CHEVRON-STAR-ROSETTA BEADS: PART I

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INTRODUCTION

Perhaps no other single group of glass trade beads is as well known, highly regarded, much sought after, and widely discussed as are the "chevron," "star," and "rosetta" beads. The majority of these are easily recognized and distinguished from other beads. Their range of size, which varies from a remarkably small 6 mm length, up to commandingly large 88 mm length (or more, about ¼ inch to 3½ inches), their pleasing color schemes and patterns, and different ideas about their age and origin have all contributed to the interest shown by bead researchers and collectors. The facts that they have been produced in great quantities (perhaps nearly continuously for *ca.* 500 years), and have a worldwide distribution, have secured their place in many private and museum collections. Certainly no other group of distinctive glass beads is as voluminously documented in the literature. References go back to the early 1800's; and it seems that many papers generated followups that either amplify or dispute points of contention. As with many beads, the two most controversial topics discussed concern the time and place of origin, and the nature of manufacture. In spite of all this attention, these questions remain somewhat unresolved; and popular misconceptions still appear in the literature and are verbally traded among collectors.

A full treatment of rosetta beads would demand a sizeable book (and I am composing such a work). In this short three-part series I can only introduce the issues by delineating certain aspects of manufacture and classification, variety of appearance, and historical importance. Part I will present a definition of the entire group of beads, and will describe specific varieties that I consider to be typical for their periods (and standards for comparison to less common varieties). In addition, I will include an historical overview that will put the previous literature into perspective. Part II will present an analysis of rosetta bead manufacture, comparing typical beads to less common beads; while Part III will be concerned with specimens that appear to be of rare occurrence, and have unusual characteristics.

IDENTIFICATION AND CLASSIFICATION

Most readers with any knowledge of glass trade beads will be familiar with the names "chevron" and "star" for our subject beads. These two names have a long history[1], and are valid when properly used. However, these names are not evocative of the primary characteristics of closely related beads, in the larger scheme of things. For want of better, more specific names, these less common beads are also often casually called "chevron" and "star" beads; and this action, in itself, makes it possible to ignore minor (or major) differences in characteristics of the unusual beads. Bead study is severely hampered by the lack of a well defined and widely agreed upon system of nomenclature; and by misuse or inconsistent use of the terms that have been provided. In other words, if the names "chevron," "star," and "rosetta" are casually used interchangeably, without regard to their intended or implied meanings, then the beads themselves come to be regarded as all being "the same," when there are important differences. It will be helpful, from the start, to define these names as I will use them. "Rosetta" will be used to indicate our entire group of beads; or to indicate beads that are neither star nor chevron beads. "Star" will be used to refer to any rosetta beads that have a pattern seen in cross section, that can be likened to a conventional star pattern, with more or less pointy rays. (The exceptions to this rule will be beads with closely related patterns, associated with very typical color schemes and external shapes. It would be pointless to segregate such specimens; and most people would not follow such a recommendation anyway.) "Chevron" will be used to indicate any star bead that has been altered by grinding or abrasion, so that internal layers are exposed, causing a pattern of wavy lines that is visible when the bead is viewed in profile[2]. The usefulness of this approach will become clear as we proceed. Since glass beads are primarily classified by their manufacture, and by their internal and external decoration (and by their external shape), I will discuss my rationale for naming along with some basic aspects of manufacture. This primary classification is depicted in the line drawings of Figure 3[3].

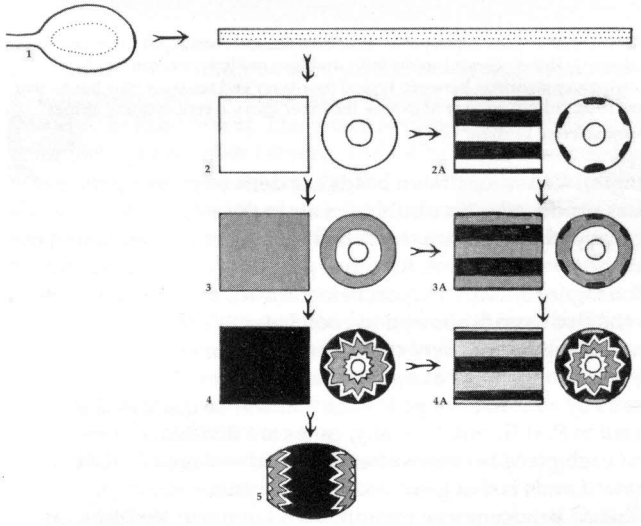


FIG. 3 A schematic depiction of cane bead manufacture, showing the *gather* with a hollow interior, that becomes elongated into a cane (No. 1); a simple monochromatic cane bead (No. 2); a striped cane bead (No. 2A); a double-layered cane bead (No. 3); a double-layered, striped bead (No. 3A); a molded star bead (No. 4); a star bead with outer stripes (No. 4A); and a ground chevron bead (No. 5). Drawing by the author.

Rosetta beads are an important sub-group in the larger family of *drawn* or *cane beads*. Cane beads are manufactured in two distinct series of operations. First, a master glassmaker produces a stock of *canes* (from the Italian *canna*, whose plural is *canne*[4] – pronounced "CAHN-neh"). Canes are produced from a *gather* of glass, which is usually shaped into a cylinder, heated to a ductile state, and *drawn* (elongated to a great

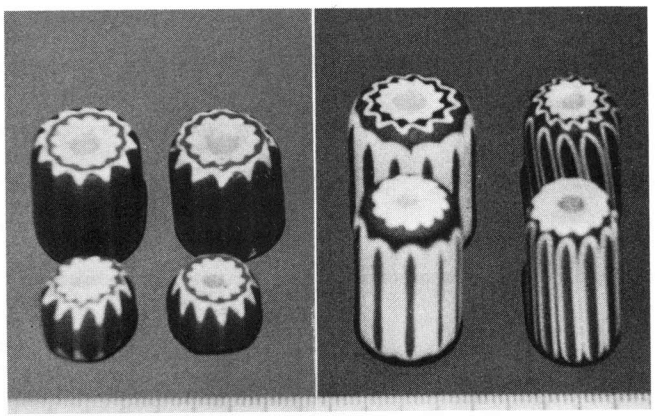


FIG. 4 Four antique typical four-layer blue chevron beads, from Africa, perhaps *ca.* 18th C. beads (on the left); and four modern chevron beads, showing a comparison between typical four-layer and six-layer blue beads, that have been ground all over to expose the inner starry layers, creating stripes. *Photograph by J. D. Allen.*

length). Canes for drawn beads are derived from a gather of glass produced with a bubble of air in the middle. With drawing, this becomes the central orifice, or perforation of the finished beads. (Canes for other purposes are usually solid.) (See Figure 3, No. 1.) Upon being drawn, the cane is lowered to the floor and is allowed to cool. Later, it's broken into handy lengths, and sent to other centers for subsequent steps. In the second series of operations, the canes are turned into beads by a number of processes that will be discussed in detail in Part II; but, basically, canes are divided into pieces, and each piece becomes a bead. The advantage of producing drawn beads is that great quantities of uniform, nearly identical beads may be manufactured in much less time than are hand made (wound) beads. The bead I have just described is monochromatic and cylindrical (see Figure 3, No. 2). The cane gather may be given other external shapes, by simple manipulations, and may also be made "compound" and "complex" in construction[5]. "Complex" canes are decorated by the addition of pre-formed rods of glass that are fused to the gather to form stripes (see 2A). "Compound" canes are constructed by adding layers of different colors of glass to the core layer of the gather (called *casing*) (see No. 3). These two processes are often combined, resulting in beads that are both multilayered and striped (see 3A). Rosetta beads may have either or both of these features (as in Nos. 4 and 4A), but their major difference from other cane beads is that the gather is subjected to molding to modify the shapes of internal layers. The mold most often used impresses a twelve pointed star shape (though other operations may change this appearance, and molds with other shapes may be used). The star pattern within a piece of cane is only visible when the cross section is viewed. When the bead is subjected to grinding, such that the ends are abraded away, the internal layers are exposed, and the points of the stars form wavy lines that are visible when the bead is viewed in profile (see No. 5). "Chevron bead" indicates the wavy line pattern of ground beads, though star beads are finished by other methods as well.

The name "rosetta bead" is derived from the Italian *perla a rosetta* (whose plural is *perle a rosette*[6] – pronounced "PER-leh ah roh-SET-teh"). *Rosetta* literally means "small rose" or "roselike," but is better translated as "floral." The name gives us an insight into the Italian conceptual identification of the patterns involved – that these are like flowers[7]. Though varied, the patterns consist of rounded forms with protruding lobes, in keeping with the round circumference of most canes. The lobes themselves may be rounded, blunt, curved, or other shapes; but are most often more or less pointy. This latter feature has inspired the English name "star bead[8]," which actually has no Italian equivalent. Since the majority of rosetta beads have starry patterns, it is no wonder that "star bead" is so well ingrained into the vocabulary. My point here is that it is not sensible to call non-star patterned beads "star beads." On the other hand, I do not wish to imply that it is always easy to distinguish between starry and floral patterns – it is not. The borderline beads, though, only present a problem if one insists that they are "star beads." The reverse is not true, since, in the Italian conception, star beads *are* rosetta beds. "Chevron bead" also has no Italian equivalent. I do not recommend that it be used for any floral patterned beads, nor for any star beads that have not been ground down (and this will preserve its use as a valid and descriptive term).

Let us conclude this section on identification with a few words about these names in other contexts; and, let us look at our subject beads in an even larger perspective. The names "chevron," "star," and "rosetta" have each been applied to beads unrelated to our subject. Solid canes with molded floral patterns are considered "rosetta canes;" and the products composed from them are considered "rosetta work[10]." "Rosette" (with the French two syllable pronunciation) is used for beads with a conventional flower shape, regardless of material and manufacture[11]. Any bead (regardless of material and manufacture) that has an external form suggesting a star, may be called a "star bead[12]." Any bead that has a pattern of wavy lines (on the ends or elsewhere – and regardless of material and manufacture) may be called a "chevron bead[13]." This duplicity may seem confusing, but is really only problematic when the context is not understood. In the context of cane beads, the above names are quite specific; in other contexts, there are other meanings.

I have defined rosetta beads as a sub-group of drawn or cane beads. What do we know about cane beads (or, beads made from tubes of glass)? It is clear that tubes of glass were made into beads *ca.* 2000 years ago[14]. However, strictly speaking, we cannot be too sure of the parallels between ancient and relatively modern productions. For instance, the "gather" may not have been manufactured the same, and the tube may not have been diminished in size by drawing, as we usually think of it. Tube beads may have been finished differently in ancient times, compared to most modern beads. In other words, these may not have been "cane beads" in the way we usually think of that term. It is not a good idea to be too sure of the similarities between ancient and modern tube beads, particularly regarding aspects that are not easily identifiable[15]. Not a great deal seems to be known about early tube beads (regarding origin and manufacture), though it appears that several centers made them. In any event, such beads do not seem to have been nearly as complex as more modern European beads. I am not aware that any ancient examples exist that have more than two or three layers[16]; and only a small percentage seem to have external decorations like stripes[17]. As far as I have been able to determine, no ancient beads of indisputable provenance are known to have molded internal layers, like rosetta beads. In Europe, it appears that cane drawing was introduced at Venice, Italy by *ca.* 1490 A.D.[18]. If this is correct, and if we give the Venetians about ten years to develop compound, complex, and molded productions, then it follows that rosetta beads were invented by *ca.* 1500 A.D. If this idea is correct, then it follows that rosetta beads were a new product during the Colonial Period, or Age of Expansion of the 1500's; and it follows that such beads as are excavated from this period represent the earliest rosetta beads manufactured.

All the beads described are more similar than they are different. All have a white, red, white, and blue color sequence for the four outer layers, all have starry patterns with twelve points, and all (but one) have been ground to shape. The vast majority of rosetta beads share these features,

while others have minor or major differences. In using "typical" beads as standards for comparison, I will be concerned with such aspects as: layer number, color sequence, layer shape (including the number of points or lobes), layer thickness, the presence of applied decorations (stripes or other sorts), external shape (and the patterns that are caused by various methods of finishing), and any other distinctive attributes (such as "poor technique"). We will find that, although many beads will be more or less typical, there are quite a few unusual combinations of individual attributes that make for very unusual beads.

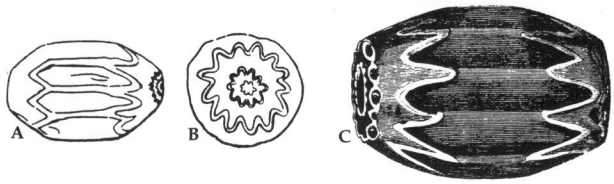


FIG. 5 Specimens A and B are derived from Akerman, 1847; but were first published in 1793. Though the line drawings are not precise, these are probably typical early seven-layer blue chevron beads, like those in Figure 1. Specimen C is derived from Brent's work of 1880, but was first published in 1871. It is a typical early seven-layer blue chevron bead, like those in Figure 1.

HISTORY

Rosetta beads, particularly chevron beads, have a history that is both simple and complex. Literary works that make direct references to our subject beads stem from the late 1700's and early 1800's; and the number of such accounts escalates after the middle 1800's[19]. Many of these references were penned by early "archaelogists" at a time when archaelogy was much less than an "exact science." Such accounts often confuse the issue more than they illuminate it, by suggesting improbably early dates of manufacture, as well as exotic places of origin[20]. Unfortunately, quite often, the beads are not well enough described for comparison to carefully dated and well-described beads. A case in point is the two specimens (A and B of Figure 5) that are derived from a work of 1793, and subsequently reproduced by Akerman in 1847. Although it is clear that we are dealing with "typical" chevron beads, the line drawings are not precise enough to be sure of certain details. The number of layers is not clear; nor are the number of points in the inner layers (seemingly 7, 9, and 13, from the inside, out). Specimen C of Figure 5 is derived from a work of 1871, subsequently reproduced by Brent in 1880. Greater care was taken in producing this woodcut, and we can see more details of the internal structure. Just the same, the bead appears to be six layered; and we depend upon a good tabular description of the structure to verify that the bead actually has seven layers, of the "typical early" sequence. Until later times, when photography allows for "objective" depictions of beads, we must be careful about interpretations of the physical characteristics of the beads discussed in the early literature. Nevertheless, a careful review of this literature reveals the ins and outs of a fascinating history, and sometimes points to specimens that are clearly identifiable. Most of the beads discussed seem to be our "typical early seven-layer blue chevron beads"[21]. They seldom have any sound archaeological attribution; but this did not curtail wild speculation. Only in more recent times have rosetta beads been subject to careful and serious analyses. Rather than give a dry recitation of the published accounts that have encouraged the mystique of rosetta beads over the years (which would be lengthy and confusing), I will narrate a short tale. The story has been told many times, in various ways; and though the nature of the ending is quite likely, it has never been proved.

STANDARD REFERENCE CHEVRON AND STAR BEADS

Figure 1 of the color plate presents a view of five similar beads, selected from a larger group in a private collection. These five beads were in the best state of preservation (compared to more corroded examples), and show a fair range of the larger sizes of such beads. All have seven layers of different colors of glass, most with the sequence (from the core layer to the outside): green, white, green, white, red, white, and blue. The first and third layers are transparent green of a more or less dark and rich shade, though there is some variation from light or yellowish green to blue green and greenish blue. Some otherwise identical beads have, for these layers, ultramarine blue (dark or lighter in shade) like the outside layer; and I've seen similar beads with such colors as brick red to brown, black (dark brown), gray, and a clear first and/or third layers. The group is united by having a common layer number (seven), and by having a white, red, white, and blue color scheme for the outer layers. In addition, all have been ground to expose their inner layers. All but one have six facet cuts per end; while the exception has been well ground all over (rounded) so that most of the outer white and blue layers have been removed (upper left specimen). This is still, by its manufacture, a seven-layer bead (though problems like this are not always so straight forward). I will refer to these beads as "typical early seven-layer blue chevron beads," and will use this phrase as a standard for comparison to other beads.

Figure 2 of the color plate presents a view of 12 modern chevron and star beads. The first two are derived from the African trade, while the majority have been imported directly from Venice in the past ten years. The beads are arranged to show the range of size of three typical external shapes; and all have the same six-layer color sequence: white, blue, white, red, white, and blue. Except for the discoidal beads in the lowest row, these are all "typical late six-layer blue chevron beads;" and I will use this phrase to serve as a standard for comparison to other beads. Except for the final bead in the third row (which has been reheated), all these beads have been ground to shape, and have been rounded rather than faceted. Like the exceptional specimen in Figure 1, the beads in the second row of Figure 2 have been ground all over, so that most of the outer blue and white layers have been removed – causing a striped appearance. Nevertheless, these are structurally six-layer beads. A related modern group, that is like a "short cut" of typical six-layer beads, consists of four layers, with the color sequence: white, red, white, and blue. These will be called "typical late four-layer blue chevron beads," for comparative purposes. Figure 4 presents a view of four "antique" examples, on the left, and a comparison between two four-layer beads and two six-layer beads, on the right. The right-hand specimens are new.

Once upon a time (perhaps between 1490 and 1500 A.D.), rosetta beads were invented by an enterprising Venetian glassmaker (in all likelihood). They were considered terribly great beads, and their manufacture was a terribly great secret. Although different sorts of beads were make at Venice, none were as beautiful, complex, and original as rosetta beads; and these and all the others were sent to far away lands for the enjoyment of other people[22]. As fate would have it, Columbus discovered the New World (which was really just as old as the Old World), and before too long rosetta beads were traveling to North and South America, as well as to Africa, the Near and Middle East, and Southeast Asia[23]. Rosetta beads were so well-liked that people often took them to the grave; though sometimes they became valued heirlooms worth more than gold[24]. Over the years, Venetians and other Europeans made

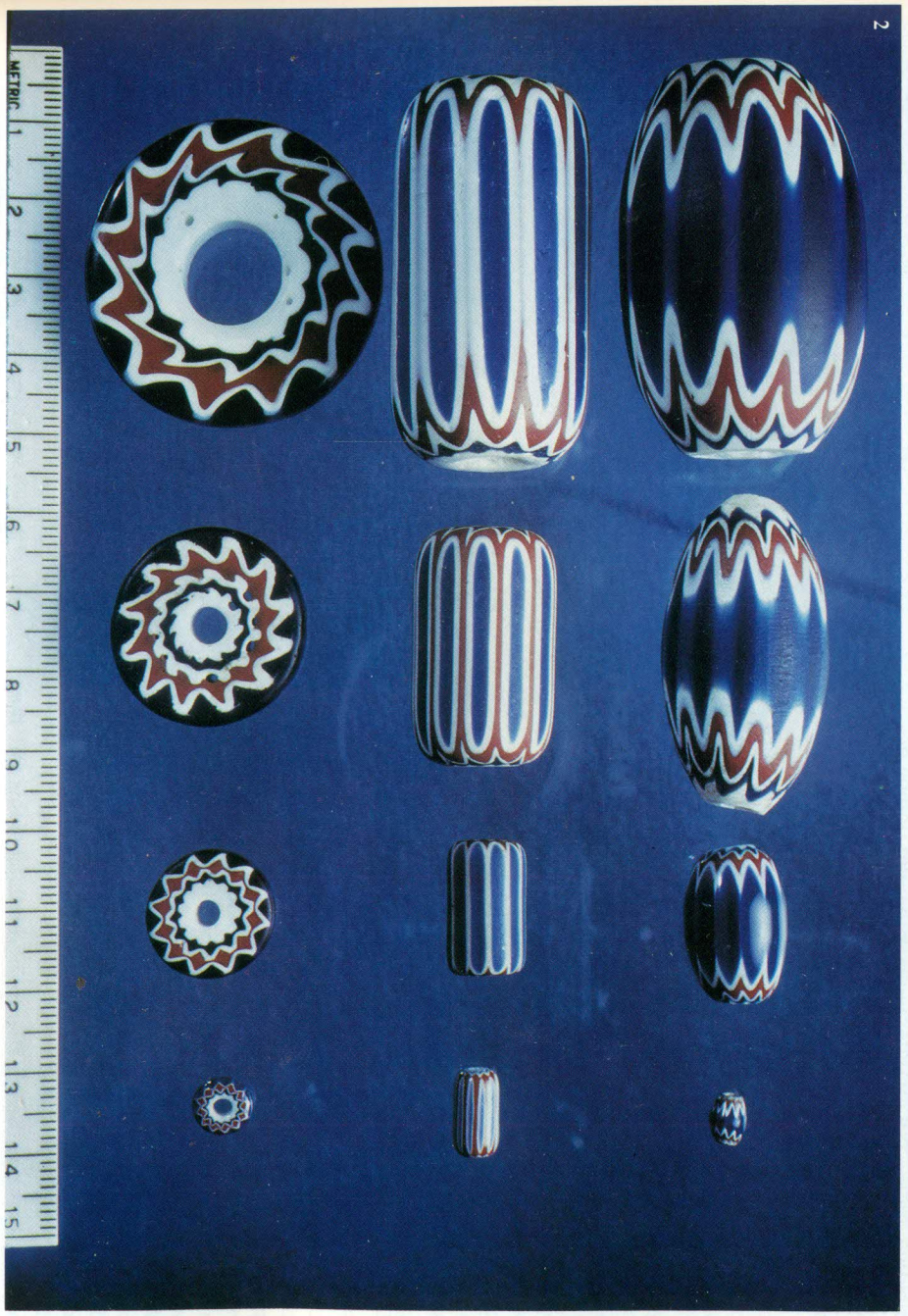
incredible numbers of all sorts of beads, and fashions demanded that styles change (or different centers – Holland and Bohemia – developed their own styles); so, it came to pass that rosetta beads were manufactured in many different colors, patterns, and shapes. While they were always considered terribly great, it happened that there were so many other kinds of beads being made (which were beautiful, but not so expensive), that rosetta beads became less important than they had formerly been. From about 1797, Venice fell upon hard times, that lasted until about 1838[25]. During this period, fewer glasswares were produced, probably including fewer (expensive) beads. After 1838, things got better for a while, but a greater revival of glassmaking took place after the 1860's[26]. By this time, most European glassmakers had learned to make very pure glass, with bright colors; and the resulting beads were less subtle than they used to be (but better made, in some ways)[27]. It happened that some people had the time to spare to go about digging up the remains of their ancestors (or other people's ancestors), and they sometimes used to find beads too. The diggers did not necessarily know that they were founding the study of archaeology, they did not know much about making careful notes concerning associations, and they often did not know what to make of the beads they reclaimed. It was understood that some cultures went back to the remote past, and that the Egyptians and Phoenicians had made complex glass beads. Rosetta beads that were dug up or found were easily seen to be "high art" by anyone familiar with glassmaking and beads. Thus, many people came to believe that rosetta beads were made in ancient times[28]. (Remember that Venice was in a state of decline, and there were few beads resembling earlier productions; while those that did were bright and new looking, and had different color sequences. Also, reclaimed rosetta beads were never found in association with other artifacts that would verify their ages[29].) So, for a long period, very few people guessed that rosetta beads from the 16th through 18th centuries were dug up in the 19th century, and mistakenly supposed to be thousands of years old. Remember all those rosetta beads that went to North and South America? Well, some archaeologists thought that this proved the ancient "Northmen" and Phoenicians used to visit the Indians in Canada and Peru (for instance)[30]. Of course, we know now that this is highly unlikely, but at the time it was a neat idea. A few people suggested that rosetta beads only dated from the 16th century onwards[31]; and while this seemed plausible for American rosetta beads, it was believed that 16th century beads copied even older ones[32]. After all, there were lots of beads made in the old days of Egypt, and some of them looked something like rosetta beads; and the rosetta beads dug up certainly did look old[33]. Since archaeologists spent a lot of time writing about their digs and their theories, many arguments concerning rosetta beads were carried on (sometimes for years)[34]. These old stories get repeated; so, even nowadays it is possible to pick up a book or a magazine, and read about typical rosetta beads being identified as "Ancient Beads of Egypt[35]" (1973), and as "glass beads resembling Phoenician types . . . unearthed at Pre-Columbian sites in Peru[36]" (1979). How about that?

Seriously speaking, my tale is a succinct distillation of 500 years of bead history, reduced to less than 1000 words; and is fully documented. Because of the sheer number of articles and papers that relate to chevron and rosetta beads, it is impossible to review more than a few; and none in any detail. However, I want to mention the previous works that stand out above all others. First of all is John Brent's landmark paper entitled "On Glass Beads with a Chevron Pattern," which was read to the Society of Antiquaries of London on June 13, 1872[37]. Although Brent believed that chevron beads were ancient products, his work is valuable because it helps us track down references that were available to him, and the locations of beads in collections. He was also the originator of the names "star" and "chevron" in the popular terminology (used these as I have recommended herein)[38]. Thea Haevernick's paper of 1961, "Die Aggryperlen = Chevron Pattern Beads = Rosetta Perlen = Star-Beads," is a painstaking review of the literature available to her; in which she cites Tischler's work of 1886 as the first correct analysis of rosetta beads through history[39]. The first article to attempt to seriate chevron and star beads by differences in manufacture through time is Marvin Smith's "The Chevron Trade Bead in North America," which appeared in *The Bead Journal* in 1977[40]. In spite of a few problems, Smith's approach is a sound basis for further study. I have tackled the problem of determining the time and place of origin of rosetta beads from the point of view of manufacture; suspecting that there were distinct and important differences between mosaic glass beads of ancient times, and those of more recent design. I have attempted to show the rationality of this argument in my paper for the Glass Trade Bead Conference, held at Rochester, New York, in 1982[41]. In the section below, I will summarize my findings. It would be extremely unfair to ignore the importance of recent contributions to bead study, and I will refer to the contemporary literature concerning rosetta beads when specimens of beads are being described, and when useful parallels are suggested. The "post-contact" American field has been a fertile ground for the recovery of rosetta beads from close to the earliest times of their manufacture; and Canadian and American archaeologists have produced detailed and carefully couched analyses of glass trade beads from these historical excavations.

PREVIOUS IDEAS ABOUT MANUFACTURE

I have mentioned that rosetta bead manufacture was a well kept secret. Although many types of beads (including less complex cane beads) have been described by eyewitnesses to the various processes, rosetta beads have never received this irrefutable testimony (at least, not in English language literature). In other words, all accounts that attempt to describe rosetta bead manufacture are *essentially speculative in nature.* At best, the subject is described by extrapolation from other known techniques. I remarked earlier that rosetta beads have been favorably compared to ancient mosaic glass beads, and that this is one of the main reasons for supposing rosetta beads date from ancient times. What exactly are these parallel aspects? In my previous article for *Ornament*[42], I presented an analysis of the three major types of compound canes produced for mosiac glasswares and beads. Briefly, these are: Cased Canes (composed of layers of different colors of glass, superimposed over one another, yielding a concentric pattern of rings), Composite Canes (composed of pre-formed parts, arranged in patterns and fused together, yielding a wide variety of designs), and Molded Canes (usually cased canes that have layers subjected to reshaping, primarily using molds, forming conventionalized shapes such as stars and flowers). The major reason for describing these techniques was to show that the literature is heavily weighted on the side of Composite Canes as the technique used by glassmakers of

FIG. 1 5 seven-layer chevron beads, collected in West Africa in the past 12 years. Probably dating from the 16th or early 17th centuries, all show signs of long wear and decomposition of the glass. The upper left-hand specimen has been ground all over, removing much of the outer blue and white layers; while the rest have faceted ends. *Courtesy of Michael Heide. Photograph by Patrick Craig.*
FIG. 2 12 six-layer star and chevron beads, of 20th C. manufacture. The first two are from the African trade, while the rest were imported directly from Venice in the past 12 years. Most have been ground to shape, and those in the second row have much of the outer blue and white layers removed, to form outer stripes. J. D. Allen collection. *Photograph by Patrick Craig.*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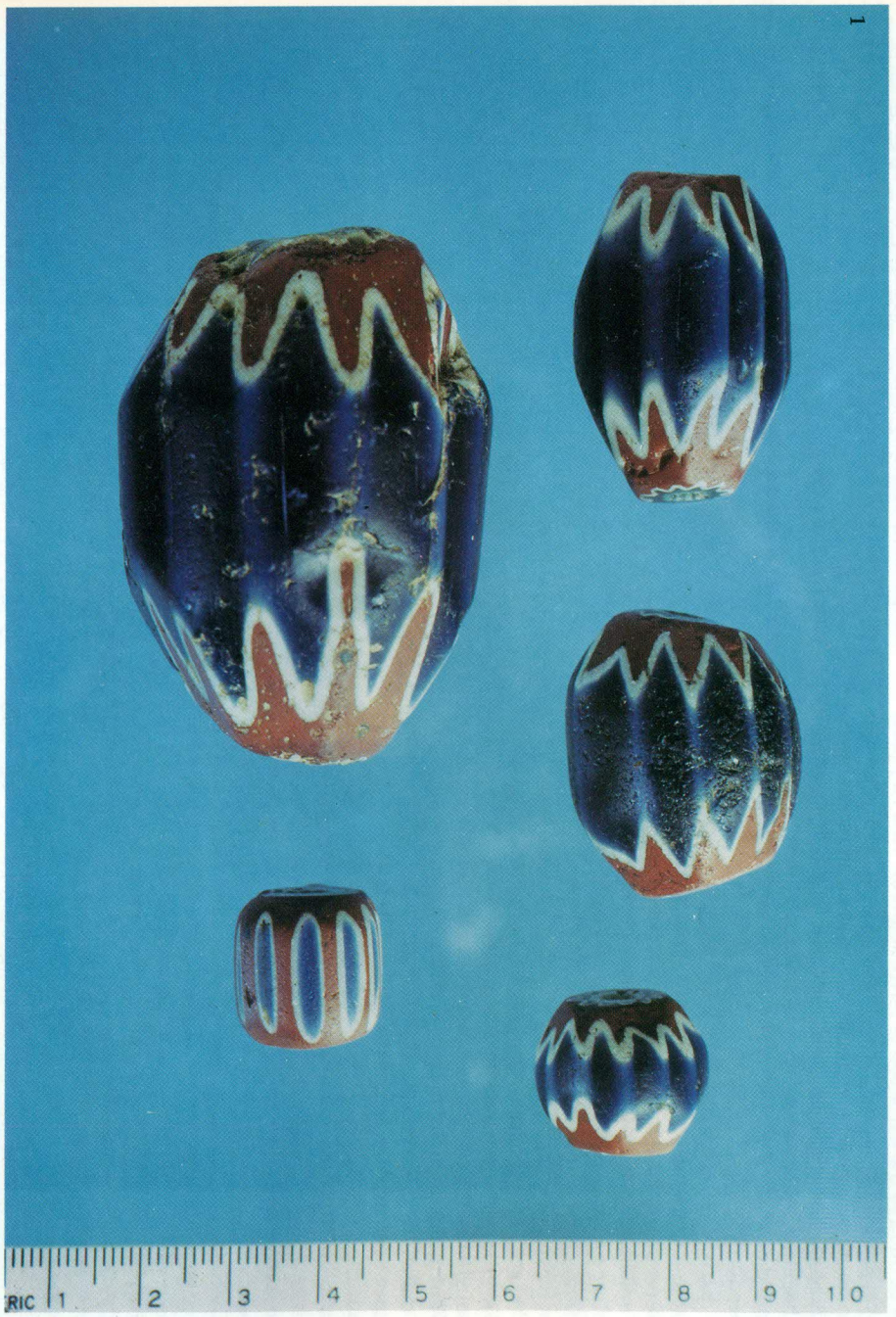
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all periods, to the exclusion of other methods. This emphasis overshadows the ancient use of Cased Canes, and canes that combine casing and compositing (also made in recent times); and completely ignores the introduction of Molded Canes altogether. Although molding is technically simple, I have found no evidence for its use in ancient times, for mosaic glass products.

Early researchers recognized that ancient mosaic glass (ot complex designs) was a composite type of production. They also recognized certain similarities between ancient so-called "millefiori" glass (of composite production), and relatively more recent European millefiori glass (more often of molded production). However, they were not aware of the differences in techniques. I have shown that recent Venetian canes exist that are precisely the same as typical six-layer star beads[43]. Very early, this relationship was understood by writers who sought to compare star beads to Venetian millefiori, and Venetian millefiori to ancient mosaic glass (so-called "millefiori"). The conclusion was that star beads might also have been made in ancient times; but this is a misunderstanding of the actual glassmaking techniques involved. In other words, several authors have proposed that rosetta bead canes are manufactured by compositing; and this must be wholly incorrect[44]. A simple examination of a rosetta bead clearly shows that the cane is produced by layering (like Cased Canes), although the layers are subsequently reconformed to various corrugated shapes. Several authors have noticed this fact, and have speculated about the nature of the operation. It has often been reported that the *gather* of glass is rolled across a corrugated surface to impress the lobes or points[45]. Although there may be several methods used for impressing shapes into layers of glass[46], the easiest would be the use of an open mold, into which the gather may be inserted. The literature often mentions this tool – not for cane molding, *per se* – but for other items with outer ribbing or fluting[47]. Due to considerations too complex to go into here (primarily involving careful examination of hundreds of beads), I am inclined to doubt that rosetta canes were made by rolling the gather across a shaped surface. The molded conception seems more valid; and I have reported on such a mold, and its likely use[48]. Concluding this section, it seems very unlikely that rosetta beads exist from ancient times, as their manufacture is distinctly different from ancient mosaic glass production; just as the similarity between ancient and modern mosaic glasses is more apparent than factual. When I embarked upon a period of intensive study to verify my supposition, I thought I was alone in this opinion. I was gratified to learn, recently, that Mr. Paul Hollister, a noted expert on glass paperweights and millefiori, has also published his views concerning the relationship between ancient and modern "millefiori," and has come to conclusions similar to my own[49].

CONCLUSIONS

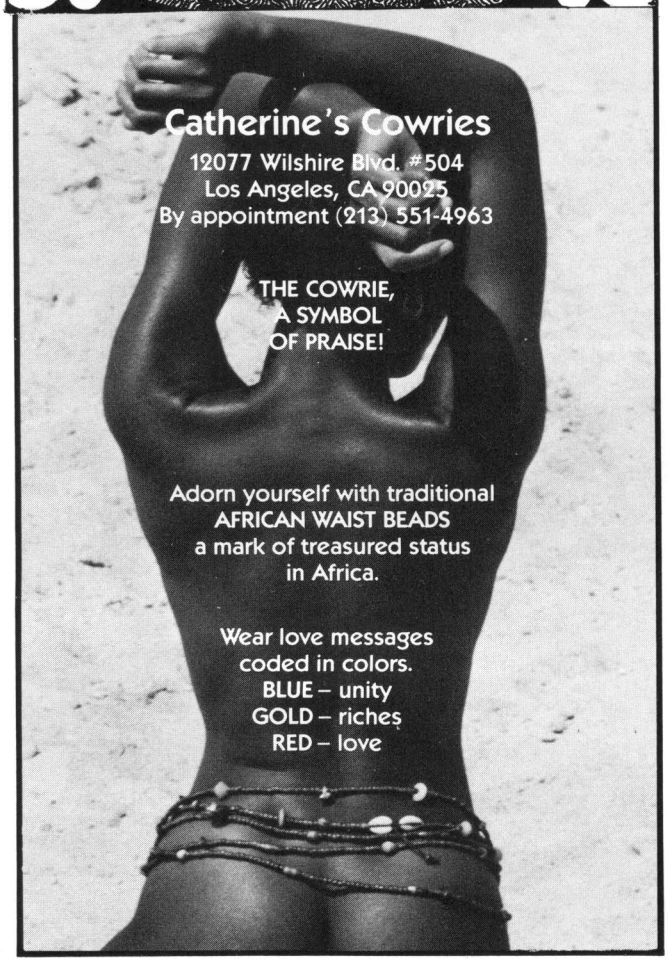
Part I has endeavored to define *rosetta beads* as a sub-class of cane beads, whose most common numbers are *star* and *chevron beads*. Although much of the previous literature proposed that rosetta beads date from ancient times, and were made by ancient techniques, this does not seem to be accurate; and I have attempted to show where these theories went wrong. In addition, I have qualified the characteristics that may be used as criteria for comparing "typical" rosetta beads to less common examples, for the ultimate purpose of differentiating between various productions, possibly in time and/or place of origin. (It's also possible that seriation through time, or relating to place of manufacture, is not readily feasible; however, before attempting anything of this sort, the variables themselves must be understood, for the purpose of comparisons between "known" groups.) Having prepared the way, Part II will present some of these comparisons. ■

**San Francisco, CA*

END NOTES AND REFERENCES

1. Haldeman, S.S. [untitled report], *Proceedings of the American Philosophical Society*, Vol. XI, pp. 369-370, 1871. Brent, John, "On Glass Beads with a Chevron Pattern," *Archaeologia*, Vol. XLV, pp. 297-380, 1880. "Chevron" and "star" were both used by Brent, in his paper *given* in 1872; however, "star" was used by Haldeman in his report of the previous year. Earlier reports mention "zigzag lines" on beads.
2. I am not using "profile" here in the sense proposed by Horace Beck, in his "Classification and Nomenclature . . . ," *Archaeologia*, Vol. LXXVII, pp. 2-3, 1928. Rather, I am referring to a view of a bead along its axis, as opposed to in "cross section."
3. Kidd and Kidd, "A Classification System for the Use of Field Archaeologists," *Canadian Historic Sites*, No. 1, p. 51, 1970. My classification parellels previous schemata; notably that of the Kidds. The following are equivalents between my numbers and those of the Kidds: 2 = Ia, 2A = Ib, 3 = IIIa, 3A = IIIb, 4 = IIIk, 4A = IIIn, 5 = IIIm.
4. Carroll, B. H., "Bead Making at Murano and Venice," [unpublished report in the Department of State, Washington, D.C.] pp. 6-8, 1917.
5. Harris and Harris, "Trade Beads, Projectile Points, and Knives," *A Pilot Study of Wichita Indian Archaeology and Ethnohistory*, p. 138, 1967. Good, M. E., "Guebert Site . . . ," *Central States Archaeological Societies, Inc. Memoir II*, p. 99, 1972. In this passage, I'm using "compound" and "complex" in the manner worked out by the Harrises, and followed by Good and others since then. In subsequent passages these words are more general and mean "having more than one part" or "not simple."
6. Haldeman, S. S., "Beads," *Report upon U.S. Geographical Surveys West of the 100th Meridian*, Vol. 7, p. 270, 1879. Dillon E., *Glass*, 1907, pp. 187-191.
7. Rosetta canes are closely allied with the *millefiori* work of the Venetians (and other Europeans). Meaning "a thousand flowers," *millefiori* gives a stronger association to the "floral" meaning of *rosetta*.
8. Brent, J., *loc. cit.*, pp. 297.
9. *ibid.*
10. Carroll, B. H., *loc. cit.*, pp. 15-17, 20.
11. Beck, H. C., *loc. cit.*, p. 29, Figure 24, specimen A.6.a.
12. Beck, H. C., *loc. cit.*, p. 33, Figure 27, specimen A.19.
13. Beck, H. C., *loc. cit.*, pp. 66-67, Figure 72.
14. Beck, H. C., "The Beads from Taxila," *Memoirs of the Archaeological Survey of India*, No. 65, 1941, pp. 25, 30, 59, Pl. XIX; Egami, N., *et al*, "Dailaman II," *The Tokyo University Iran-Iraq Archaeological Expedition*, Report 7, 1966, pp. 29-30, 34, 43-45, Pls. XIX, XXI; van der Sleen, W. G. N., *A Handbook on Beads*, 1967, pp. 23-26; Callmer, J., *Trade Beads and Bead Trade in Scandinavia*, 1977, pp. 33, 88-89, Pls. 14-16, Color Plate III; Goldstein, S. M., *Pre-Roman and Early Roman Glass*, 1979, p. 272; Francis, P., "The Glass Beads of India," *The World of Beads Monograph Series*, No. 7, 1982, pp. 3-4, Pl. I, rows 1 and 2. All these works refer to beads made from tubes or canes of glass, *ca.* 2000 years ago, or slightly more recently (Callmer – 1000 A.D.). Again, probably not all of these were "drawn" in the way we usually think of that term.
15. Amplifying the note above, it has been proposed that some early gathers were "blown," while others were supposedly created by fusing many "rods" of glass together to form the tube. Either or both of these could be incorrect (generally speaking or in specific instances).
16. These are the "gold glass" beads mentioned in the works in Note 14.
17. Callmer, J., *op. cit.*, Plate 16, and Color Plate III.
18. Nesbitt, A., 1878, *Glass*, p. 77; Carroll, B. H., *loc. cit.*, p. 19; Gasparetto, A., 1958, *Il Vetro di Murano*, pp. 184-185, 234-235. These works each mention cane drawing as practiced in Venice *ca.* 1500 A.D. Nesbitt claims that "millefiori" was reinvented before 1500; while Gasparetto says that by 1510 drawn canes had been made for *ca.* 20 years.
19. Brent, J., *loc. cit.*, pp. 297-308. Brent reviewed at least 14 previous works, in preparation for his paper of 1872.
20. Akerman, J. Y., 1847, *An Archaeological Index*, pp. 141-142, Pl. XVIII; Pellatt, A., 1849, *Curiosities of Glass Making*, pp. 10-12, 133-135, Pl. II; Akerman, J. Y., "Remarks on a Colored Drawing of some Ancient Beads," *Archaeologia*, Vol. XXXIV, pp. 47-48, Pl. 5, 1851; Morlot, A., "On the Date of the Copper Age in the United States," *Proceedings of the American Philosophical Society*, Vol. IX, 111-114, 1865; Brent, J., *loc. cit.*, pp. 304-305, 307; Price, J. E., "On Aggri Beads," *Journal of the Royal Anthropological Institute of Great Britain and Ireland*, Vol. XII, pp. 64-68, 1883; Pazaurek, G. E., 1911, *Glasperlen und Perlen-Arbeiten*, pp. 2-3, Abb. 1.
21. Akerman, *op. cit.*, Pl. XVIII; Akerman, ". . . Colored Drawing . . . ," Pl. V, Fig. 10; Morlot, *loc. cit.*, plate opposite p. 114; Brent, *loc. cit.*, Pl. XXII, and figure on p. 229; as well as many recent archaeological reports concerning excavations of 16th century sites.
22. And for the profit of the Venetians!
23. Schoolcraft, H. R., 1851, *Historical and Statistical Information, Respecting the History, Condition and Prospects of the Indian Tribes of the U.S.*, Part I, pp. 102-104, Pl. 24; Kubary, J., "Bericht über meinen Aufenthalt in Pelau," *Journal des Museum Godeffroy*, Heft IV, pp. 49-53, Tafel II, 1873; Brent, J., *loc. cit.*, p. 308; Hartman 1901, *Archaeological Researches in Costa Rica*, pp. 21, 175, and Pl. 60. Among many others, these works all mention and/or depict mainly star beads of the early seven layer type, in the countries named. In addition, I have had the opportunity to see similar beads in various museum

Continued on p.40



◀ **CHEVRON BEADS:** *From p.24*

collections, reported to have been acquired in Egypt, Palestine, and the Philippines.

24. Price, *loc. cit.*, p. 64.
25. Dillion, E., *op. cit.*, pp. 213-214; Haynes, E. B., 1959, *Glass Through the Ages*, pp. 72-73.
26. Barovier, R., "Roman Glassware in the Museum of Murano and the Muranese Revival of the Nineteenth Century," *The Journal of Glass Studies*, Vol. XVI, pp. 111-119, 1974.
27. Eisen, G., 1927, *Glass*, Vol. II, pp. 720, 731-734.
28. See Note 20.
29. Brent, *loc. cit.*, pp. 299, 304, 307.
30. Morlot, *loc. cit.*, pp. 111-114.
31. Franks, A. W. [Untitled report], *Proceedings of the Society of Antiquaries of London*, second series, Vol. II, pp. 334-335, 1864; Brent, J., *loc. cit.*, pp. 304-305, 308; Read, C. H., "A Necklace of Glass Beads from West Africa," *Man*, Vol. V, article 1, p. 1, 1905; Eisen, G., *op. cit.*, pp. 719, 731. Brent reports the ideas of A. W. Franks on p. 304, and in a postscript on p. 308. Franks, and Read are among many who argued a 16th cen. origin for star beads, while Eisen, citing an Italian source, puts their invention 200 years earlier.
32. Haldeman, S. S., "On a Polychrome Bead from Florida," *Smithsonian Institution Annual Report for 1877*, pp. 302-305, 1878; Pazaurek, G. E., *op. cit.*, p. 4.
33. Morlot, A., *loc. cit.*, pp. 112-113; Eisen, G., *op. cit.*, pp. 720, 731-734; Haevernick, T., "Beiträge zur Geschichte des Antiken Glasses, VI. Die Aggryperlen = Chevron-Pattern Beads = Rosetta Perlen = Star-Beads," *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, 8. Jahr., pp. 121-137, 1961. These three authors all note the relationship between rosetta beads and millefiori work, though the actual techniques may not have been understood. This relationship was known as early as 1849 (Pellatt, pp. 10-12, 133-135), and implied an ancient origin for rosetta beads. In addition, the name association of mosaic glass beads and chevron beads as "Aggri beads" (Price, 1883, pp. 64-68) also implied very great age.
34. Haevernick, T., *loc. cit.*, pp. 121-132.
35. Jefferson, L., 1973, *The Decorative Arts of Africa*, p. 174, Fig. 255.
36. Heatherwick, S., "Beads," *Crafts*, No. 39, p.22.
37. Brent, J., *loc. cit.*, pp. 297-308.
38. *ibid.*
39. Haevernick, T., *loc. cit.*, pp. 121-137. Haevernick states that the question will not be answered until someone carefully investigates the nature of manufacture of rosetta beads (thus, anticipating my own approach); comparing the results to the conception worked out by Tischler. I hope to have a translation of Tischler's work in the near future, for such a comparison.
40. Smith, M. T., "The Chevron Trade Bead in North America," *The Bead Journal*, Vol. 3, No. 2, pp. 15-17, 1977.
41. Allen, J. D., "The Manufacture of Intricate Glass Canes and a New Perspective on the Relationship Between Chevron-Star Beads and Mosaic-Millefiori Beads" [paper presented at the Glass Trade Bead Conference, held at Rochester, N.Y., June 12 and 13, 1982.] It is a matter of interesting coincidence that I gave this paper exactly 110 years *to the day* after Brent's landmark paper of 1872 (published in 1880).
42. Allen, J. D., "Cane Manufacture for Mosaic Glass Beads: Part I," *Ornament*, Vol. 5, No. 4, pp. 6-11, 1982; and Part II, Vol. 6, No. 1, pp. 13, 17, and 43, 1982.
43. *ibid*, p. 6, Color Plate, specimen 54D, and p. 10.
44. Carroll, B. H., *loc. cit.*, pp. 15-17, 20; Cardinall, A. W., "Aggrey Beads of the Gold Coast," *Journal of the African Society*, Vol. 24, pp. 287-298, 1924-25; Eisen, G., *op. cit.*, p. 720. These authors, and many others, thought that rosetta canes were composed of "rods," "canes," or "plates." These conceptions are *composite* in nature, and apparently wholly unrelated to any internally decorated hollow canes.
45. Neuburg, F., 1949, *Glass in Antiquity*, p. 54; van der Sleen, W. G. N., *op. cit.*, p. 103; Kidd and Kidd, *loc. cit.*, p. 49; Smith, M. T., *loc. cit.*, p.16.
46. The technique that first comes to mind is using a simple hand tool to scrape or divide trenches into the gather around its circumference. Peter Francis (personal communication, March 1983) informs me that in India the glassmaker uses a "trowel-like tool (the *mallah* or the larger *patha*) and makes a quick groove with one motion." The groove may be filled in with rods. It's also possible that a glassmaker might use a bar-shaped ("V" cross section) tool to impress "V" shapes into the length of the gather. These methods, like marvering upon a shaped surface, are less simple than molding; which performs the operation on the entire gather at once.
47. Pellatt, A., *op. cit.*, pp. 105, 112; Lock, C. G. W., 1882, *Spons' Encyclopaedia . . .*, p. 1071; Kidd, K. E., "Glass Bead-Making from the Middle Ages to the Early 19th Century," *History and Archaeology*, No. 30, p. 14, 1979. Kidd actually refers to cane fabrication using a mold, but I find his description problematic. I will discuss this in Part III.
48. Allen, J. D., *loc. cit.*, pp. 9-10; Allen, ". . . New Perspective . . ." [in press].
49. Hollister, Paul, " 'Flowers Which Clothe the Meadows in Spring', The Rebirth of Millefiori c. 1500," *Annales du 8 Congres International d'Etude Historique du Verre*, pp. 221-233, 1981. I had the pleasure of meeting Mr. Hollister at the Corning Museum of Glass, in June, 1982. Upon discussing rosetta beads and millefiori, he kindly directed me to his paper, for consideration.

CHEVRON-STAR-ROSETTA BEADS: PART II

*Jamey D. Allen**

INTRODUCTION

Part I of this series introduced the concept of "typical" rosetta beads and qualified their major attributes in terms of such characteristics as: layer number, color sequence, internal pattern, and external shape. Two specific series of typical rosetta beads, early 7-layer and late 6-layer star beads, were broadly defined to serve as standards for comparison with specimens that are variants from the norm. In Part II, I will further define typical characteristics of these standard beads, in contrast to the less common varieties, and will propose the likely reasons for similarities and differences in terms of the apparent manufacturing sequences. I strongly feel that through an understanding of the glassmaking techniques and sequences of manufacturing steps or options, it is possible to see the relationship between beads that may only superficially resemble one another. Further, it becomes very apparent that some differences are the result of minor variations in technique while other differences are caused by intent, with the use of alternate steps or techniques.

As I have suggested before, it is helpful to remember at all times that rosetta beads are produced in two separate series of operations, carried out by completely different groups of workers. First comes the manufacture of the canes themselves and then the manufacture of the beads from the canes[50]. Following this division of labor, I will first consider cane manufacture and will refer primarily to the black and white drawings of Figs. 15 and 16. All the while, I will endeavor to compare typical specimens to variants and atypical specimens (though these last types will actually be more thoroughly covered in the final installment).

THE MANUFACTURE OF TYPICAL STAR CANES

The manufacture of a typical star cane basically consists of four operations: 1) forming of the core layer of the *gather*, that surrounds a bubble of air, 2) layering the gather with additional glass (*casing*), 3) molding the gather, and 4) drawing the gather. Steps 1 and 4 begin and end the process and are performed once each. In contrast, steps 2 and 3 are usually repeated (and these steps form the first options from which the glassmaker may choose). Let us refer to each of these steps, in sequence, using a typical early 7-layer star cane as the model (see Fig. 6). The glassmaker begins by taking a gather of green glass from a crucible, manipulating it into a hollow ball with a bubble of air in the middle[50]. This green gather forms the core layer of the cane. The glassmaker proceeds to case the core with a layer of white glass, as step 2; and this is a very important aspect of manufacture. The inner green layer, formed first, is cooler and harder than the surrounding white layer — which is warmer and softer. As the glassmaker proceeds to step 3, an interesting thing occurs. In the the process of molding, the two-layered gather is inserted into a star-shaped mold. The outer white layer receives most of the reconformation, taking the starry points given by the mold, while the inner green layer resists molding and preserves the round circumference of the bubble (that will eventually become the perforation of the finished beads). This is why beads with "starry perforations" are a rarity (though they do exist). So, in typical star canes, step 3 is carried out double-layered gather, which is green and white[52]. The glassmaker repeats steps 2 and 3, casing the now starry gather with a layer of green, followed by white glass, followed by insertion into the mold. The gather now has four distinct layers of glass: green, white, green, and white; and each white layer has been molded, with the green glass below being more or less carried along (again, see Fig. 6). The glassmaker now changes colors, and cases the gather with red glass, followed by white glass, followed by the third molding. The gather now has six distinct layers. A final layer of dark transparent blue glass is added to the gather in preparation for step 4. Each time a white layer is added and the gather is molded, the glassmaker cases the starry circumference with colored glass to fill in the prominences; and, ideally, the colored layer is thick enough so that the next molding will not encroach upon the molded layers below (though this does occur). While this colored layer is usually thick, the white casing applied over it is usually thin, forming an outline such that both layers are reconformed during molding.

Let us now compare a typical late 6-layer star cane to the early 7-layer cane just described. Instead of starting with a double-layered gather of green and white glass, the more recent canes begin with only white glass. Nevertheless, the typical procedure is the same as before. The glassmaker forms a gather of white glass and cases it with more white glass in preparation for molding, as explained. The result is that later canes have a broad white core instead of the green and white of earlier canes (see Fig. 9). In some instances, it is possible to detect the line of demarcation between the two white layers by a slight difference in color. The glassmaker proceeds to add colored glass to the now starry white gather and chooses the dark blue that will also form the outer layer (thus, dispensing with green glass altogether). The blue layer is cased with white glass, forming a thin layer, and the gather is molded a second time. Whereas the typical early cane would now have four distinct layers, the typical late cane has only three distinct layers: white, blue, and white. So, although the glassmaker finishes the gather by exactly the same series of steps as before (adding red, white, and blue glass), the result is not a 7-layered cane, but a 6-layered cane; though *structurally* both early and late canes are 7-layered.

This analysis of typical early and late star cane manufacture shows that there is a definite continuity in technique and sequence of steps in beads made as long ago as the 16th century up to modern times. The differences between early and late canes *are not due* to variations in structural manufacturing steps; *they are due to the option of choosing different color sequences.*

In presenting this overview of star cane manufacture, I have omitted two operations that are important and occur repeatedly. Each time a layer of glass is added, the glassmaker manipulates the gather by *marvering* — rolling the glass across a flat surface to shape and amalgamate the layers. Also, in order to keep the gather heated to a temperature at which the glass may be easily manipulated, the glassmaker occasionally inserts the gather into the furnace, until the glass becomes plastic again. This is particularly important in preparation for step 4. The final operation

is the elongation of the gather, and the glass must be fully ductile in order to be pulled out to a great length.

VARIATIONS OF TYPICAL STAR CANES

Variant star canes result from minor differences in performing the operations described above. These minor differences occur as optional choices on the part of the glassmaker; and by accidents — that I will describe as "poor technique." It has been my experience, in analyzing many hundreds of rosetta beads, that certain types of differences from a "norm" occur throughout the approximately 500 years that such beads have been manufactured. I attribute these differences mainly to accidental variations in technique rather than to intent. In contrast, some differences from the norm are clearly attributable to definite choices of optional technique variations. Further, these choices appear to have occurred more often in certain periods and less often in others. These conclusions are still tentative, but I would like to offer my thoughts for consideration, even though some revision may eventually be necessary.

In the early period, when star bead production was a new and innovative mosaic glass industry, glassmakers took the liberty to experiment with step variations that seldom occurred later. It is my feeling that, once a "standard" for star canes was established, much of this experimentation ceased, or was greatly curtailed. In Part I, I noted that, besides green, other colors of glass were used for the first and third layers of otherwise typical 7-layered star canes. This is one variation on a standardized norm that was of frequent occurrence in early times and that has occurred much less often more recently. Comparable 6-layer beads, instead of having a second blue layer, occasionally have a green, black or red layer; but not with the frequency of earlier beads.

The typical early star cane has an internal form derived from the use of a twelve-pointed mold. The bead pictured in Fig. 7 has 18 points (in the 5th and 6th red and white layers), while the bead in Fig. 8 has only nine points (in the 3rd and 4th red and white layers). Although some star and rosetta beads of more recent times show some point number variation, this is much less common than in the early production period. In other words, in earlier times a number of different molds were created and used, while more recently the twelve-pointed mold has become a definite standard.

I mentioned before that the glassmaker has the option of adding layers of glass and molding any number of times, though the 7-layer type of cane was most common in early times. It is easy to see that by omitting one repetition of the layering and molding, a 5-layer cane will result (see Figs. 8 and 11). Such 5-layer canes were fabricated during the early period and seem to have displaced the 7-layer canes shortly thereafter[53]. By repeating the layering and molding process once more than usual, 9-layered star canes could be produced. Such beads also seem to have been made in the early period[54], though they are not common. In Part I, I mentioned that the typical late 6-layer bead is related to a 4-layer series (by the omission of the 2nd and 3rd blue and white layers). The early 5-layer beads have the same relationship to the 7-layer beads, conceptually speaking (compare Figs. 8 and 11 to 6 and 7). Four-layer beads seem to have displaced 5-layer beads, while more recently, 4 and 6-layer beads have coexisted.[55] Fig. 10 is an excellent example of the relatedness of 4 and 5-layer beads (and, by extension, 6 and 7-layer beads). The example on the left has the typical broad white core of late beads, while the right specimen has a blue core first. The great similarity between these two beads clearly indicates that they were produced at the same time from the same stock of canes; yet apparently, the glassmaker chose to make some canes with a blue core and some with only white[56].

I have explained that the white layers in star canes are usually thin and serve to outline the colored layer below. There are numerous examples of beads in which this rule does not hold true, and the resulting patterns take on an atypical appearance. If the white layer should happen to be proportionally thick, when the gather is molded the effect on the colored layer below is noticeably different. Instead of forming a parallel starry line, the colored layer may only become slightly wavy, or may remain plain or unmolded (see Fig. 12). Conversely, I have noted a few beads that have such a thin white layer that it is almost impossible to distinguish it at all (leading to the erroneous conclusion that the bead has fewer layers than it actually has). Along the same lines of layer thickness, sometimes the colored layers are proportionally too thin or too thick (compared to the norm of Figs. 6 and 9). The typical early 7-layer beads usually have a very broad red layer. While the similar late 6-layer beads also have thick red layers, they seldom have the same proportional thickness of the early beads.

The rule of double-layering and molding has not always been followed. In some instances, the glassmaker chose to mold after the addition of only one layer of glass had been added to the gather. Such beads do not have a colored star outlined in white; they have two independent stars (for instance). Conversely, there are beads in which the glassmaker chose to add three layers before molding, and the resulting beads appear to have a star with two outlines (when the outer casings are thin enough).

It is important here to discuss variations that occur using the typical twelve-pointed mold. I have discussed this elsewhere in detail[57], and will only give three examples. A star cane has well-formed radial points when it has been adequately molded and carefully cased with a surrounding layer. If the gather has only been partially inserted into the mold, the resulting lobes will be rounded protrusions rather than points. (This may be due to the gather not being hot enough to allow for full insertion, as well as to other causes. See the left specimen of Fig. 11.) Further,

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ERRATA FOR "CHEVRON-STAR-ROSETTA BEADS: PART I," ORNAMENT 7:(1), 1983

Due to errors in production, several passages of Jamey Allen's text on chevron beads were transposed, causing an incorrect sequence of development. The following list presents the HEADINGS and first lines of paragraphs in their correct order. The changes pertain to pages 20 to 22.

IDENTIFICATION AND CLASSIFICATION — The final paragraph begins with "I have defined rosetta beads . . . ."

STANDARD REFERENCE CHEVRON AND STAR BEADS — The first paragraph begins with "Figure 1 of the color plate . . . ." The second paragraph begins with "Figure 2 of the color plate . . . ." The final paragraph begins with "All the beads described are . . . ."

HISTORY — The first paragraph begins with "Rosetta beads, particularly chevron . . . ." The second paragraph begins with "Once upon a time . . . ." The final paragraph begins with "Seriously speaking . . . ." The following is a list of minor errata from the text.

INTRODUCTION - Line 6: change to ". . . up to a *commandingly. . . ." Page 20, column 2: The author accidently deleted Note 9, which happens to be extraneous anyway. Page 21, column 2, line 4: omit "a" in ". . . gray, and* a *clear. . . ." Page 22, column 2, line 5: change to "(*and *used these as . . . ."*

END NOTES AND REFERENCES — Page 24: Under Note 1, Brent's pagination should read "297-308," not 380. Page 40: Under Note 47, the final words are "Part II," not Part III. Under Note 49, Hollister's original text had "Wich," not Which. Page 23: Figure 1 of the color plate was reproduced upsidedown, so that the noted "upper left hand specimen" appeared on the lower right.

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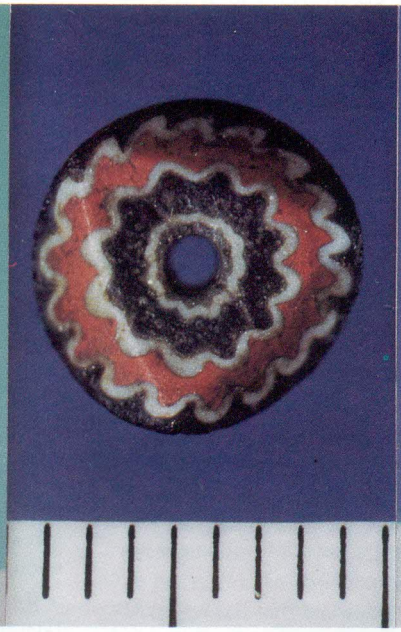

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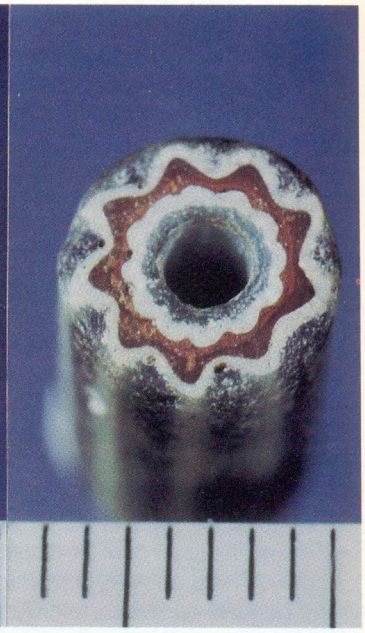

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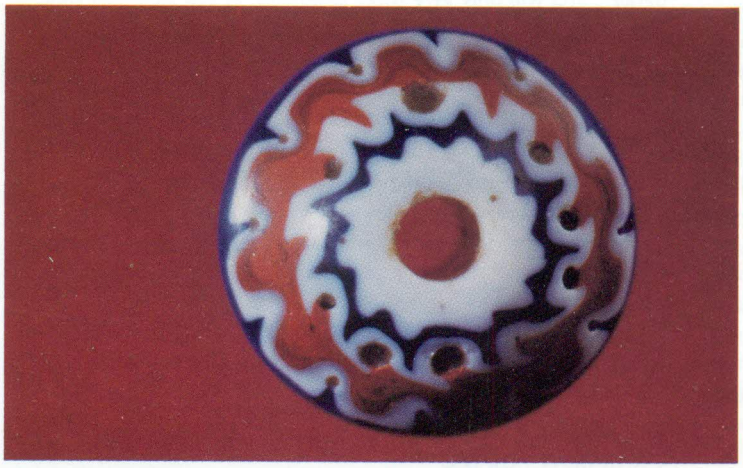

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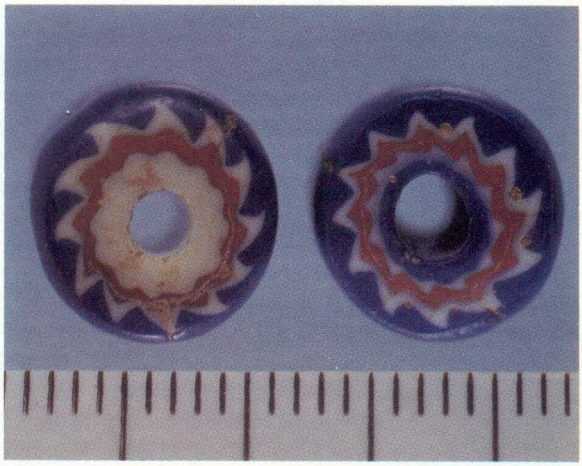

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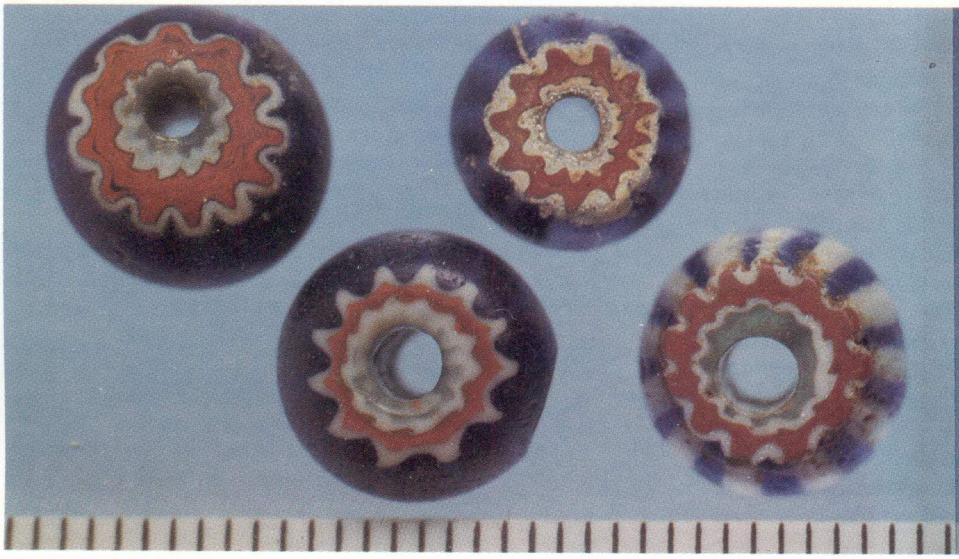

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these rounded lobes (and even some well-formed points) are subject to changes during the next layering and marvering. For instance, if the next casing is thin, the marvering may have the effect of flattening out the points, so that they become blunted (as in Fig. 9). Let us suppose that well formed points have been cased with a surrounding layer but that the glassmaker marvers the gather too vigorously. In this instance, the points will be caused to bend and curve, resulting in a pattern that looks like a circular saw blade or pinwheel (see Figs. 7 and 10)[58]. Thus, we see that some unusual starry shapes are accounted for by technique rather than by unusual molds.

MAKING BEADS FROM CANES

The subject of making beads from hollow canes of glass has been addressed many times by previous authors[59] and many readers may suppose that nothing new needs to be said. This is certainly not the case. Surprisingly enough, there are several aspects of cane bead production that have been glossed over, or almost completely ignored. In fact, this is a subject of such complexity that I cannot possibly do it justice in the space allotted to bead manufacture here. I will have to give a broad view, once again, with only a few important details. The black and white drawings of Figs. 15 and 16 will illustrate the major trends, and the reader is requested to view these and to read the Figure explanations for a general understanding of what follows.

Once stocks of canes have been produced, they are turned over to the centers that have the job of turning the canes into beads. There are several methods by which canes are made into beads, and though the processes themselves differ, the resulting beads do not always differ noticeably from one another. Cane bead production can be divided into two groups, pertaining to finishing in a warm state and finishing in a cold state. They can be divided further into two groups, pertaining to individual treatments and treatment *en masse* (beads finished one by one versus beads finished simultaneously in groups). Therefore, there are four major divisions of cane bead production: 1) beads finished in a cold state, individually; 2) beads finished in a cold state, *en masse;* 3) beads finished in a warm state, individually; and 4) beads finished in a warm state, *en masse.* Not all of these categories have been well described by previous authors (and my own speculations are involved here). Besides these four major groups, there are a few subgroups as well as beads that result from combinations of techniques. I will discuss each category, and a few variations.

BEADS FINISHED COLD, INDIVIDUALLY

This group of beads is derived from canes divided by fracturing into bead-length sections, which are then ground to shape individually, probably using a lapidary-type grinding wheel. The classical chevron bead (examples 2, 13, and C) is a typical result of the process. The section of cane is reshaped by cutting through the external layers of glass, primarily on the ends. In early times, most chevron beads were facet-cut (as in Nos. 21 to 23), though rounding and some beveling have become the norm more recently. Many types of cuts have been devised, including the less common pear shape (No. 16), the spindle (No. 20), the faceted spindle (No. 24), and the faceted bi-cone (No. 27)[60]. Because grinding is applied to a cane piece in the cold state, the layers of glass, internally, continue to have the straight lines caused by drawing the gather (while reheated beads become re-

FIG. 6 A large 7-layer chevron bead (the same as the giant bead in Fig. 1 of Part I), from Africa. *Courtesy of Michael Heide.*

FIG. 7 A small 7-layer bead from Peru, with three facets on the end shown, and six on the reverse. The 5th and 6th layers are molded into 18 points. *Courtesy of Elizabeth Harris.*

FIG. 8 A small 5-layer bead from Peru, with flat ends, and with the 3rd and 4th layers molded into 9 points. Instead of having a 5th blue layer, blue canes are inserted into the white layer and a clear casing forms the outer 5th layer. *Courtesy of Elizabeth Harris.*

FIG. 9 A tiny 6-layer modern bead, from Venice, with a natural diameter of 6 mm. spherical in shape. The 3rd and 5th layers are molded and reformed into blunted points. *Author's collection.*

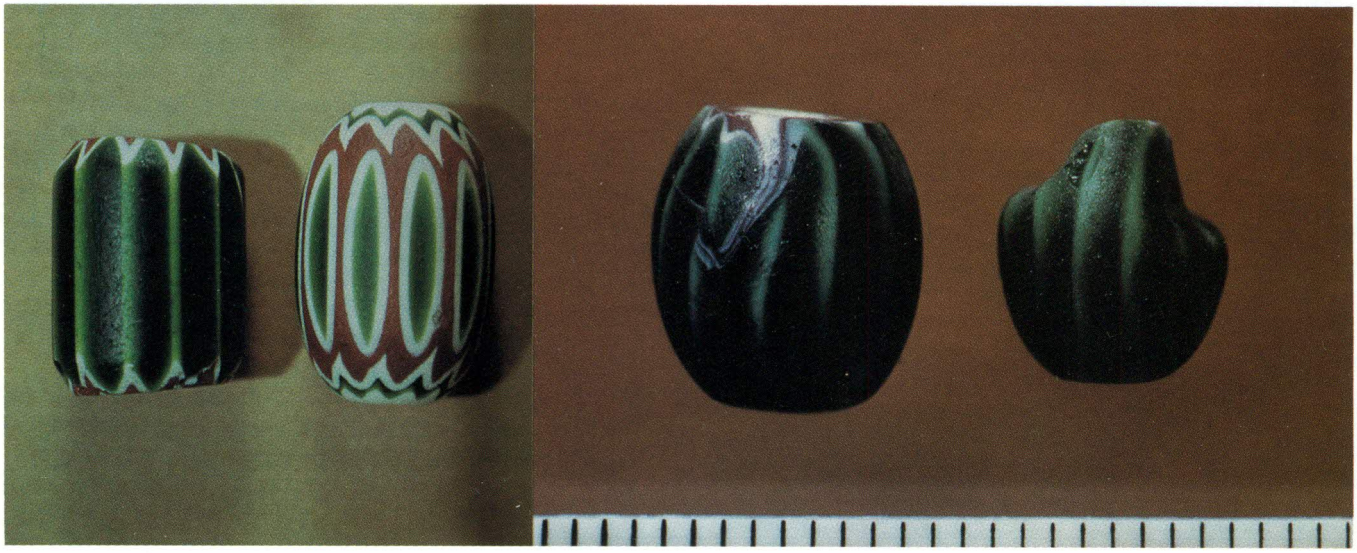
FIG. 10 Two related 4 and 5-layer beads, from Africa, showing a comparison between slightly different approaches to core layer production. Probably 19th century beads. *Courtesy of Michael Heide.*

FIG. 11 A group shot of reheated 5-layer beads, probably all produced fairly early, though from unrelated sources. The left specimen (*courtesy of G. B. Fenstermaker*) was retrieved from an Indian grave in Pennsylvania, while the rest are from Africa (*courtesy of Michael Heide and Liza Wataghani*). Note the slight differences in layer thickness, and patterns, and the striped example on the right.

FIG. 12 A small variant chevron bead from Africa, showing the difference in pattern caused by thick white layers, and poor technique. *Courtesy of Michael Heide.*

FIG. 13 Two typical late 6-layer green chevron beads. The left specimen is from Africa (*courtesy of Helen Forcum*), while the right well-ground example is from the American Southwest (courtesy of Jo Allyn Archambault). The natural diameter is ca. 20 mm.

FIG. 14 Two hot-pinched beads of the typical 4-layer construction, with green exteriors. The examples show production mistakes that help to identify the process used. Both beads are from Africa. *Courtesy of Art Expo, and Albert Summerfield, respectively. All photographs by Patrick Craig.*



13 14

conformed and loose the straight line — compare 2A with 3A and 4A). When grinding is used to cut through most of the external layers, the resulting beads show a striped pattern, though the profile shapes remain more of less typical (compare B to E and G, and C to F and H). These stripes are not, therefore, the result of adding units to the cane gather (as will be discussed in the next installment), but are an integral part of a more or less typical cane. The stripes, being set into a starry layer, have tapered ends, and I refer to these as "boat-shaped stripes." Note that the boat-shaped stripes of D result from cutting through to *internal layers,* while those of E to H are the remains of *external layers.*

BEADS FINISHED COLD, EN MASSE

Cane sections may be placed into a lapidary-type tumbler, with abrasives, having the effect of removing the external layers and slightly rounding the shape. Rather than resulting in the typical barrel shape, a cylinder with rounded ends is formed (as in No. 12, and E and G below and the second row of beads in Fig. 2 of Part I). It is not possible to say when this process commenced, though examples of such beads that I have seen are all fairly new, or modern beads. Unlike hand grinding, the use of a tumbler with abrasives attacks all surfaces of the cane segment, which is why so many of these beads are striped. Also, these beads do not display any grinding striations.[61]

BEADS FINISHED WARM, INDIVIDUALLY

There are two approaches to making individual beads in a warm state. The worker may begin with previously divided cane pieces, which are reheated and shaped; or the worker may choose to take a length of cane, which is heated and divided into beads as a process. (Nos. 3 and 3A, and 4 and 4A represent these types, respectively.) In either case, the heating and shaping result in beads that do not have layers with straight lines (as in ground beads), but have curved lines. It is not always possible to distinguish between these two types (nor to distinguish between cane pieces reshaped individually, and those reshaped *en masse* — discussed below). In the individually reheated process, the worker probably places the cane piece on a wire spit, and heats it in the flame of a lamp (*a la lucerna*[62]), and then reshapes it using small troughs of forms. In many instances, the process results in beads that have a slight distortion of the layers, that can be seen when the bead is viewed end per end — the ends don't match[63]. When the worker begins with a length of cane, the process is slightly different. In this case, the cane is heated at the point where a division will be made, and a tool is used to pinch or constrict the cane, forming the end of the bead. The tool is probably something as simple as a *pucella* or snipper[64], since this process has been in use since early times. Again, because of individual handling, many specimens show distortion of the layers, and the ends of the beads do not match (as in Nos. 49 and 50). Color Fig. 14 depicts two specimens of these "hot- pinched" beads. The bead on the left has a thread of glass from the internal layers, that has come to rest on the outside — showing that a reheating process has been used, that cannot be accounted for by other methods of finishing beads. The bead on the right shows a malformation of the shape, due to the pinching operation. These tool marks are the best indications of the processes used. Because of the constriction of the ends, a bead that has been broken will seem to have an "inflated" perforation — though these may not be "blown" beads at all (however, perhaps a few are). Many hot-pinched beads have ground ends, so that the tool marks are removed (and perhaps constricted perforations are more adequately opened up). I will present more examples of these beads in later installments.

BEADS FINISHED WARM, EN MASSE

There seems to have been an evolutionary trend away from making reheated beads one by one, to making them in quantity[65]. Obviously, this would streamline production and increase labor efficiency. Reheating cane beads *en masse* has been typically applied to the very small "seed beads" that are well known around the world, but has also apparently been used for somewhat larger beads. The first process described, used prior to the 19th century, involved placing the cane pieces in an open pan along with packing materials that keep the beads from sticking to one another, or collapsing into themselves; whereupon the pan was placed over a fire, and the contents stirred[66]. The combination of heat and movement caused the pieces to become rounded. This process was replaced by an apparatus, slightly similar to a lapidary tumbler, that is positioned over a small furnace and is revolved to circulate the contents. This is "hot-tumbling *en masse.*" Hot-tumbling, then, is a fairly recent process, although many previous authors have used this term to describe reheated beads made much earlier[67]. While some of these early beads were probably made by the open pan reheating process (which would have resulted in very similar products), surely a portion of the early beads were made individually. Thus the "hot-tumbled" designation is inaccurate, and does not account for the basic appearance of the beads. The actions of heating and rolling the cane segments results in beads that are more or less spherical, and the two ends of the beads match each other. This may not be the case with beads that are reheated individually, where the process distorts one end and not the other.

There is another problem that previous researchers have faced in identifying the manufacture of rounded beads. Because of the similarity between hot-tumbling *en-masse,* and lapidary tumbling with abrasives, any number of authors have confused one process with the other. That is, many reheated rounded beads have been presumed to have been abraded, though there is no removal of external layers. This is a mistake. In contrasting the external forms of star beads, faceted beads are called "faceted chevrons" (which is correct), while rounded star beads are called "tumbled chevron beads" (even though some of these have been *rounded by grinding* — as opposed to facet-cut, while others are reheated, and not necessarily "tumbled").

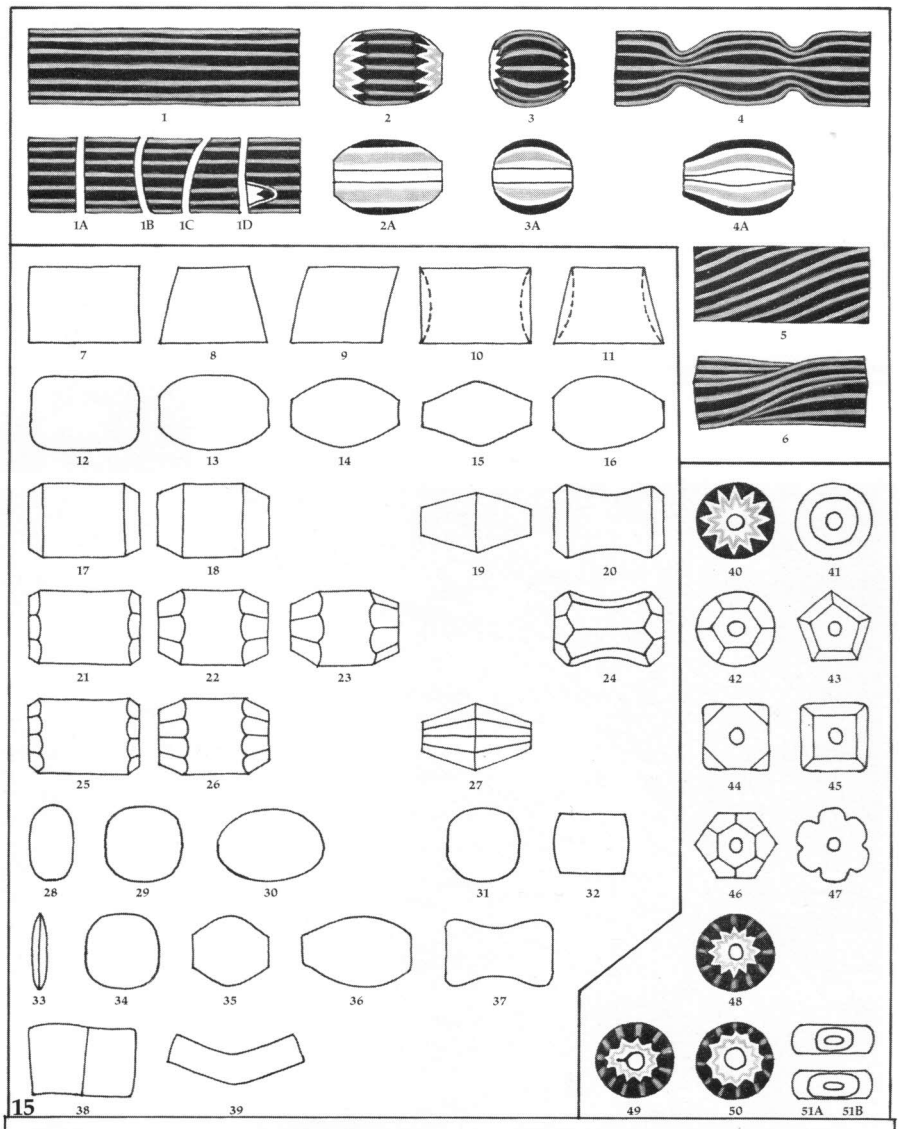
Another problem concerns the fact that, in some instances, a bead may be finished by a combination of techniques. One obvious example, that does not pose a great problem, is the instance where a group of beads that have been individually ground are also finished *en masse* for a high polish. They might be polished as a group, or they might be slightly reheated enough for the surfaces to flow, as a group. We simply do not know enough about the bead industry to make valid generalizations. Fig. 16 depicts two interesting examples, that almost defy classification, but occur occasionally. If a cane segment, such as example A, is reheated and rounded (individually or *en masse*), the resulting bead will be example I. We can take example I and grind or tumble it in abrasives and come up with example J. On the other hand, we could also take example G (which has been previously ground or abraded), and hot-tumble it, and wind up with example J! Which process produced example J? Conceptually speaking, either or both could work. Example K is a reheated bead that was subsequently ground down around the girth or equator, to expose the inner layers. This forms boat-shaped stripes, that are similar to the *pattern* found on example D above, though the process and the external shape is very different. These examples show that the manufacture of cane beads is not as forthright as many people suppose.

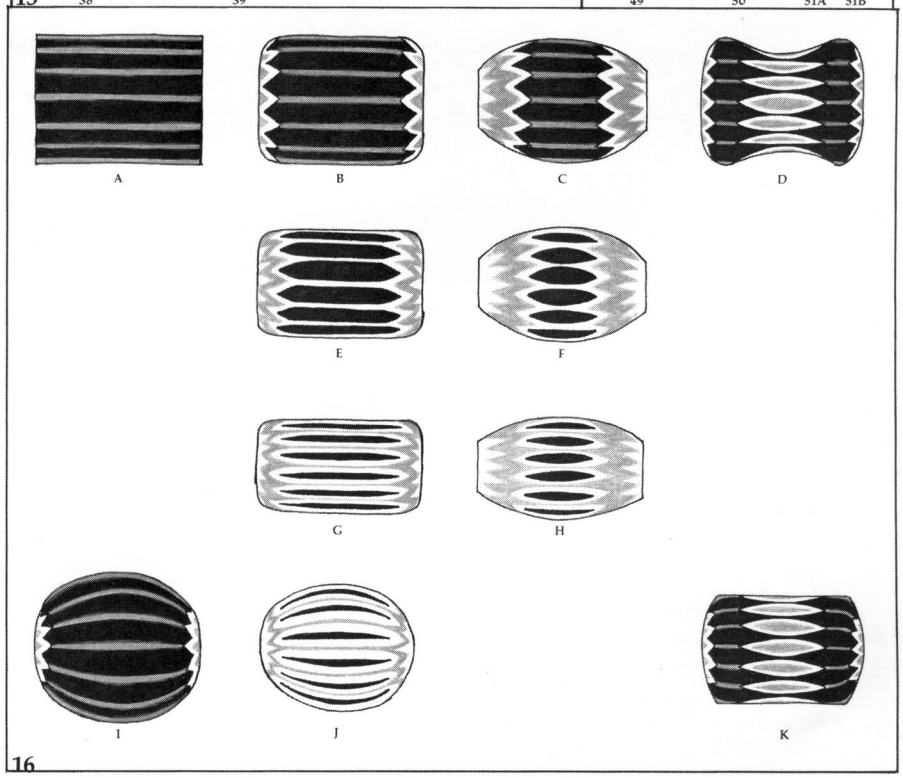
Continued on p. 40

FIG. 15 & 16 These drawings depict the major trends of cane beads, starting with basic concepts and simple applications, and building in complexity and diversity. The top section of Fig. 15 concerns cane divisions and types of beads (Nos. 1 to 4A), and shows round and angular twisted canes (Nos. 5 and 6). The left section concerns common profile shapes, usually based on long cane segments, though many beads with these treatments are short or standard (primarily Nos. 7 to 27, which are ground beads, while Nos. 28 to 39 are reheated beads). The right section depicts canes or beads in cross section, showing the difference between the appearances of ground beads and reheated beads (Nos. 40 and 48 to 50), as the latter have a swelling of their girth, and some malformation of the pattern. The right section also depicts variant cross sections that are due to *grinding the bead* (No. 43), reshaping the cane (Nos. 44 to 47), and *reshaping the bead* (Nos. 51A and 51B). In addition, end treatments applied to beads are shown, including rounding, faceting and beveling (Nos. 41 to 46). Fig. 16, below, depicts the relationships between methods of finishing and the resulting external patterns. The major contrast is between ground beads (Letters A to H), and reheated beads (Letters I to K — though some grinding or abrasion has also been applied to J and K). References will be made across the sections of Fig. 15 (by numbers), and to Fig. 16 (by letters), for comparisons and discussion.

All profiles have a horizontal axis; and all examples that are patterned are based on typical 4-layer star canes, though the same trends occur in other series.

Example No. 1 is a length of star cane, seen in cross section in No. 40. When a cane is fractured into sections, the break may be straight across (1A), concave/convex (1B), at an angle (1C), and splintered or chipped (1D). Grinding neatens the ends, and the type of break may suggest the shape (as in Nos. 7 to 11). (No. 7 equals A below). Grinding may be used to change the shape, creating rounded beads (Nos. 12 to 16), beveled or chamfered cuts (Nos. 17 to 20), facets with 6 cuts per end (Nos. 21 to 24) and with 8 cuts per end (Nos. 25 to 27). (Nos. 13 to 20 equal No. 41, while Nos. 21 to 24 equal No. 42.) The typical chevron bead (Nos. 2 and 2A) is due to grinding that cuts through external layers (No. 2 equals No. 13, and C below). Many star beads are finished by being reheated and reformed. Some are processed *en masse* (Nos. 28 to 30, typical hot-tumbled beads), some are treated individually (Nos. 33 to 39), and a few have been both reheated and ground (Nos. 31 and 32). Grinding cuts through layers, while reheating reconforms layers (compare Nos. 2 and 2A to 3, 3A, 4, and 4A — and 40 to 48, 49 and 50. No. 2 equals 40; No. 3 equals 48; No. 4 equals 49 and 50). Note that some reheated beads are flattened (Nos. 51A and 51B, which might be Nos. 35, 36, or 37). No. 33 has been flattened into a "wafer bead." No. 38 is two beads that have been fused together. No. 39 has been bent to an "elbow" shape.





CHEVRON: *from p. 28*

CONCLUSIONS

I have described two early blue (series 7 and 5-layer), and two late blue (series 6 and 4-layer) bead series, and have compared the latter to green (series 6 and 4-layer) bead series. I have also described the manufacturing sequences of these typical beads, and have mentioned a few accidental and/or optional variations of similar, less common beads. The production descriptions have included both cane manufacture and actual bead manufacture and I have made some preliminary generalizations regarding their occurrence in time, and numerical frequency. With the editor's permission, I have decided to expand this series into four parts. Part III will deal with star bead series of less common color sequences, and striped beads, while Part IV will deal with floral patterned rosetta beads. ■

San Francisco, CA

END NOTES AND REFERENCES [for Part II]

50 I stress this point because it seems that people become confused regarding production details, attributing aspects of cane manufacture to the maker of the bead itself. For instance, faced with a chevron bead that has been ground down to its red layer, but having blue and white stripes from the outer layers, I'm often asked, "Why didn't the beadmaker just produce a red cane?" This, of course, is not the beadmaker's job.

51 Anonymous, "Miscellaneous Communications...," *American Journal of Science and Arts,* Vol. 27, No. 1, p. 79, 1835; Kidd, *loc. cit.*, pp. 13-14. The initial gather may be made hollow by hand manipulation using a tool; or it may be blown to create the bubble of air.

52 Pellatt, *op. cit.*, pp. 104-106. Pellatt explains the process of double-layer molding of glass products. Though he does not refer to cane production, the conception is perfectly parallel.

53 Smith, *loc. cit.*, pp. 15-16.

54 Smith, M. T., and M. E. Good, 1982, *Early Sixteenth Century Glass Beads in the Spanish Colonial Trade*, pp. 39, 44, specimens 124 and 125.

55 Smith, *loc. cit.*, pp 15-16. Smith reports the replacement of 7-layer faceted beads by 5-layer rounded beads. The actual time at which white cored beads became the rule has not been specifically determined; however, in my experience, the more recent 4-layer and 6-layer beads coexist, and practically any variety (size, shape, etc.) of one has an analog in the other.

56 There can be very little doubt that these two beads derive from one production series. Not only are both practically identical, in terms of external shape and mode of finishing, but they also both have a very distinctive opaque grayish-blue glass (the core of the right bead, and the exterior of both) that is not often seen.

57 Allen, "...New Perspective..." [in press].

58 Kidd, *loc. cit.*, p. 14. Kidd describes the pinwheel effect as being due to twisting the gather, while it's in the mold. I do not agree with this, as a general rule.

59 Anonymous, *loc. cit.*, p. 79; Ure. A., 1845, *Recent Improvements . . .*, 208-210; Harris and Harris, *loc. cit.*, pp. 134-138; Kidd and Kidd, *loc. cit.*, pp. 47-53; Kidd, *loc. cit.*, pp. 13-16, 23-26.

60 I have recently seen a chevron bead that has been faceted all over, though the facets are not of geometric precision. There are countless possibilities for cuts and shapes, and new ones keep appearing.

61 I have long been aware of the possibility of tumbling in abrasives, though authors who discuss this usually seem to confuse the process with hot-tumbling (described subsequently). I am indebted to Elizabeth Harris for showing me the results of her experiments with star bead tumbling, which has convinced me that this process has been used, at least in recent times.

62 Gasparetto, *op. cit.*, p. 243.

63 This is not always the case. Well-made beads have matching ends. However, the poorly made beads are the ones that defy explanation if only a hot-tumbling process is used to account for these features

64 Pellatt, *op. cit.*, p. 81.

65 Carroll, *loc. cit.*, pp. 9, 19-20.

66 *ibid.*

67 Harris and Harris, *loc. cit.*, pp. 135-136; Smith, *loc. cit.*, pp. 15-16; Smith and Good, *op. cit.*, pp. 16, 18.

CHEVRON-STAR-ROSETTA BEADS PART III

*Jamey D. Allen**

INTRODUCTION

In Part III of this article, I will discuss the manufacture of star beads that feature external stripes as an added decoration. I will also present a sampling of star beads of less common color schemes than those discussed in previous installments; and will further define the term "series of beads," discussing the characteristics that make beads similar to, or different from, one another (as individual specimens and groups).

STRIPED STAR CANE MANUFACTURE

In Part I (Fig. 1), I explained that many cane beads feature external stripes as decorations. The stripes are made from preformed rods of glass, that are fused onto the surface of the cane gather. Most often, the stripes are marvered flush with the surface (though some are left slightly raised). When the gather is elongated, the stripe units stretch and diminish in size with the rest of the glass; and, naturally, if the gather is twisted at the same time, the stripes spiral around the cane. I will refer to any beads with this sort of decoration as having "superficial stripes." Stripes vary in their occurrence in number, color sequence, and structural complexity. A bead may have as few as one stripe (Fig. 26), or as many as thirty-six (Fig. 20, the lower right bead) — possibly more. The usual number of stripes is six, eight, or twelve, in most instances. The stripes may all be one color (Figs. 18, 21, and 27), or they may be a combination of colors. Often, there is a sequence of two or three alternating colors (Figs. 17A and B, and 28). Long beads of this sort look like Christmas candy. A single stripe may be composed of one rod unit (Figs. 17A and B) or it may be composed of two or more rods placed close together, for a wide but very thin stripe (Figs. 26 to 28). A stripe may also be compound, or composed of two or more colors placed in close proximity (Figs. 19 and 29). Usually the "background color" that separates one stripe from its neighbor is the final layer of the cane. For instance, Fig. 27 is a black chevron bead, with yellow stripes. In contrast, a few beads have their outer surface entirely covered with stripes, and have no "background" to speak of (as Fig. 20, the lower right bead, which has a red outer layer covered with alternating red and yellow stripes).

Any cane beads may have the superficial stripes just described. Star beads, however, have an additional variety, made possible by their molded construction. The glassmaker has the option of inserting stripe units between the points of a molded starry layer, rather than onto an otherwise finished gather. With fusion and marvering, the stripes take on a triangular cross section, conforming to the "V" shape of the indentations (Figs. 30 to 32). I will refer to these stripes as being "set-in." Often, set-in stripes take the place of the usual external layer (as in Figs. 8 and 11 of Part II). In many instances, set-in stripes are covered by clear (or bluish) glass as the final layer. This clear glass may be so thin as to be nearly invisible; or, it may be so thick that the stripes are somewhat magnified (Fig. 32). Like superficial stripes, set-in stripes may all be one color, or a sequence of two or more colors (Figs. 30 to 32). Occasionally, a single set-in stripe is composed of several rods; and, rarely, it may consist of more than one color of rods (Fig. 33, which has blue stripes alternating with red-yellow-red stripes — and happens to have only ten points in the starry layers).

There are interesting similarities and differences between superficial and set-in stripes. Whereas superficial stripes may vary from few to many on any given bead, set-in stripes will almost always number the same as the number of molded points of the cane (usually twelve). Set-in stripes occur between the starry points, while superficial stripes may occur anywhere on the surface. They may be far apart or close together. They may be between the internal points, over them, or combinations of both. Figs. 17A and B present six beads of similar appearance, seen in profile above, and cross section below. The left examples have set-in stripes, while the middle ones have superficial stripes. Note that the difference between them is not noticeable in the upper cylindrical examples; but it becomes much more obvious in the lower specimens that have ground ends (are "chevron beads"). Set-in stripes become "boat-shaped," having tapered ends; while superficial stripes have blunt or ragged ends[68].

In earlier installments, I mentioned that many star beads have a striped appearance because much of the outer layer(s) has been ground away, exposing the starry layers. This is in marked contrast to added stripes, where grinding would serve only to remove them, not to cause them. In the past, authors have mistaken typical 4-layer blue star beads, which had been ground down to their red layers, for red beads with added stripes[69]. Such errors, if unchecked, could lead to a false perspective on the series produced during the period in question. Oddly enough, there actually are red star beads with added blue and white stripes *that imitate a ground typical blue bead* (as in Fig. 29). An understanding of manufacturing techniques and familiarity with known series will help to avoid such mistakes.

COLOR SCHEMES

All rosetta beads feature at least two colors. In considering color scheme, it is necessary also to attend to layer number, as these two aspects are practically inseparable. I cannot here report every color sequence/layer number combination I have recorded;

but, I will make some observations and generaliziations pertaining to the occurrence of certain groups, referring to the specimens illustrated.

Star beads may be composed of a single layer of glass, or up to nine layers (possibly more, though I've not heard of any yet). The 1-layer bead is a special case, as the starry points are always filled-in by stripe units (as in Fig. 30)[70]. Beads with four to seven layers certainly outnumber those with more or fewer layers; though specimens with two or three layers are not uncommon. Beads with one, eight, or nine layers seem to be quite rare. Two-layered beads consist of a starry core, surrounded by an outer layer (Fig. 23, a most unusual "pinwheel" patterned bead with a hexagonal cross section). These relatively simple star beads often also have external stripes (Figs. 29 and 33). Three-layer beads are fairly common; and one reason for this is that they often consist of the white, red, and white sequence, with added stripes (Fig. 28, respectively a horizontally flattened "wafer" bead, and a vertically flattened "tabular" bead). Many 4-layer star beads also have the typical color sequence, excepting only the external layer color. Figures 19, 20 (the left beads), 22 (the right bead), 26, and 27 are all examples of this variation (respectively with green, red, turquoise, green, and black for the exteriors). The other, less typical 4-layer beads are seen in Figures 17A and B, 18, 21, and 32. Some 5-layer beads were shown in Part II. Figures 24 and 25 consist of 6-layer beads, while 22 (the left bead) and 31 are 7-layer beads. No 8 or 9-layered beads are pictured.

Because many star beads have a color scheme that is comparable to the typical sequence, except for the external, most obvious layer, it is logical to group them by the color of the outer layer. For instance, the typical beads are "blue beads." The specimens of Figure 19 are typical green beads, with compound stripes; the Figure 27 bead is a typical black chevron bead, with yellow stripes. The word "typical," then, is a shortcut for describing the inner structure of a bead. In dealing with atypical beads, this approach has no meaning, and step by step descriptions are demanded. Just the same, we can group these beads broadly by referring to their outer layer color. For instance, Figure 23 is a black bead. When the final layer consists of clear glass, the bead ought to be designated by the color below. For instance, Figure 32 is a white bead, with red and green stripes. Let us discuss the occurrence and frequency of outer layer colors.

The dark transparent blue glass of standard typical star beads is undoubtedly of the most frequent occurrence. If all white beads with (or without) different combinations of stripes are taken as a whole, they probably account for the next greatest number. Close contenders would be beads with transparent green exteriors[71]. Black beads are occasionally seen (Figs. 23 and 27), although "black glass" is not a single color, but a group of different very dark colors[72]. Red beads are known, but seem to be fairly rare. Some consist of the opaque brick red of the inner layers of typical beads (the left beads of Fig. 20), while a few, mostly modern beads, have a brilliant cherry red exterior (the upper right bead of Fig. 20)[73]. Transparent turquoise blue made its appearance during the early production period, as evidenced by examples surviving from that time[74]. Figures 22 (the left bead) and 31 are both from colonial period digs in Peru; while a few more recent turquoise beads exist as well (the right bead of Fig. 22). Nineteenth century advancements in glass technology have provided a palette of many bright colors that appear in more recent star beads. Figure 24 consists of six layers that are structurally typical. However, the "white" layers are bright lemon yellow, the red ones bright red, and the green ones opaque lime green — a gaudy, but appealing specimen from the African trade. Example 25 is a new bead, composed of two white, red, and yellow sequences, for six layers. The yellow is a loud lemon color, while the red is almost a fluorescent pink. All the beads of Figures 18 and 21 are related, and will be discussed as a group. Their exteriors mostly consist of opaque slate blue glass, seldom seen in more typical beads.

Although the outer layers of star beads are the most visible, we cannot ignore the colors of internal layers, particularly in less common series of beads. The colors noted above may appear in internal layers too; and, in more typical beads, usually occur between white layers. On the other hand, some atypical beads have no white layers at all (as in Figs. 23 and 30).

DEFINING A SERIES OF BEADS

No previous bead researchers have provided a hardline definition or set of criteria for a "series of beads" — at least none that are not questionable. By "series of beads," I primarily mean that a given group of beads is a series if the structures of the canes (internal forms, layer numbers, and color sequences) are demonstrably alike. Minor differences in these aspects make for sub-series of the typical series, be they differences of cross section shapes, external stripes, other applied decorations, color substitutions, etc. Major differences demand that the beads in question be considered series unto themselves; yet, sometimes, it is difficult to apply the rules. Let us look at two sub-series that are very similar and at an atypical series in which individual beads vary considerably.

Figures 17A and B, discussed earlier, may be considered to be sub-series of one group (an imaginary bead, as far as I know, consisting of four layers: red, white, red, and white). The left group has set-in stripes, while the right group has superficial stripes. These structural differences are important enough to demand that they not be considered a single sub-group; particularly the ground beads that look less like one another than their unground counterparts above.

Figure 18 consists of beads that are far from identical in their structures, yet are obviously closely related. All were acquired on a single string (whose basic appearance can be seen in the two horizontal strands above). I have sorted out specimens that show the range of colors involved, in core and external layers. These are arranged in two groups: three rows in cross section, and three rows in vertical profile. The first row of cross sections shows several characteristics. The 1st and 2nd beads represent the maximum and minimum diameters of all. The 3rd and 4th beads show the variation of the third red layers — some thin and some thick, some well-formed and some not. The 2nd and 3rd beads also consist of an odd shade of blue, for the core and outer layer (respectively). The 5th and 6th beads consist of odd core colors, not seen in other specimens. The two rows below are arranged to show how the core colors of the majority vary from an opaque pale blue (almost white), through medium blue, and to dark blue. Usually, there is a noticeable swirling of the glass, seemingly caused by mixing two colors together; *and*, the second layer seems to consist of the secondary color of the core. In fact, within many specimens, this second layer is very difficult to perceive as a layer unto itself, and appears almost as an adjunct to the core. All beads have brick red third layers, followed by opaque slate blue exteriors, with superficial blue stripes (twelve, when intact). As with the core color variation, there is some tendency for the outer layer colors to grade from a light tint to a slightly darker shade, as shown in the bottom three rows. Again, the left specimens approach being white in color, but are not true white. These three rows are arranged to show external differences caused by individual grinding of the beads.

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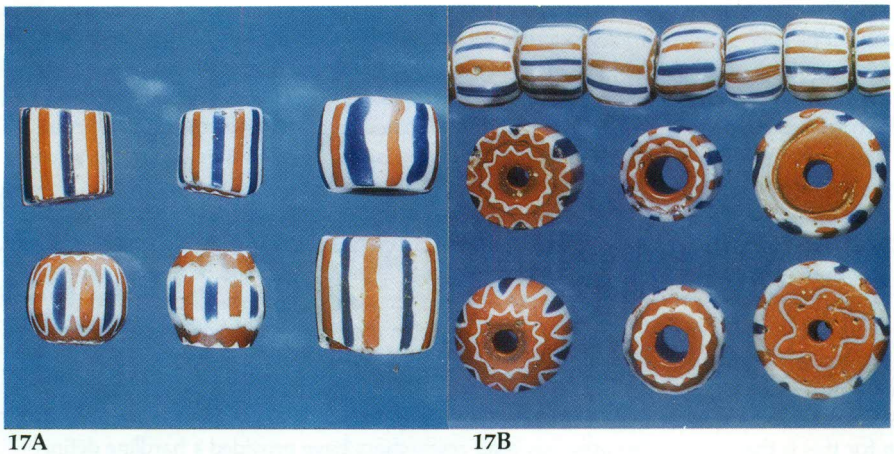
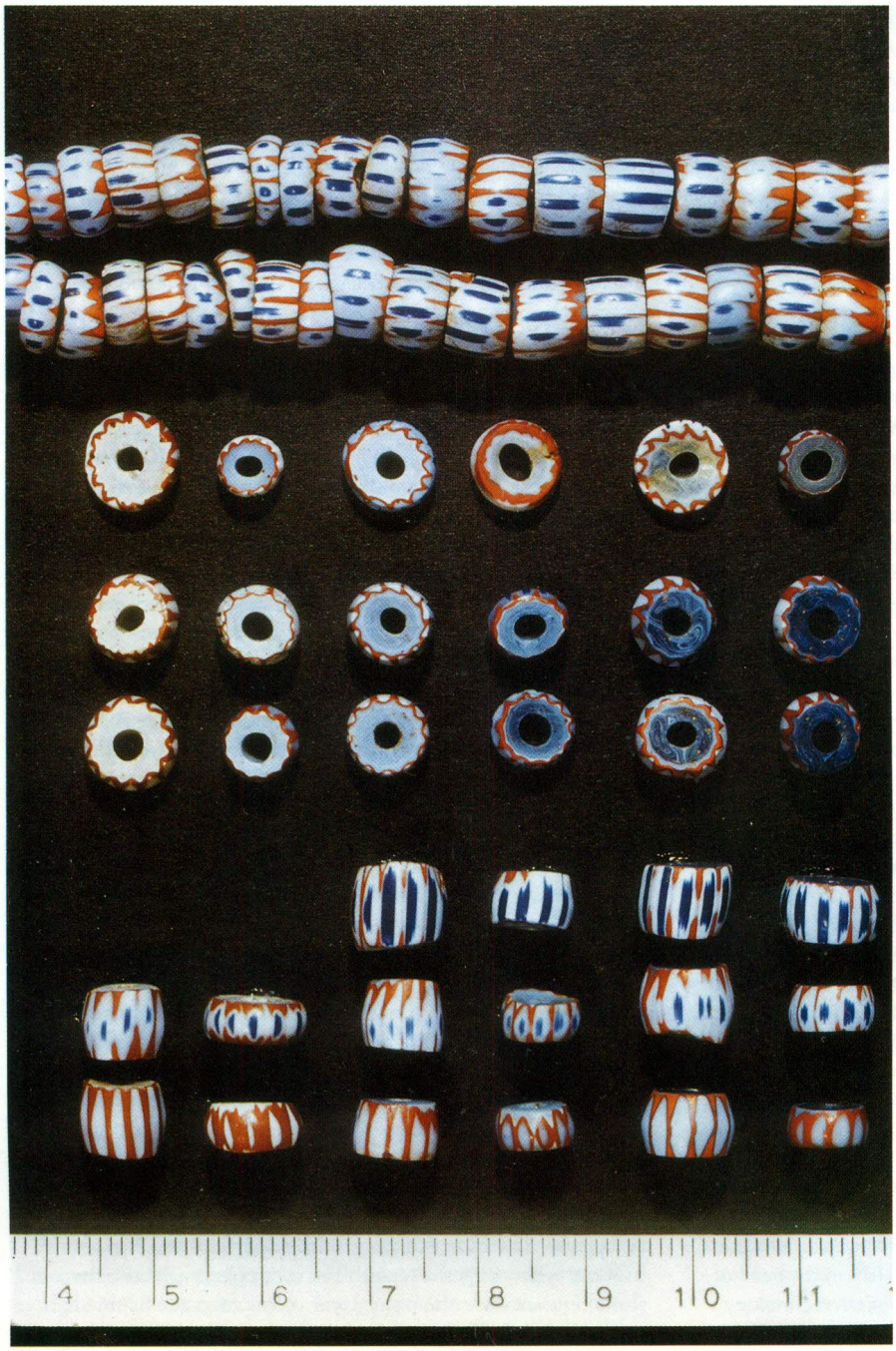


17A 17B



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All photographs by Patrick Craig.

FIGS 17A and B Six beads of similar appearance, in which the upper rows appear in vertical profile, and the lower ones in cross section. The left specimens have set-in stripes; the middle ones have superficial stripes; and the right ones are hand-made, imitating cane beads. The horizontal strand separating the two ranks consists of tumbled beads, similar to the upper, middle bead. Probably 19th C. beads, from Africa. *Courtesy of Liza Wataghani, Michael Heide and Pauline Lum.*

FIG. 18 An organized group shot of a striped, slate blue star bead series, showing the range of color of core layers, and external patterns. Note that none have the typical white layers between the red and blue. *Author's collection.*

FIG. 19 A group shot of 4-layer green star beads from Africa. All have compound superficial stripes. 19th and 20th C. beads. *Courtesy of Boyd Walker, Michael Heide and Gerald B. Fenstermaker.*

FIG. 20 A group shot of five beads with red exteriors. The left specimens are of 4-layer construction, from Africa; while the upper right bead has 5 layers, of unusual color sequence, with a bright red exterior — a relatively new bead, but rare. The lower right bead, from Africa, has a brick red exterior, completely covered by 36 red and yellow stripes. *Courtesy of Michael Heide, and author's collection.*

FIG. 21 A group shot of six beads of similar construction, all with 4 layers; and none with any white layers. Similar to the Fig. 18 beads. *Courtesy of Michael Heide and Patti Yeiter.*

FIG. 22 Two beads with turquoise blue exteriors. The left bead has 7 layers, with a square cross section; from colonial Peru. The right bead has 4 layers; from Africa, and probably of late 19th or early 20th C. manufacture. *Courtesy of Elizabeth Harris, and Penny Diamanti de Widt*

FIG. 23 A rare 2-layer bead from Africa, composed of red and black layers, with a "pinwheel" pattern, and a hexagonal cross section. *Courtesy of Jewels.*

FIG. 24 A 6-layer chevron bead, of typical construction, but with bright opaque colors; probably of late 19th or early 20th C. manufacture, from Africa. *Courtesy of Michael Heide.*

FIG. 25 A new 6-layer chevron bead of unusual color scheme, featuring white, pinkish-red, and lemon yellow layers. *Courtesy of Michael Heide.*

FIG. 26 A typical 4-layer green chevron bead, but with a single spiral stripe composed of several red stripe rods placed close together. Probably of 19th C. manufacture, from Africa. *Courtesy of Michael Heide.*

FIG. 27 A typical 4-layer black chevron bead, with six yellow superficial stripes. Probably a 19th C. bead, from Africa. *Courtesy of Michael Heide.*

FIG. 28 Two 3-layer white beads, with "candy stripes," from the African trade, and probably of 19th C. manufacture. The left bead has been pressed flat, into a "wafer" bead; while the right bead has been pressed into a flat "tabular" bead. *Courtesy of Steven Cohn, and author's collection.*

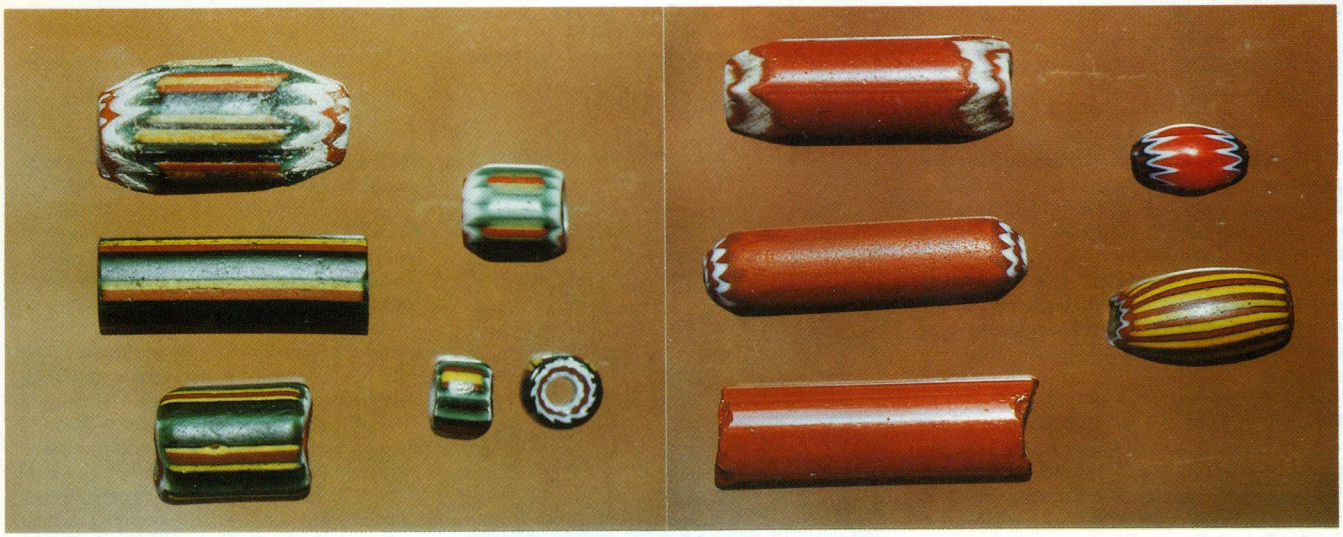
FIG. 29 Three 2-layer red chevron beads from Africa, that imitate typical blue beads, ground down to their red layers — though these have added superficial stripes. Probably 19th C. *Courtesy of Michael Heide and Liza Wataghani.*

FIG. 30 A rare single-layer dark blue star bead, with set-in red and yellow stripes. From Africa, and probably of 19th C. manufacture. *Author's collection.*

FIG. 31 A most unusual 7-layer chevron bead, from colonial Peru. The exterior turquoise blue layer has been star-molded (along with the red and white layers just below), in preparation for the addition of the set-in stripes of alternating red and white. *Courtesy of Elizabeth Harris.*

FIG. 32 A discoidal 4-layer bead from Africa, with set-in stripes of alternating green and red, surrounded by a thick clear layer. *Author's collection.*

FIG. 33 Two 2-layer beads from Africa, featuring compound red-yellow-red set-in stripes, and having only ten points. *Courtesy of Michael Heide.*



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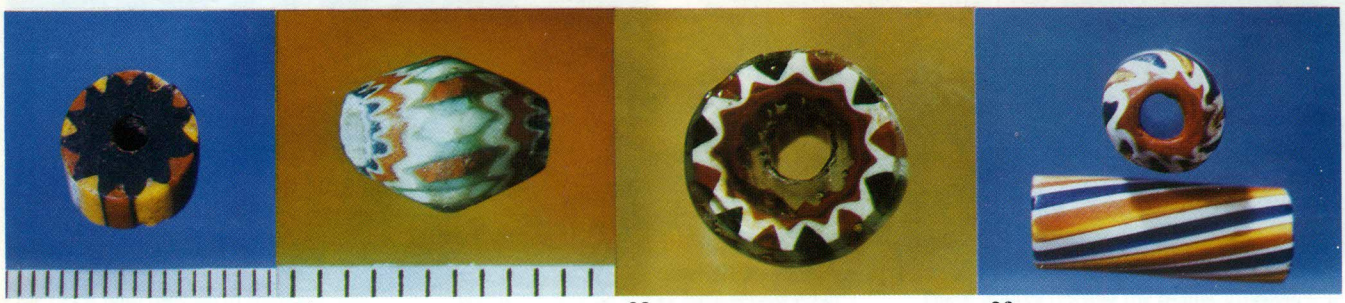

30 31 32 33

◀CHEVRON BEADS: from p. 27

The first row of profiles consists of beads which have most of their outer layers and stripes intact. Those directly below have a portion cut away; while the lowest row of beads is clearly cut down to the red layers. Note that there were *no* light colored beads with intact stripes (on the left). Surely, this is circumstantial. I expect that all beads in this group originally had stripes.

The beads in Figure 21 are closely related to those just described; but show more variation. The lower right bead, though newer, is the closest to the Figure 18 beads. The upper left and middle, and the lower left beads all have translucent medium blue glass. Since there is no separating white layer, the red layer shows through the exterior, and causes a purplish appearance. The second layer of the upper middle bead, and the exterior of the lower right bead are off-white-blue, in contrast to the medium blue of the others. Again, all these beads have superficial dark blue stripes. Despite all these differences, I am inclined to put the Figure 18 and 21 beads into a single group, if not a distinct, well-defined series.

CONCLUSIONS

Part III has endeavored to describe trends found in less common star beads, and to relate them to typical beads, when comparable series exist. I have made some generalizations concerning color scheme occurrences, and their frequency or rarity; and I have attempted to show how series of beads may be alike or different, in terms of individual specimens and groups. In Part IV, I will present a number of beads that differ remarkably from star beads — perhaps the rarest of all rosetta beads. ■

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END NOTES AND REFERENCES FOR PART III

[68] The two right hand beads are not discussed because they are not cane beads. They are hand-made, wound beads, formed to imitate cane beads. The lower specimen actually has an applied wavy line to simulate a molded white layer.

[69] Good, M.E., *loc. cit.*, pp. 127-128, Pl. 6, Fig. 170; Stone, L.M., "Fort Michilimackinac . . . ," *Publications of the Museum, Michigan State University, Anthropology Series*, Vol. 2, p. 101, Fig. 49Q. Both Good and Stone describe the beads in question by the apparent appearance, rather than likely structure. Thus, the remaining blue and white layers are called "longitudinal glass insets" by Stone; and Good refers to the bead as being "complex," meaning having added stripes. As these were the only star beads recovered from the sites referred to, the statistical presence of "red" star beads is misleading.

[70] The same bead, without stripe units would be considered a "melon-form" bead; not a star or rosetta bead.

[71] The color green varies in shade from light and yellowish to dark and bluish tones. Excepting opaque versions, I am including all these as one group. It's interesting to consider the time of the introduction of green glass as an exterior color. Although green inner layers are known in early beads, I know of none with external layers. I believe that turquoise blue served that function in early beads, with green replacing it later. As a possible corroboration, early beads that have turquoise stripes are nearly the same as similar later beads with green stripes.

[72] The most common "black" glass is actually a dark shade of reddish or purplish brown, possibly made using iron and manganese. This glass appears in the internal layers of early beads, and in inner and outer layers of more recent beads. I have recorded one colonial period bead with a neutral gray exterior that looks black. Some 19th century beads appear black, but are actually very dark blue.

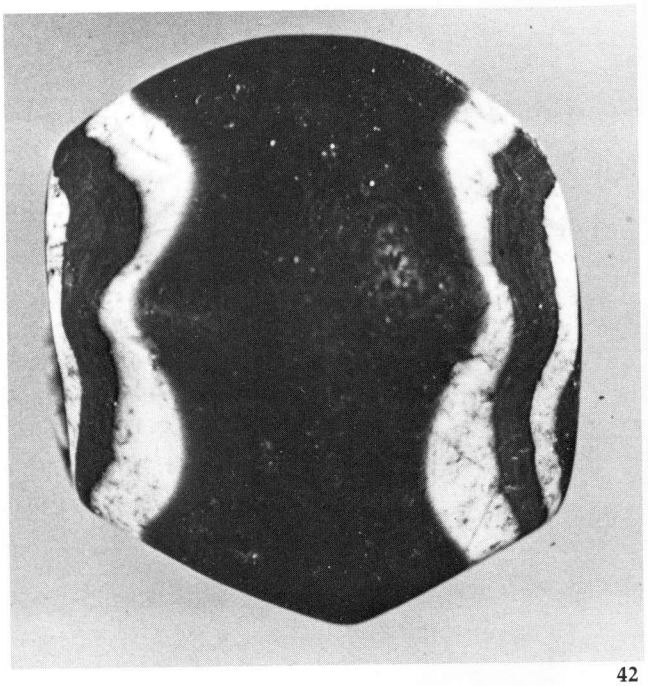
[73] Sorensen, C., "The enduring Intrigue of Glass Trade Beads," *Arizona Highways*, Vol. XLVII, No. 7, pp. 16, 36, Fig. CL178. Sorensen pictures a bright red bead of the same color sequence as my Fig. 20 bead. He implies that the red glass is produced by using gold as a colorant; and this and other comments suggest that the bead is an early one. I suspect that these beads are actually fairly new (ca. 50 years old, and not more than 100), and have selenium, or some other modern colorant.

[74] Smith, M.T., *loc. cit.*, p. 15, Fig. 2; Smith and Good, *op. cit.*, pp. 34-35, Fig. 7, Nos. 88, 89, and 92. Smith's Fig. 2 was described as having a blue exterior, though he's informed me (Personal Communication, Sept. 1983) that it's actually turquoise blue. Smith and Good report on three turquoise specimens, also derived from the colonial period.

CHEVRON-STAR-ROSETTA BEADS PART IV

*Jamey D. Allen**

This final installment, Part IV, will deal with rosetta beads that seem to be of the most rare occurrence — beads that many collectors and researchers possibly have not seen before, and which possibly have not been conceptually related to the more common star beads already discussed. I will primarily be concerned with beads whose internal patterns are not "starry" but have forms that are more "floral" in nature. In addition, I will discuss a few examples of beads that will be seen to be closely related to more typical star beads, but which have important differences also. Some of these are allied to typical beads by their color sequences, while the internal pattern is distinctly different. On the other hand, some are internally similar to typical star beads, yet their external forms call attention away from this aspect and demand special attention.



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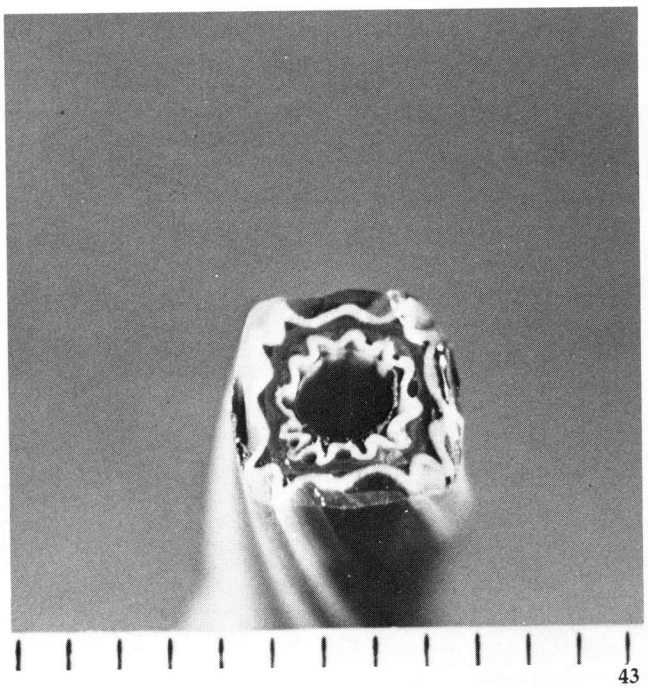

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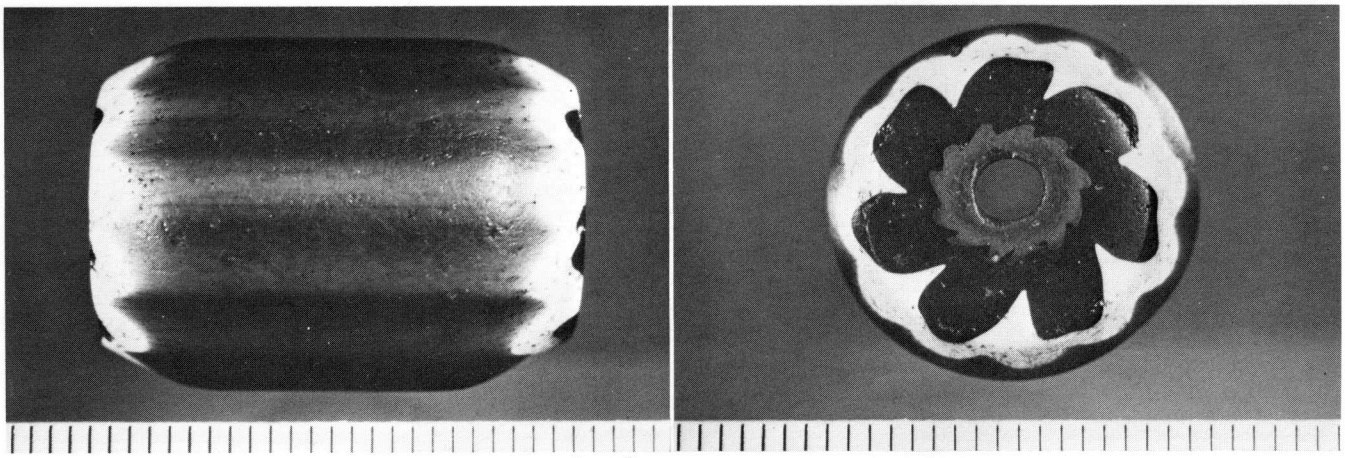
COG-LAYERED AND BLANK BEADS

Fig. 34 depicts two Colonial Period beads from Peru, in profile and cross-section, that have 7 layers and color sequences exactly like typical beads discussed before. These beads differ, however, in that the 5th and 6th, red and white, layers have not received the usual 12-pointed star molding. Instead, the gather had been inserted into a mold forming many slightly protruding lobes on the white layer, leaving the red layer below plain or "blank." The molded lobes are so shallow that they might easily be missed had not the beads been faceted on the ends. As seen in the left example, the line of demarcation between the 6th white layer and the outer blue has a "feathery" sort of appearance; and the facet cuts cause the feathery line to be scalloped in appearance. (See also the discussion of Fig. 35, below.) So, we have here a variation on the typical theme of early 7-layer faceted chevron beads, but with unusual shapes in some layers. Millefiori wares dating from the 16th and 19th centuries also occasionally feature canes with many-lobed patterns. The current name for this design is "cog" — a name I feel is suitable for the appearance. I have opted for the name "cog-layered chevron bead" to describe the Fig. 34 beads[75].

Fig. 35 presents a bead that interests me particularly because I predicted its likely occurence long before I ever saw an example of such a bead. This specimen, derived from the African trade, has 7 layers in a typical early sequence of colors; however, all the layers are unmolded — merely concentric rings. This bead clearly does not fulfill all the requirements I have set up for rosetta beads, as it lacks the all-important internal molding. Nevertheless, its obvious relationship to rosetta beads — specifically early 7-layer faceted chevron beads — demands that it be recognized as belonging in the larger scheme of bead classification. I have named this the "blank chevron bead." The name "chevron" is only marginally applicabie here, as the facets do not expose starry layers. It is interesting to note, however,



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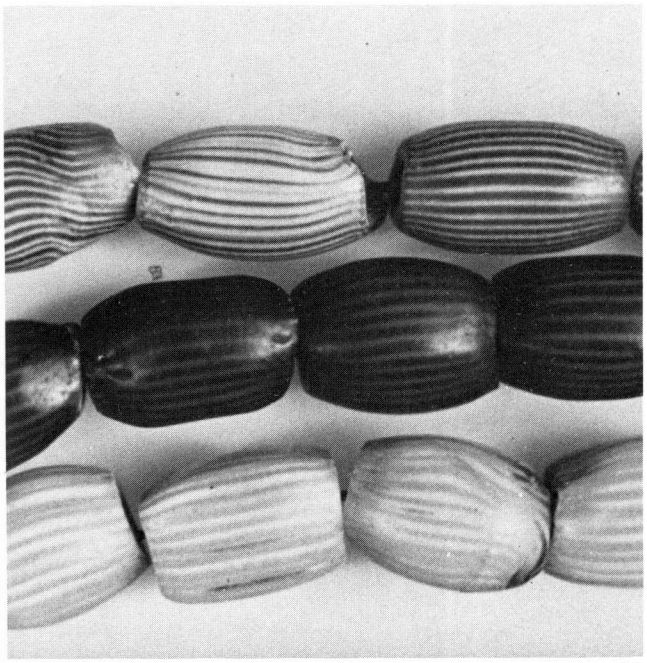

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Captions for color on p. 26.

FIG. 34 Two Colonial Period 7-layer faceted beads from Peru. The 6th layers have been "cog-molded" into many tiny lobes. The right bead is 7.5 mm in diameter. *Courtesy of Elizabeth Harris.*

FIG. 35 An early "blank chevron bead" from the African trade, with a typical 7-layer color scheme, but with unmolded layers. The natural diameter is 16 mm. *Courtesy of Michael Heide.*

FIG. 36 A small Colonial Period "Nueva Cadiz-star bead" from Peru. The bead has a square cross-section, and has been twisted, but features starry internal layers; 23 mm long. *Courtesy of Elizabeth Harris.*

FIG. 37 Two 4-layer "scallop beads" from Africa, probably of 19th C. manufacture, with floral internal layers; 17 mm in diameter. *Courtesy of Liza Wataghani.*

FIG. 38 Three hot-pinched beads from Africa, probably of 19th C. manufacture. The left bead has unmolded layers, while the middle and right beads have floral layers; 8 mm in diameter. *Author's collection, and courtesy of Liza Wataghani.*

FIG. 39 A modern Venetian bead with a floral core layer; 33 mm in diameter. *Courtesy of Gertrude Thomas.*

FIGS. 40 & 41 Four modern Venetian beads featuring floral internal patterns, seen in cross-section and vertical profile. The upper left bead has an eye pattern, due to the shape of the layers, and external grinding. The other beads clearly have floral internal layers; 12.5 mm in diameter and 13.5 mm long. *Courtesy of Elizabeth Harris.*

FIG. 42 A profile view of the Fig. 35 "blank chevron bead" from Africa. Note how the facet cuts cause a wavy line pattern; 16 mm long.

FIG. 43 A cross-section view of the Fig. 36 Nueva Cadiz-star bead, showing its 5-layer construction, and square external shape; 4 mm diameter.

FIGS. 44A & 44B Profile and cross-section views of a "scallop bead" from Africa, of 4-layer construction, with floral internal layers; 25 mm long and 17 mm in diameter. *Courtesy of Michael Heide.*

FIG. 45 A profile view of the Fig. 38 beads, seen in the same left-to-right sequence. Note the distortion of the beads, at the ends, caused by finishing technique. Note also that the internal pattern is not visible when the beads are viewed in profile; 10-11 mm long.

All photographs by Patrick Craig; except Fig. 39, courtesy of Robert K. Liu.

that *facet cuts cause* the pattern to have a sort of scalloped or wavy appearance. This effect can be seen in the profile view of the bead, Fig. 42. Note also the similarity to the left bead of Fig. 34[76].

NUEVA CADIZ-STAR BEADS

Fig. 36 (seen in cross-section in Fig. 43) can be described as a hybrid between the star bead and the "Nueva Cadiz" square-cross-section, often twisted, cane bead — well known from the early Colonial Period. Structurally, it seems to be a relatively typical early 5-layer bead (although it is possible that a very thin clear 6th layer covers the stripes). The bead has only four stripes — one on each side — of alternating brick red and medium greenish-blue applied to a thick clear layer. These float above the 4th white starry layer; and, between the stripes, the starry layer shows through as shaded white stripes (due to the angularity of the points). Similar beads exist that have the colored stripes applied directly to the white starry layer[77]. As the stripes are rather wide, they straddle more than the gap between two points — and thus are not typical set-in stripes (as described in Part III). Note that the cross-section (Fig. 43), having been pressed square, shows the star pattern greatly distorted. Two points are forced into each corner — becoming very pointy, while the "side" points are flattened — becoming broad. These beads have been recovered in Florida, Peru, and Africa, though they appear to be extremely rare. It would be interesting to know whether or not other series of similar beads exist with further congruencies to Nueva Cadiz beads[78].

FLOWER BEADS

I will now turn to specimens of beads whose internal patterns — derived from the use of lobed molds — suggest floral rather than starry forms. Fig. 37 depicts two fairly unusual beads from the African trade, probably of 19th C. manufacture, with 4 layers of glass, in the sequence: brick red, blue-black, white, and transparent green. The beads are rounded on the ends by grinding, though I do not consider them "chevron beads" because their internal structure is not starry, and the pattern exposed is not zig-zig lines. I prefer to call this a "scallop bead." The red core has received a 12-pointed star pattern, but the black layer was molded into 7 rounded lobes, while the white layer has 12 rounded lobes[79]. Viewing the profile and cross-section views of a single bead (Fig. 44A and 44B), the reader may notice that the black layer does not appear to have well-rounded petals. This is because the molding of the white layer above (in its sequence) also had an effect on the black layer. Some black petals were forced in and became concave; while others were pressed from each side and became more pointed.

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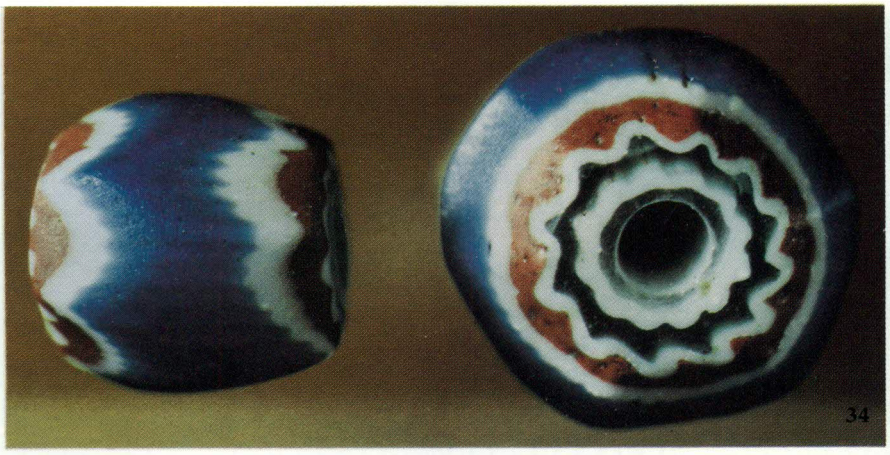
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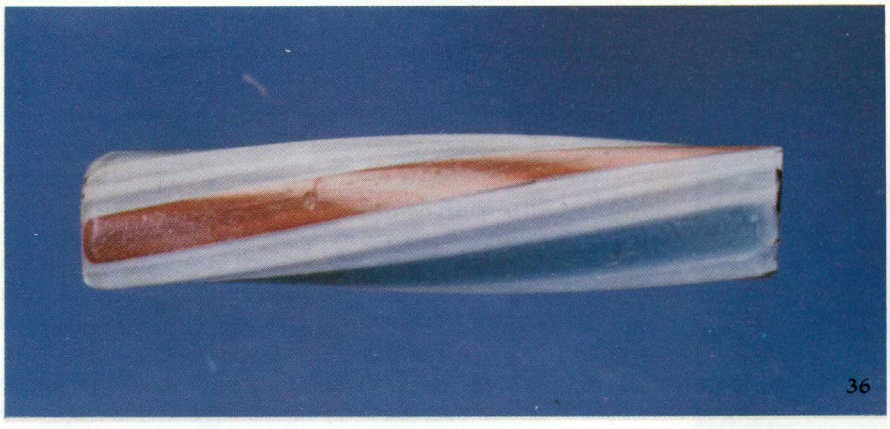
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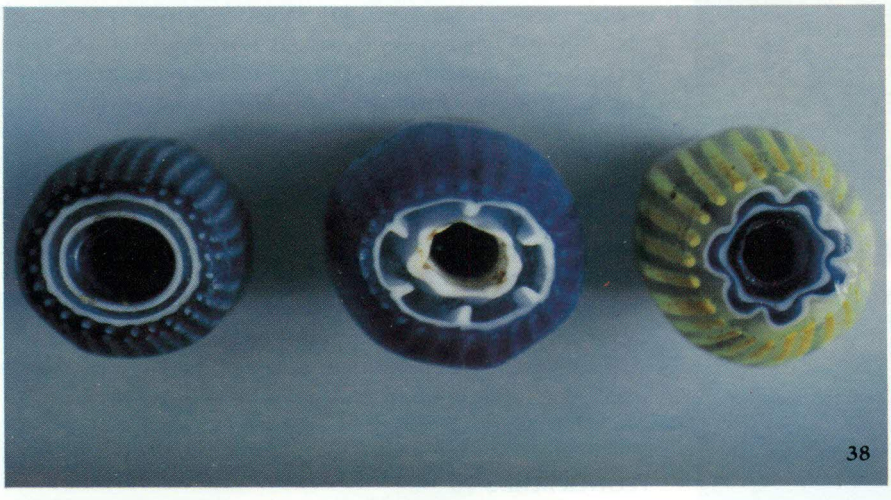
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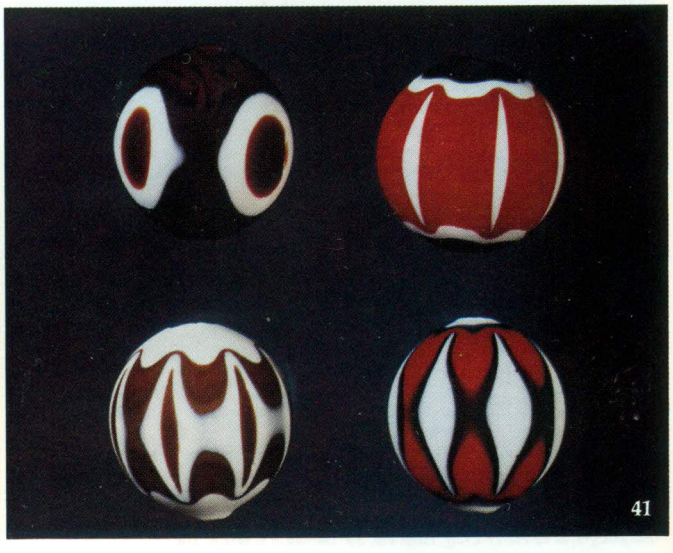
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CHEVRON BEADS *from p. 27*

During the manufacture of the gather, each of the layers was molded in turn. This is in contrast to typical star beads, where the gather usually has two layers molded at one time. Because these beads have a green external layer over a shaped white layer, they have an immediate similarity to green chevron beads. Note that the right bead of Fig. 37 has been ground all over, so that the remains of the green layer form stripes on a white background — also typical of many chevron beads.

Fig. 39 is a modern Italian bead of white and bright turquoise blue glass with 4 layers, in the sequence: white, blue, white, and blue. It is related to the scallop bead just described, in that the core layer has received floral molding to form 6 rounded petals; and, again, subsequent molding of the 3rd white layer has encroached upon the core flower causing the petals to become indented — almost bifurcated. The molding of the 3rd layer is that of typical star beads with 12 points. I regard this as a chevron bead because of this fact, though the floral interior cannot be ignored[80].

Fig. 38 presents a cross-section view of three beads that are similar in many respects. All are probably 19th C. beads and are from the African trade. Though the number of layers, patterns, and color schemes vary, all three have many fine stripes — each formed from a single rod of glass, sandwiched between 2 layers of transparent glass, so that they float above a white layer[81]. The left bead has no molded layers and therefore is not, strictly speaking, a rosetta bead. However, just as Fig. 35 is related to typical facted chevron beads, the left bead is clearly related to the middle and right beads — lacking only floral molding. The colors are light transparent cobalt blue and white, in the 5-layer sequence: blue, white, blue, white, and blue (with sandwiched white stripes). The middle bead is of 4-layer construction with the color sequence: white, transparent blue, white, and transparent blue (with sandwiched white stripes). The 3rd white layer has received floral molding forming 6 petals. Although the gather was only molded once, this affected all 3 layers. However, subsequent marvering of the gather has caused the white layer to become flattened — almost plain — in appearance and has also caused the petals of the 2nd blue layer to become wide and blunt. The right bead is of 5-layer construction and has the color sequence: dark transparent blue, white, dark transparent blue, white, and clear (with sandwiched opaque yellow stripes). Again, the gather was molded only once after the formation of the 4th white layer; and this affected the inner layers down to the core pressing each into a floral, waving line.

Ignoring the external colors, the left and right beads are most alike in structure. That is, the reader may imagine that had the right bead not been pressed into a floral mold, it would look a great deal like the left bead, in terms of its blue, white, blue, and white sequence. Anyone who is familiar with European millefiori glasswares and beads will see and appreciate the similarity between the patterns of these cane beads, and typical 19th C. Venetian millefiori[82]. These three beads were all finished in a warm state probably by the "hot-pinched" method described in Part II. Their profile appearance can be seen in Fig. 45. Note that the ends have not been ground down and the exterior layers extend all the way to the ends. The beads have been rounded by a constricting operation preformed individually by hand. This often results in a twisting or distortion of the beads' ends as seen in Fig. 45. For the cross-section photograph, three well-formed specimens were chosen to serve as clear examples of the internal features. The ends of hot-pinched beads are often ground flat (or beveled) removing the distortion caused by the shaping operation. Just the same, these beads seldom or never have their ends ground such that the inner layers are so exposed as to be perceived, in profile, as scallops, or whatever. Thus, it is necessary to view the cross-section to appreciate that the beads are in the rosetta family — and this aspect may often be overlooked.

The four beads seen in Fig. 40 and 41 are modern rosetta beads from Venice, but are not often seen. All have opaque glass of brilliant hues, like most new Italian beads. They are unusual in several respects. The internal molding is floral in all examples; and the exterior shapes are derived from a process seldom or never seen in earlier rosetta or cane beads. The upper left specimen is interesting because the profile pattern is quite different from the other beads. The cane had been given 4 lobes after the addition of the 2nd white layer and was cased with brown glass. In the process of cutting away most of the 2nd and 3rd layers of the bead, four spots were created that look a great deal like eyes. Thus, it is difficult to perceive this as a rosetta bead; although a close examination reveals that the bead is indeed cane-drawn, with shaped layers, as are the rest in this figure. The three remaining beads show more clearly floral-type molding and each gather had been molded only once. Again, most of the external layers have been cut away in the process of shaping the beads. In profile, the patterns that developed are like stripes of odd conformations — the remains of outer layers forming thin stripes, and the internal floral layers joining (or not joining) to form "hour glass" stripes.

Rather than having been hand ground, or mechanically tumbled in abrasives, to remove material from the ends, forming round beads, these specimens have been "milled." I suspect that each bead-length section of cane has been placed into a device that spins the bead and allows the beadmaker to cut the glass, much like a lathe is used to cut wood. The finishing is very mechanical in appearance, in that the amount of glass cut away is quite precise, yielding a nearly perfectly round bead. However, the pattern that is developed ignores the structure of the cane with its minor imperfections. In other words, had the beads been ground by hand, the beadmakers could easily control how much material is removed, and where. This would result in a bead that might not be perfectly round, but would have a uniformly developed external pattern. As seen in Fig. 41, the two lower beads, some layers are left intact at the equator, while others are separated. Again, this is obviously a mechanical process. Note that the ends of the beads have a slight "nipple" effect at the perforations. This is one of the main reasons I feel these beads were turned and lathed. Certainly tumbling in abrasives would not yield shapes with protuberances at the apertures.

Aside from the differences in the quality and color of these new beads and their mode of finishing, they can be seen to be related to the somewhat older Fig. 38 beads by their internal structure. By the same extension, we can relate them to modern millefiori wares, as well.

DISCUSSION

Flower-patterned rosetta beads are rather uncommon. I have seldom come across them during my 16 years of dealing with glass beads and know of only a few more examples besides those I have described here. Mosaic glass canes, made for millefiori work, most frequently have both starry and floral patterns; and it would be difficult to prove which type of pattern outnumbers the other. Although we might expect the same ratio of occurrence in rosetta beads, it is clear that many more star-patterned than flower-patterned beads have been produced over the years. I can think of no reason why this should be, other than the special favor given star and chevron beads since early times. I am sure that many readers will agree that floral beads are attractive and pleasing to the eye; and their variations

of lobed interiors make for an interesting assortment of external patterns in finished beads.

CONCLUSIONS

Each of the four parts of this series has been formulated to present distinct and important aspects of the history, manufacture, and variety of occurrence of rosetta beads. In Part I, I defined the entire family, concentrating on the most common and easily recognized types — the early and late blue star and chevron beads. As these are the greatest occurrence and have received the most attention from collectors and researchers, I gave a review of their history, and put them forth as standards for comparison to less common, but related types. Part II was concerned with describing star beads with minor (but important) differences from typical beads; and presented a step-by-step analysis of manufacture, from the formation of the gather, to the finishing of actual beads (applicable to *all* cane beads). In Part III, I discussed the manufacture of striped star beads, and presented a selection of beads featuring less common color schemes; and I discussed some of the difficulties engendered in trying to define a "series of beads." Part IV has been concerned with describing those rosetta beads that do not have starry patterns, or have features that overshadow a star-patterned interior. These were: cog-layered and blank beads, Nueva Cadiz-star beads, and various flower and scallop beads.

Star and chevron beads are so well known that many people who are familiar with glass trade beads have wrongly considered them to be "all alike;" and few have considered the place of closely related beads. Also, popular terminology — its use and misuse — has encouraged this perception. I have attempted to define and categorize different sub-groups of rosetta beads, to show their great diversity, to devise applicable names, and to provide a perspective on their interrelatedness. Much work remains to be done; and certainly there are many more beads to be categorized and described in a larger volume. This series, however, attempts to serve as a solid foundation, and complements both of the previous papers I have produced and cited herein[83]. ■

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ACKNOWLEDGEMENTS

It is only through the generosity and assistance of other bead collectors and researchers that I have been able to depict and describe so many unusual specimens of rosetta beads. I sincerely thank Elizabeth Harris, Dr. Michael Heide, and Liza Wataghani for allowing me to borrow and record numerous beads from their collections; and for understanding why it has sometimes been necessary to have them for many months at a time. Many other people have loaned me specimens for study; and each bead has been a new piece of a very large puzzle on which I am still working. I thank the following people for the beads described in this article: Jo Allyn Archambault, Tor and Judy Carlsson, Stephen Cohn, Gerald B. Fenstermaker, Helen Forcum, Jewels, Pauline Lum, Albert Summerfield, Gertrude Thomas, Boyd Walker, and Patti Yeiter.

I am very grateful to Arthur Hills and Emmy Kuster for their help with translations of foreign literature — an immense assistance.

Anyone who has ever attempted to photograph a tiny glass bead knows that the process is extremely difficult and seldom entirely successful. I am very fortunate to be working with Patrick Craig, who has spent countless hours with me during the past four years, making a photographic record of nearly every bead that passed through my hands. With the exception of Fig. 39 (courtesy of Robert K. Liu), I heartily thank Patrick for the 41 beautiful and informative photographs used throughout this article.

ENDNOTES AND REFERENCES: PART IV

[75] Hollister, P., 1969, *The Encyclopedia of Glass Paperweights*, p. 88, example [35]; Tait, H., 1979, *The Golden Age of Venetian Glass*, pp. 103-105, specimens 163 to 166; Smith and Good, *op. cit.*, pp. 35 and 43, specimen 93. Hollister, among other authors, refers to the many-lobed cane pattern as "coglike." These molded forms may have many rounded or pointed shapes, but either way, they are not easily seen as flowers or stars. Many people even see the usual 12 points of most star beads as not equaling a "star." Regardless of the name given, these patterns were created in the 16th C., as witnessed by Tait's 4 examples, and are found in 19th C. millefiori, as discussed by Hollister. Smith and Good depict a Colonial Period Peruvian bead, similar to my Fig. 34.

[76] Smith and Good., *op. cit.*, pp. 39 and 44, specimen 122. If my bead, Figs. 35 & 42, had been rounded by grinding, the pattern developed would have been concentric rings parallel to the equator. The facet cuts actually *cause* a scalloped appearance. Other beads exist from the Colonial Period, which have 7 layers in a typical sequence; i.e., Smith and Good's example, #122. This happens to be a tiny, square-cross-section bead, somewhat related to the Nueva Cadiz. Smith and Good do not make any comparison between their bead and either star beads or Nueva Cadizes. The relationship, however, has important ramifications. See Notes 78 and 79.

[77] Personal Communications from Marvin Smith, June and July, 1983; and personal observation.

[78] It is entirely possible that other series of beads exist, that are hybrids of star and Nueva Cadiz beads. Such might have the typical Nueva Cadiz blue, white, and blue color sequence, with a square cross-section — yet also have molded internal layers. Certainly, there are a number of beads that are typical star beads, but are also square in cross-section, and have been twisted as well. The Nueva Cadiz beads are widely considered to be a mystery, in terms of their supposed place of origin. Many people believe that they are of Spanish manufacture — possibly made in Spain, or in Western Europe for Spanish trade, or in Mexico (the New World) for Spanish trade. It is worth noting that Nueva Cadiz beads are usually found along with typical Colonial Period star beads. It has long been my own feeling that they are *all* made by the Venetians. Now that it is clear that hybrids between these two types of bead are known to have been made, I feel we have strong circumstantial evidence of a Venetian origin for all.

[79] It is entirely possible that the 3rd white layers have been given the typical 12-pointed star molding, although the form is rounded, as explained in Part II. It would be interesting to know of otherwise similar beads, like my Fig. 39 bead, that clearly have pointed rays. In any case, considering the 7-lobed interior, we must regard this bead as floral. Just as the typical "star bead" is faceted or ground to make a "chevron bead," the "flower bead" may be cut to form the "scallop bead."

[80] I have recorded other recent star beads with floral interiors in which the molding of the starry layers *has not* encroached upon the floral layers. In these instances, it is quite clear that the lobes were not originally pointy, like 6 or 7-rayed stars, but had rounded forms.

[81] Although I discussed the variations of stripes in Part III for star beads, I did not discuss "floating" or "sandwiched stripes" because — as far as I know — none exist in star beads, other than my Fig. 36 bead. Certainly, there may be some. In counting the layers of the Fig. 38 beads, I have opted to describe the 2 final layers, with stripe units in between, as a single layer. Had these layers been different colors, I would have counted them as 2 layers.

[82] Allen, J.D., *loc. cit.*, p. 6, specimens 47 to 51.

[83] Allen, J.D., *loc. cit.*, and ". . . New Perspective . . ." [in press]. As stated, my analysis of cane manufacture for mosaic glass beads is very closely related to cane manufacture for rosetta beads. These two works are intimately connected; and both ought to be read for a larger understanding of mosaic glass history and technology. The paper I presented at the Glass Trade Bead Conference is an amalgamation of both of my articles for *Ornament*, although it was produced in between them in time. Each work includes information not contained in either of the others — so all are worth reading, and none gives the whole picture. This article complements the Conference paper, in that many of the beads I described — which will be depicted as black and white drawings — are featured here as color photographs. In addition, as this article has been produced most recently, it contains specimens with which I was not familiar in 1982, when the Conference took place, and is therefore somewhat more up to date. I will close with a few remarks about previous installments of this article. In Part I, Note 39, I referred to Tischler's analysis of rosetta cane manufacture. I am now in a position to state that a recent translation from the German indicates Tischler's conceptions are parallel to my own. Certainly, any differences are quite minor. In Part III, Note 71, I stated that I knew of no early star beads with green external layers. Recently I was presented with a small 7-layer, faceted bead from Borneo. It has a dark green exterior and looks like an early bead in all other respects. It had been strung with other glass beads of various periods including reheated star beads — some of which were also green.

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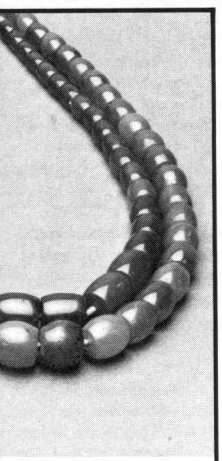

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ERRATA 7(2)

CHEVRON-STAR-ROSETTA BEADS: PART II

Page 24, paragraph 2, lines 7-8: . . . refer primarily to the color illustrations of Figs. 6 to 12. I will then proceed to discuss methods of producing finished beads, and will refer primarily to the black and white drawings of Figs. 15 and 16.

Page 24, column 2, line 1: . . . carried out *using a* double-layered . . . .

Page 28, line 4: . . . more *or* less . . . .

Page 40, lines 1-3: I have described two early (7 and 5-layer) blue series, and two late (6 and 4-layer) blue series of beads; and have compared the latter to a (6 and 4-layer) green series of beads.

ERRATA 7(3)

CHEVRON-STAR-ROSETTA BEADS: PART III

Page 24, paragraph 2, line 1: In Part I (Fig. 3), I explained . . . .

Page 24, column 2, paragraph 2, line 10: . . . seen in profile in A, and in cross-section in B.

Page 25, column 2, paragraph 4, line 4: . . . while the *middle* group . . . .

FOLLOWUP: Ecuadorian Spindle Whorls

Page 28, Figs. 4 & 5 have been transposed; Wilbert (1974) refers to the type of whorl shown in the current Fig. 5.