed on beads from western Missouri (Glascock and Speakman 2002) and from the Plains region (Billeck and Dussubieux 2006). The Sullivans Island study is one of the first to sample beads from the far-western region of North America. It is also one of the later historic-period collections to be studied in this manner.

Hancock et al. (1994) concluded that due to the dispersion of Italian glassmakers and the broad trade in raw materials in 17th-century Europe, the chemical composition of archaeological beads from the Great Lakes area could not be used to identify specific European sources of beads; e.g., Amsterdam or Venice, the two dominant sources of glass beads at the time. Nonetheless, since the Sullivans Island assemblage appeared to have beads that were likely from both Asia and Europe, it might be possible to at least distinguish between European and Asian glass compositions and, at best, between Chinese, Bohemian, and Venetian glass. Due to the wide range of elements measured with LA-ICP-MS and the high sensitivity of this technique, studies of the sources of ancient glass in South and Southeast Asia (Dussubieux and Gratuze 2004) and Africa (Robertshaw et al. 2003) have met with some success.

In his work with the Hudson's Bay Company's Fort Union and Fort Vancouver bead collections, Ross (1990, 2000) exhaustively reviewed historical records to assess bead sources, and identified Great Britain and China as distribution centers, and China, Bohemia, and Venice as likely manufacturing sources for the beads in 19th-century assemblages. Fort Vancouver, Washington, is located about 80 km downriver from Sullivans Island and, while a number of the highly ornate beads may not have come from the fort (Lester Ross 2004: pers. comm.), a large part of the collection was probably obtained directly or indirectly from the fort inventories.

Beads were selected for the Sullivans Island study based on descriptions and characteristics that have been linked to known bead manufacturing sites. Mold-pressed beads and drawn faceted beads are considered to have been made in Bohemia (Neuwirth 1994; Ross 1990, 2000, 2003; Ross with Pflanz 1989). Venice is assumed for the bulk of 19th-century beads since Venice was the dominant center of bead manufacture for this time period (Karklins 1985; Karklins with Adams 1990; Ross 1990, 2000). Although wound beads were produced in Venice, drawn beads were emphasized for this sample group. Beads from China are referred to as Canton or China beads in historical records and Ross (1990) found that these large, blue wound beads were imported in great quantities. Nineteenth-century beads also attributed to China include highly transparent/translucent, strongly pigmented wound specimens with a great number of air bubbles in the glass (Francis 1986; Liu 1995). Therefore, based on characteristics, comparison with other collections, and the archaeological and bead-research literature (Francis 1979a-b, 1986; Glascock and Speakman 2002; Karklins et al. 2002; Kenyon, Hancock, and Aufreiter 1995; Liu 1995; Ross 1990, 2000), three bead groups were identified for sampling: 1) beads that could potentially be attributed to Venice; 2) those attributed to Bohemia; and 3) varieties with characteristics attributed to Chinese beads. It is worth emphasizing the hypothesized nature of these groups, especially the Venetian and Chinese ones.

These three groups were sampled using LA-ICP-MS to determine if the glass composition varied enough to distinguish between the three potential sources and to see if European glass could be distinguished from Asian glass. It was hoped that the major, minor, and trace elements that LA-ICP-MS can identify would provide a finer look at the glass composition than could be ascertained using INAA.

METHODOLOGY

The 56,343 glass beads from Sullivans Island had been classified (Burgess 2004) using the Kidd and Kidd (1970) system as expanded by Karklins (1985), and also following Ross (1990, 2000). Classification was based on manufacturing type, diaphaneity, shape, presence or absence of decoration, color, and size. Diaphaneity was recorded as transparent (tsp), translucent (tsl), or opaque (op). Length and least diameter were recorded, although size grading was done according to diameter size. Beads were separated into the following size groups: 0-2 mm = very small; 2-4 mm = small; 4-6 mm = medium; 6-10 mm = large; and 10+ mm = very large. Small, medium, large, and very large beads occurred within the sample groups.

A total of 128 beads representing 31 varieties were tested. Where possible, five beads from each variety were selected in order to test for consistency between visually identical beads. Color was controlled for, as much as possible, by trying to include beads of similar color across the sample groups, although both monochrome and polychrome beads were included. Different glass chemistries have been linked to the two principal pre-19th-century bead manufacturing techniques, with drawn beads primarily having a soda or soda-lime composition while wound beads have a potash-glass composition; lead occurs in both wound and drawn varieties (Hancock et al. 1996; Hancock et al 1997; Karklins et al. 2002). These findings were not supported by the Sullivans Island beads of probable Bohemian origin.

The compositional analyses were carried out at the Smithsonian Institution's Materials Conservation Institute in Suitland, Maryland, with a Perkin Elmer Elan 6000 Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) connected to a Cetac LSX-200 *Plus* UV laser for direct introduction of solid samples. The single point analysis mode with a laser beam diameter of 100 μm was selected. The laser operated in Q-switch mode at 100% of the laser energy (4.8 mJ) and at a pulse frequency of 20 Hz. A 20 s pre-ablation time was set to ensure that possible surface contamination did not affect the results and to eliminate the transient part of the signal. A blank signal was acquired followed by three runs for each glass sample. The average signal corrected from the blank was considered for the calculation of concentrations.

To improve reproducibility of measurements, the use of an internal standard is required. The isotope Si^{30}, a major constituent of glass, was selected. The concentrations of the major and minor elements were calculated, assuming that the sum of their concentrations in weight percentage is equal to 100% (Gratuze 1999).

Quantitative results are obtained by comparing the signal intensity measured for a given element in a sample to the signal intensity for the same element in a standard reference material (SRM) with certified concentrations. NIST glass SRM 610 and Corning Glass A, B, C, and D (Brill 1999) were used to calculate major and minor element concentrations. Only SRM 610, using concentrations from Pearce et al. (1997), was used for the calculation of trace element concentrations expressed as ppm of elements.

Silica (SiO_2), alumina (Al_2O_3), soda (Na_2O), potash (K_2O), magnesia (MgO), lime (CaO), and iron oxide (Fe_2O_3) are considered the most relevant constituents for identifying glass ingredients and for classifying the different glass groups. All compositions were recalculated and reduced to these seven oxides (Brill 1999). Reduced concentrations will be in italics or indicated as such. In the case of lead glass, when lead was used as flux, there is some information loss in using reduced concentrations, but information on the composition of the base glass is still present. Oxide concentrations are reported in this study and are indicated by the use of the terms potash rather than potassium and lime rather than calcium.

THE RESULTS

Bohemian Beads

The glass beads that were identified as Bohemian for this study are mold-pressed specimens with ground facets and a biconical perforation; a mold-pressed bead with molded facets and a straight perforation; and drawn faceted beads (Pl. XA). The two blown-in-the-mold beads were inaccurately placed in the supposed Venetian group for sampling, but yielded glass compositions consistent with the other Bohemian beads. Neuwirth (1994) also attributes these beads to Bohemia.

Ross (2003) has dated the mold-pressed beads with ground facets and biconical perforations to the first half of the 19th century. Three such beads were sampled.

Mold-pressed beads with molded facets and a straight or cylindrical perforation are thought to date to the second half of the 19th century (Ross 2003). One bead of this type was sampled. The beads with ground facets and those with molded facets show different chemical compositions, which is particularly interesting since these bead varieties have temporal implications. The three beads with ground facets have a high-potash high-lime (K-Ca) glass type, which was the predominant glass encountered in the Bohemian beads. The one molded-facet bead that was sampled has a K-Al glass type. It is the only bead to have this composition in the entire study and it is one of the later beads in the collection.

The drawn faceted beads in the study have been frequently called "Russian blues," although this has long been considered a misnomer. These beads are frequently blue, but also occur in a variety of other colors. The sampled beads were dark blue, colorless, and green. The chemical composition of these beads, which was K-Ca glass, places them in the Bohemian group. They have six flat sides and a series of ground facets at either end. They occur throughout the 19th century and may first have appeared in the late 18th century (Ross 2000).

Most of the Bohemian beads have a high-potash high-lime or K-Ca composition (Table 1). The major constituent of this type of glass, after silica, is potash and the concentration ranges from 11.8 to 17.0%. The lime content is slightly lower and ranges from 6.1 to 10.6%. Soda concentrations can be as high as 2.3% but in most cases soda, as well as alumina and magnesia, concentrations are below 1.0%. This high concentration of potash and lime seems to indicate the use of forest-plant ashes as a flux (Turner 1956). The silica source is a sand with low quantities of alumina (< 1%).

Table 1. Average Reduced Composition for High-K-Ca Glass Attributed to Bohemia.

	Average and Standard Deviation
SiO_2	75.5 +/- 1.3%
Na_2O	1.1 +/- 0.5%
MgO	0.25 +/- 0.0.7%
Al_2O_3	0.6 +/- 0.1%
K_2O	13.9 +/- 1.2%
CaO	8.5 +/- 1.1%
Fe_2O_3	0.16 +/- 0.09%

There have been similar findings for 19th-century Bohemian glass and beads: potassium (K) and calcium (Ca) levels of 9.0-15.0% and 5.0-7.5%, respectively, for Bohemian glass, and 12.0-13.0% K and 5.4-8.0% Ca for 19th-century faceted beads (Kenyon, Kenyon, Hancock, and Aufreiter 1995; Ross 2000). Glascock and Speakman (2002) found that Bohemian beads had low magnesia (MgO less than 1000 ppm) and high potash.

The K-Ca glass beads are translucent and opaque dark blue, opaque white, transparent green, dark yellow, and colorless. Table 2 shows the elements or compounds involved as colorants. Dark blue beads are colored with cobalt. Arsenic is ubiquitous in the Bohemian glass but it seems that a correlation exists between nickel, an element only present in significant quantities in cobalt-blue beads, and arsenic.

Table 2. Coloring and Opacifying Elements in the High-Potash High-Lime Glass.

Color	Detected Elements	Coloring or Opacifying Agent	Comments	Reference
tsl. dark blue	Co	Co^{2+}	Association Co-Ni-As	Scholze 1980
op. dark blue	Co, P	Co^{2+}, $3Ca_3(PO_4)_2.CaF_2$ (bone ashes)	Association Co-Ni-As	Moretti and Hreglich 2005; Scholze 1980
tsl. white	P	$3Ca_3(PO_4)_2.CaF_2$ (bone ashes)		Moretti and Hreglich 2005
tsl. green	Cu, Pb	Cu^{2+} in a lead-containing glass		Scholze 1980
colorless	As, Mn	Oxidize Fe^{2+} into Fe^{3+}		Scholze 1980
tsl. dark yellow	Fe	Fe^{3+} - S_n^{2-}	Sulfur is not measured with LA-ICP-MS	Schreurs and Brill 1984

Bismuth is an element that has higher concentrations in cobalt-blue beads (Fig. 1). Cobalt associated with arsenic, nickel, and occasionally with bismuth is found in glass dating to the 16th century and onward, and probably originates from the mining district of Schneeberg (Erzgebirge) in Germany (Gratuze et al. 1996).

In addition to the K-Ca glass, three other glass types are identified in the present study among the mold-pressed beads attributed to Bohemia: 1) two red beads with ground facets are composed of lead-silica (Pb-Si) glass; 2) transparent yellow beads without facets are composed of high-soda high-lime or Na-Ca glass; and 3) white beads with molded facets are of a high-potash high-alumina or K-Al glass.

The mold-pressed red beads have a distinctive Pb-Si composition with slightly more than 50% lead and very small quantities of alkali. These beads also contain gold (44 ppm) which is used as a colorant and according to Weyl (1951:385), "the most desirable colour shades and the most intense colours are obtained in lead glasses because the higher the lead content, the more soluble is gold."

The transparent yellow mold-pressed beads with a Na-Ca composition contain soda (15%), lime (6.6%), and potash (2.5%). Other elements have concentrations below 1.0%. These beads are the only ones in the sample to contain uranium (209 ppm). Cadmium was also detected, along with significant quantities of zinc (3700 and 3600 ppm, respectively). These elements may have been added to the glass as colorants.

The white mold-pressed beads with molded facets have an Al-K composition. While alumina has a concentration lower than 1.0% in the other Bohemian glass beads, the white beads contain 16%. Potash concentrations range from 8.7 to 11.8%, soda has concentrations around 3%, and lime concentrations range from 0.13 to 2.8%. This composition seems to correspond to a type of glass described by Silverman (1918) which results from a mix of what was referred to as Russian potash, containing a small proportion of soda with no significant quantities of lime, as well as an alumina-rich ingredient. The introduction of the latter into this type of glass would have rendered it opaque. Alumina limits the solubility of other substances present in the glass batch (e.g., chlorides). Two of the five white beads have very low quantities of lime (0.1 and 0.2%) along with low quantities of phosphorus (< 1.0%). The presence of more phosphorus and lime in some beads of the white mold-pressed group may be due to the addition of bone ash (Moretti and Hreglich 2005), also used for opacifying purposes.

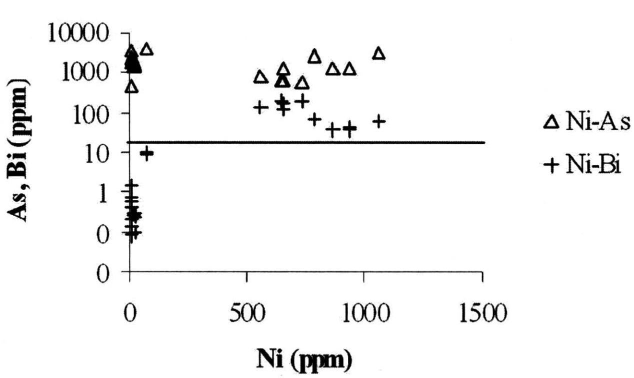


Figure 1. Nickel, arsenic, and bismuth concentrations in the high-potash high-lime glass.

Of the two blown-in-the-mold beads, one is white with linear ridges, two annular ridges, and translucent blue stripes. The second one is a fragment of opaque purple-blue. These beads had been included in the group potentially from Venice, but their K-Ca composition is consistent with a Bohemian origin. Both contain phosphorus in quite high concentrations (more than 6%) and bone ash may have been used as an opacifier, as was also indicated for the white beads in the Bohemian group. Cobalt imparts a purplish-blue color and, as with the Bohemian dark blue beads, it is accompanied by arsenic, nickel, and bismuth, suggesting a common cobalt source.

Beads Attributed to Venice

The small, drawn, monochrome and polychrome beads that dominate 19th-century archaeological collections were the primary varieties selected for the sample group hypothesized to be from Venice (Pl. XB). For the most part, these heat-rounded beads are referred to as embroidery beads or, sometimes, seed beads, a label that is too often used incorrectly. They were typically used for beadwork and generally fall into the small (2-4 mm) size category. Opaque blue, opaque white, translucent red, translucent green, and colorless varieties (Kidd and Kidd type IIa) were sampled. Drawn red-on-white beads were included, as were opaque white-on-white beads. The latter are identical to the ones illustrated by Ross (1990:45, Table 5, Pl. I) which are listed as FOVA variety numbers 1040 and 1089. While red-on-white beads are sometimes called "whitehearts" or *cornaline d'Aleppos*, the term red-on-white is preferred and will be used here. Faceted drawn beads (Kidd and Kidd type IIf) of a reddish-purple color were sampled as well to see if they fell within the Bohemian or the Venetian glass compositions. These tumbled beads usually have one or two facets ground onto their surfaces.

The glass composition of the beads attributed to Venice showed more overall heterogeneity than the Bohemian beads. Two different glasses were identified within the Venetian group—a non-lead glass and a lead glass (Table 3). The non-lead glass contains low quantities of lead, generally below 1.0%, which were probably unintentionally added to the glass along with another ingredient. Non-lead glass beads have a high-soda high-lime or Na-Ca composition with an average concentration of 12.4% soda and 8.7% lime.

The beads with non-lead compositions are all drawn and heat rounded: opaque turquoise-blue of small and medium size; translucent reddish-purple with ground facets; and the opaque white-on-white beads. Both the white and the blue varieties are among the most ubiquitous beads found on 19th-century sites. The turquoise-blue color is due to the presence of 1.4-1.7% of copper. The faceted reddish-purple beads have a glass composition that differs from the faceted beads attributed to Bohemia. The reddish-purple glass is colored with manganese, with concentrations ranging from 1.7 to 2.3%. Manganese occurs with a concentration of 0.12% or less in the other Na-Ca glass samples attributed to Venice.

The glass of the opaque white-on-white beads contains about 5% antimony. This element may have combined with calcium to produce calcium-antimony oxide, an opacifier (Rooksby 1962). This opacifier has been used in Venice in the production of white glass since the 15th century. Moretti and Hreglich (2005), and Sempowski et al. (2000) dated its occurrence in white beads found in northeastern North America to the beginning of the 17th century. Its appearance here, in a bead collection dating from the late 18th to the late 19th century, helps support the hypothesis that the opaque white-on-white beads were manufactured in Venice. In early North American bead collections, proving which beads were made in Amsterdam and which were made in Venice has been highly difficult. Since Amsterdam was no longer a bead-producing center during the time period covered by the Sullivans Island collection, it is not considered to be a potential source for any of the beads in this study.

Table 3. Reduced Average Compositions with Standard Deviations of Glass thought to be Venetian.

	Non-Lead High-Soda High-Lime Composition	Lead Glass
SiO_2	69.4 +/- 1.3%	74.9 +/- 3.4%
Na_2O	12.4 +/- 1.3%	6.0 +/- 2.8%
MgO	1.8 +/- 0.2%	0.7 +/- 0.3%
Al_2O_3	1.1 +/- 0.3%	0.6 +/- 0.3%
K_2O	6.0 +/- 1.5%	13.1 +/- 6.1%
CaO	8.7 +/- 1.5%	4.4 +/- 1.3%
Fe_2O_3	0.6 +/- 0.2%	0.4 +/- 0.4%

Within the non-lead glass, potash has an average concentration of 6.0% and magnesia 1.8%. The potash and magnesia concentrations, higher than 1.5%, suggest the use of halophytic plant ash as a flux (Shortland et al. 2006). It has been established that Venetian glassmakers imported plant ash from the Levant (Verità and Toninato 1990). Lime could have been a constituent of the sand used, and high strontium concentrations (650 to 1450 ppm) and the correlated lime-strontium observed in Fig. 2 indicate that either the sand was taken from a coastal deposit or that crushed seashells were added to the glass batch to stabilize the glass (Freestone et al. 2002; Jackson 2005).

The other beads in the group thought to originate from Venice are composed of lead glass. Three varieties of drawn, monochrome heat-rounded beads contain lead: the opaque white beads, the translucent red beads, the translucent green beads, and the colorless beads. The drawn, polychrome, heat-rounded red-on-white beads are also in the lead-glass group.

Lead glass can be either potash- or soda-like. The lead glass encountered in these samples is referred to as Pb-(Na, K). Actually, no discrete groups appeared, but an inverse soda-potash concentration correlation was observed (Fig. 3). That kind of correlation has already been noted in non-lead Venetian glass by Šmit et al. (2005). Verità and Toninato (1990) explain this change in the soda concentrations of Venetian glass as a result of a decrease in the quality of the plant ash used, causing a diminution in its soda content. Alumina and magnesia concentrations are quite low (< 1.5%) and lime ranges from 0.1 to 6%. Strontium concentrations in this glass are always below 300 ppm.

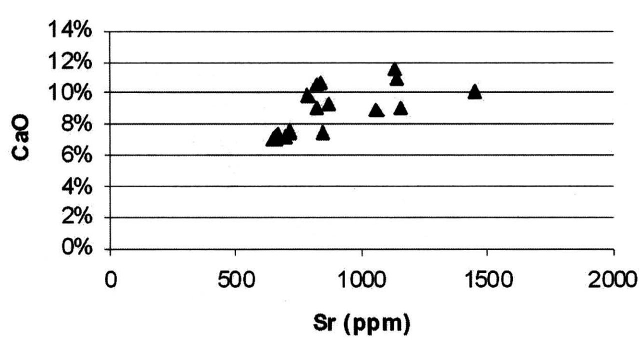


Figure 2. Sr-CaO graph for the high-soda high-lime glass attributed to Venice.

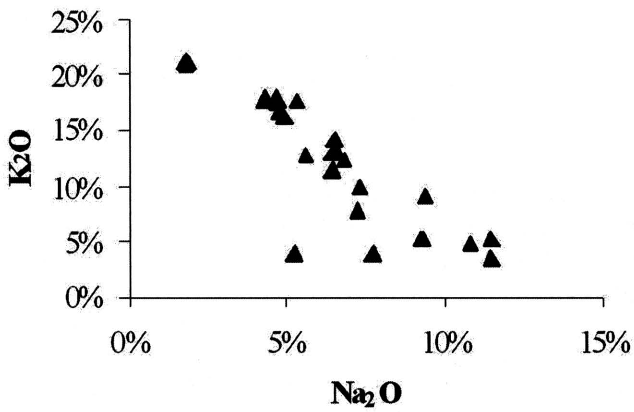


Figure 3. Soda and potash reduced concentrations in the lead-glass beads attributed to Venice.

Correlations between the composition of the beads and their color were observed throughout this study (Fig. 4). In the lead-glass group, the drawn green beads contain from 40 to 60% lead and no arsenic. They also contain copper in quantities higher than the other samples; 0.9% on average, while copper concentrations are lower than 0.1% in all the other beads. Copper ion Cu^{2+}, in a lead glass matrix, imparts a green color to glass (Scholze 1980). White beads not only contain lead but also arsenic in concentrations ranging from 2.6 to 5.7%. A lead-oxy-arsenate compound is a white opacifier that was identified in Venetian glass as early as the first half of the 18th century (Rooksby 1962). Moretti and Hreglich (2005) have reported a glass recipe dating to the end of the 17th century that involves the use of arsenic and lead oxide to produce an opalescent glass.

The translucent red and the colorless drawn beads have lower lead concentrations (<20%) and both varieties contain arsenic. Gold was detected in red glass in concentrations ranging from 122 to 294 ppm. Gold was detected in the transparent red Lycurgus Cup dating from the 4th century A.D. (Barber and Freestone 1990) and Hunt (1976) alleges that an Egyptian manuscript from the Greco-Roman era makes reference to red glass colored by gold. It was, however, only in the 17th century that a stable gold precipitate was discovered—the "purple of Cassius"—and successfully applied to the coloration of glass. The purple of Cassius consists of finely divided gold and colloidal stannic acid that gives a redder color to the glass in the presence of lead (Carbert 1980). The red beads contain lead but their tin concentrations are very low. Antimony concentrations are higher in the red beads compared to the other ones and it may have acted as a reducer instead of tin.

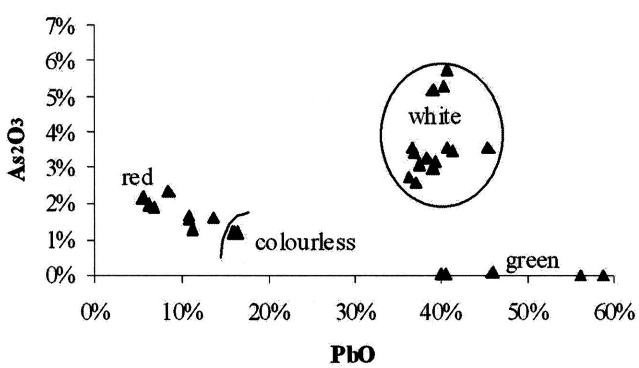


Figure 4. Lead and arsenic concentrations in the lead-glass beads attributed to Venice.

The colorless beads have a very specific composition; they have the highest concentration of potash (17.5%) and the lowest concentration of soda (1.5%). They also have extremely low concentrations of iron oxide (< 0.1%). Arsenic can also act as a decolorizer and is able to oxidize iron producing Fe^{3+} ions that have a very low coloring power. Lead may have been added to colorless glass because of the shine that it imparts.

Notably, the white glass in the drawn, heat-rounded IIa beads differs significantly from the white glass used for the Bohemian mold-pressed beads. The white Bohemian beads are composed of a potash-alumina glass, whereas the white Venetian glass has lead as the major element after silica, with potash and soda. Interestingly, the drawn opaque white-on-white beads in the sample group are non-lead beads, and have soda, lime, and potash as the major elements following silica. These small, multi-layered white beads and the drawn Kidd and Kidd IIa beads dominate collections during the period that Sullivans Island was occupied.

Red-on-White Beads

Two varieties of beads with white cores and red outer layers were included in the study: the drawn red-on-white beads, whose compositions fall into the lead-glass group defined for the Venetian material, and one wound-on-drawn bead.

Made by combining the two major bead-manufacturing processes (winding and drawing), the rare wound-on-drawn bead has a translucent red outer layer wound over a drawn, tubular, opaque-white core. Only three of these beads had been previously encountered in North America, and they were identified by Karklins (1985) and Sprague (2004: pers. comm.). Twelve additional wound-on-drawn beads were identified by Burgess (2002) in the Sullivans Island collection. Nothing was known about the source of these beads, although for the purposes of this study Venice was hypothesized due to their visual similarity to the common, drawn red-on-white beads.

The compositions determined for the red and white glasses differ from the ones defined for the beads attributed to Venice. The red is a lead glass containing almost 49% of this element, instead of about 10% as seen in the red glass attributed to Venice. Potash is about 7.5% (instead of about 16%), soda is 3.7% (instead of about 4.5%), and lime is less than 1.0% (instead of 3%). The glass contains gold (122 ppm) but does not contain a significant quantity of arsenic, contrary to the Venetian red-glass composition.

The white glass is non-lead with a high-potash high-lime composition which is very similar to the Bohemian glass with some slight differences. With a concentration of 3.6% soda, the white core does not fit within the range of concentrations determined for the Bohemian glass, which is 0.2-2.4%. The alumina (1.1%) and potash (10.2%) concentrations are very similar to the concentration of the same elements in Bohemian glass. The high quantity of phosphorus detected (about 5%) suggests the use of bone ash to opacify the glass.

Although the composition of the wound-on-drawn bead does not exactly match any of the compositions identified in this study, its makeup seems closer to Bohemian glassmaking tradition than to the Venetian one.

Beads Attributed to China

The manufacture of glass beads in China is of some antiquity. Elaborate glass beads were present by the late Zhou period (475-256 B.C.) and bead production there continued on and off over the following centuries (Francis 2002). Sprague (1990) received conflicting reports regarding Chinese bead production in general during a visit to the beadmaking center of Boshan.

According to Francis (2002), Chinese beads of non-lead glass are the primary kind encountered in the Americas. He describes some of them as being opaque blue, occurring from Alaska to Washington state, and links their widespread distribution to the ascent of Boshan as the main beadmaking center in China. These are among those described as "Canton beads" in historical records (Ross 1990). Other bead varieties which Francis (2002) describes as being Chinese have distinct colors, air bubbles in the glass, large perforations with clay present on their surface, and irregular outlines. Liu (1995) also lists the same traits as being signifiers of Chinese beads. For this study, the beads hypothesized to be from China were selected based on these descriptions, both the blue Canton-type beads, and the translucent, monochrome wound beads with numerous bubbles in the glass. Examples of both are present in the non-lead category.

The beads selected for analysis are all wound and fall into the large (6-10 mm) to very large (over 10 mm) size category (Pl. XC). Most are spherical (Kidd and Kidd type WIb) and occur in opaque turquoise blue, translucent pink, translucent red, translucent dark blue, and translucent green. A very large, oval, translucent dark blue bead (type WIc) was also included, as were some distinctive translucent red disk-shaped beads with flat ends and generally flat sides (type WId).

The beads hypothesized to be from China form a far more heterogeneous group than the beads attributed to either Venice or Bohemia. It should be noted that this heterogeneity could simply indicate that some of these beads could be from somewhere other than China since the selection process, while based on characteristics thought to be diagnostic, is nonetheless somewhat speculative. If broad compositional groups and subgroups are defined based on lead content and alkali or alkali-earth element concentrations, it appears that the compositions vary a lot within each subgroup, even for visually identical beads. The beads in the sample sort into four different subgroups based on composition: 1) a non-lead glass with a high-soda high-lime composition; 2) a lead glass that has a high-soda high-potash composition; 3) another lead glass with a high potash content (Table 4); and 4) a lead-barium glass represented by a single opaque blue bead.

Subgroup 1: Non-Lead High-Soda High-Lime Glass (Na-Ca)

The high-soda high-lime glass of the beads in this subgroup does not contain significant quantities of lead ($<$ 0.14%). Average concentrations of soda and lime are close to 10% for both and potash concentrations are slightly lower on average (7.6%) and range from 2 to 12.5%. Magnesia is always less than 1.0%.

The high-soda high-lime or Na-Ca beads are opaque turquoise blue, transparent dark blue (both spherical and oval varieties), and transparent green. The turquoise-blue beads contain 0.8-0.9% copper. The opacity of these beads is not due to tin, nor antimony or arsenic since these elements occur in very low concentrations. One of the turquoise-blue beads has about 560 ppm of barium which is in the range of the concentrations exhibited by the glass beads in this group, the other beads have slightly higher concentrations, in the range 2000 to 6000 ppm. This element may have a role in the opacity of these beads. The translucent dark-blue beads contain cobalt. As with the Bohemian beads colored by cobalt, it seems that arsenic, nickel, and bismuth are associated with the coloring ingredient. The green

Table 4. Reduced Average Compositions with Standard Deviations of Three of the Four Chinese Glass Groups.

	Non-Lead High-Soda High-Lime Glass	High-Soda High-Potash Lead Glass	High-Potash Lead Glass
SiO_2	68.8 +/- 3.4%	74.9 +/- 1.0%	80.0 +/- 2.0%
Na_2O	10.9 +/- 2.3%	10.2 +/- 0.6%	1.8 +/- 0.8%
MgO	0.3 +/- 0.2%	0.6 +/- 0.4%	0.1 +/- 0.1%
Al_2O_3	1.6 +/- 0.8%	0.7 +/- 0.05%	1.0 +/- 0.8%
K_2O	7.6 +/- 2.9%	11.5 +/- 0.7%	14.5 +/- 1.1%
CaO	10.4 +/- 2.8%	1.8 +/- 0.4%	2.5 +/- 2.6%

beads are colored by chromium, present in the glass with concentrations in the range of 2000 to 3000 ppm.

Subgroup 2: High-Soda High-Potash Lead Glass (Pb-Na-K)

Five translucent red beads colored using gold (70-130 ppm) represent Subgroup 2. These are the distinctive, wound, disk-shaped beads with flat ends, somewhat resembling a tire. Lead concentrations are in the range of 20%. This glass is referred to as Pb-Na-K. Soda and potash concentrations average about 10%. The lime content is low and its concentration ranges from 1.5 to 2.3%.

Subgroup 3: High-Potash Lead Glass (Pb-K)

The beads of the third subgroup have lead concentrations ranging from 25.6 to 34.2% and potash has the highest concentration (14% on average) after silica and lead. This is referred to in this study as high-potash lead or Pb-K glass. Soda and lime concentrations vary respectively from 0.7 to 2.5% and 0.2 to 2.6%. Trace element concentrations seem to confirm the existence of distinctive compositions related to the use of different sources of ingredients as shown in Fig. 5 for protactinium and tantalum. Discrete groupings appear based on the color of the beads when plotting these two elements.

The Pb-K beads are the wound, spherical, translucent red, translucent pink, and opaque turquoise-blue varieties. The translucent pink beads contain gold (21 to 47 ppm) and slightly more tin than any other beads in this group (686 to 2594 ppm). This composition suggests that this glass is the only gold-containing glass of the beads sampled that may have been colored by the purple of Cassius. Two of the Pb-K beads are translucent red, but unlike the other red beads in this study, they do not contain significant concentrations of gold. These beads do contain uranium (12 and 13 ppm) which is an element that can produce a red color in a lead glass but the quantities of uranium seem quite low. Some elements not measured, like cadmium or selenium, may have been used to color these beads. Four of the Pb-K beads are opaque turquoise blue and contain copper but the opacifying agent remains a mystery. The opacity may be due to an element not measured using LA-ICP-MS, like fluorine, or to some physical properties of the glass rather than to a specific compound.

Subgroup 4: Lead-Barium Glass (Pb-Ba)

The four opaque turquoise-blue beads in the high-potash lead glass subgroup are visually identical to a fifth one that has a totally different composition. These five beads are often referred to as Canton beads (Ross 1990). Instead of being made of high-potash lead glass like the other four, one

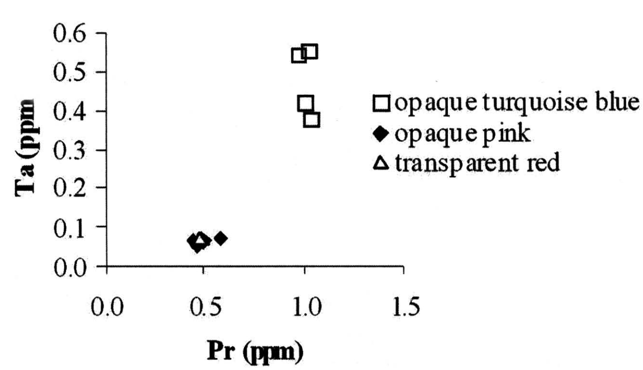


Figure 5. Protactinium and tantalum concentrations in the high-potash lead-glass samples.

of the turquoise-blue beads is made of a lead-barium glass with very little soda and potash and 5.8% of lime. Lead-barium glass is one of the earliest glasses manufactured in China, spanning the period from the 5th to 4th centuries B.C. until the 3rd century A.D. (Jiayao 1996; Brill 1999). The presence of barium in this bead is puzzling. Was barium still used at this late period or is the presence of barium a sign of glass recycling? Testing a larger sample of these visually-identical beads is required to resolve these questions.

The broad heterogeneity in the beads chosen for the supposed Chinese group is interesting. Historical records do in fact suggest some recycling of glass in China, and describe the use of broken European glass in glassmaking in late 18th-century Canton, a practice that had allegedly been abandoned by 1896 in favor of Chinese glassmaking (Francis 1986, 2002). In fact, the high-soda high-lime compositions in the sample sets attributed to China and Venice are quite similar when the major elements are compared (Fig. 6). The similarity could also mean that these beads originated from a European source and had nothing at all to do with China in terms of manufacture or distribution. Magnesia is, however, lower in these beads (< 1.0%) and trace elements exhibit different patterns (Fig. 7). A high-soda high-lime glass was also identified among the Bohemian beads, with very low strontium and cesium concentrations. Strontium and cesium levels are also reported in Fig. 7. For the Bohemian glass, the concentrations for these elements are extremely low. The results presented in Fig. 7 suggest the distinct presence of a third group of high-soda high-lime glass containing higher levels of strontium and cesium, that corresponds to some of the beads attributed to China. The number of samples for this third high-soda high-lime glass is very low (n = 2), however, and further analysis would be necessary to validate any conclusions.

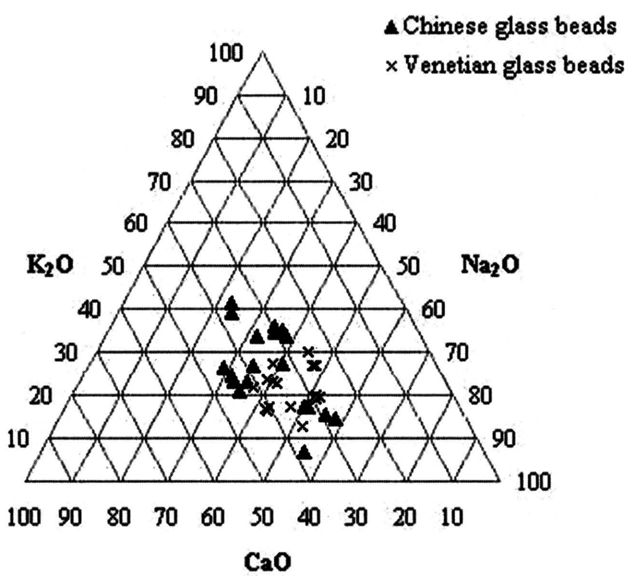


Figure 6. Ternary diagram including potash, lime, and soda concentrations in the high-soda high-lime glasses attributed to China and Venice.

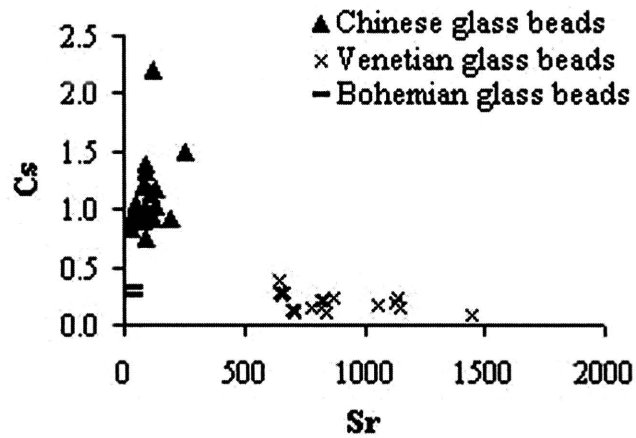


Figure 7. Cesium and strontium concentrations in the high-soda high-lime glasses attributed to China and Venice.

DISCUSSION

The 128 beads for this study were selected and segregated into three groups according to their presumed place of manufacture: Bohemia, Venice, and China. Even though the beads were sorted based on descriptions and characteristics presented in the archaeological and bead literature, the division was still somewhat speculative. As expected, more groupings appeared following the LA-ICP-MS study (Table 5). Composition did seem to vary according to the suggested country of origin, especially for Bohemian glass, but was also affected by color and diaphaneity. Drawn beads are the most common 19th-century bead manufacturing type, and are generally followed in frequency by wound beads, and then by mold-pressed beads in collections of this time period. The Sullivans Island collection follows this general convention. The bead compositions generally sort into these manufacturing categories based on their place of origin: the molded beads from Bohemia, the drawn beads from Venice, and the wound beads from China. Part of this breakdown is due to sampling bias, however, since drawn beads were emphasized in the beads attributed to Venice. Wound beads were also made in Venice, especially the elaborate lampworked beads, and the oval, opaque white beads (Kidd and Kidd type WIc) included in this study yielded a composition typical of Venetian glass.

Eight significantly different compositions were identified. One of these, Na-Ca, was divided into three

Table 5. Chemical Composition Findings.

	Manufacture	Color	Size	Kidd & Kidd Type	Glass Type	Coloring/ Decolorizing/ Opacifying Element
Bohemia	Drawn, two rows ground facets	tsl. green	L	If	K-Ca	Cu, Pb
	Drawn, two rows ground facets	tsl. colorless	L	If	K-Ca	Mn, As
	Drawn, two rows ground facets**	tsl. dark blue	L	If	K-Ca	Co
	Drawn, two rows drawn facets	colorless outer layer; op. white core	M-L	IIIf	K-Ca	P
	Mold-pressed, ground facets	op. blue	L	MPIIa	K-Ca	Co, P
	Mold-pressed, ground facets	tsl. white	L	MPIIa	K-Ca	P
	Mold-pressed, ground facets	tsl. red	VL	MPIIa	Pb-Si	Au
	Mold-pressed, molded facets	op. white	L	MPIIa	K-Al	P
	Mold-pressed	tsl. dark yellow	L	MPIIa	K-Ca	Fe
	Mold-pressed, spherical, mold seam	tsp. yellow	L	MPIIa	Na-Ca	U, Cd
	Blown**	op. white w/ tsl. blue stripe	L	Blown in mold	K-Ca	P
	Blown**	tsl. purple blue*	VL	Blown in mold	K-Ca	Co, P
	Wound-on-Drawn*	tsl. red on op. white	L	Wound on drawn	K-Ca (white) Pb-Si (red)	P (white), Au (red)
Venice	Drawn	op. turquoise blue	S	IIa	Na-Ca	Cu
	Drawn	op. turquoise blue	M	IIa	Na-Ca	Cu
	Drawn	op. white	S	IIa	Pb-(Na,K)	As
	Drawn	tsp. colorless	S	IIa	Pb-(Na,K)	As
	Drawn	tsl. red	S	IIa	Pb-(Na,K)	Au
	Drawn	tsl. green	S	IIa	Pb-(Na,K)	Cu, Pb
	Drawn	op. white on op. white	M	IVa	Na-Ca	Sb
	Drawn	tsl. red on op. white	M?	IVa	Pb-(Na,K)	Au (red) As (white)
	Drawn, faceted	tsl. reddish purple	M	IIf	Na-Ca	Mn
	Wound	op. white	S/M	WIc	Pb-K	As
China	Wound	op. turquoise blue	VL	WIb	Pb-K Pb-Ba	Cu
	Wound	tsl. pink	L	WIb	Pb-K	Au

Table 5. Continued

	Manufacture	Color	Size	Kidd & Kidd Type	Glass Type	Coloring/ Decolorizing/ Opacifying Element
China	Wound	tsl. red	VL	WIb	Pb-K	Unknown
	Wound***	tsl. red	L	WId	Pb-Na-K	Au
	Wound	op. turquoise blue	L	WIb	Na-Ca	Cu
	Wound	tsl. dark blue	VL	WIc	Na-Ca	Co
	Wound	tsl. dark blue	VL	WIb	Na-Ca	Co
	Wound	tsl. green	VL	WIb	Na-Ca	Cr

* Hypothesized Bohemia, but composition suggests a Venetian origin

** Hypothesized Venice, but composition suggests a Bohemian origin

*** No source hypothesized, composition suggests a Chinese origin

subgroups with features that differed according to the production location. A correlation was observed between composition and provenance but, interestingly, no consistent correlation was found between the technique used to produce the beads and the composition of the glass, at least for glass from Bohemia. For example, the same K-Ca composition was identified for drawn, mold-pressed, and mold-blown Bohemian beads. On the other hand, five visually identical Chinese turquoise-blue beads belong to two different glass groups—one exhibits a lead-barium composition; the other a Pb-K composition. Thus, beads that look alike can have different compositions, at least for those made in Asia.

Several glass types were used at each of the three proposed manufacturing locales. They may have been produced by different glass manufacturing workshops or at slightly different periods. The presence of uranium in the Bohemian Na-Ca glass indicates that this glass was produced no earlier than the second half of the 19th century while the Bohemian K-Ca glass is part of an older tradition.

The Bohemian beads form the most homogeneous and consistent group in the study. Most of them are high-potash high-lime glass and correspond to a recipe involving forest-plant ash and lime sand. This supports Glascock and Speakman's (2002) LA-ICP-MS findings which, in addition to establishing that beads of similar color cluster together, found Bohemian beads to be much more homogenous in composition than Venetian beads. A Bohemian source for the varieties identified in the Sullivans Island collection is further supported by Neuwirth (1994). According to her research, all of these bead varieties—the mold-pressed, the drawn faceted, and the blown-in-the-mold beads—were manufactured in Bohemia.

Two glass types are identified for the Venetian beads: a high-soda high-lime glass and a lead glass with very variable concentrations of soda and potash. The glass type involving lead has a more heterogeneous composition, a finding that is consistent with Glascock and Speakman (2002). Venetian glass beads are the most commonly encountered beads on 19th-century North American archaeological sites, especially the small, drawn embroidery beads sampled here. The drawn faceted beads (Kidd and Kidd type IIf) were found to correspond to Venetian glass, although it had originally been hypothesized that they were made in Bohemia due to the presence of ground facets. Interestingly, Neuwirth (1994) states that beads made in Venice were sent to Bohemia for grinding as does Bussolin in 1847:

> Our beads are cut quite easily in Bohemia, and at very reasonable prices.... It should be noted that cut colored-crystal beads are also produced in Bohemia. The type of process, however, is very different and the product should not be confused with the beads produced in the Venetian factories (Karklins with Adams 1990:73; Ross 2000).

Some of the glass compositions encountered are related to achieving a specific color, especially for red glass. Red glass colored with gold was obtained using specific recipes that involved the use of lead glass since the incorporation of this element seems essential to obtaining an intense ruby-red color. Four different recipes for red glass containing gold and lead were identified. Even though the composition of red glass varied according to the sample group, the red glass always contained lead; levels of more than 50% were detected in the Bohemian glass, while only 6% was present in the Venetian glass. The lead concentration in glass that also contained gold ranged from 18.6 to 32.8% in beads attributed to China. Concentrations of soda, potash, and lime varied too. The red glass in Venetian beads contained up to 2% arsenic, while only 24 and 27 ppm of arsenic were measured in the glass from Bohemia. Variable concentrations of antimony were also detected in the red glass according to the place of origin.

Lead in copper-containing glass has the property to impart a green color. The presence of high alumina concentration in the Bohemian Al-K glass resulted in an opaque glass.

It is interesting to note that different colorant traditions existed in Bohemia, Venice, and China. In Bohemia, white beads were mostly produced using a phosphorus-rich ingredient like bone ash. In Venice and China, however, phosphorus did not appear in especially high concentrations in white beads. Rather, arsenic, combined with lead, was used in China and Venice, and antimony was detected in some white Venetian beads. Chromium was used to produce green glass in China while copper and lead were preferred in Venice and Bohemia. The same cobalt, associated with nickel, arsenic, and sometimes bismuth, was used in dark-blue glass regardless of presumed source. Even in early periods cobalt pigment was traded over very long distances.

The composition of the red and white glasses from the rare wound-on-drawn bead was most surprising when compared to that of the glasses from the red-on-white drawn beads. While there were some differences, both glasses in the wound-on-drawn bead were close to the red and white Bohemian glass, but very different from the more common red-on-white beads which were similar to Venetian glass. Thus it appears that wound-on-drawn beads may have originated in Bohemia.

CONCLUSION

Compositional analysis studies of 19th-century glass beads are few and the beads from Sullivans Island provided the opportunity to investigate glass thought to be from the three major bead producing centers of this time period. A wide range of glass recipes were identified for the 128 beads sampled for this project. Some are specific to a given area (e.g., the high-potassium high-calcium glass of Bohemia) but others seem to have been used at different places, like the high-sodium high-calcium compositions identified for beads attributed to Bohemia, Venice, and perhaps China. Different trace element patterns within this glass suggest the use of different types of ingredients but further investigation is needed to define the significance of this recipe at each of the three production centers. Other possibilities also exist. It may be that beadmakers in different countries were copying each other or that some of the attributions regarding place of origin are incorrect. It is, of course, not possible to assert that different compositions automatically indicate different areas of manufacture, but this study was designed to take a broad look at a range of bead varieties produced in potentially different areas that will hopefully encourage additional studies, since comparative material for this time period and this technique is still scarce. While LA-ICP-MS analysis of the glass beads from Sullivans Island has answered certain questions, it has raised others. One of the strengths of this technique lies in its ability to identify trace elements, which may turn out to be subtle yet significant markers for identifying the places of origin of beads in future studies.

ACKNOWLEDGEMENTS

The authors would like to thank Pamela Vandiver, sponsor of Laure Dussubieux's Smithsonian fellowship; Smithsonian photographer Donald Hurlbert for bead photography; Roderick Sprague for ongoing encouragement and sage advice on bead collections from the Plateau; and William T. Billeck for comments on earlier drafts of this article.

REFERENCES CITED

Barber, D.J., and I.C. Freestone

1990 An Investigation of the Color of the Lycurgus Cup by Analytical Transmission Electron Microscopy. *Archaeometry* 32(1):33-46.

Billeck, William T., and Laure Dussubieux

2006 Laser Ablation - Inductively Coupled Plasma - Mass Spectrometry of 17th and 18th Century Turquoise Colored Glass Beads from the Plains. Poster presented at the 2006 Annual Meeting of the Society for American Archaeology, San Juan, Puerto Rico.

Brill, Robert H.

1999 *Chemical Analyses of Early Glasses.* Vol. 2. The Corning Museum of Glass, Corning.

Burgess, Laurie E.
2002 Beads from the River: The Sullivans Island Glass Bead Collection. Poster presented at the 2002 Annual Meeting of the Society for American Archaeology, Denver.
2004 The Sullivans Island Collection: Trade Goods in Eighteenth and Nineteenth Century Funerary Contexts. Paper presented at the 2004 Annual Meeting of the Society for Historical Archaeology, St. Louis.

Burgess, Laurie E., and Laure Dussubieux
2005 Laser Ablation Analysis of Nineteenth Century European and Asian Glass Trade Beads from North America. Poster presented at the 2005 Annual Meeting of the Society for American Archaeology, Denver.

Carbert, J.
1980 Gold-Based Enamel Colours. *Gold Bulletin* 13(4): 144-150.

Cox, Ross
1832 The *Columbia River*. 3rd ed. Henry Colburn, London.

Dussubieux, Laure, and B. Gratuze
2004 Nondestructive Characterization of Glass Beads: Application to the Study of Glass Trade between India and Southeast Asia. Paper presented at the 9th International Conference of the European Association of Southeast Asian Archaeologists, Sigtuna, Sweden.

Francis, Peter, Jr.
1979a The Czech Bead Story. *The World of Beads Monograph Series* 2. Lapis Route Books, Lake Placid.
1979b The Story of Venetian Beads. *The World of Beads Monograph Series* 1. Lapis Route Books, Lake Placid.
1986 Chinese Glass Beads: A Review of the Evidence. *Occasional Papers of the Center for Bead Research* 2. The Center for Bead Research, Lake Placid.
2002 *Asia's Maritime Bead Trade, 300 B.C. to the Present.* University of Hawai'i Press, Honolulu.

Freestone, I.C., M. Ponting, and M.J. Hughes
2002 The Origin of Byzantine Glass from Maroni Petrera, Cyprus. *Archaeometry* 44:257-72.

Glascock, Michael D. and Robert J. Speakman
2002 LA-ICP-MS of European Glass Beads. Paper presented at the 2002 Annual Meeting of the Society for American Archaeology, Denver.

Gratuze, B.
1999 Obsidian Characterization by Laser Ablation ICP-MS and its Application to Prehistoric Trade in the Mediterranean and the Near East: Sources and Distribution of Obsidian within the Aegean and Anatolia. *Journal of Archaeological Science* 26:869-81.

Gratuze, B., M. Blet-Lemarquand, and J.N. Barrandon
2001 Mass Spectrometry with Laser Sampling: A New Tool to Characterize Archaeological Materials. *Journal of Radioanalytical and Nuclear Chemistry* 247:645-656.

Gratuze, B., I. Soulier, M. Blet, and L. Vallauri
1996 De l'Origine du Verre à la Céramique. *Revue d'Archéométrie* 20:77-94.

Hancock, R.G.V., S. Aufreiter, and I. Kenyon
1997 European White Glass Beads as Chronological and Trade Markers. In *Material Research Society Symposium Proceedings Volume 462: Material Issues in Art and Archaeology*, edited by Pamela B. Vandiver, James R. Druzik, John F. Merkel, and John Stewart, pp 181-191. Materials Research Society, Pittsburgh.

Hancock, R.G.V., A Chafe, and I. Kenyon
1994 Neutron Activation Analysis of Sixteenth-and Seventeenth-Century European Blue Glass Trade Beads from the Eastern Great Lakes Area of North America. *Archaeometry* 36:253-266.

Hancock, R.G.V., J. McKechnie, S. Aufreiter, K. Karklins, M. Kapches, M. Sempowski, J.-F. Moreau, and I. Kenyon
2000 Non-Destructive Analysis of European Cobalt Blue Glass Trade Beads. *Journal of Radioanalytical and Nuclear Chemistry* 244:567-573.

Hunt, L.B.
1976 The True Story of Purple of Cassius. *Gold Bulletin* 9(4):134-139.

Jackson, C.
2005 Making Colourless Glass in the Roman Period. *Archaeometry* 47:763-780.

Jiayao, An
1996 Ancient Glass Trade in Southeast Asia. In *Ancient Trades and Contacts in Southeast Asia*, edited by Amara Srisuchat, pp. 127-138. National Cultural Commission of Thailand, Bangkok.

Karklins, Karlis
1985 Guide to the Description and Classification of Glass Beads. In *Glass Beads*, 2nd ed., pp. 85-118. Parks Canada, Studies in Archaeology, Architecture, and History, Ottawa.

Karklins, Karlis with Carol F. Adams

1990 Dominque Bussolin on the Glass-Bead Industry of Murano and Venice (1847). *Beads: Journal of the Society of Bead Researchers* 2:69-84.

Karklins, K., R.G.V. Hancock, J. Baart, M.L. Sempowski, J.-F. Moreau, D. Barham, S. Aufreiter, and I. Kenyon

2002 Analysis of Glass Beads and Glass Recovered from an Early 17th Century Glassmaking House in Amsterdam. In *Archaeological Chemistry: Materials, Method and Meaning*, edited by Kathryn Jakes, pp. 110-127. American Chemical Society, Washington, D.C.

Kenyon, Ian, R.G.V. Hancock, and S. Aufreiter

1995 Neutron Activation Analysis of AD 1660-1930 European Copper-Coloured Blue Glass Trade Beads from Ontario, Canada. *Archaeometry* 37:323-337.

Kenyon, Ian, Susan Kenyon, Ron Hancock, and Susan Aufreiter

1995 Neutron Activation Analysis of Some 19th Century Facetted Glass Trade Beads from Ontario, Canada, that have Chemical Compositions Resembling Bohemian Glass. *Bead Forum* 27:4-9.

Kidd, Kenneth E. and Martha A. Kidd

1970 A Classification System for Glass Beads for the Use of Field Archaeologists. *Canadian Historic Sites: Occasional Papers in Archaeology and History* 1:45-89.

Krieger, Herbert W.

1935 Salvaging Early Cultural Remains in the Valley of the Lower Colombia River. *Explorations and Fieldwork of the Smithsonian Institution in 1934*, pp. 53-56. Smithsonian Institution, Washington, D.C.

Liu, Robert K.

1995 *Collectible Beads*. Ornament, Vista, CA.

Minor, Rick, Kathryn A. Toepel, and Stephen D. Beckham

1985 An Overview of Investigations at 45SA11: Archeology in the Columbia River Gorge. *Heritage Research Report* 39. Heritage Research Associates, Eugene, OR.

Morretti, C. and S. Hreglich

2005 Tecniche di produzione dei vetri opachi impiegate dai vetrai veneziani tra il XV ed il XX secolo. *Rivista della Stazione Sperimentale del Vetro* 5:5-27.

Neuwirth, Waltraud

1994 *Perlen aus Gablonz: Historismus, Jugendstil/Beads from Gablonz: Historicism, Art Nouveau.* Privately published, Vienna.

Pearce, N.J.G., W.T. Perkins, J.A. Westgate, M.T. Gorton, S.E. Jackson, C.R. Neal, and S.P. Chenery

1997 A Compilation of New and Published Major and Trace Element Data for NIST SRM 610 and SRM 612 Glass Reference Materials. *Geostandards Newsletter* 21:114-115.

Phebus, George P.

1978 The Smithsonian Institution 1934 Bonneville Reservoir Salvage Archaeology Project. *Northwest Anthropological Research Notes* 12(2):113-177.

Robertshaw, Peter, Michael D. Glascock, Marilee Wood, and Rachel S. Popelka

2003 Chemical Analysis of Ancient African Glass Beads: A Very Preliminary Report. *Journal of African Archaeology* 1:139-146.

Rooksby, H.P.

1962 Opacifiers in Opal Glasses through the Ages, J.E.C. *Journal of Science and Technology* 29(1):20-26.

Ross, Lester A.

1990 Trade Beads from Hudson's Bay Company Fort Vancouver (1829-1860), Vancouver, Washington. *Beads: Journal of the Society of Bead Researchers* 2:29-67.

2000 *Trade Beads from Archeological Excavations at Fort Union Trading Post National Historic Site*. National Park Service, Midwest Archeological Center and the Fort Union Association.

2003 Bohemian Faceted-Spheroidal Mold-Press Glass Bead Attributes: Hypothesized *Terminus Post Quem* Dates for the 19th Century. *Beads: Journal of the Society of Bead Researchers* 15:24-41.

Ross, Lester with Barbara Pflanz

1989 Bohemian Glass Beadmaking: Translation and Discussion of a 1913 German Technical Article. *Beads: Journal of the Society of Bead Researchers* 1:81-94.

Scholtze, H.

1980 *Le verre, nature, structure et propriétés*. Institut du Verre, Paris.

Sempowski, M.L., A.W. Nohe, R.G.V. Hancock, J.-F. Moreau, F. Kwok, S. Aufreiter, K. Karklins, J. Baart, C. Garrad, and I. Kenyon

2001 Chemical Analysis of 17th-Century Red Glass Trade Beads from Northeastern North America and Amsterdam. *Archaeometry* 43(4):503-515.

Sempowski, M.L., A.W. Nohe, J.-F. Moreau, K. Karklins, S. Aufreiter, and R.G.V. Hancock

2000 On the Transition from Tin-Rich to Antimony-Rich European White Soda Glass Trade Beads for the Senecas of Northeastern North America. *Journal of Radioanalytical and Nuclear Chemistry* 244(3):559-566.

Shortland, A., L. Schachner, I. Freestone, and M. Tite

2006 Natron as a Flux in the Early Vitreous Materials Industry: Sources, Beginnings and Reasons for Decline. *Journal of Archaeological Science* 33:521-530.

Silverman, A.

1918 Alabaster Glass: History and Composition. *Journal of the American Ceramic Society* 1(4):247-260.

Šmit, Ž., K. Janssens, E. Bulska, B. Wagner, M. Kos, and I. Lazar

2005 Trace Element Fingerprinting of Façon-de-Venise Glass. *Nuclear Instruments and Methods in Physics Research* B 239:94-99.

Sprague, Roderick and An Jiayao

1990 Observations and Problems in Researching the Contemporary Glass-Bead Industry of Northern China. *Beads: Journal of the Society of Bead Researchers* 2:5-14.

Strong, Emory

1959 *Stone Age on the Columbia River*. Metropolitan Press, Portland.

Turner, W.E.S.

1956 Studies in Ancient Glasses and Glassmaking Processes, Part V: Raw Materials and Melting Processes. *Journal of the Society of Glass Technology* 40:277T-300T.

Verità M., and T. Toninato

1990 A Comparative Analytical Investigation on the Origins of the Venetian Glass Making. *Revista della Stazione Sperimentale del Vetro* 4:169-175.

Weyl, W.A.

1999 *Coloured Glasses*. 6th ed. The Society of Glass Technology, Sheffield.

Laurie E. Burgess
Associate Chair
Department of Anthropology
National Museum of Natural History
Smithsonian Institution
Washington, DC 20560
E-mail: BURGESSL@si.edu

Laure Dussubieux
Manager
LA-ICP-MS Laboratory
Department of Anthropology
The Field Museum
1400 S. Lake Shore Drive
Chicago, IL 60605-2496
E-mail: ldussubieux@fieldmuseum.org

BOOK REVIEWS

International Bead & Beadwork Conference.

Jamey D. Allen and Valerie Hector (eds.). Rezan Has Museum, Istanbul, Turkey. 2007. 360 pp., 495 color figs. ISBN 978-975-8919-32-1. $50.00 (soft cover).

The International Bead & Beadwork Conference was held at Kadir Has University in Istanbul, Turkey, November 23-25, 2007. The theme for the academic program was "The Global Perspective of Beads and Beadwork: History, Manufacture, Trade, and Adornment." During the three-day event, 44 papers were presented in two concurrent sessions; one on "Beads" chaired by Jamey D. Allen, and the other on "Beadwork" chaired by Valerie Hector.

Due to space constraints, it is not possible to provide more than the titles of the articles in this review. While most of these well relate what the subject matter of the article is, some do not. In such cases, a brief description is provided in parentheses.

BEAD SESSION

Stone Beads in Ancient South Asia – 7000 to 600 BC, by Jonathan Mark Kenoyer

A Series of Mycenaean Glass Beads from Lindos, by Şeniz Atik

How does a Bead Mean? An Archaeologist's Perspective, by James Lankton (Why study beads?)

Beads from the Kingdom of Hazor, by Maud Spear

Mistaken Identity: The Misrepresentation of Beads in the Antiquities Marketplace, by Jamey D. Allen

Moche Beads from Ancient Peru, by Christopher Donnan

African-Made Glass Beads (Garden-Roller Beads), by Margret Carey

Australian Aboriginal Beads from around 40,000 B.P. to Pre-European Settlement (1788), by Jean Nicholls

The Good, the Bad and the Evil Eye Bead: A New Look at Eye Beads Throughout History, by Lois Sherr Dubin

Messengers from the Past, Ambassadors to the Future, by Elaine Robnett Moore (The Bead Timeline of History at the Bead Museum in Washington, D.C.)

Ritual and Value Beads of Borneo's Indigenous People, by Heidi (Adelheid) Munan

The Studies of A.J. Arkell on the Movement of Beads in the Anglo Egyptian Sudan in the 1930s, by Sara Withers

Impact of Social and Political Change on the Use of Beads among the Konyaks, by Alok Kumar Kanungo

Gender, Education, and Aesthetic Change in the Krobo Bead Industry, by Amanda Gilvin and Nomoda E. Djaba

The Japanese Multimetal Ojime Bead, by Frederick Bourguet Chavez

Trade Beads: The Manufacture and Movement of Beads in Recent History, from CE 1400 to 1950, by Jamey D. Allen

Realistic Replicas, Ingenious Imitations, Fantastic Fakes: Collecting Brazen Copies in the World of Beads, by Stefany Tomalin

Traditional Glass Bead Making in Turkey, by Torben Sode

The Nature and Art of Turkish Evil-Eye Beads, by Cemal Cingi

The Early Development of Polymer Clay Beadmaking, by Kathleen Dustin

A Nail that Sticks Up, by Emiko Sawamoto (A brief biography of beadmaker Sawamoto)

The Effects and Counter Effects of the Internet on the Marketing and Collecting of Beads, by Joyce Holloway

The Peter Francis Jr. Archival Collection at the Bead Museum: Its Scope and Content, by Katie Anderson

BEADWORK SESSION

Artist's Statement, by Joyce J. Scott (A brief note from the multi-talented artist)

Products of Patience, by Ethem Çelik (Contemporary Turkish prisoner beadwork)

Needle Beadworks in Konya-Seydişehir, by Gülten Kurt and Tevhide Özbaği

Turkish Prisoner-of-War and Balkan Beadwork, by Adele Rogers Recklies and Jane Kimball

Turkish Prisoner of War Inscribed Beadwork of the Great War, by Jane Kimball

Ethnographic Perspectives on the Use of Seed Beads in the Textile Folk Art in the Balkans: 3 Case Studies, by Miriam Milgram

Ethnographic Beads and Necklaces in the Middle East, by Widad Kawar

The Use of Beads in the Handwork Products, by Melda Özdemir (Beaded Turkish handicrafts)

The Talismanic Power of Beads, by Çigdem Çini (Concentrates on Anatolia)

The Beads on the Woven Girdles of Anatolia, by Şerife Atlihan

Bead Embroidered Calligraphy Panels Located in the Collection of the Waqf Museum of the Turkish Art of Calligraphy, by Zübeyde Cihan Özsayiner

Evolving Relationships: Zulu Beadwork in the Second Half of the 20th Century, by Frank Jolles

Two Puzzles in African Beadwork, by Margret Carey

A Zulu Love Letter ("Isinyolovane") Revisited, by Juliette Leeb-du Toit

Beads, Blossoms, and Dancing Boots: Subarctic Athapaskan Beadwork and Identity, by Kate Duncan

Early 17th Century English Beadwork Purses, by Carole Morris

Souvenir Beadwork of the Six Nations Iroquois, by Karlis Karklins

Russian Beadwork in Connection with Russian History, by Elena S. Yurova

Between East and West: Peranakan Chinese Beadwork from Malaysia, Singapore, and Indonesia, by Hwei-Fe'n Cheah

The End Users – Beadwork Culture of the Dayak of Borneo, by Heidi (Adelheid) Munan

My Career and the Question of Time, by David Chatt (Why artists spend all that time making beadwork)

Even a cursory examination of the foregoing list reveals the broad scope of the articles and the varied interests of the authors. This makes the book a perfect introduction to beads and beadwork for the budding researcher or collector as well as the professional who wants to keep abreast of what's happening in bead research worldwide. Numerous excellent color illustrations accompany the articles.

While the content is excellent, there are several editorial problems with the volume. That the book was edited and prepared in haste is evident from the numerous inconsistencies in the format of the chapter headings, bibliographies, and figure captions. That there are generally no spaces between paragraphs and the first lines of paragraphs are not indented makes for difficult reading. While there is no table of contents *per se*, each section is preceded by a foldout list of the papers as they appeared in the original conference program. This is a bit confusing as a number of the titles in the list differ from those printed in the book and some of the papers that are listed have not been included in the proceedings. Finding specific articles is further complicated by the fact that none of the pages are numbered.

Despite the shortcomings, this volume is a welcome addition to the growing body of knowledge on beads and beadwork. Both Jamey D. Allen and Valerie Hector, as well as Kadir Has University and the Rezan Has Museum, deserve special commendation for bringing this valuable resource to fruition.

There is only one distributor outside Turkey. Contact Alice Scherer (alice@europa.com) for ordering information. Of the 500 copies printed, only around a dozen remain available as of this writing.

Karlis Karklins
1596 Devon Street
Ottawa, ON K1G 0S7
Canada
E-mail: karlis44@aol.com

Navajo Beadwork: Architectures of Light.

Ellen K. Moore. University of Arizona Press, Tucson. 2003. i-xxiii + 250 pp., 38 color figs., 13 b&w figs., appendices, index. ISBN 0-8165-2286-3. $50.00 (cloth).

North American Indian beadwork is primarily associated in the public mind with the Plains, Woodlands, and to an extent, the Northwest Coast. Its place among the Navajo of the Southwest is largely unknown except to travelers on the Diné Reservation. Thus, anthropologist Ellen Moore's groundbreaking book, *Navajo Beadwork: Architectures of Light*, is a major contribution to both the ethnographic and beadwork literature. In addition to introducing Navajo beadwork and the complex of cultural beliefs it embeds, the book provides a nuanced and valuable ethnographic process model for those interested in researching indigenous art production. Based on Moore's close collaborative work with Navajo beadworkers over a period of years, this elegant interdisciplinary study integrates Navajo knowledge and approaches to life maintained through oral tradition with information from anthropology, linguistics, art, aesthetics, and written history.

In Part 1, "Entering the Beadworkers' World," Moore explains her ethnographic process, developed through a combination of academic training and learning from her Navajo collaborators. She then presents the "Underpinnings"— the themes of the book—each based in complex interrelationships of individual artistic and accepted cultural processes.

Part 2, "Beads Then and Now," traces the importance and role of beads and stitched beadwork in Navajo life to the present, via a collation of information maintained through oral tradition.

The core of the book, Part 3, "Creating Design," probes how, in Navajo beadwork, aesthetic sensibilities reflect cultural expectations. Navajo scholar Wilson Aronilth (p. vii) explains: "Our forefathers believed that our minds, thoughts and knowledge come from colors." Light and color are the sources of both inspiration and the central organizing principles that govern the Navajo beadworker's creative processes. Colors and color sequencing associated with times of the day and the traditional directions dominate patterning. Design and color are conceived together in the beadworker's mind to produce what Moore calls "Architectures of Light." During the beading process, multiple visual and verbal metaphors are both associated and interdependent with prayer. "Bringing the Design to Life" involves *Nahat'á*—prayer, thought, and dreaming until the design comes to mind, followed by *Iiná*, its coming to life. *Iiná* is when the design "just goes."

Beaded patterns tend to be banded and use traditional motifs. Zigzags, stepped patterning, and symbols of the four directions are common on Navajo textiles, as well as diamonds, feathers, and arrowheads. Colors combinations are spoken of as "rainbow," "sunset," or "fire" colors, and are graduated from dark to light, ordered by the phenomena of color change through the daily cycle as observed in the vast sky that visually dominates the reservation. Some colors have symbolic meaning as well; for instance, purple also represents the breath of life. Bands of stacked colors in peyote stitch encircle cylindrical forms such as the handles for fans used in the Native American Church or aspirin bottles intended for either personal use or sale. Narrow bands are stacked perpendicular to the length on linear forms such as belts or bracelets. The book's 32 color illustrations depict these and many more items, as well as the inspirational color banding of the reservation hills, the sky at dawn and evening, and the rainbow, a protector.

Not as esoteric as this review at first glance may suggest, this study of Navajo beadwork is user-friendly. Moore provides the reader with a breadth of knowledge about Navajo culture and beliefs as well as about the beadwork itself. Equally important, the book invites one to think in unusual and important ways about the creative process and the awarenesses that feed it.

Kate C. Duncan
School of Art
Affiliated Faculty
American Indian Studies and Museum Studies
Arizona State University
Tempe, AZ 85287-1505
E-mail: Kate.Duncan@asu.edu

Made of Thunder, Made of Glass: American Indian Beadwork of the Northeast.

Gerry Biron. P.O. Box 250, Saxtons River, VT 05154-0250. 2006. 48 pp., 19 b&w figs., 45 color figs. ISBN 0-9785414-0-5. $20.00 (paper).

Gerry Biron's *Made of Thunder, Made of Glass*, a catalogue accompanying an exhibit of the same name, is the first publication to feature early 19th-century beaded purses created in American Indian communities in northeastern North America. Such an exhibit and publication are well overdue. For two centuries these colorful purses have been admired by North American and European private and public collectors, but no research into their specific origins has ever been published. Where they were made and who made them are questions that have never been fully researched. Gerry Biron undertook the challenge to find the answers and to share his results in this publication. Biron is in the best position to undertake such a study because of the large collection he and JoAnne Russo have created.

There are few collections as large as theirs. Many museums and private collections contain a few of these beaded pieces but no one has attempted to survey such small collections. Biron and Russo have the interest and the available material to undertake the study.

Sixty-four color and black and white images illustrate the wide variety of 19th-century purse and hat forms. About 100 beaded purses are pictured in this publication—an impressive collection. Although fewer than a dozen examples of the rare caps and hats are included, each one is a unique piece of art just like the purses. The excellent photographs show pristine purses that show little wear and bead loss though they are nearly two centuries old. It is assumed that many have been patiently restored. We hope that a record has been made with before and after photographs so future researchers can identify the original and the restoration beadwork.

The beaded purses, also referred to as pouches or bags, are decorated on both sides with colorful seed beads (three of those pictured are four-sided). The beadwork on almost all of them is very elaborate and exhibits obvious differences in patterns and beads. The makers did not duplicate their patterns. No one has observed two identical purses although both sides on the most common type are very similar.

The catalogue illustrates the four major types or styles of 19th-century northeastern beaded purses: 1) bags whose decoration is dominated by zigzag motifs; 2) bags that often exhibit paired elements, often circles or coils in a double-curve motif; 3) vase-shaped purses from New England; and 4) flat bags that feature floral designs in two shades of red, blue, green, yellow, and white. Biron discusses them all. In the first three styles the beaded designs on each side of the purse are different while the two sides on purses of the fourth type are almost always nearly identical. It is frustrating that space considerations limited the number of illustrations in the catalogue so there are few instances where both sides are shown. Nevertheless, the photographs included do provide images of an extensive selection of these forms of beadwork.

Equally valuable in this publication is the inclusion of 19th-century portraits of women and little girls posed with their favored beaded purses. It is remarkable that there are so many photos of the purses in use. In one instance a man wears a beaded Glengarry-type hat, today considered to be women's wear. This is the first time such scarce pictures have been published. There is probably not another collection of similar photographs. Researchers are indebted to Biron for collecting and sharing these images. It is interesting to note that the majority of the people pictured with their Indian purses are apparently not of native descent. It would be a valuable addition to our understanding of the purses to pursue further research on the location of the studios where the pictures were taken because the cities might give a clue as to where the purses were made. Of the many historic photographs we have of sales booths piled high with Iroquois beadwork, none show any flat purses. Where were the purses in these old portraits purchased? It would be good to know.

A unique section in the book is a series of paintings rendered by Biron, a fine artist. Many of the paintings are based on historic photographic images of Native Americans. In each case Biron has added a piece of beadwork to the original scene. These large paintings lined the walls of the Made of Thunder exhibit and illustrated some of the people who might have been associated with the beadwork when it was new. Noting that observation, the paintings are more of a showcase of Biron's amazing artistic talent than a contribution to the understanding of the history of the beadwork. They do, however, reveal the deep admiration that Biron has for the beadwork and the people who created it.

The highlight of the publication is an essay on the early 20th-century beadworkers who lived in lower Manhattan. These families, originally from the Saint Regis (Akwesasne) reservation on the Saint Lawrence River, created pin-cushions in the style well known from Mohawk settlements along the river especially Kahnawake south of Montreal. The residents of the Mohawk colony on West Broadway sold their beadwork on the streets and wharfs of New York City. One interesting note is that they wholesaled to a Hebrew peddler who was able to get more money for the beadwork than the Mohawks could themselves. One wonders how the beadwork was identified to buyers. However interesting, this footnote to the story of Iroquois beadwork is not really relevant to the subject of the book as this fascinating article provides no evidence that beaded purses were made at the colony.

This brings up the question of where these beaded purses were actually made and when. Of the four types, there is considerable agreement that two of the types were made in western New York on Seneca reservations. Biron's suggestion that some were made in Ohio is highly speculative. The first type featuring zigzag motifs was probably made in the Seneca communities in the southwestern part of New York state. The second type with the "beehives" and double-curve motifs was probably made at Tonawanda or maybe Tuscarora in the northwestern part of New York. The vase-shaped purses that were made in New England are attributed to several different native communities. Much research has yet to be undertaken to write their history.

The fourth purse type, the kind with floral motifs in two shades of five colors, raises the most questions. This is the most common of all the purse types and is the one pictured in the early portrait photographs. It is estimated that some 12,000 were made in less than a 100-year period. *Haudenosaunee* and non-Indians alike recognize these purses as being Iroquois; it is the most recognizable form of Iroquois beadwork, but no one is sure of where the purses were made. As some are lined with French-language newspapers, they most likely were made in Quebec but no one has identified the community. They are most likely Mohawk because they share the five-color motif with the Mohawk pincushions framed with leaves in five colors. These purses are, however, sometimes identified in the literature as "probably Tuscarora." Because of their similarity and if some are definitely Mohawk, the likelihood of these purses all being made by the Mohawk is high. Biron may tend to agree but he speculates that they evolved in western New York, which is unlikely.

Biron is a professional artist, not a professional researcher, historian, or anthropologist, so he may be excused the few factual errors included in his essay, such as the name of Fulton's steamboat, the shape of the National Badge of the Iroquois, and the identification of a piece in the Iroquois Indian Museum. The most serious error is his assertion that the Iroquois Confederacy no longer exists. Most contemporary *Haudenosaunee* would refute this statement. The Grand Council of the Confederacy still meets, treaty cloth from the U.S. Federal government still upholds the ancient relations between sovereigns, and people travel on *Haudenosaunee* passports. They may not agree on whether they should call themselves Iroquois, *Haudenosaunee*, or Six Nations, but they all agree that the Iroquois Confederacy is still in existence.

The *Haudenosaunee* are proud of their beadworkers. They appreciate the historic pieces illustrated in this catalogue and they admire the beadwork created by contemporary beadworkers. They should be grateful that Biron has brought this extensive collection of fantastic pieces together and has published this catalogue so that others may admire and appreciate the wonderful purses made by their ancestors.

Dolores N. Elliott
28 Zevan Road
Johnson City, NY 13790
E-mail: Dolores@stny.rr.com

Lubāna ezera mitrāja Neolīta dzintars un tā apstrādes darbnīcas (Neolithic Amber of Lake Lubāns Wetlands and Amber-Working Workshops).

Ilze Loze. Institute of the History of Latvia, Academy Square 1-1202, Riga LV-1050, Latvia. 2008. 188 pp., 80 color figs., 81 B&W figs. ISBN 978-9984-9924-8-8; UDK 902/904(474.3). $25.00 (hard cover).

The complicated and permanently incomplete biography of an artifact can never be fully comprehended in all its stages. When amber beads and pendants are in question, archaeologists often find them used and finished, more or less processed, as artifacts that have temporarily broken their "life cycle" and are now static finds in a grave, hoard, or settlement debris. Yet this static archaeological record is but one of the many phases of the biography of an amber ornament: before that moment, it was a piece of resin, lingering for millions of years in clay layers, then rolled by sea waves and washed onto the shore where it was found, carved, exchanged, worn, to return–only temporarily–into the ground, and then dug out as an "archaeological find." Archaeologists rarely have an opportunity to perceive more than this last "passive" phase of an amber bead but in her most recent book, *Lubāna Ezera Mitrāja Neolīta Dzintars (Neolithic Amber of Lake Lubāns Wetlands and Amber-Working Workshops)*, Dr. Ilze Loze, doyenne of Latvian archaeology and amber studies at the Institute of the History of Latvia in Riga, succeeds in convincingly demonstrating several stages in the life of Latvian Neolithic amber beads and pendants. Moreover, through a detailed analysis of Neolithic amber workshops, she raises some important issues regarding the functioning of prehistoric communities, social organization, craftsmanship, and exchange.

Dr. Loze concentrates on a number of archaeological sites dating to the middle and late Neolithic (from the middle of 4th to the end of the 3rd millennium B.C.E.) in the region of the Lake Lubāns Depression in eastern Latvia. The Depression is a wetland that receives water from many tributaries of the Daugava, the largest river in the eastern Baltic region. This wet and naturally diverse region was not only suitable for life in the Neolithic, but the specific peat-bog conditions enabled the perfect preservation of the archaeological material, amber above all. Archaeological investigations in the region began in 1938 and have continued until the present. Twenty-seven Neolithic sites were registered in the process. Ilze Loze has studied the amber from this region for decades, publishing a number of studies on the subject, and this book crowns her research into prehistoric amber of the Eastern Baltic region.

Contrary to expectations, natural deposits of amber do not exist in the Lake Lubāns region but are found further to the west and southwest, by the shores of the Baltic. The first chapter of the book is dedicated to these natural deposits that, during the Neolithic, stood by the shores of the brackish-water Litorina Sea, the predecessor of the present Baltic Sea. The communities of the Pit-Comb Ware Culture that occupied the peat-bog region around Lake Lubāns as early as about 3300 B.C.E. established a dynamic exchange with their littoral neighbors, not only acquiring raw amber from them but also probably learning how to process it as well. Soon, however, this lake district, and not the regions close to the source of the material, became the center of amber manufacture and retained this distinction for more than a thousand years. Infrared analyses of the amber, undertaken under the supervision of the late Professor Curt W. Beck at the prestigious Amber Research Laboratory at Vassar College, Poughkeepsie, New York, confirmed the author's assumptions on the origin of the raw material worked in the Neolithic workshops of the Lake Lubāns Depression.

Of course, not all the Neolithic sites of the Lake Lubāns region held evidence of amber workshops; some sites produced no amber jewelry at all. Dr. Loze nevertheless offers a detailed account of the Neolithic occupation for the entire region, thus positioning the amber workshops within the wider archaeological context. The complex network of interregional exchange in amber slowly emerges before the reader, with the focal points on the centers of manufacture. The author pays special attention to two such workshops attributed to the Middle Neolithic Pit-Comb Ware Culture. The Nainiekste and Zvizde settlements not only produced a large quantity of amber beads and pendants of various types (such as trapezoidal pendants, rings, zoomorphic figurines, and button-shaped, cigar-shaped, and tubular beads), but also direct evidence for the process of amber carving. Lumps of unprocessed amber and unfinished beads and pendants of various types were recovered, as well as a significant amount of scrap and even broken beads, that testify–in the opinion of Ilze Loze–that this material represents the work of "apprentices" training in the craft. Analysis of the spatial distribution of the types of amber jewelery produced in the workshops of the Lake Lubāns Depression proves that as early as the Middle Neolithic, the trade in amber extended well beyond the local region and that the network included far-off communities to the east, in the upper Volga valley and that of its tributary, the Oka. The amber evidence is corroborated by the presence of flint and flint implements at sites in the Lake Lubāns Depression and by the shores of the Litorina Sea; petrological analyses confirm that the flint originated precisely from the upper Volga and Oka valleys.

The carving of amber in the Lake Lubāns Depression, as well as the active trade in amber with remote communities, continued into the ensuing Late Neolithic period when it seems that the central role was played by the settlement at Abora–an important and meticulously investigated site. At this settlement, along with the amber workshops, evidence of other crafts–such as stone carving and pottery production–was uncovered. Over the years, the site produced 1,410 amber artifacts and almost 2 kg of amber scrap. The Abora craftsmen introduced new pendant types and methods for perforating pendants and beads (two-sided perforations and multiple perforations). The most popular new types were the stemmed disc and tooth-shaped pendants. Loze provides minute typological analysis of the amber pendants, beads, and figurines, thus providing us with a reference framework for the study of amber in the whole region. The analysis is enhanced by both color and black-and-white illustrations of the archaeological material, thus creating an encyclopedia of the Neolithic amber of Latvia.

Besides Abora, Dr. Loze meticulously describes other smaller workshops, such as the Asne I, Iča, and Lagaža settlements. Lagaža represents the last phase of the Neolithic amber workshops in the region. During the first half of the second millennium B.C.E., the Neolithic communities of the region suffered a crisis and moved away, probably due to a change in the lake's water level, and the centuries-long tradition of amber carving in the Lake Lubāns Wetlands was interrupted.

In her superb study, Loze uses the recovered amber artifacts to delineate the complex social and cultural traits of Neolithic society in the Eastern Baltic region, as well as the extensive trade network with both neighboring peoples and distant communities as far away as the Volga valley and the Dnieper basin. The reader is not faced with the image of isolated agricultural Neolithic villages, but an open system of well-developed and specialized craft production (in almost proto-industrial quantities), innovation, inter-regional communication, and material and social exchange. And so, to the long-standing cultural biography of amber beads, Ilze Loze has skillfully and eruditely added several convincing, turbulent, and interesting lines.

It should be pointed out that while the bulk of the book is in Latvian, there is an excellent 15-page English summary. The illustrations are pretty much self-explanatory.

Aleksandar Palavestra, Ph.D.
Associate Professor
Department of Archaeology
Faculty of Philosophy
University of Belgrade
Belgrade, Serbia
E-mail: apalaves@eunet.yu

The Bead Goes On.

Koos van Brakel. KIT Publishers, Mauritskade 63, P.O. Box 95001, 1090 HA Amsterdam, Netherlands. 2006. 80 pp., 60 color figs. with an accompanying DVD. ISBN 90-6832-487-X. $65.00 (hard cover)

The short title leaves one guessing. The subtitle reveals the subject of this book: The Sample Card Collection with Trade Beads from the Company J.F. Sick & Co. in the Tropenmuseum, Amsterdam.

J.F. Sick and Company were one of the principal suppliers of beads and other adornments to West Africa during the first part of the 20th century. The firm appears to have begun business around 1910 in Hamburg, Germany, with branches in Venice and Gablonz (now Jablonec-nad-Nisou in the Czech Republic). In the aftermath of World War I, the main office was moved to Rotterdam in the Netherlands. In 1927, it was moved again, this time to Amsterdam. In a merger intended to increase the firm's market, the company was acquired in 1959 by Hagemeyer and Co. which operated in the Dutch East Indies. Due to the political and cultural changes that were taking place in the East Indies and West Africa at the time, this turned out to be a bad decision and the bead side of the business quickly went downhill. As a result, the office in Venice was closed in 1964.

The closure was, of course, a blow to the company and its employees, but there is a bright side to the event. Like many companies that dealt in beads, J.F. Sick and Co. issued sample cards and there were 197 such cards displaying 22,000 beads at the Venetian office at the time of closure. There was also a 50-page color catalog. Noting the historical importance of these items, one of the employees, a Miss Winkels, recommended that the cards be donated to the Tropenmuseum in Amsterdam and this was summarily done in 1964. This book documents and illustrates the collection.

The sample cards are assigned to four chronological groups: 1) 1910-1913 (cards 1-68); 2) 1920-1929 (cards 69-150); 3) 1930-1939 (cards 151-181); and 1948 onwards (cards 182-188). Some of these are illustrated in the book. The rest are on an accompanying DVD. They show the wide range of fancy and millefiori/mosaic glass beads that poured into West Africa during the first half of the 20th century, including various rosetta or chevron beads.

The reproduction of the printed J.F. Sick catalogue takes up slightly more than half the book. Attributed to the period 1919-1926, it provides color images of a wide variety of glass specimens produced in Venice and Bohemia, including millefiori/mosaic, fancy, rosetta/chevron, plain and striped pound beads, and several mold-pressed forms. There are also Prosser beads and buttons, gilt beads, and those of Vulcanite and stone. Agate finger rings and amulets, and "cheap jewelry" complete the inventory.

One very brief appendix discusses the three principal techniques used to produce the glass beads sold by the company, while another provides a descriptive list of other important collections of bead sample cards at various locations around the world.

While the book is short on text, the high-quality color illustrations make it a useful reference for those collecting or researching African beads. Most previous publications that deal with bead sample cards and books have concentrated on those of 19th-century origin. It is nice to finally see one that deals with the 20th century. The fact that the cards are so well documented gives them even more significance.

Karlis Karklins
1596 Devon Street
Ottawa, ON K1G 0S7
Canada
E-mail: karlis44@aol.com

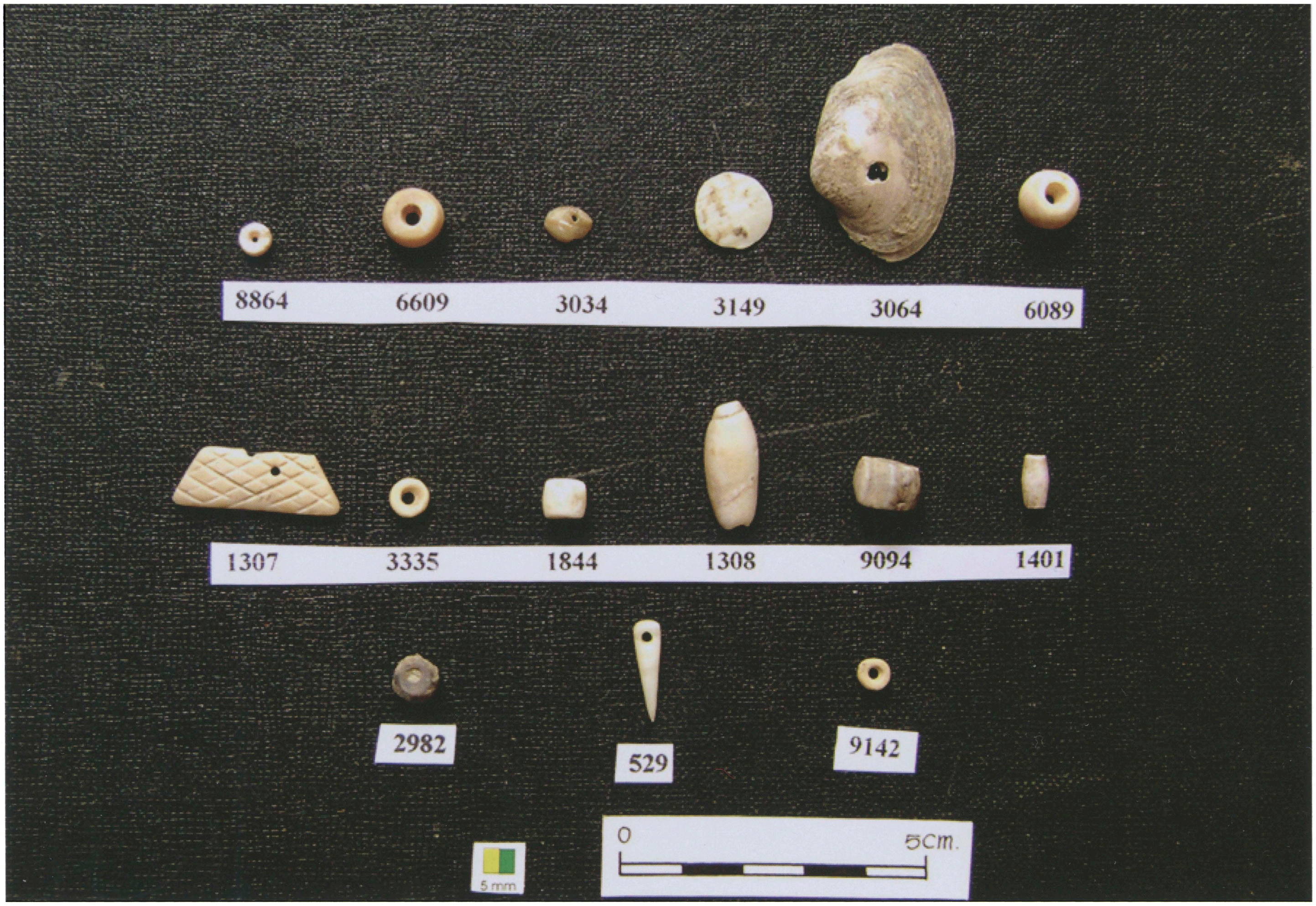


Plate IXA. *Mewar:* Shell, bone, and ivory beads from Balathal (photo: A.K. Kanungo).

Plate IXB. *Mewar:* Terra-cotta beads/spindle whorls from Balathal (photo: A.K. Kanungo).

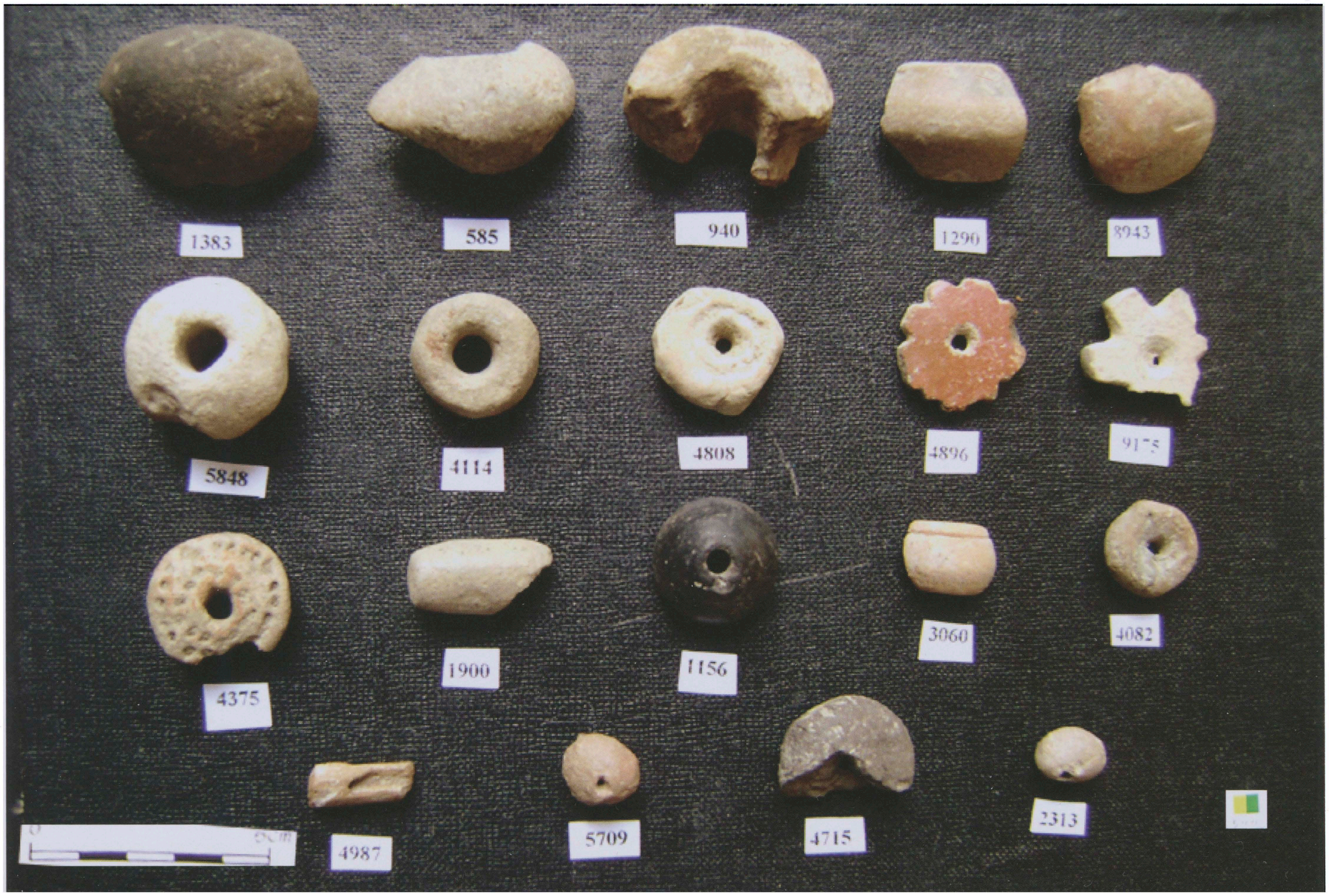


Plate XA. *Chemical Composition:* Beads attributed to Bohemia: a-c, mold-pressed with ground facets; d, mold-pressed with molded facets; e, mold-pressed with ground facets; f, mold-pressed; g, wound-on-drawn; h-i, blown-in-the-mold; j-m, drawn faceted. (all photos: D. Hurlbert).

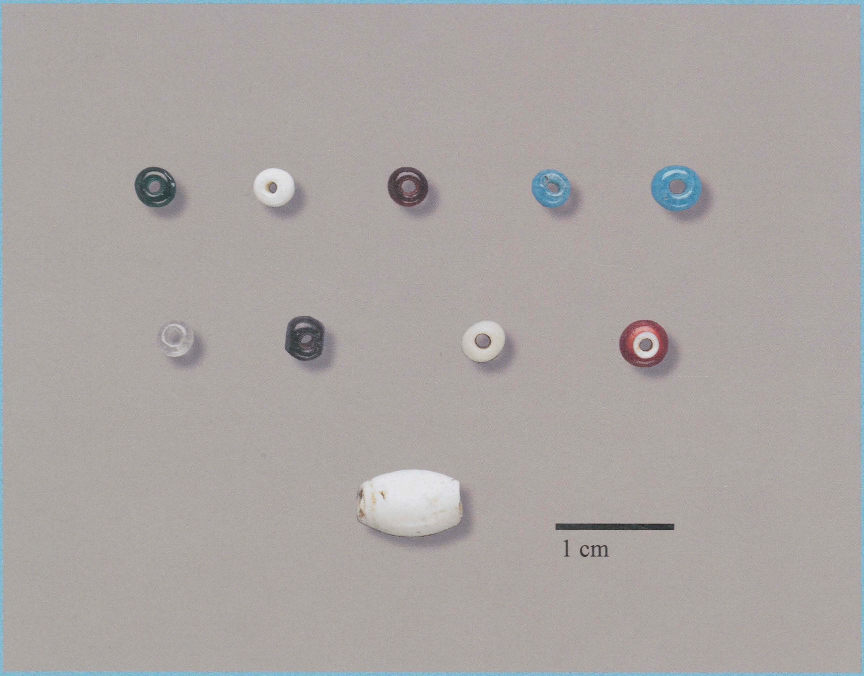


Plate XB. *Chemical Composition:* Beads attributed to Venice: a-f, drawn heat-rounded; g, drawn heat-rounded, faceted; h-i, drawn multi-layered.

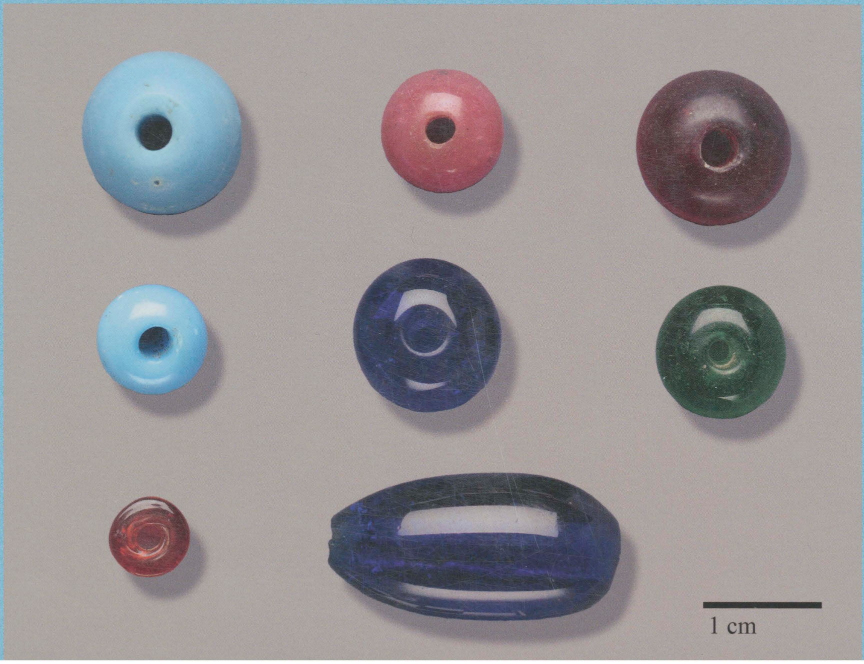


Plate XC. Chemical *Composition:* Wound beads attributed to China.