TAPHONOMICAL AND CHRONOLOGICAL STUDIES OF A CONCENTRATION OF EUROPEAN GLASS TRADE BEADS FROM ASHUAPMUSHUAN, CENTRAL QUEBEC (CANADA)

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Abstract

As early as the sixteenth century, glass beads were among the several categories of goods brought from Europe to be traded to Northeastern North American Indians. Attempts to set up a chronological framework on the basis of the chemistry of these beads has been recently enhanced by the application of neutron activation analysis of turquoise blue glass beads from many sites in Southwestern Ontario and Central Quebec. Subsequently, in the Quebec site of Ashuapmushuan was found a collection of 515 beads excavated from a very restricted area, indicating that they pertain to a single depositional event. This suggestion is tested through taphonomical studies, in particular on the basis of the spatial distributions of the beads. Chronological placement is also assessed on the basis of neutron activation of 122 turquoise blue glass beads. These taphonomical and chronological observations lead to some challenging cultural interpretations.

Among the several kinds of goods that were bartered by the Europeans for the furs that the Amerindians obtained through their traditional hunting and gathering way of life, were glass beads. Instances of beads concentrations are sometimes found: such is the case in this paper whose main objective is to describe a set of white, blue, red and black glass trade beads found in a restricted space of an Algonquian archaeological site in the central Québec area known as Saguenay-Lac-Saint-Jean (Fig. 1). This site named DhFk-7 is located at the mouth of Lake Ashuapmushuan into the river of the same name.

On the basis of artifact distribution, three main zones were distinguished on this site: north, central and south among which the first one only has been the subject of extensive excavations in 1990 and 1994 respectively (Fig. 2). The area of about 50 square metres of the north zone of the northern area excavated in 1990 (Moreau & Langevin 1992; Moreau n.d.) gave rise to a little less than two hundred trade glass beads (Moreau 1993, 1994a) most of them randomly spread thoughout all the area (Moreau n.d., 1994b), the unique exception being a few dozens of minute beads (seed beads) that could have pertained to the same artifact. In contrast, apart from the concentration of 515 beads excavated in the south zone of the northern area, only a few dozens of beads were found randomly spread over the 25 square metres excavated in the course of the 1994 archaeological fieldwork.

The 1994 glass bead concentration is split into two adjacent square metres (Fig. 3). In the square excavated first, N90W102, this concentration of beads presented itself

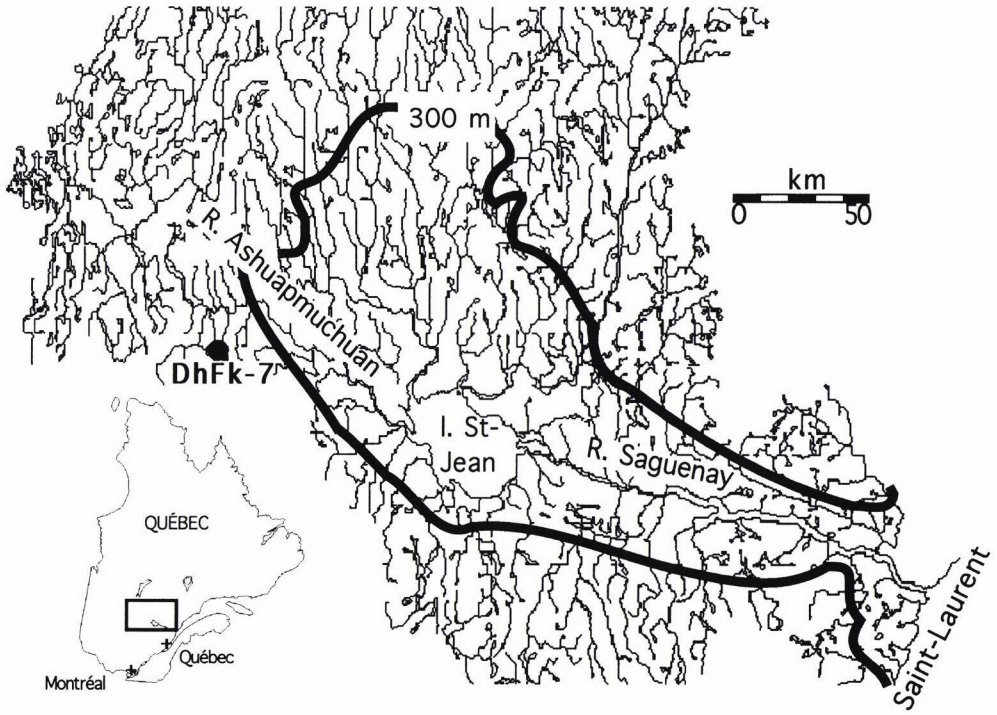

Fig. 1. Localisation of Ashuapmushuan site DhFk-7 in the Saguenay–Lac-Saint-Jean region.

as a set of 249 beads (167 white, 55 turquoise, 10 royal blue, 17 black) restricted mainly to a volume the size of a fist in the southern part of the south-west 50 x 50 cm subsquare, immediately adjacent to the northern wall of square N89W102. This fist-like concentration was stratigraphically located in the humus zone underneath the vegetal bed. Given the very restricted nature of the volume in which these 249 beads were found no other localisation was noted than the overall limits of the volume itself.

In contrast, the 266 beads (177 white, 67 turquoise, 5 royal blue, 17 red) subsequently found in square N89W102 were mainly spread over a much larger area covering almost the whole extent of its 50 x 50 cm north-western subsquare. While digging, individual localisation of these beads was noted according to their colours, but no individual record was taken as to which bead corresponded to the distributional pattern of bead colours. In brief, the precision of localisation of individual beads is limited to its provenience from the subsquare. Such limitation in localisation is the result of the decision made in the field given the very large number of beads to localise and their minute size (average of about 2 mm in diameter and 1.5 mm in length). It is of interest to note that, given the difficulty to excavate these small beads, only between 30% and 40% among them were found while screening the earth from the subquares.

The overall distribution of the subset of the 266 beads that were individually localized shows that they are restricted to about 30 cm in both the east-west and north-south directions (Fig. 3). Individual distributions of beads according to the five layers distinguished during the excavation show a wider distribution in all directions in the upper layers (humus 0 to III) in comparison to humus IV where the beads are mainly concentrated along the northern edge of the subsquare in a position adjacent both in terms of horizontal and vertical localisations to the fist-like bulk of beads. These dis-

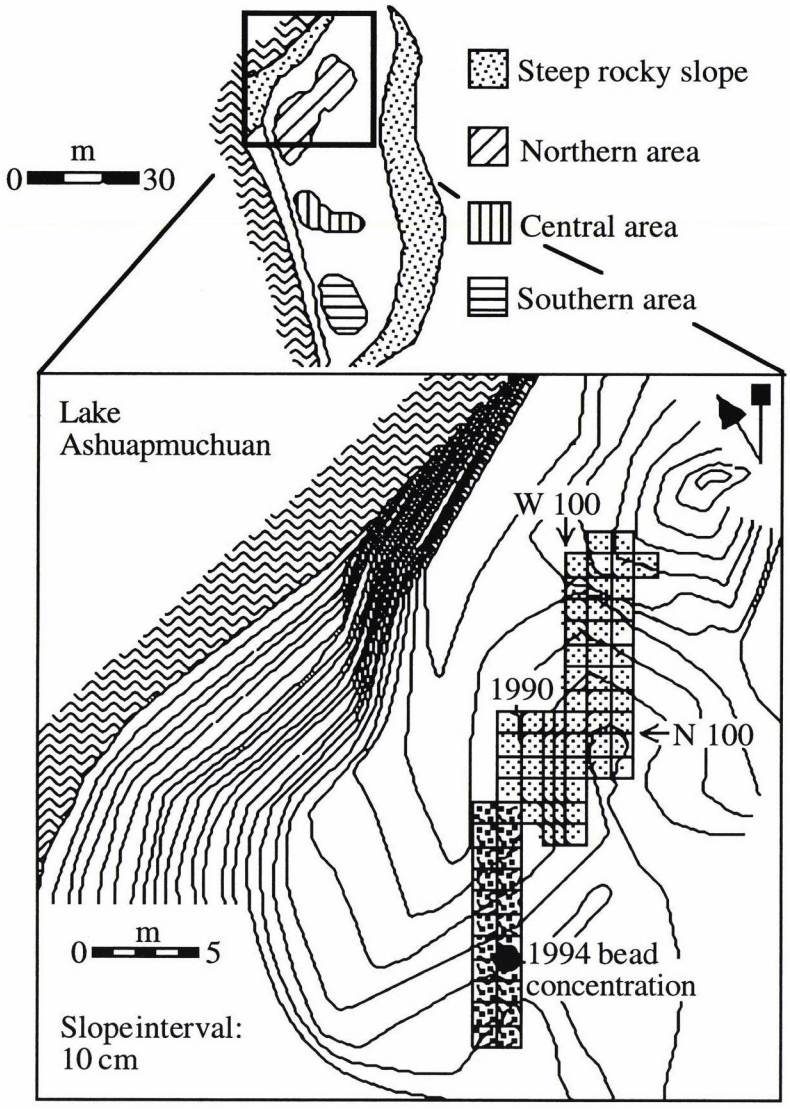

Fig. 2. Location of the 1994 bead concentration in relation to the 1990 and 1994 excavation areas on site DhFk-7.

tributions also clearly show that the red beads are outside the horizontal distribution of the white and turquoise ones as they are also in terms of vertical distribution (Fig. 4). This distribution also illustrates that while the turquoise and white beads exhibit similar vertical distributions in the southern area of the concentration, this area comprises all the red beads albeit they most probably do not relate to the white and turquoise blue concentrations while the fist-like concentration includes all the black beads and most of the royal blue beads.

Based on successfull results of previous studies (Hancock et al. 1994, Kenyon et al. 1995, Hancock et al. 1996), all the 122 turquoise blue beads and one specimen of dark blue bead were submitted to INAA using the SLOWPOKE Reactor Facility of

	Al %	Ca %	Cl %	Co ppm	Cu %	Mn ppm	K %	Na %	Sn ppm	As ppm	Sb ppm
Turquoise blue beads											
Group 1											
N	76	76	76	76	76	76	76	76	76	76	76
μ	0.77	6.1	0.95	130	0.76	600	3.1	11	773	147	169
Sx	0.03	0.38	0.04	20	0.05	48	0.28	0.35	423	57	173
Group 2											
N	46	46	46	46	46	46	46	46	46	46	46
μ	0.40	5.1	0.95	98	0.96	153	2.0	11	670	635	128
Sx	0.02	0.27	0.04	13	0.03	16	0.26	0.33	385	41	31
*t**	13.2	9.46	0.128	39.5	-5.08	380	11.5	5.48	27.2	-362	18.6
Dark (royal) blue bead											
N = 1	0.67	8.5	1.0	330	0.03	860	1.6	10	480	800	140

*p (99 %): ± 2.617. double tailed. df: (76+46-2)

Table. 1. Elemental characterization of the turquoise-blue beads of the 1994 Ashuapmushuan concentration.

the University of Toronto. These beads were selected in batches of ≈20, their lengths and widths were measured and they were weighed into polyethylene capsules. They were irradiated serially for 5 minutes at 5 kW power (neutron flux of 2.5 x 10^{11} $n.cm^{-2}.s^{-1}$.) After a delay time of 5–7 minutes each was assayed for 5 minutes for their gamma-ray activity using a Ge detector based gamma-ray spectrometer to produce data for Al, Ca, Cl, Co, Cu, Mn, Na and Sn. After 1–3 hours, they were recounted for 600–2000 s (depending on the level of K) to analyze for As, K, Na and Sb, with Na linking the two countings to ensure analytical credibility.

Although no obvious separation could be made on the basis of colour observations, the 122 turquoise blue beads eventually lead to a clear distinction between two groups on the basis of elemental data obtained from INAA (see Table 1): 76 beads (chemical group 1) are characterized by relatively high Co content (130 ± 20 ppm) and somewhat low Cu content (0.76 ± 0.05%) in contrast with the 46 turquoise blue beads (chemical group 2) with low Co content (98 ± 13 ppm) and somewhat high Cu value (0.96 ± 0.03%). In fact, only one (Cl) among the eleven elements analysed by INAA resulted in a non significant *t* test between the mean values of the two groups of turquoise blue beads. These univariate results are supported by scatterplots of factor analysis applied to the eleven elements: both the distribution of factor (dimension) 1 vs factor 2 (Fig. 5a) as well as factor 1 vs factor 3 (Fig. 5b) result in clear segregation of the two groups with the single royal (dark) blue bead specimen lying completely outside both groups.

On the basis of the chronological distribution of turquoise blue beads through time

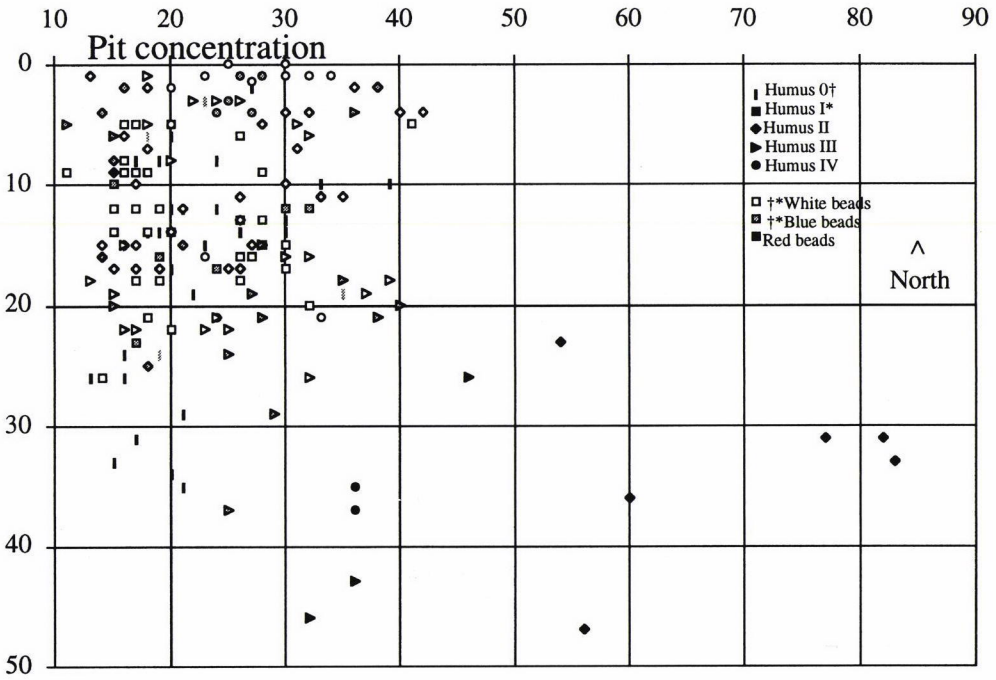

Fig. 3. Beads distribution of the 1994 Ashuapmushuan concentration.

as established by previous INAA studies for Ontario (Hancock et al. 1994, Kenyon et al. 1995) and for Saguenay-Lac-Saint-Jean (Hancock et al. 1996), could the 1994 bead concentration from Ashuapmushuan be dated? These studies suggest that ratios of Cl/Na and K/Na may lead to some answer. Hence turquoise blue beads of the first half of the seventeenth century occupy a somewhat central position in a graph of one vs the other ratio (Fig. 6). In this graph, empty triangles, diamonds and rectangles represent respectively the turquoise blue beads from the three glass beads periods that could be segregated in the 1575 to 1650 time period in Ontario while the empty circles that share the same area of distribution represent the 1600 to 1650 turquoise blue beads from Saguenay–Lac-Saint-Jean. Solid circles that represent the late French Regime (1660–1760) in Ontario share about the same location with solid triangles that represent the late part (1700–1750) of this period in Saguenay–Lac-Saint-Jean. The Early British (1760–1840) Regime is represented by crosses over gray shading for Ontario and by x over shading for Saguenay–Lac-Saint-Jean. Finally, the Late British Regime from 1840–1900 and modern specimens from the 1900–1930 time period are respectively represented by black diamonds and squares.

All the above beads were coloured by means of copper oxides, rarely with measurable traces of cobalt. In contrast, the turquoise blue beads of the 1994 concentration are tinted by both copper and cobalt although the cobalt value is fairly low (in the hundreds of ppm) compared to royal (dark) cobalt coloured bead with value of Co in the range of three or more times this concentration level. Group 1 (relatively high Co levels) and group 2 (relatively low Co levels) of the 1994 Ashuapmushuan bead concentration are respectively represented by short and long bars in Fig. 6. Although their segregation is still maintained in this graph, they share a space uncommon with the copper coloured specimens whatever their time periods. They do however partly share

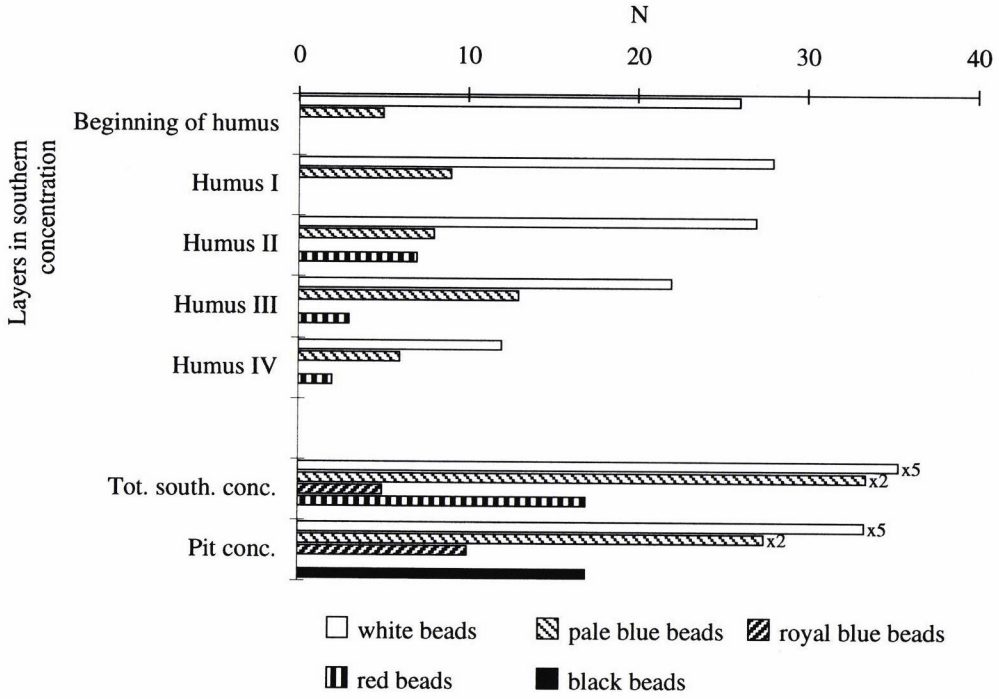

Fig. 4. Vertical distribution of the beads of the 1994 Ashuapmuchuan concentration.

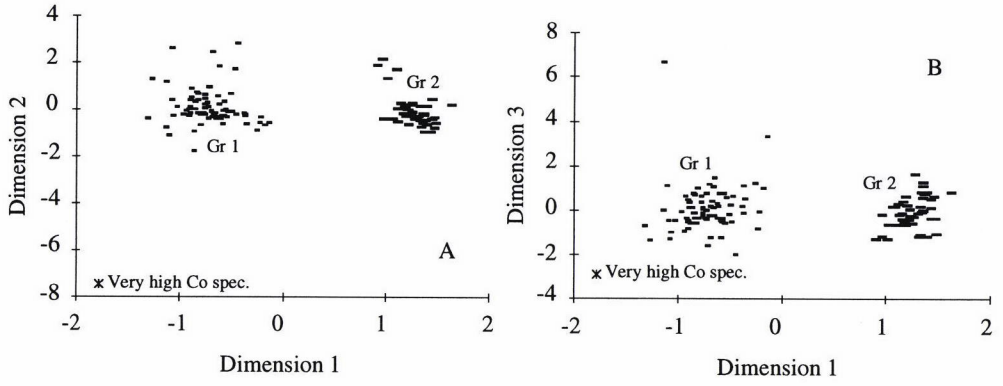

Fig. 5. Scatterplots of the 1994 Ashuapmushuan concentration turquoise blue beads based on 11 elements.

the area of distribution of cobalt coloured beads of the 1600 to 1650 time periods found in Ontario represented by x. In contrast, later (presumably 1650–1700) cobalt rich specimens from Saguenay–Lac-Saint-Jean (+) present a contrasting position to either the Ontario cobalt specimens or the specimens from the 1994 Ashuapmushuan concentration. Finally stars represent tin rich specimens presumably from the 1640 to 1700 time period in Saguenay-Lac-Saint-Jean while stars over shading represent antimony rich specimens from the Early British Regime (1760 to 1840) in Ontario, both distributions neighbouring each other as well as the specimens from the 1994 Ashuapmushuan concentration.

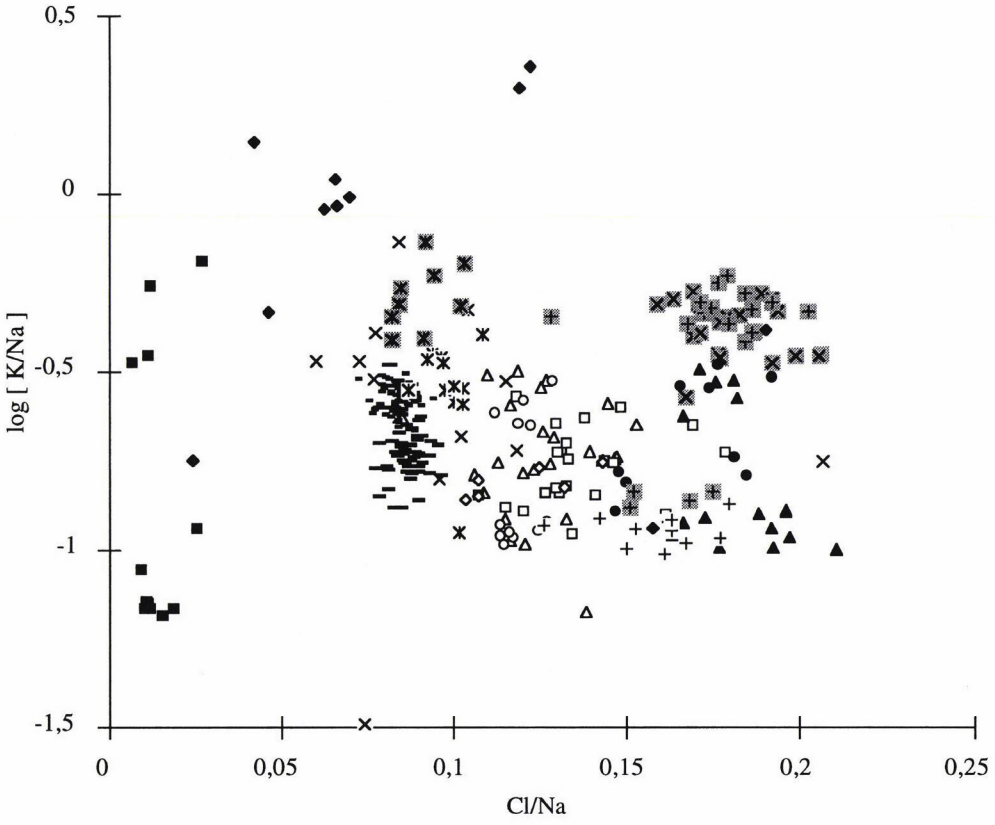

Fig. 6. K/Na vs Cl/Na for Ontario and Lac-Saint-Jean turquoise blue glass beads.

Keeping in mind that the turquoise blue specimens from this concentration were both cobalt and copper tinted as opposed to copper tinted only specimens, and as much as the Cl/Na vs the K/Na ratios are significant, the Ashuapmushuan 1994 concentration may well be more akin to a late French Regime to Early British Regime time frame than to any preceeding or following time periods. This however is still to be tested further to confirm this hypothesis.

The contrasting distributional patterns of beads between a bulk of specimens grouped in a volume the size of a fist and a set of specimens spread in a 30 by 30 cm space also invite some cultural interpretation of the 1994 Ashuapmushuan concentration. Keeping in mind the example recently found in an Algonquian burial in Ontario (Ross et al. 1996) of a bag decorated by means of a row of white trade glass beads of about the size of those of the Ashuapmushuan concentration and by means of a host of tinkling cones made of scraps of alloyed copper kettles of European origin rolled in conical fashion, could the Ashuapmushuan be the remains of such a decorated bag? Distribution of the beads according to colours and localisation (Table 2) shows that the contrasting pattern between the fist-like concentration and the southern one already noted for the black and the royal blue specimens is also clearly exhibited by the contrasting distribution of the two groups of turquoise blue beads, most of the specimens with the high Co content being in the southern concentration while the low Co specimens mostly pertain to the fist-like concentration.

Color / chemistry	« Fist-like » concentration	Southern concentration	Total
White	*not yet differentiated* N=167	*not yet differentiated* N=177	344
Turquoise blue group 1 high Co / low Cu	**few** n=22 (29 %)	**most** n=54 (71 %)	76
Turquoise blue group 2 low Co / high Cu	**most** n=33 (72 %)	**few** n=13 (28 %)	46 } 122
Royal blue very high Co	**most** N=10 (67 %)	**few** N=5 (33 %)	15
Black	**all** N=17 (100 %)	**none** N=0 (0 %)	17
Red	**none** N=0 (0 %)	**all** N=17 (100 %)	17
Total	249	266	515

Table 2. Distribution of the 1994 Ashuapmushuan concentration according to localisation and color / chemistry.

In short, the fist-like concentration may constitute a bulky set of loose beads at the bottom of a bag that could explain their lowermost stratigraphical position while the beads spread over the 30 x 30 cm area could be the remains of the decorative beads on the bag, their somewhat random actual distribution in both vertical and horizontal directions being the result of the different taphonomical processes that took place since the time of deposition. Again this proposition should stand as a hypothesis as long as other arguments cannot be provided. Fortunately, all the white beads of the Ashuapmushuan concentration have recently been submitted to INAA along with a major project of chronocultural placement of white beads from over all Northeastern North America. While this is, however, another story, the study of these white glass beads could well provide (or not provide) support to either or both of the above hypotheses.

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