AN ANALYSIS OF THE CERAMICS FROM THE LOWTON SITE
by

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## A THESIS

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$$

## ABSTRACT

A collection of rim sherds from the Lowton site in south-central Manitoba is discussed, and the technique of association analysis, described by Whallon, (1972), is applied to the collection to derive a typology for it. The limitations of the technique, principally in the selection of attributes for analysis, are discussed, and suggestions are made for the improving of the technique.

The collection is described in terms of the types derived by the technique, and comparisons are made with the ceramics of other parts of southern Manitoba, Saskatchewan, Alberta, Minnesota, and North and South Dakota. On the basis of these comparisons, it is suggested that the site was part of one or more cultural manifestations of the late prehistoric which existed on the Canadian Plains. It is further suggested that the Lowton manifestations were derived partly from the Village Farming Traditions of the Missouri Valley, and partly from the Woodland Tradition of southeastern Manitoba.

## ACKNOWLEDGEMENTS

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## INTRODUCTION

This thesis has two objectives: (1) to derive a typology for the rim sherds from the Lowton site, and (2) to offer some suggestions about the site's place in the archeological context of the Northern Plains, as far as that can be determined from its ceramics. In order to carry out the first objective $I$ used the technique of association analysis proposed and described by Robert Whallon (1972). I offer this method, and the resulting typology, along with some comments on the problems I encountered in working with the technique, to other researchers into Plains archaeology as a possible aid to their work. In pursuing the second objective, I have compared the types derived for the Lowton collection with others established for the pottery of this province and adjacent areas. I offer some tentative suggestions concerning the significance of the similarities of the Lowton ceramics with other material from the Canadian and U. S. Plains.

This thesis presents a synthesis of part of the data which was recovered from the Lowton site before it was destroyed in 1947, and, I hope, makes a contribution towards solving some of the problems of Plains prehistory. It is not a site report for the Lowton site. In view of the absence of contextual data from the site, such a report would be
little more than an artifact catalogue. This study presents a specialized analysis of a significant portion of the artifacts recovered from the site: the rim sherds.

## CHAPTER I

THE LOWTON SITE

The Lowton Site, DiLv-3, is located on the southwest quarter of section 26 , township 5, range 16 , in Strathcona municipality, in south-central Manitoba (Fig. 1). A portion of it spreads over into NW-23-5-16 of the same municipality, and Highway 23 runs along the section line, bisecting the site. The site is midway between the towns of Belmont and Ninette. Three miles to the west is the northern tip of Pelican Lake, the largest in a chain of long lakes that lie in the Pembina River valley. This valley forms a trench which cuts into the Manitoba Escarpment west of Pembina Mountain, and south of the Tiger Hills, two elements of the Escarpment. A continuation of this trench communicates with the Souris River valley, about twelve miles to the northwest. Thus, the Lowton Site is located close to a physiographic feature which, in prehistoric times, would have been a convenient travel route across southern Manitoba and into North Dakota. Before the period of intensive Euro-Canadian settlement, the site was located in the Aspen Parkland vegetation zone. The surrounding area is now agricultural land. It was first settled in the late nineteenth century by a Mr. Lowton, whose son-in-law owned the land on which most of the site was situated when it was excavated.

FIGURE 1 - LOCATION OF THE LOWTON SITE


The site was first brought under cultivation in the 'twenties. It soon became apparent that it was a rich source of Indian artifacts. A local collector, Mr. Frank Brown, began to collect artifacts from the site in the mid-thirties. Much of his collection was sold piecemeal, but the remainder, over two thousand potsherds, were sold to Mr. Chris Vickers in 1946. Vickers, in turn, kindly turned this collection over to the University of Manitoba for study. The site was excavated and more systematically collected by Vickers in the later 'forties. He first visited the site in 1943, and tested there in the summer of 1944. He surface collected there in the spring of 1945, and that summer, continued the excavation started in the previous season, $X U-1$ (Fig. 2). He also dug a test unit, $X U-2$, elsewhere on the site. Surface collecting was continued in the spring of 1946, and throughout that summer work was continued on $X U-1$. Two new units were opened: $X U-3$ and another test pit. More surface collecting was done in the spring and summer of 1947, including the area of the newly cut Highway 23. Work was continued on $\mathrm{XU}-3$. The road construction disturbed all the areas were Vickers had dug, and no further excavating was done on the site. Surface collecting was carried out in 1948, 1949, 1950, 1951, and 1964. In 1963, Vickers donated the bulk of his archaeological collection from southern Manitoba, including the Lowton material, to the Department of Anthropology at the


University of Manitoba. This donation included all of the pottery from the Lowton site that Vickers had obtained, except for fifty sherds that he sent to the North Dakota Historical Society, and sixty-six sherds sent to the National Museum of Canada. This latter group was borrowed for this analysis.

The Lowton collection was referred to me as a thesis project in the late summer of 1971. On cataloguing the collection $I$ discovered that it was quite large and varied, consisting, in total, of 4119 artifacts. Of these, there were 2764 sherds (1212 rims and 1552 body sherds), 1175 stone artifacts, including many complete points, scrapers, bifaces, large tools, and waste flakes; there were 111 pieces of bone, and 69 pieces of shell. The distribution of the artifacts on the site is given in Table 1.

Analysis of the Lowton site presents several major difficulties.The site was thoroughly disturbed by ploughing and collectors by the time Vickers examined it. His own excavations were productive of artifacts, but little else. No structures were found, and the only cultural feature located was in XU-1, which contained "a clearly discernable" deposit of "burnt bone and ash" (Vickers, 1946:63), and yielded many points. Vickers concluded that this was a midden, but its relation to the rest of the site was not determined. XU-2 yielded few artifacts, and " the clear line

TABLE 1
DISTRIBUTION OF THE ARTIFACTS IN THE LOWTON SITE

| Artifact class | Surf. XU-1 XU-2 XU-3 | Total |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Rimsherds | 272 | 1 | 18 | 291 |
| Bodysherds | 202 | 1 | 73 | 276 |
| Rimsherds collected by Brown | 952 |  |  | 952 |
| Bodysherds collected by Brown | 113 |  | 113 |  |
| Lithics |  |  |  |  |

of the deposit could not be detected" (Vickers,1945:66). XU-3 was a trench $15^{\prime}$ by $4^{\prime}$ by $10^{\prime \prime}$ deep, and yielded a fair quantity of artifacts, but there was "no indication of clearly defined occupational deposit, the material recovered (was) scattered throughout the entire depth of the trench" (Vickers, 1946:87). Most of the artifacts were taken from the surface of the ploughed field. Although Vickers noted the areal distribution of the surface finds (Fig. 2), no clear patterns suggesting cultural features are discernable. Because Vickers did his work before radio-carbon dating techniques were available, and before paleo-ecology was stressed in archaeology, no carbon or pollen samples were taken. The context of the bone and shell recovered was too imprecisely recorded to make it useful for dating. Thus, the most fruitful kinds of anthropological analysis, such as reconstructing subsistence patterns, or plotting the functional areas of the site were not possible. Even the basic questions regarding culture sequence and dating were difficult to answer.

Because of these and other limitations, my analysis was restricted to the ceramics, and I concentrated on the rim sherds, of which there were over 1200 in the collection. For the puposes of this analysis, I assumed that these sherds constituted a random sample from the site. The analysis and conclusions given in the following chapters were based on these sherds.

## CHAPTER II

METHODOLOGY

One aspect of the research was the application of the statistical technique of association analysis, described by Robert Whallon (1972), to a sample of mainly surface collected sherds. This technique involves the description of the sample in terms of selected attributes, and then the typing of the sample according to the associations of the attributes.

In this thesis, attribute is defined as a single item in the description of an object, in this case rimsherds. An attribute may be continuous, such as the measurement of some aspect of the object (mass, height, diameter, etc.), or discrete, consisting of a series of non-overlapping states, into one of which the object is classed.

I chose certain attributes of rim form, surface finish and decoration, and omitted those connected with the technology of ceramics, such as paste, temper, and hardness. Because an aim of my research was to trace the cultural affiliations of the Lowton site, I limited my detailed analysis to stylistic attributes which presumably reflected most closely the cultural preferences of the Lowton potters. I based my selection on the list that MacPherron used in his analysis of ceramics from the Juntunen site in northern Michigan (1967:

303-306). The list of attributes used in this analysis is given in Table 2, and a detailed description of the attributes is given in the Appendix.

Preliminary Statistical Description
The analysis of the Lowton rimsherds was divided into two stages: the description of the collection in terms of the selected attributes, and the actual typing of the collection by the technique of association analysis.

Association analysis involves calculations of chisquare values for all pairs of attributes. This requires that all attributes be discrete. Eight of the attributes originally selected were various measurements of rim form or notching. It was thus necessary to divide the continuous range of variation expressed by these attributes into discrete categories, that is, to rationalize the continuous attributes. In order to accomplish this, the frequency distributions, means and standard deviations of each continuous attribute, based on measurements taken from the entire collection, were needed. These were obtained from the CONDESCRIPTIVE and CODEBOOK programs of the Statistical Package for the Social Sciences (SPSS) (Nie, Bent, and Hull, 1970: 96-114). Once the frequency distributions of the continuous attributes had been obtained, the attributes were rationalized by dividing their ranges of variation into small, medium, and large categories, based on standard deviation units.

$$
\begin{aligned}
& \text { TABLE } 2 \text { - Continued } \\
& \text { 3. Rim Curvature } \\
& \text { (i) Straight } \\
& \text { (ii) S-Curved } \\
& \text { (iii) Incurved } \\
& \text { (iv) Outcurved } \\
& \text { 4. Rim Flare. } \\
& \text { (i) Absent } \\
& \text { (ii) Small } \\
& \text { (iii) Medium } \\
& \text { (iv) Large } \\
& \text { 5. Rim Flare Position } \\
& \text { (i) Absent } \\
& \text { (ii) Interior } \\
& \text { (iii) Exterior } \\
& \text { (iv) Both } \\
& \text { C. LIP } \\
& \text { 1. Lip Thickness } \\
& \text { (i) Small } \\
& \text { (ii) Medium } \\
& \text { (iii) Large } \\
& \text { 2. Lip Overhang } \\
& \text { (i) Absent } \\
& \text { (ii) Small } \\
& \text { (iii) Meaium } \\
& \text { (iv) Large } \\
& \text { (i) }
\end{aligned}
$$

TABLE 2
THE ATTRIBUTES USED TO DESCRIBE THE LOWTON CERAMICS

[^0]table 2 - Continued
3. Lip Overhang Position
(i) Absent
(ii) Interior
(iii) Exterior
(iv) Both
4. Lip Surface
(i) Flat
(ii) Convex
(iii) Concave
5. Lip Slope
(i) Outsloping
(ii) Insloping
(iii) Horizontal
6. (i) Absent
(ii) Interior
(iii) Exterior

\[

$$
\begin{aligned}
& \text { TABLE } 2 \text { - Continued } \\
& \text { (x) Notching (Continued) } \\
& \text { (b) Distance Between Notches } \\
& \text { (i) Absent } \\
& \text { (ii) Small } \\
& \text { (iii) Medium } \\
& \text { (iv) Large } \\
& \text { (c) Notch Depth } \\
& \text { (i) Absent } \\
& \text { (ii) Small } \\
& \text { (iii) Medium } \\
& \text { (iv) Large } \\
& \text { (d) Notch Direction } \\
& \text { (i) Absent } \\
& \text { (ii) Vertical } \\
& \text { (iii) Right Oblique } \\
& \text { (iv) Left Oblique } \\
& \text { (e) Notch Position } \\
& \text { (i) Absent } \\
& \text { (ii) Interior } \\
& \text { (iii) Exterior } \\
& \text { (iv) Both } \\
& \text { (v) Lip Surface }
\end{aligned}
$$
\]

[^1]-15-


Thus, the medium category consisted of all values that fell within one standard deviation of the mean; the small and large categories consisted of the values in the left and right tails, respectively, of the distributions (Fig. 3). The distributions of the continuous attributes and their division into discrete categories is shown in Figures 4 - ll. With three exceptions, all have approximately normal distributions, and could be easily rationalized according to the method described above. The exceptions were Rim Flare, Notch Width, and Distance between Notches (Figs. 9, 10, 11), whose distributions were skewed. Most of the values for these attributes fell in the small end of the range of variation, the frequencies dropping off sharply as the attribute values increased. Thus, the majority of the sherds in the collection had little or no rim flare. On the notched sherds most notches were small and close together. The small, medium, and large categories for these three attributes are shown in Figures 9-11.

The next step in the analysis was to dichotomize the twenty-six discrete attributes. Each state of each attribute was made an attribute in its own right, with two possible states: present or absent. For example, the attribute Rim Curvature has four states: Straight, Incurved, Outcurved, and s-Curved. These are equivalent to four dichotomized attributes. If a rim has the state Straight with respect to

## FIGURE 3

DIAGRAM TO SHOW THE RATIONALIZATION OF A CONTINUOUS ATTRIBUTE


Assuming that the continuous attribute has a normal, or approximately a normal distribution, it can be rationalized by letting all values within one standard deviation ( $\sigma$ ) of the mean $(\mu)$ be the medium state, and all the values in the right and left tails be the large and small states, respectively.


the attribute Rim Curvature, then, with respect to the dichotomized attribute Rim Curvature-Straight, its state is present. With respect to the other dichotomized attributes of the Rim Curvature class, its state is absent. The list of the 113 dichotomized attributes is also given in Table 2. Only a small proportion of the sherds (169 sherds, or about $14 \%$ of the whole collection) were sufficiently complete to be described in terms of all the dichotomized attributes. The rest were missing the neck portion of the rim, and therefore could not be described in terms of Neck Thickness, Neck Angle, or Rim Height. The typology derived by association analysis was based on this sample of 169 rimsherds and was mater applied to the rest of the collection.

## Association Analysis

The technique Whallon describes (1972:18-21) involves ranking the dichotomized attributes according to their importance in accounting for variation within the collection. The collection is then divided into successively smaller and more homogenous groups on the basis of each attribute in turn, starting with the first one in the hierarchy. What is needed is a value which will indicate the relative importance of an attribute, so it can be placed in the hierarchy. The value used is a function of the chi-square statistic. The rationale behind the use of this statistic is as follows:

Suppose that an attribute $x$ always occurs in combination with attribute $\underline{a}$, and never in combination with attribute $p$. Thus, $x$ could be used to divide the collection into two groups, mutually exclusive with respect to a and p. If the chi-square test of independance were performed on the distributions of $\underline{x}$ with $\underline{a}$, and $\underline{x}$ with $\underline{p}$, high chi-square values would be obtained for each association. This would indicate that the distribution of $x$ in the collection is dependant on the distributions of $\underline{a}$ and $\underline{p}$. That is, $\underline{x}$ always occurs when $a$ occurs, and never when $p$ occurs. Note that the chisquare value is high for both positive and negative associations of x .

Now suppose that an attribute $y$ occurs equally frequently in association with both $\underline{a}$ and $p$; $\underline{y}$ could not therefore be used to divide the collection into two groups, mutually exclusive with respect to a and p . A chi-square test of independance for $\underline{a}$ with $\underline{y}$ and $\underline{p}$ with $\underline{y}$ would yield low chi-square values, indicating that the distribution of $\underline{y}$ in the collection is relatively independant of and $\underline{p}$.

Assume that $x$ has high positive or negative associations with a number of attributes. This means that the groups based on the presence or absence of $\underline{x}$ would also be similar to the groups divided off on the presence or absence of $a$ or $p$ or any of several other attributes. If the chi-square test for independance were run on all associations of $x$ with other
attributes, most of the resulting values would be high. If this procedure were repeated for every attribute being used, the result would be a function of chi-square (the sum of the individual chi-square values, or the mean chi-square value) for each attribute, and the attributes could then be ranked according to these values. Attribute $x$, the most useful for dividing the collection, would be at the top of the hierarchy. Attribute $\underline{y}$, the least useful because its occurrence has little to do with those of most other attributes ( and having therefore the lowest sum and mean chi-square values), would be at the bottom of the hierarchy.

The calculations of the chi-square values* for the Lowton collection resulted in a matrix with 113 x 113 cells, from which redundant values had'been omitted. The concept of redundancy as used by Whallon (1972:18-19) can be explained by referring to the Rim Curvature example mentioned above. A sherd can only exhibit one of four profiles; it cannot, for example, be both incurved and outcurved. This is true for most attribute classes, and such within-class combinations were omitted from the matrix. Also, for some attributes, the $\mathrm{Ab}-$ sent state automatically eliminated certain other attributes. For example, if a sherd showed Absent for the

* The mechanics of the chi-square test for independance can be found in most statistics texts, for example, Roscoe, 1969, (pp 196-201). The CROSSTABS program of the SPSS (1970:115-23) was used to perform the chi-square calculations for this project.
dichotomized attribute Exterior Surface Finish - Cord-Wrapped Paddle, then all the other attributes relating to that kind of surface finish became redundant, and their chi-square combinations were also omitted.

However, in the cases of the attribute classes Decorative Motif, Decorative Technique, and Decoration Location, combinations of attributes within classes were not redundant. Thus, a single sherd could be decorated with both cord-wrapped-stick and punctated designs. Such combinations were included in the matrix.

The reduced matrix was examined, and, for, each dichotomized attribute, the sum and mean chi-square values.. were calculated. Whallon discusses (1972:21-27) the relative merits of different functions of chi-square that can be used in association analysis. In this analysis, the hierarchy based on the sum of chi-squares was used to derive a typology for the sample. A hierarchy based on the mean chi-square values might be preferable, since this function takes into account the different sample sizes used to calculate the sums of chi-squares for different attributes. However, in this analysis, the hierarchies derived from the two functions of chi-square were not very different. Indeed, for the first twenty-odd attributes actually used to. derive the typology, they were almost identical.

Tables 3 and 4 give the two hierarchies initially set
table 3
THE SUM-OF-CHI-SQUARES ATTRIBUTE HIERARCHY BASED RANK DICHOTOMIZED ATTRIBUTE SUM OF CHI-SQUARES 272.00
265.00
259.00
256.80
256.10
248.00
244.90
244.20
242.00
229.00
227.00
226.12
226.07
224.00
220.00
212.00
208.00
207.00
205.00

 | SUM OF CHI-SQUARES |
| :---: |
| 202.00 |
| 198.00 |
| 192.00 |
| 191.00 |
| 190.90 |
| 190.40 |
| 188.00 |
| 186.00 |
| 186.00 |
| 186.00 |
| 186.00 |
| 186.00 |
| 185.00 |
| 183.00 |
| 183.00 |
| 183.00 |
| 183.00 |
| 176.00 |
| 173.00 |

| RANK | TABLE 3 - Continued DICHOTOMIZED ATTRIBUTE |
| :---: | :---: |
| 37. | Distance Between Notches, Small |
| 38. | Overhang Position, Both |
| 39. | Decoration Location (iii) |
| 40. | Rim Curvature, Outcurved |
| 41. | Notch Direction, Left Oblique |
| 42. | Decorative Motif (v) |
| 43. | Distance Between Notches, Medium |
| 46. | Notch Width, Absent |
| 46. | Distance Between Notches, Absent |
| 46. | Notch Depth, Absent |
| 46. | Notch Direction, Absent |
| 46. | Notch Position, Absent |
| 49. | Rim Flare Position, Interior |
| 51.5 | CWP, Cord Direction,Absent |
| 51.5 | CWP Cord Size, Absent |
| 51.5 | CWP Degree of Smoothing, Absent |
| 51.5 | CWP Distance Between Cords, Absent |
| 54. | Lip Edge, Both |
| 55. | CWP, Cord Size, Medium |

\[

\]

$$
\begin{gathered}
\text { SUM OF CHI-SQUARES } \\
\hline 134.00 \\
133.00 \\
124.00 \\
117.00 \\
113.00 \\
107.00 \\
104.00 \\
102.00 \\
101.00 \\
99.60 \\
99.10 \\
97.80 \\
97.20 \\
94.00 \\
93.00 \\
91.00 \\
90.00 \\
90.00 \\
89.80
\end{gathered}
$$

$$
\begin{array}{llc} 
& \text { TABLE 3 - Continued } \\
\text { RANK } & \text { DICHOTOMIZED ATTRIBUTE } & \text { SUM OF CHI-SQUARES } \\
\text { 94. Rim Thickness, Medium } & 89.10 \\
\text { 95. Neck Angle, Large } & 88.00 \\
\text { 96. Decorative Technique, (ix) } & 87.00 \\
\text { 97. Rim Height, Small } & 86.00 . \\
\text { 98. Rim Flare Position, Both } & 84.80 \\
\text { 99. Rim Flare Position, Exterior } & 84.70 \\
\text { 100. Surface Finish, Other } & 84.20 \\
\text { 101. Rim Curvature, Incurved } & 83.00 \\
\text { 102. Decorative Technique, (v) } & 82.00 \\
\text { 103. Decorative Technique, (iii) } & 81.00 \\
\text { 104. Surface Finish, Smoothed Fabric Impressed75.00 } \\
\text { 105. Rim Thickness, Small } & 74.93 \\
\text { 106. Lip Slope, Outsloping } & 74.92 \\
\text { 107. CWP, Cord Size, Small } & 73.00 \\
\text { 108. Lip Slope, Horizontal } & 72.85 \\
\text { 109. CWP, Cord Direction, Left Oblique } & 72.82 \\
\text { 110. Decorative Motif, Absent } & 68.00 \\
\text { 111. Neck Thickness, Medium } & 67.50 \\
\text { 112. Overhang Position, Exterior } & 67.30 \\
\text { 113. Rim Height, Medium } & 47.00
\end{array}
$$

$$
\begin{gathered}
\text { TABLE } 4 \\
\text { THE MEAN Chi-SQUARE ATTRIbUTE hierarchy based oi }
\end{gathered}
$$

\[

\]

$$
\begin{aligned}
& \text { ON } \\
& \text { MEAN CHI-SQUARE } \\
& \hline 7.100 \\
& 5.300 \\
& 5.200 \\
& 4.600 \\
& 4.500 \\
& 4.500 \\
& 4.500 \\
& 3.600 \\
& 3.520 \\
& 3.510 \\
& 3.400 \\
& 3.000 \\
& 2.900 \\
& 2.800 \\
& 2.600 \\
& 2.560 \\
& 2.540
\end{aligned}
$$

| RANK | table 4 - Continued |  |
| :---: | :---: | :---: |
|  | DIChotomized attribute | MEAN CHI-SQUARE |
| 56. | Surface Finish, Fabric Impressed | 1.640 |
| 57. | Lip Edge, Both | 1.610 |
| 58. | Decoration Location, (ii) | 1.536 |
| 59. | Overhang Position, Interior | 1.533 |
| 60. | CWP, Distance Between Cords, Medium | 1.520 |
| 61. | Decorative Motif, (iii) | 1.510 |
| 62. | CWP, Distance Between Cords, Small | 1.489 |
| 63.5 | Rim Flare, Absent | 1.485 |
| 63.5 | Rim Flare Position, Absent | 1.485 |
| 65. | Surface Finish, Smoothed | 1.430 |
| 66. | Notch Position, Both | 1.400 |
| 67. | Lip Edge, Interior | 1.3912 |
| 68.5 | Decoration Location, Absent | 1.3911 |
| 68.5 | Decorative Technique, Absent | 1.3911 |
| 70. | Lip Thickness, Medium | 1.390 |
| 71.5 | Overhang, Absent | 1.348 |
| 71.5 | Overhang Position, Absent | 1.348 |
|  | Lip Thickness, Large | 1.346 |
| 74. | Rim Flare, Small | 1.290 |


| MEAN CHI-SQUARE |
| :---: |
| 2.030 |
| 2.000 |
| 1.980 |
| 1.960 |
| 1.911 |
| 1.890 |
| 1.890 |
| 1.890 |
| 1.890 |
| 1.880 |
| 1.870 |
| 1.850 |
| 1.840 |
| 1.7639 |
| 1.7633 |
| 1.750 |
| 1.720 |
| 1.710 |
| 1.680 |


| RANK | table 4 - Continued DICHoTOMIZED ATTRIBUTE |
| :---: | :---: |
| 37. | Notch Direction, Right oblique |
| 38. | Lip Surface, Flat |
| 39. | Distance Between Notches, Small |
| 40. | Overhang, Large |
| 41. | Rim Curvature, s-curved |
| 43.5 | CwP, Cord Direction, Absent |
| 43.5 | cwp, Cord Size, Absent |
| 43.5 | Cwp, Degree of Smoothing, Absent |
| 43.5 | CwP, Distance Between Cords, Absent |
| 46. | Lip Edge, Neither |
| 47. | Notch Direction, Left oblique |
| 48. | Distance Between Notches, Medium |
| 49. | Overhang Position, Both |
| 50. | Decorative Motif (v) |
| 51. | Decoration Location (iii) |
| 52. | Rim Curvature, Outcurving |
| 53. | Rim Flare Position, Interior |
|  | CWP, Cord Size. Medium |
| 55. | CWP, Distance Between Cords, Large |
|  |  |


| RANK | table 4 - Continued |  |  |
| :---: | :---: | :---: | :---: |
|  | DICHOTOMIZED ATTRIBUTE | MEAN | CHI-SQUARE |
| 94. | Decorative Technique, (iv) |  | 0.855 |
| 95. | Neck Angle, Medium |  | 0.830 |
| 96. | Rim Thickness, Medium |  | 0.810 |
| 97. | Decorative Technique, (ix) |  | 0.804 |
| 98. | Surface Finish, Smoothed Fabric Impressed |  | 0.803 |
| 99. | Neck Angle, Small |  | 0.800 |
| 100. | Rim Height, Small |  | 0.787 |
| 101. | Rim Flaxe Position, Both |  | 0.786 |
| 102. | Rim Flare Position, Exterior |  | 0.784 |
| 103. | Rim Curvature, Incurved |  | 0.762 |
| 104. | Decorative Technique, (v) |  | 0.756 |
| 105. | Decorative Technique, (iii) |  | 0.747 |
| 106. | CWP, Cord Size, Small |  | 0.728 |
| 107. | . CWP, Cord Direction, Left Oblique |  | 0.721 |
| 108. | Rim Thickness, Small |  | 0.6812 |
| 109. | Lip Slope, Outsloping |  | 0.6811 |
| 110. | Lip Slope, Horizontal |  | 0.662 |
| 111. | Overhang Position, Exterior |  | 0.623 |
| 112. | Neck Thickness, Medium |  | 0.614 |
| 113. | Rim Height, Medium |  | 0.435 |

CHI-SQUARE
1.280
1.270
1.260
1.230
1.220
1.066
1.065
1.040
1.030
1.000
0.970
0.960
0.9224
0.9223
0.910
0.900
0.891
0.880
0.863

| TABLE 4 - Continued |  |
| :--- | :--- |
| RANK | DICHOTOMIZED ATTRIBUTE |
| 75. Neck Thickness, Small |  |
| 76. Lip Slope, Insloping |  |
| 77. Decorative Technique, (ii) |  |
| 78. CWP, Cord Size, Large |  |
| 79. Rim Thickness, Large |  |
| 80. Neck Angle, Small |  |
| 81. Notch Position, Lip Surface |  |
| 82. Decorative Motif, Absent |  |
| 83. Rim Curvature, Straight |  |
| 84. Distance Between Notches, Small |  |
| 85. Overhang, Small |  |
| 86. CwP, Cord Direction, Right Oblique |  |
| 87. Rim Height, Large |  |
| 88. Rim Flare, Large |  |
| 89. Rim Flare, Medium |  |
| 90. Surface Finish, Other |  |
| 91. Decorative Technique, (vii) |  |
| 92. CWP, Degree of Smoothing, Unsmoothed |  |
| 93. | Neck Thickness, Small |

up, based on all 113 dichotomized attributes, and use the sum of chi-square and mean chi-square functions, respectively. These were superseded by reduced hierarchies at a later stage in the analysis, as is explained below.

I encountered several difficulties in applying this technique to the Lowton sample, which I was unable to resolve entirely to my satisfaction. The first and most important in concerned with the selection of the attributes to use in this kind of analysis. Whallon does not deal with this problem in his discussion of the technique, but simply presents us with his list of attributes (1972:23) based, presumably on those that Ritchie and MacNeish used in their original analysis of the material. Part of the rationale behind my attribute list was an attempt to break down rim form, cord-wrapped-paddle surface finish, and notching into their basic component attributes. I believe now that the inclusion of so many minor attribute distinctions introduced too much detail into my hierarchies. Attributes which might have been more useful in subdividing the sample were obscured by being displaced to lower positions in the hierarchies.

I attempted to remedy this problem by eliminating the thirty-six dichotomized attibutes which were dependant on other attributes (Table 2). Since the attributes dependant on the cord-wrapped-paddle kind of surface finish deal only
with aspects of that finishing technique, they can only occur when the main attribute is present. Therefore, they will have high chi-square values, both with that attribute, and with the other attributes of the Exterior Surface Finish class. The same is true of the attributes dependant on the decorative technique of notching. All of these attributes will have abnormally high sum and mean chi-square values, and will displace more significant attributes to lower positions in the hierarchies. Tables 5 and 6 give the hierarchies based on the 77 attributes which remained after the dependant attributes were removed from the calculations. It was the hierarchy shown in Table 5 , which is based on the sum of chi-squares value, which was used to type the sample.

In general, the problem of selecting the most useful attributes to use in any kind of attribute analysis has yet to be satisfactorily solved. The analyst may borrow a list already used by previous researchers in his area, as Whallon has done, a procedure which does not strike me as particu-. larly fruitful. He may use the attributes recognized by the potters of modern peasant cultures, but this is also of dubious value if no ethnographic link can be established between the prehistoric potters represented in the archaeological record and present day pottery making cultures. This is especially true of the Plains ceramic manifestations.

The solid line indicates the point at which subdivision of the sample was stopped.


[^2]\[

$$
\begin{array}{llc} 
& & \text { TABLE } 6 \text { - Continued } \\
\text { RANK } & \text { DICHOTOMIZED ATTRIBUTE } & \text { MEAN CHI-SQUARE } \\
\text { 18. } & \text { Decorative Motif, (viii) } & 2.289 \\
\text { 19. Lip Edge, Absent } & 2.241 \\
\text { 20. Overhang, Large } & 2.149 \\
\text { 21. Lip Edge, Exterior } & 2.130 \\
\text { 22. Lip Edge, Botl } & 2.127 \\
\text { 23. } & \text { Rim Curvature, Outcurved } & 2.069 \\
\text { 24. } & \text { Overhang Position, Interior } & 1.981 \\
\text { 25. } & \text { Decorative Motif, (v) } & 1.948 \\
\text { 26. } & \text { Overhang Position, Both } & 1.920 \\
\text { 27. Decorative Motif, (iii). } & 1.916 \\
\text { 28. Rim Flare Position, Interior } & 1.913 \\
\text { 29.5 Rim Flare, Absent } & 1.897 \\
\text { 29.5 Rim Flare Position, Absent } & 1.897 \\
31.5 & \text { Decoration Location, (iii) } & 1.854 \\
31.5 & \text { Rim Curvature, S-curved } & 1.854 \\
33 . & \text { Lip Thickness, Medium } & 1.804 \\
34 . & \text { Neck Thickness, Large } & 1.776 \\
35 . & \text { Rim Thickness, Large } & 1.750 \\
36.5 & \text { Decoration Location, (ii) } & 1.713 \\
36.5 & \text { Surface Finish, Fabric Impressed } & 1.713
\end{array}
$$
\]

| MEAN CHI-SQUARE |
| :---: |
| 1.672 |
| 1.672 |
| 1.516 |
| 1.399 |
| 1.379 |
| 1.339 |
| 1.329 |
| 1.329 |
| 1.290 |
| 1.280 |
| 1.270 |
| 1.251 |
| 1.224 |
| 1.155 |
| 1.136 |
| 1.136 |
| 1.078 |
| 1.019 |
| 1.017 |
| 1.006 |

panuţuos - 9 зтвva RANK DICHOTOMIZED ATTRIBUTE 38.5 Overhang Position, Absent 40. Rim Flare, Small Lip Slope, Insloping Decorative Technique, (ii) Decoration Location, Absent Decorative Technique, Absent Lip Edge, Interior Surface Finish, Smoothed Rim Flare, Medium Neck Angle, Small Decorative Motif, Absent Decorative Motif, Absent
Rim Flare, Large Rim Flare, Large

$$
\begin{aligned}
& \text { Decorative Technique, (vii) } \\
& \text { Rim Thickness, Medium } \\
& \text { Decorative Technique, (iv) } \\
& \text { Overhang, Small } \\
& \text { Rim Height, Large }
\end{aligned}
$$

One possible solution to the problem of attribute selection would be to use an exhaustive attribute list to describe a sample, and then perform preliminary statistical analysis on the sample to reduce the list to those attributes which account for most of the variation in the sample. One such procedure is factor analysis, by which the analyst may "see whether some underlying pattern of relationships such that the data may be 'rearranged' or 'reduced' to a smaller set of factors or components that may be taken as the source variables accounting for the observed interrelations in the data." (SPSS:209)。

Another difficulty is deciding when to stop dividing the sample "when subdivision of any branch of the classification has proceeded to the point where further subdivision is fortuitous and not meaningful." (Whallon, 1972:21). For his cut-off point Whallon used the first attribute in the hierarchy that did not show an association with any other attribute below it in the hierarchy with a chi-square value greater than or equal to 3.84. This number is the critical value for chi-square for a two by two matrix at the 5\% level of significance. In my case, division of the sample down to that point would have produced a very large number of groups with few sherds in any one of them. Consequently I chose to stop dividing the sample after the first 22 attributes, at which point it had been divided into 28 groups. The problem of finding a suitable "stopping point" (other than by estimating when the breakdown has produced
groups that "look good") remains one of the weaknesses of this technique.

Another problem is what minimum should be set on the expected value for a cell in the calculations of the chisquares. Whallon points out that the traditional minimum of 5 is regarded as too conservative by most statisticians (1972:20). But he also maintains that reducing the minimum expected value to 3.5 may still exclude a lot of data from an archaeological association analysis. In his analysis he used both 3 and 0 as minimum expected values, and discovered that the resulting typologies were quite similar (1972:Figs. $4,5)$. The main difference was that the typology based on the 0 minimum showed a tendancy for small groups or individual sherds to be split off from the larger types. By setting the minimum expected value at 3 , whallon derived a typology very similar to that obtained by Ritchie and MacNeish. Therefore he decided, tentatively, that this was the more valid procedure. I do not see, however, why a typology resulting in several splinter types is less desirable than one in which all the types are large. In the Lowton analysis the minimum expected cell frequency was 5, but the resulting typology, nonetheless, had several splinter types, which, in most cases, represented actual minor types in the collection.

A word should be said about the sample on which the association analysis was performed. As mentioned above, this
sample of 169 sherds consisted of only those rims which were complete enough to be described in terms of all the attributes which had been selected. No attempt was made to obtain a truly random sample from the collection. It is possible therefore that the sample selection biased the analysis, since some types of pottery may have been prone to greater breakage, and were thus excluded from the sample. I did not have the opportunity to test the results I did obtain against those that might have been obtained from a random sample.

Results and Evaluation of the Technique
The subdivision of the sample and the types derived for the collection are shown in Figure 12, and described in detail in the next chapter. As can be seen, the attributes which were the most significant, according to the analysis, were those of decoration and lip form. There were thirteen levels of division, and, after the first seven levels, the major groups in the collection had been distinguished from each other, and several minor types had been isolated. The major groups were undecorated sherds, notched sherds, and sherds decorated on the lip only, by some technique other than notching. The minor types isolated at this level were the sherds with pinched decorations, those with cord-wrapped stick decorations on the rim, and those with cord impressed "rainbow corded" designs on the rims. Thus the technique

- FIGURE 12 - Classificatory mRE of the low'on collection

succeeded in distinguishing the major "wares" present in the collection.

It is more difficult, however, to assess the validity or usefulness of the thirty-three types that resulted from further division of the collection through the remaining six levels. The larger types, especially $1,7,15,18,20$, and 22 exhibited fairly wide ranges of variation, and some. notably 13 and 15 were distinctly divisible into more than one type, merely upon inspection. Furthermore, the major types derived do not correspond to the types usually used in the archaeology of Manitoba and adjacent areas, and, in order to compare the Lowton material with other collections, I had to subdivide again most of my types, and, in some cases, recombine them, in order to get comparable typological entities.

However, it is still an open question whether the lack of correspondence between my types and those of other archaeologists necessarily invalidates the technique I used. Whallon was satisfied with the effectiveness of association analysis when it yielded to him typologies similar to those already derived by Ritchie and MacNeish for the same assemblage of Owasco ceramics. The validity of Ritchie and MacNeish's typology had been demonstrated, Whallon felt, by its usefulness in seriation studies. The ultimate vindication of Whallon's analysis depends on the validity of the seriation
studies which use Owasco ceramics, if that, indeed, can ever be established with certainty. In the case of the Lowton material, my major types contain pottery which strongly resembles that described by MacNeish (1958) under the designations Manitoba Corded Ware, and Winnipeg Fabric Impressed Ware. However my types themselves do not correspond to MacNeish's because he used surface finish as an important distinguishing attribute, while in my analysis, attributes of surface finish all had low positions in the hierarchy, and were therefore not used in deriving the typology. But, again, this lack of correspondence does not necessarily invalidate my results, since MacNeish's typological synthesis itself has been criticized by archaeologists in recent years.

There does not at the moment appear to be a sure way of evaluating the validity of the Lowton typology derived by association analysis. There are no living native pottery making cultures on the northern Plains to test the typology against, and the ethnographic record is too ambiguous for this purpose. Had structures been uncovered at the site, and the pottery types associated with them, a possible check on the typology would have been provided. But such was not the case.

I would suggest that some refinements of the technique might yield more useful results. The main one, selection of attributes has already been discussed. The use of another
statistical function could also improve the technique. WhalIon mentions that the phi-coefficient has been used instead of the chi-square functions by some researchers (1972:28). This might be preferable insofar as the phi-coefficient is a measure of the degree of dependance of two attributes, whereas the chi-square statistic merely indicates the presence or absence of dependance.

In summary, I would suggest as useful continuation of this type of research that several statistical typological techniques could be performed on a single assemblage. Other techniques would include cluster analysis, which was attempted in this project but dropped before conclusive results could be obtained, due to logistical problems, and principal component analysis, which has been used with some success by Wagner (1971). If such analyses were performed on a sample for which outside typological information was available, in the form of ethnographic information, or in situ distribution patterns, it would be possible to assess more accurately than $I$ have been able to do, the usefulness of the technique of association analysis for archaeological typology.

## CHAPTER III

THE TYPOLOGY OF THE LOWTON CERAMICS

The Lowton ceramics form a heterogenous collection of several distinct groups. As mentioned in the previous chapter, three major groups and four smaller groups were distinguished in the collection, as well as several very minor types, and miscellaneous sherds not assignable to any type. The groups are: (I) the undecorated sherds (Types l - 6; 205 sherds); (II) sherds decorated on the lip only,by some technique other than notching (Types 7 - 10, part of Type 15, Types 16 18; 334 sherds); (III) sherds with expanded lips or "braced rims" (parts of Types 13 and 15; 17 sherds); (IV) sherds with cord-wrapped-stick impressed line designs on the rim exterior (Type 14 and part of Type 13; 12 sherds); (V) sherds decorated with notched lips (Types 20-27; 516 sherds); (VI) sherds with grooved lips (Types 28 - 30; 31 sherds); (VII) sherds with cord impressed line designs on the rim exterior (Types 31 and 32 ; 39 sherds). The minor types, 11 , 12, 19, and the miscellaneous sherds account for the remaining 36 classified sherds in the collection.

As can be seen from Figure 12, it was the attributes of decoration and lip form that were used to type the collection. The collection was fairly homogenous in terms of the rest of the attributes. The trends can be summarized as fol-
lows: Most of the necks on the complete rim sherds were 3 to 7.5 mm . thick (mean 6.0 mm .), and most made an angle with the shoulder portion of the sherd of $140^{\circ}$ to $170^{\circ}$ (mean $160^{\circ}$ ). Most rims were $4.5-6 \mathrm{~mm}$. thick (mean 5.4 mm .), and (on complete sherds) $18-32 \mathrm{~mm}$. in height (mean 25 mm .). With the exception of the sherds of groups III and VII, most sherds had rim curvatures which did not deviate by a great amount from the vertical; shallowly incurving, outcurving or s-curved rims were fairly common. Almost half of the sherds had no rim flare, and on most of the rest the amount of flare was not considerable (lips 1.05 to 1.45 times thicker than the rims, mean 1.38). Also, about half or more of the sherds had no overhang; on those that did it usually amounted to less than 3 mm . of clay hanging over the lip edge. The bulk of the collection had lips between 5 and 8 mm . thick (mean 6.7 mm .). Most of the lips were horizontal, or only slightly insloping or outsloping. Most sherds had two distinct lip edges. The occurrence of the various lip surface curvatures can be ascertained from Figure 12, as that attribute was used to type the collection. Tables 7, 8, and 9 give the percentage breakdown of the collection according to surface finish, decorative technique, and decoration. It can be seen that over three-quarters of the rim sherds were decorated on the lip only; $6.7 \%$ were decorated on the rim exterior surface, while $17.4 \%$ were not decorated at all.

## TABLE 7

DISTRIBUTION OF SURFACE FINISHES IN THE LOWTON COLLECTION

|  |  |  |
| :--- | :---: | :---: |
| TECHNIQUE | ABSOLUTE FREQUENCY | RELATIVE FREQUENCY |
| Cord-Wrapped-Paddle | 764 | $63.4 \%$ |
| Fabric Impressed | 205 | $17.0 \%$ |
| Smoothed | 217 | $18.0 \%$ |
| Other | 18 | $1.5 \%$ |
|  |  |  |
| TOTAL | 1204 | $99.9 \%$ |

TABLE 8
DISTRIBUTION OF DECORATION IN THE LOWTON COLLECTION

| DECORATION | ABSOLUTE FREQUENCY | RELATIVE FREQUENCY |
| :--- | :---: | :---: |
| Undecorated | 209 | $17.4 \%$ |
| Lip Decorated |  |  |
| Lip Form Modified | 69 | $5.7 \%$ |
| Notched | 504 | $41.9 \%$ |
| Pinched | 25 | $2.1 \%$ |
| Notching and Other | 11 | $0.9 \%$ |
| Lip Decoration | 293 | $24.3 \%$ |
| Other Lip Decoration | 79 | $6.5 \%$ |
| Decorated on the Lip | 14 | $1.2 \%$ |
| and/or Elsewhere |  |  |
| Unidentifiable | 1204 | $100.0 \%$ |

TABLE 9
DISTRIBUTION OF DECORATIVE TECHNIQUE IN THE LOWTON COLLECTION

|  |  |  |
| :--- | :---: | :---: |
| TECHNIQUE | ABSOLUTE FREQUENCY | RELATIVE FREQUENCY |
| Undecorated | 209 | $17.4 \%$ |
| Lip Form Modified | 69 | $5.7 \%$ |
| Pinching | 25 | $2.1 \%$ |
| Punctates (Lip Only) | 29 | $2.4 \%$ |
| Notching | 504 | $41.9 \%$ |
| Cord Impressions | 152 | $12.6 \%$ |
| (on Lip or Rim) | 65 | $5.3 \%$ |
| Incising (Lip or Rim) | 68 | $5.6 \%$ |
| Tool Impressions |  |  |
| (on Lip or Rim) | 69 | $5.7 \%$ |
| Cord-Wrapped-Stick | 14 | $1.2 \%$ |
| Impressions (Lip or Rim) |  |  |
| Unidentifiable | 1204 | $99.9 \%$ |
| TOTAL |  |  |

Of the various decorative techniques, lip notching was by far the most commonly used, accounting for more of the decorated sherds than all of the other techniques combined. The most commonly used technique of surface finishing was the vertical or oblique application of cord-wrapped-paddles. Nearly two-thirds of the sherds have this surface finish. The rest of the collection is about evenly divided between fabric impressed and smoothed surfaces.

A few words of caution should be said about the typology and the comparisons given in this chapter. I emphasize the fact that the attributes I used to define the Lowton types are not necessarily the same as those used by other analysts of western Canadian and American ceramics, but were those determined by the results of the association analysis, according to the hierarchy given in Table 5. Thus, for example, attributes of surface finish, important in MacNeish's typology, were not considered in the setting up of my typology, although they were considered when the Lowton material was compared to that of other sites. Another problem arises from incomplete sherds. Although the attributes used to type the collection did not depend on the rim sherd's being complete, incomplete sherds created problems when compared to pottery from other sites. This is especially true with regard to the attribute rim curvature. The difference between an incurved and an S-curved rim profile may
distinguish two different types, especially in the Middle Missouri typologies. On many of the Lowton sherds it was not possible to decide which profile was exhibited, since an incurved sherd, broken at the middle of the rim, could in fact be the upper part of an S-curved rim. This should be remembered when referring to the comparisons of some of the types described below.

Concerning comparisons, I will mention again that it was usually necessary to subdivided and re-combine the Lowton types in order to compare them with the ceramics from other sites. Furthermore, a word should be said about the method of comparison. With the exception of the material from the Riverview and Snyder I sites, which was available to me for direct examination and comparison, the comparisons were made from the descriptions and illustrations of types in published reports. The difficulty here, aside from the shortcomings of verbal descriptions and artifact photographs, was that there was no way of knowing if the material described covered the entire range of ceramic variation for a given site or collection.

The selection of regions to be examined for comparisons with the Lowton ceramics was governed partly by the geographic situation of the site, and partly by the presence of certain ceramic types in the collection. It was assumed that Lowton participated in a ceramic tradition involving the
rest of southern Manitoba, and the Canadian Plains, hence, the archaeological literature of these regions was examined for comparative material. The presence of "Blackduck" and "Middle Missouri" types suggested that an examination of the pottery of Minnesota and the Dakotas, respectively, would be useful.

The results of the application of the technique of association analysis to the sample of 169 sherds is shown as a classificatory tree in Figure 12. The typology so derived was applied to the entire collection, resulting in the types described below. The breakdown of the collection is also shown on Figure 12. A list of the types and their frequencies in the collection is given in Table 10. Table 11 summarizes the distribution of types comparable to the Lowton types in Manitoba and adjacent regions.

Group I - The Undecorated Types
Type 1: ( $\mathrm{n}=115$ ) ; (P1. I, a - d)
Defining Attributes: Absence of decoration; lips medium thick to thick; lip surfaces flat.

Other Attributes: This type may be divided into three subtypes on the basis of surface finish. la - (88 sherds); Cord-wrapped-paddle impressed surfaces; rims straight or slightly s-curved, a few are slightly to moderately outcurved; flare is absent or slight, a few have
moderate flare; lipslopes range from slightly insloping through horizontal to slightly outsloping; 18 have moderate overhang, the rest have little or no overhang.
lb - (13 sherds); Fabric impressed surfaces; rim and lip form as in la, except that only one sherd has moderate overhang. 1c - (l4 sherds) ; Smoothed surfaces; rim form as in la; lipslopes are horizontal or slightly outsloping; overhang is slight or absent.

Type 2: ( $n=14$ ) ; (Pl. I, e -g)
Defining Attributes: The same as for Type 1, except that the lip surfaces are convex.

Other Attributes: This type can be divided into three subtypes on the basis of surface finish.

2a - (8 sherds); Cord-wrapped-paddle impressed surfaces; rims are slightly incurved, straight, or slightly S-curved; flare is absent or slight; lipslopes are slightly insloping or horizontal; overhang is absent to moderate. This subtype is very similar to la.
$\underline{2 b}$ - (1 sherd); Fabric impressed surface ; the rim is straight; flare is slight; lipslope is horizontal; overhang is slight; similar to lb.

2c - (5 sherds) ; Smoothed surfaces; rims are straight; flare is absent or slight; lipslopes are insloping; overhang is absent; similar to lc.

Type 3: ( $n=6$ ); (Pl. I, $h, i$ )
Defining Attributes: Absence of decoration; lips medium thick to thick; lip surfaces convex, and are continuous with the rim surfaces, hence there are no lip edges.

Other Attributes: This type can be divided into two subtypes on the basis of surface finish. 3a - (2 sherds); Fabric impressed surfaces; rims straight or slightly outcurved; flare is absent or slight; lipslopes are insloping; overhang is slight; similar to $\underline{l b}$ and $2 b$. 3b - (4 sherds) ; Smoothed surfaces; rims are slightly outcurved through straight to slightly incurved; flare is absent; lipslopes are insloping; overhang is absent; similar to 1c, 2c.

Type 4: ( $\mathrm{n}=53$ ) ; (P1. II, a - c )
Defining Attributes: Absence of decoration; lips are thin; lip surfaces are flat.

Other Attributes: This type can be divided into three subtypes on the basis of surface finish.

4a - (37 sherds); Cord-wrapped-paddle impressed surfaces; rims are straight or slightly s-curved, a few are slightly to moderately outcurved; flare is absent or slight; lipslopes range from slightly insloping to horizontal to slightly outsloping; overhang is mostly absent; similar to la. 4b - (10 sherds); Fabric impressed surfaces; rims are incurved through straight to slightly outcurved; flare is absent; lipslopes are mostly horizontal, a few are insloping; over-
hang is absent; similar to 1 b .
4c - (6 sherds); Smoothed surfaces; rims are slightly out-. curved, straight or incurved; flare is absent; lipslopes are slightly outsloping through horizontal to slightly insloping; overhang is absent; similar to lc.

Type 5: ( $n=2$ ); (Pl. XI, h)
Defining Attributes: This type is aberrant to Group I insofar as it is decorated on the rim; there is no lip decoration. Lips are thin, and the rim decoration consists of widely spaced horizontal lines.

Other Attributes: The design is incised on one sherd and cord impressed on the other. The sherds are smoothed. One has an S-curved rim profile, the other a slightly incurved one. Flare is absent. One has a flat insloping lip; the other's rim comes to a point. Overhang is absent. Type 6: (n=15); (Pl. II, d)

Defining Attributes: Absence of decoration; thin lips; convex lip surfaces.

Other Attributes: One five sherds the surfaces are cord-wrapped-paddle impressed; on seven others, these impressions are well smoothed over but still discernable; on three sherds, the surfaces are completely smoothed, Rims are slightly outcurved through straight to slightly incurved; flare is absent; lipslopes are slightly outsloping through horizontal to insloping; overhang is absent.

The Comparable Types to Group I and Their Distributions: The Cordmarked Subgroup: Types la, 2a, 4a, and the cord-wrapped-paddle impressed sherds of Type 6 can be compared to part of the Cemetery Point Corded type as described by MacNeish (1958:162, Pl. XVII, 1,2). The following traits of that type are relevent: absence of decoration; the rim and sometimes the lip are cord-wrapped-paddle impressed; the rims are straight or slightly outcurved and flare is generally absent; lips are usually flat though they can be convex; lipslopes can be outsloping, horizontal or insloping. The Cemetery Point Corded type has a widespread distribution in southern Manitoba. It is reported by MacNeish from the Lockport site on the Red River, and the Cemetery Point site on the Winnipeg River, in southeastern Manitoba (MacNeish, 1958: 140-41). It appears from the illustrations and descriptions in the report that this type was present at the United Church site on Rock Lake (MacNeish and Capes, 1958, PI. VI, 4-6). In southwestern Manitoba, this type has been surface collected from the lower Antler and Gainsborough River valleys (Capes, 1963:27-28, Pl. IX, 1-4). Fourteen Cemetery Point Corded-like sherds are in the collections of the Anthropology Department of the University of Manitoba, from the Riverview site in this area. At least one similar sherd was recovered from the Snyder I site by Syms. Pottery known as Regina Corded Ware also occurs in this region (Capes, 1963:

29-30, Pl. X, 1-6). Three sherds of the Regina Ware type are undecorated, with cord-wrapped-paddle impressed surfaces; the lips are flat or slightly convex, and are horizontal or outsloping, The Regina Ware sherds, however, are generally thicker and coarser in texture than the comparable Lowton types. Some of the sherds of Joyes' Avery Corded Ware (1969: 122-26, Pl. 21, g) are comparable to these Lowton types. The salient attributes of that Ware are absence of decoration, cord-wrapped-paddle impressed surfaces, on which the impressions may be vertical or moderately oblique, as on the Lowton sherds of these types, or horizontal or extremely oblique, which patterns do not occur on the Lowton pottery. The rims are straight or slightly outcurved; lips are flat or convex, with, sometimes,moderate overhang on the lip's exterior edge; lipslopes are horizontal or outsloping. However, the Avery Corded sherds are coarser and thicker than the Lowton sherds.

Pottery similar to the cordmarked types of Group I occurs in northern Minnesota (Evan's Group B, 1961:67, Pl. 9a, Fig. 7, b). Most of these sherds are cord-wrapped-paddle impressed, and almost all are undecorated.

A few sherds similar to these Lowton types were found at the Mortlach site in Saskatchewan (Wettlaufer, 1955:28, Pl. 2, 4). From the nearby Walter Felt site was recovered material which may also be compared to these types (Kehoe,
1964): the surfaces are cord-wrapped-paddle impressed; decoration is absent; rims are straight; lips are flattened, with moderate to extreme overhang; the sherds are moderately thick. Joyes (1969:222-23) states that this pottery is similar to his Avery Corded Ware. Griffin reports Manitoba Cordmarked pottery, similar to the Lowton types of this Group, from a midden on the east shores of Last Mountain Lake in Saskatchewan (1965:233-35). The ceramics from the Johnston collection from southeastern Alberta include cord-wrappedpaddle impressed sherds, but none of these resemble strongly any of the Lowton ceramics (Griffin, 1965:209-22). The Ross site,near Lethbridge, yielded undecorated, cord-wrapped-paddle impressed pottery comparable to these Lowton types (Griffin, 1965:227-33).

Wood (1962:232-33) reports the occurrence of ceramics from the Buffalo Lodge Lake locality in northern North Dakota which is similar in some respects to the cordmarked Lowton types of this Group. Joyes states that this material resembles his Avery Corded Ware (1969:125-26).

The Fabric Impressed Subgroup: Types $1 \mathrm{~b}, 2 \mathrm{~b}, 3 \mathrm{a}$, and $4 b$ are comparable to the Alexander Fabric Impressed type of the Winnipeg Fabric Impressed Ware as described by MacNeish (1958:166-67, Pl. XVIII, l-7). The following attributes of that type are relevant: absence of decoration, babiche (raw hide thong fabric) impressed surface, rims mostly outcurved,
though a few are straight; flare appears to be absent or slight; the lips are flattened, and have slight to moderate overhang; lipslopes are outsloping through horizontal to insloping. Rims range from 3 mm . or less to over 6 mm . in thickness, the average being 6 mm .

In southeastern Manitoba this type occurred at the Lockport and Cemetery Point sites, and at the Alexander's Point, Waulkinen, and Sturgeon Falls sites on the Winnipeg River (MacNeish, 1958:140-41). Joyes reports Winnipeg Fabric Impressed Ware from the Avery site (1969:140-43, P1。23, d - i). In southwestern Manitoba, similar pottery has been found at the Snyder I and Riverview sites.

A fabric impressed body sherd was found at the Long Creek site (Wettlaufer and Mayer-Oakes, 1960: Pl. 6, 5). Pottery ascribed to the Winnipeg Fabric Impressed Ware occurs in localities at the confluence of the Moose Jaw and Qu'Appelle Rivers in Saskatchewan, and at the midden site on Last Mountain Lake. Similar pottery was also found at the Ross site in Alberta.

The Smoothed-Surface Subgroup: Types 1c, 2c, 3b, and 4c, being smoothed and undecorated, resemble various kinds of "Plain" pottery. which have a widespread distribution in western Canada, and the U.S. Sherds similar to these types were found at the Avery site (Joyes, 1969:149-50, Pl. 24, f - h), and at the United Church Site (MacNeish and

Capes, 1958:139-41, Pl. V, 4-9), where they were labelled "Laurel Plain". However, none of the sherds of this "Laurel Plain" type can be included in Laurel Plain as described by MacNeish (1958:142-51), insofar as the latter ware involves sherds that have some kind of decoration on them. In southwestern Manitoba, sherds labelled "Plain Ware" by Capes (1963:33-34) were found in the region of the confluence of the Gainsborough and Antler Rivers with the Souris River. The undecorated varieties of this type are similar to the smoothed sherds of Group I. The University of Manitoba's collections contain two sherds from the Snyder I site and 17 from the Riverview site which are comparable to these Lowton types.

Evans. Group Cr from sites in northern Minnesota, includes sherds comparable to the smoothed Group I types (Evans, 1961:67).

Smooth-finished and undecorated sherds were found at the Mortlach site, associated with the Moose Jaw occupation (Wettlaufer, 1955:28, P1. 2, 5).

In the Dakotas, there are at least four similar pottery types in which the combination of smoothed surfaces and lack of decoration can occur: Riggs Plain, Fort Yates Plain, Talking Crow Straight Rim, and McVey Plain. As described by Wood (1967:64-65, Pl. 8, g - h), Riggs Plain pottery is smoothed and undecorated; the rims are slightly out-
curved to straight; lips are usually convex, but may be flat or pointed; flare and overhang are absent. This type corresponds most closely to the Lowton types 2 c and 3 b . The Fort Yates Plain type (Wood, 1967:67, Pl. 9, j) is similar to Riggs Plain except that the rim profile is moderately $S$ curved; there is nothing in the Lowton collection to compare to it. As described by Caldwell (1966:37-40), some of the sherds of the Talking Crow Straight Rim type are smoothed and undecorated. Rims are smoothed and undecorated, and are straight or slightly to moderately outcurved; lips can be flat, convex or bevelled. Flare and/or overhang can occur, and may be slight to moderate. Most rims are 5 mm . to 7 mm . thick. Sherds of the Lowton types lc and 4c are comparable to the flat-lipped varieties of this type, while types 2c and 3 b may be compared with the convex-lipped varieties. The McVey Plain type (Brown, 1967:11, Pl. 6, a - d) are also smoothed and undecorated. Rims are slightly to very outcurved, or straight on a few sherds; most lips are convex; flare and overhang are absent; rims are between 3 mm . and 6 mm . thick. Lowton sherds of types 2 c and 3 b may be compared with this type.

Riggs Plain pottery has been found at the Huff site (Wood, 1967), the Paul Brave site (Wood and Woolworth, 1964: 16-18, Pl. 3, b, d-h, Pl. 6, e), the Shermer site (Sperry, 1968:38, Pl. 6, A - B), and at the Indian Creek and Buffalo

Pastures sites of the Arikara Bad River Phase (Lehmer and Jones, 1968: Pl. 23, c). The undecorated smoothed variety of Talking Crow Straight Rim has been found at the Black Partizan site (Caldwell, 1966). McVey Plain pottery has been found in the area of the Pony Creek Reservoir, at several sites (Brown, 1967:11, 18, 23, 28, 33, 38, Pl. 6, a - d). Some of the rims from the Hitchell site (Johnston, 1967:45-46, Pl. 9, i, 1), included by the author in his Group 7, may be comparable to these Lowton types. Undecorated smoothed rim sherds were also found at the Biesterfeldt site in southeastern North Dakota, which has been tentatively identified as early historic Cheyenne (Wood, 1971:31, Pl. 9, c, d).

The sherds of Type 5 can be compared with a few of the Manitoba Corded sherds from the United Church site (MacNeish and Capes, 1958:144, Pl. VI, 2) which have "broad line incising" on the rim exterior. The motif of widely spaced horizontal lines also occurs on one of the Cambell Creek Ware sherds from the Black Partizan site (Caldwell, 1966: Pl. 9, e).

Group IIa - Types with Lip Decoration Other Than Notching

Type 7: ( $\mathrm{n}=96$ ); (P1. II, $\mathrm{e}-\mathrm{g}$ )
Defining Attributes: The presence of decoration on the lip, exclusive of the following motifs: lip grooving, rows of discrete small items on the lip, short vertical or ob-
lique lines, and pinched designs. The lips are medium thick to thick; overhang is slight or absent.

Other Attributes: This type may be divided into three subtypes on the basis of decoration.

7a - (70 sherds) ; The lips are marked by cord or fabric impressions. On some sherds this consists simply of a cord or fabric roughening of the surface, which is sometimes very faint. On other sherds, there is a single twisted cord impression running along the lip surface parallel to the edges; this may also be very faint. Rims are straight or slightly s-curved; a few are slightly incurving or slightly outcurving; flare is absent to moderate; most lipslopes are horizontal, some are slightly insloping or slightly outsloping; lip surfaces are flat. 21 sherds are fabric impressed, five are smoothed, and the rest are cord-wrapped-paddle impressed. 7b - (15 sherds); A flat object was pressed around the lips of the vessels that these sherds represent, producing flat lips. All sherds have cord-wrapped-paddle impressed surfaces. The rims are slightly outcurved through straight to slightly incurved; flare is absent or slight, except for one sherd that has extreme flare. Lipslopes are insloping. 7c - (ll sherds); Most of these sherds have straight, wavy, or zig-zagged lines incised into the lip surface, and running parallel to the lip edges. Two sherds have broken oblique lines, which approximately parallel the lip edges.

The rims are straight or S-curved; a few are incurved; flare is absent or slight. Lipslopes are horizontal; lip surfaces are flat. Two sherds are smoothed; the rest have cord-wrapped paddle impressed surfaces.

Type 8: ( $\mathrm{n}=49$ ) ; (Pl. III, a - C$)$
Defining Attributes: These are the same as for Type 7, except that overhang is moderate to extreme.

Other Attributes: This type can be divided into the same three subtypes as Type 7.

8a - (15 sherds); Lips are cord or fabric marked; 12 sherds are cord-wrapped-paddle impressed, three are fabric impressed. Rims are strongly outcurved through straight to incurved; flare is mostly absent. Lips are flat, and their slopes range from slightly outsloping through horizontal to slightly insloping.

8b - (23 sherds); Flattened lips; all sherds have cord-wrapped-paddle impressed surfaces. The rims are straight, slightly S-curved, or slightly incurved; flare is absent to slight. Lipslopes are slightly to strongly insloping. 8c - (ll sherds); This subtype has the same kinds of decorations as occur in 7c; however, two sherds have in addition oblique incised lines on the lip surface. Rims are slightly S-curved, or slightly incurved, though one sherd has a strongly $S$-curved profile; flare is absent or slight. Lipslopes are horizontal or slightly insloping.

Type 9: ( $\mathrm{n}=17$ ); (P1. III, d, e)
Defining Attributes: These are the same as for Type 7, except that the lips are thin.

Other Attributes: Four sherds have faint incised lines along the lip surface; the rest have cord marked lips. Two sherds have fabric impressed surfaces; the surfaces of the rest are cord-wrapped-paddle impressed. Rims are slightly outcurved through straight and S-curved to slightly incurved; flare is absent or slight. Most lips are horizontal, though a few are slightly insloping or slightly outsloping. Overhang is absent on most sherds.

Type 10: ( $\mathrm{n}=2 \mathrm{l}$ ); (Pl. IV, $\mathrm{a}, \mathrm{b}$ )
Defining Attributes: The presence of decoration on the lip exterior edge in the form of small pinched out nubbins of clay.

Other Attributes: Eleven sherds are cord-wrappedpaddle impressed, one is smoothed, and one is check-stamped. Rims are S-curved, incurved, or straight; two are strongly outcurved. Flare is absent on most sherds, but where it occurs, it is moderate or extreme. Most lipslopes are insloping or horizontal, though one sherds has an extremely outsloping lip. Overhang is slight to extreme; a few sherds have no overhang. Rims are moderately thick.

Comparable Types to Group IIa and Their Distributions:
The Cordmarked and Fabric Impressed Lip Subgroup: Types

7a, 8a, and most of Type 9 are characterized by cordmarked or fabric impressed lip surfaces. MacNeish (1958:162, 166) includes sherds with such lip treatments in his Cemetary Point Corded and Alexander Fabric Impressed types. In most other respects, these Lowton types conform to MacNeish's types, and thus they may be regarded as comparable to them. A few sherds with cordmarked lips were found at the Riverview site.

The Flattened Lip Subgroup: Types 7 b and 8 b are characterized by flattened and usually insloping lips. MacNeish includes sherds with similar lip forms in his Cemetery Point Corded type (1958:143,162). These two subtypes may be compared with MacNeish's type, since all of their sherds have cord-wrapped-paddle impressed surfaces.

The Parallel-Incised Lip Subgroup: Types 7c, 8c, and a few of Type 9 are characterized by lines incised along the lip surface. Montgomery (1908) reports a comparable small mortuary vessel from a burial mound at Sourisford, in southwestern Manitoba. The lip of this vessel was decorated with zig-zagged and straight incised lines running parallel to the lip edges. A sherd comparable to these types was found at Riverview. Wettlaufer reports that straight lines incised on lip surfaces often occur on sherds of his Moose Jaw Cordmarked type, from the Mortlach site (1955:27, Pl. 2, 2).

I was unable to find any pottery that resembled the
sherds of Type 10 in the literature that I consulted.

Type 11: ( $n=2$ ); (PI. XII, d)
Defining Attributes: The presence of decoration on the rim exterior, consisting of short vertical or oblique lines.

Other Attributes: The surfaces are smoothed; rims are moderately or extremely outcurved; flare is absent; lips are convex, and overhang is absent. One sherd is thin, the other is medium thick.

Type 12: ( $n=4$ ); (Pl. XII, e, f, $h$ )
Defining Attributes: These are the same as for Type 11 except that there is decoration on the rim interior.

Other Attributes: On two sherds, probably from the same vessel, the decoration consists of closely spaced oblique cord-wrapped-stick impressed lines. The surfaces are smoothed. Rims are extremely outcurved and flare is absent. Lips are convex and have no distinct edges; overhang is absent. The rims are medium thick.

On the other two sherds, the decoration consists of widely spaced vertical tool-impressed lines. One has a smoothed surface; the other has a cord-wrapped-paddle impressed surface finish. The rims are slightly outcurved; flare is absent. The lip of one is flat, that of the other is convex. Overhang is absent. The rims are medium thick.

Groups III and IV - The Expanded Lip and Cord-Wrapped-Stick Rim Decorated Types

Type 13: ( $\mathrm{n}=8$ ); ( P . $\mathrm{IV}, \mathrm{c}, \mathrm{d}$ )
Defining Attributes: The presence of the short vertical or oblique line motif, on the lip and (sometimes) elsewhere; flat lip surfaces; overhang absent or slight; absence of decoration on the rim interior.

Other Attributes: This type can be divided into two distinct subtypes.

13a - (3 sherds); The rims have strongly outcurving profiles; flare is extreme, and the lipslopes are extremely outsloping. The sherds have a thickened or "braced" rim. The decoration consists of oblique lines impressed across the wide lip surface. The surfaces are smoothed. Rims are thick. This subtype is very similar to subtype 15a.

13b - (5 sherds); This subtype is characterized by oblique cord-wrapped-stick impressed lines on the lip surface and rim exterior; one sherd has only horizontal lines on the rim exterior, in addition to oblique lines on the lip. The surfaces are smoothed. The rims are straight and flare is slight to extreme. Lipslopes range from insloping through horizontal to outsloping. This subtype is very similar to Type 14, differing from it only in the absence of rim interior decoration.

Type 14: ( $\mathrm{n}=7$ ) ; (Pl. IV, e, f)
Defining Attributes: These are the same as for Type 13
except that the decoration is present on the rim interior as well as on the rim exterior and the lip.

Other Attributes: The decorations on the rim exterior consist of oblique lines at the top of the rim (there is a herringbone design here on one of the sherds), and a series of parallel horizontal lines below them. Two sherds have deep interior punctates, and corresponding exterior bosses. The lip and rim interior motifs are a row of short oblique lines; in some cases vertical lines are pressed into the rim interior below these. All of these lines are impressed with a cord-wrapped-stick. Rims are straight or slightly outcurved. Flare is slight to extreme. The lipslopes range from outsloping through horizontal to insloping. These rims are medium thick to thick.

Type 15a: ( $\mathrm{n}=14$ ) ; ( $\mathrm{Pl} . \mathrm{V}, \mathrm{a}-\mathrm{c}$ )
Defining Attributes: Short vertical or oblique line motifs on the lip; convex lip surfaces; overhang absent or slight.

Other Attributes: This subtype is characterized by oblique cord impressed (tool impressed in two cases) lines running across the lip surface. Two sherds have, in addition, a rather complex impressed and punctated design on the upper rim interior. Except for one cord-wrapped-paddle impressed sherd, all have a smoothed surface finish. Rims are moderately to extremely outcurved, and flare is moderate to ex-
treme. The lips are wide and have extremely outsloping surfaces, and thus this type also has "braced" rims. Most rims are medium thick.

Comparable Types to Groups III and IV and Their Distributions: The Cord-Wrapped-Stick Decorated Rim Subgroup: Types 13b and 14 form the "Blackduck" component of the Lowton collection. MacNeish labels such pottery Manitoba Corded Ware (1958:156-162, Pl. XVII, 3-9), and its relevant attributes are: extensive decoration on the lip and rim using cord-wrapped-stick impressed lines, smoothed lip and rim surfaces, straight to outcurved rim profiles, slight to extreme flare, and flat, mostly horizontal or outsloping rims. Rims tend to be thick ( 6 mm . to 13 mm . thick, mean, 9 mm .). The most common decorative motif consists of oblique lines on the lip and upper rim exterior, and, on the rest of the rim exterior, a series of horizontal lines. There are also usually a row of widely spaced large punctates on the rim exterior. This motif, except for the punctates, is exhibited on all but two of the the Lowton sherds of these types, and it is characteristic of MacNeish's Manitoba Horizontal type. On another type of this Ware, Manitoba Herringbone, the oblique lines on the upper rim exterior are replaced by a herringbone pattern of oblique lines. One sherd each of Types $13 b$ and 14 has such a motif. One difference between these Lowton types and MacNeish's types is that, on the former,
punctates, when they occur, are on the rim interior, and produce corresponding bosses on the exterior, whereas, with the latter types, the reverse is the case. Interior punctates occur, however, on the Stott Noded type of the Manitoba Corded Ware, which was found at the Stott site near Brandon (MacNeish, 1954:35, Pl. IV, 6).

Sherds of the Manitoba Corded (Blackduck) types were found at the Alexander's Point, Lockport, Waulkinen, Sturgeon Falls, Cemetery Point, and Tuokko sites in southeastern Manitoba (MacNeish, 1958:140-41), at the Avery site (Joyes, 1969: 130-34, Pl. 23, a), and at the Stott site (MacNeish, 1954: 32-34, Pl. IV, l, 2). Nickerson found Blackduck pottery in the Antler River valley, and in the vicinity of Arden, Manitoba (Capes, 1963:28-29, P1. IX, 5-10). Pottery of this type also has been found at the Riverview site.

Blackduck pottery was originally described for sites in north-central Minnesota, ascribed by Wilford (1941, 1945, 1955) to the Headwaters Lakes Aspect. Various styles and types of this ware are common in that State, and elsewhere on the Upper Great Lakes. Of the several Blackduck types described by Evans (1961), four can be compared with Lowton material. The Osufsen Cord and Punctate type (1961:51-53, Fig. 5a) to three sherds of Type 14; the Osufsen Boss and Corded Type (1961:56-57, Fig. 5i) is similar to two other Type 14 sherds, those with exterior bosses; the Schocker

Horizontal Corded type (1961:54, Fig. 5d) shows some resemblance to a sherd of Type 13b; another 13 b sherd has no horizontal lines on the rim exterior, and so could be compared with Evans' Nett Lake Vertical Corded type (1961: 55, Fig. 5f). The rest of the sherds of these Lowton types are too incomplete to show more than the lip decoration, and the oblique lines on the upper rim, traits which occur on most Blackduck sherds.

In western Canada, Manitoba Horizontal pottery is reported from the localities at the confluence of the Moose Jaw and Qu'Appelle Rivers (Griffin, 1965:233-35). A single sherd, with cord-wrapped-stick impressed lines on the rim, was found at the Mortlach site (Wettlaufer, 1955:21, Pl. I, 3). Some of the pottery that Kehoe (1959:240-42) calls Wascana Ware has cord-wrapped-stick or cord-wrapped-cord impressed lines decorating the lips and rims. From her description, these seem to be similar to Blackduck pottery.

The Expanded Lip Subgroup: Types $13 a$ and 15 a are characterized by thickened and extremely outsloping lips ("braced rims"), and outcurved rim profiles. They can be compared to the Stanley Braced Rim Ware, and similar types of the Middle Missouri tradition. As described by $\operatorname{Wood}$ (1967:68-70, Pl. 8, f, k; Pl. 9, a, c - e), sherds of this Ware have a smoothed, sometimes polished, surface finish, and are decorated by "closely spaced oblique or transverse tool impressions"
applied to the wide lip surface. (Wood, however, describes the decorated portions of these sherds as part of the rim.) Some sherds have oval or round punctates on the lip. Rims are straight to strongly outcurved, and are braced, that is, thickened at the top, either by folding a flap of clay over the upper rim, or by adding a fillet of clay there. Lips are usually convex, but may be flat.

Pottery of this type occurs at the Huff site (Wood,1967), and similar material occurs throughout the Middle Missouri area. Ceramics of this kind are described in Will and Hecker's study of the prehistoric pottery cultures of North Dakota (1944:39, 43; Pl. 11, 12, 16, 17), and in Will and Spinden's earlier study of the Mandans (1906: P1. 39, a, d, g; P1. 40, a). Wood and Woolworth report similar material from the Demery site. (1964:98-99, PI. 13, c, e, f). Sherds of this sort, with cord impressed lines decorating the lip (the most common technique at Lowton) were found at the Koehler site in the Heart Butte Reservoir area of North Dakota (Cooper, 1958: P1. 7), at the Two Teeth site in South Dakota (Smith and Johnston, 1968:21, Pl. 6, a - b), and at the Fire Heart Creek site (Lehmer, 1966: Pl. IX). Sites of the Stutsman Focus of the Jamestown Reservoir area of eastern North Dakota, yielded pottery similar to these types (Wheeler, 1963: Pl. 31, $a, c, ; P l .33, C, d, f, g)$.

Group IIb - Types with Lip Decoration Other Than Notching
Type 15b: ( $n=27$ ); (P1. V, e - j)
Defining Attributes: The short vertical or oblique line motif on the lip; convex lip surface; overhang absent or slight.

Other Attributes: The sherds of this subtype are decorated on the lip surfaces by straight, oblique, crisscrossed, or alternating lines. The most common decorative technique is cord-wrapped-stick impressed lines, but tool impressions, cord impressions, and incised lines also occur. The most common surface finish consists of cord-wrappedpaddle impressions, but some of the sherds are fabric impressed, and a few are smoothed, Rims are extremely outcurved, s-curved, straight, or moderately incurved. Flare is absent or slight; a few sherds have moderate flare. Lipslopes range from extremely outsloping through horizontal to slightly insloping; outsloped lips are the most common. The rims are medium thick.

Type 16: ( $\mathrm{n}=10$ ) ; ( $\mathrm{Pl} . \mathrm{V}, \mathrm{d}$ )
Defining Attributes: These are the same as those of Type 15, except that overhang is moderate to extreme. Other Attributes: The range of decorative techniques is the same as that displayed by Type 15b. Motifs include oblique lines across the lip, and criss-crossed lines on the lip surface. Surface finishing techniques include cord-
wrapped-paddle impressions, fabric impressions, and smoothing. Rims are outcurved, slightly S-curved, or straight; flare is absent. Lipslopes are outsloping or horizontal. This type is very similar to Type 15 b .

Type 17: ( $\mathrm{n}=84$ ) ; (Pl. VI, $\mathrm{a}-\mathrm{g}$ )
Defining Attributes: The presence of decoration on the lip surface consisting of rows of discrete items, but not notching; flat lip surfaces; overhang absent or slight.

Other Attributes: This type can be divided into four subtypes, depending on the decorative technique used. 17a - (20 sherds) ; Decoration consists of a single or double line of punctates along the lip surface. The punctates are made with a variety of instruments, including hollow tubes (perhaps feather ends), small pointed objects, and objects with rectangular or lenticular cross sections. Most sherds are finished with cord-wrapped-paddle impressions. Most rims are straight, though a few are S-curved; flare is absent or slight. Lipslopes are mostly horizontal; a few are slightly insloping. Rims are medium thick to thick.

17b - (17 sherds); The sherds are decorated with oblique cord-wrapped-stick impressed lines, either running across the surface of the lip, or pressed into the lip's exterior edge. Nine sherds are cord-wrapped-paddle impressed; four are fabric impressed, and four are smoothed. Rims are outcurved, straight, s-curved, or slightly incurved; flare is
absent, slight, or extreme. Lipslopes are mostly outsloping; a few are horizontal or insloping. Rims are medium thick. 17c - (12 sherds); These sherds are cecorated by oblique incised lines running across the lip surface. Two sherds are smoothed, the rest are cord-wrapped-paddle impressed. Rims are usually straight or incurved; flare is absent or slight. Lipslopes are either horizontal or outsloping. Most rims are medium thick.

17d - (35 sherds); These sherds are decorated by oblique tool impressed lines running across the lip surface. Two sherds have a herringbone pattern on the lip; on two others, the impressions were made with a twisted cord, and run right across the lip surface and a short ways down the adjacent rim surfaces. Two sherds are fabric impressed; the rest are cord-wrapped-paddle impressed. The rims of this subtype show all the variations in profile from slightly outcurved, through straight and S-curved to slightly incurved; flare is absent to moderate. Lipslopes range from slightly outsloping through horizontal to slightly insloping. Most rims are medium thick; a few are thick.

Type 18: ( $\mathrm{n}=30$ ); (Pl. VII, $\mathrm{a}-\mathrm{d})$
Defining Attributes: These are the same as those of Type 17, except that the overhang is moderate to extreme.

Other Attributes: This type can be divided into the same four subtypes as Type 17.

18a - (4 sherds); These sherds are decorated by round, rectangular, or slit-like punctates on the lip surface. All are cord-wrapped-paddle impressed. Rims are slightly incurved or slightly S-curved; flare is absent or slight. Lipslopes are horizontal or slightly insloping. Rims are thin to medium thick.

18b - (9 sherds); The decoration is essentially the same as that of Type 17 b . Two sherds are fabric impressed the rest are cord-wrapped-paddle impressed. Rims are outcurved or straight; flare is absent to extreme. Lipslopes are outsloping through horizontal to slightly insloping. Rims are medium thick.

18c - (5 sherds); The decoration is the same as that of Type 17c. One sherd is smoothed; the rest have cord-wrapped-paddle impressed surfaces.Rims are slightly incurved or straight; flare is absent or slight. Lipslopes are slightly outsloping to horizontal. Rims are thin to medium thick. 18d - (12 sherds); These sherds are decorated by oblique tool or cord impressed lines running across the lip surface; one sherd has a herringbone pattern on the lip. One sherd is fabric impressed; the rest are cord-wrapped-paddle impressed. Rims are slightly outcurved through straight to slightly incurved; flare is absent to moderate. Lipslopes are outsloping through horizontal to slightly insloping. Most of the rims are medium thick.

Comparable Types to Group IIb and Their Distributions: The sherds of Types 15b and 16 form a rather diverse group, Three sherds are similar to Type 15a, lacking only the braced rim. These two types are similar to the others of Group IIb in their decorative techniques, but their rim and lip forms set them apart from Types 17 and 18. Sherds similar to some of those of $15 b$ and 16 were found at the Hintz site of the Stutsman Focus (Wheeler, 1963: Pl. 32, h), at the Indian Creek site of the Arikara Bad River Phase (Lehmer and Jones, 1968: Pl. 23, $f, i)$, and on sites of the Grand Detour Phase in central South Dakota (Caldwell and Jensen, 1969: Pl. 14, b). These comparisons cover only a few of the varieties present in these two Lowton types. I was unable to find any ceramics comparable to the rest of the sherds. The decorative techniques that these sherds exhibit have a widespread distribution in western Canada and the Dakotas.

The several subtypes of Types 17 and 18 form an important component of the Lowton collection. Sherds with punctates, and incised, tool impressed, cord impressed, or cord-wrapped-stick impressed lines on the lip occur frequently on sites in Manitoba, western Canada and the Dakotas. A large proportion of MacNeish's Sturgeon Falls Fabric Impressed type consists of sherds decorated on the lip with oblique cord-wrapped-stick impressed lines. However, since most of the Lowton sherds with similar decoration have a cord-wrapped
paddle impressed surface finish, these types are not strictly comparable (MacNeish, 1958:167). At Avery, six sherds with smoothed surfaces and oblique tool impressed lines across the lip were found; these are included in Joyes Group 4 (Plain) (1969:149-50). At the Stott site were found smoothed sherds with cord-wrapped-stick impressed lines on the lips and punctates on the rim exterior. MacNeish states that "sherds similar to these have been found at the Belmont Midden (Lowton Site)" (1954:36). If this is so, then these sherds have been lost, for no sherds with exterior punctates occur in the Lowton collection. Except for the punctations, however, these Stott sherds would be comparable to the Lowton types 17 b and 18b. Nickerson recovered a cord-wrapped-paddled vessel whose lip was decorated by punctations with an awl-like object. Capes refers to this as the Souris variant of the Manitoba Cordmarked Ware (1963:28, Pl. IX, ll, l2). It is comparable to the Lowton Types $17 a$ and 18a. Sherds of the Regina Corded Ware can also be decorated with cord-wrapped-stick impressed lines on the lip surface (Capes, 1963:30). Several lip decorated sherds were found at the Riverview site; most of them with cord-wrapped-stick impressed lines on the lip. But incised and tool impressed lips also occurred. Sherds with cord impressed and tool impressed lines, and punctates, on the lip were found at the Snyder I site.

Evans' miscellaneous Group C includes sherds with incised lines across the lip (1961:67). His Group E (1961:67-68,

Fig. 9e) sherds have a cord-wrapped-paddle impressed surface finish, and the lips are cord-wrapped-stick impressed; this group may then be compared with the Lowton types 17 b and 18 b . Evans states that similar pottery "has a wide geographical distribution, but is very common between Minnesota and Wisconsin, along the southern half of their common border." (1961:68). It also occurs in central Minnesota.

At the Long Creek site near Estevan, Saskatchewan, Long Creek Wrapped Rod may be compared to the Lowton types 17b and 18 b , although the distinctive diamond-paddled surface finish of the Saskatchewan type does not occur in the Lowton collection (Wettlaufer and Mayer-Oakes, 1960). Kehoe's Ethridge Ware (1959:238-40) has cord-wrapped-paddled, smoothed, or, rarely, fabric impressed surface finishes. It is either undecorated, or decorated on the lip with notches, incised or cord-wrapped-stick impressed lines. Some elements of this ware, therefore, may be compared with Types 17b, 17c, 18b, and 18c.

Pottery types with lip decorations involving these techniques occur frequently in the Dakotas. The Riggs Decorated Lip type from the Fire Heart Creek site has incised line decorations on the lips (Lehmer, 1966: Pl. VII, 4). Wood reports sherds with cord-wrapped-stick impressed lines on the lips from the Towner Locality in the Souris River valley in North Dakota (Example A; Wood, 1962:233, Fig. I, e, h).

The Talking Crow Straight Rim type, which can be undecorated, can also be decorated with fairly deep, closely spaced, tool impressed lines running across the lip. This type accurs at the Spain site (Smith and Grange, 1958: Pl. 30, h - j), the LaRoche site (Hoffman, 1968: Pl. 11, b-e, g), the Two Teeth site (Smith and Johnson, 1968: P1. 4, i-k), the Molstad Village site (Hoffman, 1967: Pl. 15, b,d, e), and the Black Partizan site (Caldwell, 1966: Pl. 9, g - i). Talking Crow ware can also be decorated with herringbone patterns on the lip (Smith and Grange, 1958:102), a motif which occurs on a few of the sherds of the Lowton types 17d and 18d. Lips decorated with tool impressed lines set in a herringbone pattern also occur on some of the sherds of the Anderson Incised type, found at sites of the Grand Detour Phase (Caldwell and Jensen, 1969: Pl. 15, g). Riggs Decorated Lip pottery occurs at sites of the Arikara Bad River Phase (Lehmer and Jones, 1968: Pl. 23, d - l). Spaulding reports the tool impressed technique of lip decoration at the Arzeberger site (1956: Pl. VII, b; Pl. XII, c, d; Pl.XIV, g, h, k, l, m, o, q. Cord-wrapped-stick impressed lines also occur as a lip decorating technique on some of the sherds from the Biesterfeldt site (Wood, 1971: Pl. 7, e, g, h).

Type 19: ( $\mathrm{n}=1$ ) ; ( Pl . XII, g )
Defining Attributes: This sherd is decorated only by
a line of notches or punctates pressed into the rim exterior just below the lip.

Other Attributes: The surface is fabric impressed; the rim is S-curved; overhang and flare are absent. The lip is convex, moderately insloping, and thin. The rim is medium thick.

Group V - The Notched Lip Types
Type 20: ( $\mathrm{n}=279$ ) ; (Pl. VIII, $\mathrm{a}-\mathrm{h}$ )
Defining Attributes: The presence of decoration on the lip only in the form of notches cut into either or both of the lip edges, or into the lip surface. lips medium thick to thick; lip surfaces flat; overhang slight or absent.

Other Attributes: This type may be divided into four subtypes.

20a - (205 sherds) ; The decoration consists of notches of various sizes, depths, orientations and spacing, which have been pressed into the lip surface, or the lip interior or exterior edges, but not both. 141 sherds have cord-wrapped paddle impressed surfaces; 40 are fabric impressed, and 24 are smoothed. Rims are mostly straight or S-curved; there are some sherds with incurved or outcurved profiles. Flare is absent to moderate; a few sherds have extreme flare. Lipslopes range from slightly outsloping through horizontal to slightly insloping.

20b - (34 sherds); The decoration consists of notches pressed into the lip surface or edges; since they are large and deep, a quantity of clay is displaced from the upper rim or lip, opposite the side into which the notch is pressed. This gives a wavy or "scalloped" appearance to the rim when viewed from above. Twenty sherds have cord-wrapped-paddle impressed surfaces; six are fabric impressed, and eight are smoothed. Rims are slightly outcurved through straight to slightly incurved; one sherd is S-curved; flare is absent to moderate; a few have extreme flare. Lipslopes are outsloping through horizontal to insloping.

20c - (19 sherds) ; Decoration consists of notches pressed into both edges of the lip. On most sherds the notches are set alternately into the interior and exterior edges; on some the notches are small and are set opposite each other. Three sherds are smoothed; the rest have cord-wrapped-paddle impressed surfaces. Rims are straight, or slightly to moderately incurved; flare is absent to extreme. Lipslopes range from slightly insloping through horizontal to slightly outsloping.

20d - (2l sherds) ; This subtype is characterized by lower rims than occur on most of the other notched sherds. The notches on these are usually rather long, closely spaced, and pressed into the lip exterior edge. Rims are incurved or moderately $S$-curved; flare is absent or slight. Lipslopes
are mostly insloping; a few are horizontal. Overhang is absent.

Type 21: ( $\mathrm{n}=1$ ) ( $\mathrm{P} 1 . \mathrm{XIII}, \mathrm{d}$ )
Defining Attributes: These are the same as those for Type 20, except that, in addition to lip notching, which on this sherd is very crude, there is decoration on the upper rim interior.

Other Attributes: The rim exterior surface is vertically brushed, and, in addition to the notching on the lip, there are vertical cord-wrapped-stick impressed lines on the rim interior. The rim is slightly outcurved; flare is absent. The lip is slightly outsloping, and has slight overhang. Type 22: ( $\mathrm{n}=118$ ) (P1. IX, a - f)

Defining Attributes: These are the same as those of Type 20, except that the overhang is moderate to extreme.

Other Attributes: This type can be divided into four subtypes.
22a - (76 sherds) ; Decoration is the same as that of Type 20a。 47 sherds are cord-wrapped-paddle impressed; 25 are fabric impressed, and four are smoothed. Most rims are straight or slightly s-curved; there are a few sherds with incurved or outcurved profiles; flare is absent to moderate. Lipslopes range from slightly insloping through horizontal to slightly outsloping.
$\underline{22 b}$ - (14 sherds); Their decoration is the same as that of

Type 20b. Eight sherds are cord-wrapped-paddle impressed; five are fabric impressed, and one is smoothed. Most rims are straight; a few are S-curved or slightly outcurvéd;flare is absent or slight. Lipslopes are insloping or horizontal. 22c - (17 sherds) ; Decoration is the same as that of Type 20c. Seven sherds are fabric impressed; the rest are cord-wrapped-paddle impressed. Most rims are slightly to moderately incurved; a few are straight or slightly s-curved. Flare is absent to moderate. Lipslopes are horizontal to insloping.

22d - (II sherds); In addition to notches on the lip edges, these sherds have decoration on the lip surfaces. Two sherds have a line of lenticular punctates; two have oblique incised lines; six have an incised line running parallel to the lip edge, and one has both oblique and parallel incised lines on the lip surface. Three sherds are fabric impressed, four are smoothed, and the rest are cord-wrapped-paddle impressed. Three rims are S-curved; the rest are incurved; flare is slight to extreme. Lipslopes are horizontal to slightly insloping.

Type 23: ( $\mathrm{n}=25$ ) (P1. X, a)
Defining Attributes: The presence of decoration on the lip only, in the form or notches cut into either of the lip edges or the lip surface; moderately thick to thick lips; convex lip surface; overhang absent or slight.

Other Attributes: One sherd is check-stamped; three are fabric impressed; four are smoothed; the rest are cord-wrapped paddle impressed. Rims are outcurved through straight and S-curved to slightly incurved; flare is absent to moderate. Lipslopes range from outsloping through horizontal to slightly insloping.

Type 24: ( $\mathrm{n}=9$ ) : (P1. X, C )
Defining Attributes: These are the same as those for Type 23, except that the overhang is moderate to extreme.

Other Attributes: Six sherds are cord-wrapped-paddle impressed; three are fabric impressed. Rims are slightly incurved through straight to outcurved; flare is absent to moderate. Lipslopes are outsloping through horizontal to insloping.

Type 25: ( $n=74$ ); (Pl. X, b, d)
Defining Attributes: The presence of decoration on the lip only in the form of notches cut into either of the lip edges, or into the lip,surface. Lips are thin, and have flat surfaces.

Other Attributes: This type can be divided into two subtypes.
25a - (56 sherds) ; The decoration consists of notches of various sizes, orientations and spacing, on one of the lip edges only, and with no scalloping. Five sherds are fabric impressed, one is smoothed, and the rest are cord-wrapped-pad-
dle impressed. Rims are slightly outcurved through straight and slightly s-curved to slightly incurved; flare is absent or slight. Lipslopes are horizontal or insloping; a few are outsloping. Overhang is absent to moderate.
25b - (18 sherds) ; The notching on these sherds is deep enough to create the scalloping effect on the lips. Two sherds are fabric impressed; the rest are cord-wrapped-paddle impressed. Rims are outcurved through straight to incurved; flare is absent or slight. Lipslopes are horizontal or insloping; a few are slightly outsloping. Overhang is absent except on one sherd.
Type 26: ( $\mathrm{n}=1$ ) (P1. XIII, f)
Defining Attributes: These are the same as those of Type 25, except that, in addition to the notches, there are horizontal incised lines on the rim exterior.

Other Attributes: The surface finish is smoothed over cord-wrapped-paddle impressed. The rim is S-curved, and flare is absent. Lipslope is horizontal, and overhang is absent. Type 27: ( $\mathrm{n}=9$ ) ; (Pl. X, e)

Defining Attributes: These are the same as for Type 25 except that the lip surfaces are convex.

Other Attributes: Four sherds have scalloped lips; the rest are just notched. Three sherds are smoothed; the rest are cord-wrapped-paddle impressed. Rims are slightly incurved or straight; flare is absent. Lipslopes are horizontal or
slightly outsloping. Overhang is absent except on one sherd. The Comparable Types to Group $V$ and Their Distributions:

The notched lip decorative technique does not appear to have been an important one in southeastern Manitoba. MacNeish (1958:174, Pl. XX, 2) reports the occurrence of "Pelican Lake Ware" from the Alexander's Point and the Lockport sites. This material is comparable to the smoothed variety of Type 20a. Despite it's proximity to the Lowton site (it is about 20 miles to the southeast), no notched lip pottery was reported from the Avery site. However, notched lip sherds were found at the nearby United Church site, and were included in the Manitoba Corded type of that site (MacNeish and Capes, 1958:142-45, Pl. VI, 5). MacNeish (1954: 36, Pl. 4, 9) reports the occurrence of "Belmont Midden" sherds at the Stott site. These have cord-wrapped-paddle impressed surfaces and notched lips, and can thus be compared with Type 20a. Notched lip sherds were found at the Riverview site, and include smoothed and cord-wrapped-paddle impressed sherds. Also found at Riverview was a sherd with both notching on the lip and an incised line running along the lip surface, as in Type 22d. Sherds with lip notching have also occurred as surface finds in the Antler River valley, and several notched lip sherds, including one with additional lip decoration, were recovered from the Snyder I site. Notching occurs as a decorative technique on some of
the sherds of the Moose Jaw cordmarked type, found at the Mortlach site (Wettlaufer, 1955:26-28, Pl. 2, 1-3). The Ross site yielded pottery with cord-wrapped-paddle impressed surfaces, overhang on the lip exterior edge, and large, closely spaced notches pressed into the lip exterior edge; these can be compared with Type 22a (Griffin, 1965:227-33, Fig. 87, a - c). Kehoe's Ethridge Ware includes notched lip sherds which appear to be similar to some of the types of Group V.

The notched lip technique also occurs in the Dakotas. The Lisbon Tool Impressed type of the Stutsman Focus has deeply notched lips, and a vertical cord-wrapped-paddle surface finish (Wheeler, 1963: Pl. 35, a - c). Shallow notching across the lips occurs on the Fort Yates Decorated Lip sherds from the Shermer site (Sperry, 1968: Pl. 7, g, h). Example B from the Towner Locality (Wood, 1962:233-34, Fig. 1, f) is similar to the Lowton Type 22a. At the Black Partizan site (Caldwell, 1966: Pl. 9, d), one of the sherds of the Cambell Creek Ware has a vertically cord-wrapped-paddle impressed surface, external lip overhang, and closely spaced notches impressed thereon; it is comparable to Type 22a. Notched lip pottery occurred at the Arzeberger site (Spaulding, 1956: Pl. XII, g, l; Pl. XIV, i, j); and at the Hitchell site (Johnston, 1967: Pl. 10, a - c). Sherds of the Anderson Todl Impressed type found on sites in the Big Bend Reser-
voir (Caldwell and Jensen, 1969: Pl. 14, a - f) have lip notching and show some resemblance to the Group $V$ types. In Iowa, the Plain (smoothed) Wares from the Coralville Reservoir area on the Iowa River have notches on the exterior lip edge, which also shows moderate to extreme overhang (Caldwell, 1961: Pl. 28, $a, b)$. One group has no overhang, but has flaring rims and deep, narrow, angular notches pressed, close together, into the lip exterior edge (Caldwell, 1961: Pl. 27, g - i; Pl. 28, f).

Group VI - The Grooved Lip Types
Type 28: ( $\mathrm{n}=27$ ) ; (P1. XI, a)
Defining Attributes: The presence of decoration on the lip surface only in the form of a groove pressed into the lip surface, parallel to the lip edges. In most cases the groove is as wide as the lip itself. On some sherds the resulting concavity is quite slight; on others it is deep.

Other Attributes: All the sherds have cord-wrapped-paddle impressed surfaces. Rims are $S$-curved, straight, or slightly incurved; flare is slight to moderate. Most lipslopes are insloping; a few are horizontal and one is outsloping. Overhang is absent or slight. Lips and rims are mostly medium thick.

Type 29: ( $\mathrm{n}=3$ ) ; (Pl. XI, b)
Defining Attributes: These are the same as for Type 28 with the addition of a single row of punctates on the lip
surface.
Other Attributes: On one sherd the punctates are rectangular; on the other two they are round. The surfaces are cord-wrapped-paddle impressed. Rims are straight; flare is moderate. Lipslopes are horizontal. One sherd has moderate overhang; on the others overhang is absent. Lips and rims are medium thick.

Type 30: ( $\mathrm{n}=1$ ) ;
Defining Attributes: These are the same as those of Type 28, but, in addition to the grooving, there are notches pressed alternately into the interior and exterior edges of the lip.

Other Attributes: The exterior surface is cord-wrapped-paddle impressed. The rim is straight and flare is moderate. The lip slopes inwardly and overhang is absent.

I was unable to find any ceramics comparable to the Group VI types in the literature that I consulted. One notched and lip-grooved sherd was found in the Riverview material that I examined, but it differed from the Lowton sherds in that the rim flared far more than occurs on any Lowton sherd.

Group VII - Types with Cord Impressed Iines on the Rim Type 31: ( $n=19$ ) ; (Pl. XI, c)

Defining Attributes: The presence of cord impressed
line designs on the rim exterior, consisting of oblique and/ or horizontal and/or curvilinear lines; flat lip surfaces. Other Attributes: The surfaces are smoothed. All rims are incurved to strongly incurved; flare is slight to extreme. Lipslopes are insloping to strongly insloping. Overhang is absent. Lips and rims are medium thick.

Type 32: $(n=20)$; (P1. XI, d, e)
Defining Attributes: These are the same as those of Type 31, except that the lip surfaces are convex.

Other Attributes: The surfaces are smoothed. Rims are incurved to strongly incurved; flare is absent to extreme. Lipslopes are insloping; overhang is absent. Most rims are medium thick.

Comparable Types to Group VII and Their Distributions:
Types 31 and 32 are virtually identical with the ceramics described by Will and Hecker (1944:46-69, Pl. 14, 15), Will and Spinden (1906:173-79, P1.37, 39, 40), and Wood (1967: 66, Pl. 7) for the Middle Missouri Village cultures of the Dakotas. Wood calls this type of pottery Fort Yates Cord Impressed, and the relevant attributes of that type are as follows: a smoothed, sometimes lightly polished surface finish, gently curving rims, with low, S-shaped profiles (the incurving rims of the Lowton sherds represent the broken off upper portions of such S-curved rims); flare is usually absent. Lips are convex, sometimes flat. Lips are 3 mm . to 8 mm . thick, and rims are 4 mm . to 9 mm . thick. Decoration consists
of "three to ten lines of horizontal cord impressions" on the upper rim; "On many sherds the decorated zone is interrupted by four equally spaced cord impressed triangles, at the apex of which are usually small appliqued nodes. Most triangles are composed of two to four lines and the base of the triangle is bounded by a single cord impressed line, or, less often, left open. The triangles are predominantly rectilinear, but a few of them are curvilinear or 'rainbow' in appearance" (Wood, 1967:66).

Sherds of this and similar types have a widespread distribution in North and South Dakota and adjacent regions, and are known in small quantities from several sites in Manitoba. These finds include eight sherds found at the Avery site (Joyes, 1969:143-45, Pl. 24, a, b), MacNeish's Mandan -like sherds from Lockport (1958:171), and another similar sherd from the Stott site (MacNeish, 1954:36). Capes reports (1963:30-31, Pl. XI, 2-8) that Nickerson found sherds of this type in the lower valleys of the Antler and Gainsborough Rivers. At least two sherds of this type were found at Riverview.

Miscellaneous Sherds:
In addition to the types already described, there are 29 sherds in the collection which could not be placed into the typological scheme derived for the collection. These
miscellaneous sherds are now described seperately.
Three sherds are distinct in the collection by virtue of their combination of the attributes check-stamped surface finish, and shell temper. Their rims are incurved; lips flat and insloping; flare is absent; overhang is slight on one sherd and absent on the others. (P1. XI, f) (\#577, 639, 754)

Sherd \#548 has a distinctive rim profile: the rim is flared, but comes in again to a point at the lip; there are no lip edges. The surfaces are smoothed; the rim is slightly incurved; overhang is absent. (Pl. XI, g)

Sherd \#79 has a smoothed surface finish, a straight rim profile, moderate flare, and a convex, outsloping lip. Overhang is absent. Decoration consists of two cord impressed lines on the lip surface, running parallel to the lip edges. (PI. XII, a)

Sherds \#162, 163, and 927 have "effigies" on the lip, that is, a nubbin of clay has been pinched up and out from the lip surface, and decorated with incised or impressed, lines, and/or punctates. One sherd is smoothed, one is fabric impressed, and one is cord-wrapped-paddle impressed. Rims are straight or slightly incurved; flare is absent or moderate, and the lips are flat and slightly insloping. (PI. XII, b, c)

Sherds almost identical to \#927 (PI. XII, c) were found in a burial near Reston Manitoba (Bradell, Minty, and Tamplin, 1970: Pl. 24, F - H), where other sherds with large pinched
out decorated clay nubbins were also recovered (Ibid: P1. 24, K, L). Similar "effigy"sherds were found at the Snyder site。 Sherd \#93 has an incurved rim profile with a definite angle on the rim exterior, making the upper part of the rim a sort of collar. The lip is flat and insloping; the surfaces are smoothed. The upper rim is decorated by oblique cord impressed lines. Flare and overhang are absent. (PI. XIII,a) Sherd \#325 is smoothed, has an incurved lip, and a convex, insloping lip; flare and overhang are absent. It is decorated by oblique cord-wrapped-stick impressed lines at the top of the rim, and by horizontal cord-wrapped-stick impressed lines below that. (Pl. XIII, b)

Sherd \#1076 has a smoothed over cord-wrapped-stick impressed surface; the rim is straight, and tapers to a point at the lip. It is decorated by some irregular cord-wrappedstick impressed lines at the top of the rim exterior.

Sherd \#1267 has an S-curved rim profile, a pointed lip, and there are some short tool impressed vertical lines on the top of the rim exterior, and a row of similar lines below them on the rim.

Sherd \# 1026 has an incurved rim profile, except at the very top of the rim, where is curves sharply outward. The lip is convex, has no edges; flare and overhang are absent. The surface is smoothed. Decoration consists of shallow tool impressed oblique lines on the rim interior just be-
low the lip.
Sherd \#80 has a vertically brushed exterior surface finish, a straight rim profile, and moderate flare. The lip is flat, horizontal, and has moderate interior overhang. The decoration consists of deep cord-wrapped-stick impressed notches set alternately into the interior and exterior edges of the lip, creating a kind of scalloping. Also, there is a row of large, widely spaced interior punctates on the rim, with a corresponding row of exterior bosses. The rim is medium thick. ( Pl . XIII, C )

The interior punctates and the vertically brushed surface finish suggest an affiliation for this sherd with the Blackduck Brushed type. However, this sherd does not show much resemblance to any of the sherds of this type illustrated by MacNeish (1958:159, Pl。XVII, 8,9).

Sherd \#2 has a distinctive rim profile: the upper part or "collar" is straight, but the lower part is strongly S-curved. The surface is smoothed. The lip is flat and slightly outsloping. Flare and overhang are absent. The decoration consists of small, shallow, closely spaced notches pressed into the lip interior edge. (Pl. XIII, e)

Sherds \#l79 and 171 (Old Catalogue, from the National Museum) are probably from the same vessel. Their surfaces are smoothed. The rims are straight, very high, and have no flare. The lips are convex, horizontal, and have no overhang. The decoration consists of incised oblique and horizontal lines
on the rim exterior and of oblique incised lines on the lip's exterior edge. (Pl. XIV, a)

Sherds \#308 and 1225 are probably from the same vessel. Their surfaces are smoothed. The lower part of the rim is incurved, but the upper part shows considerable and sudden outcurving. The lips are convex, strongly outsloping and have no edges. Flare and overhang are absent. The upper part of the rim exterior is undecorated, while the lower part has oblique cord impressed lines on it, bounded on the top by a single horizontal line. (Pl. XIV, b)

Will and Spinden illustrate a sherd quite similar to these (1906: Pl. $40, j)$, and similar sherds were found at the Koehler site in the Heart Butte Reservoir area (Cooper, 1958: Pl. 6, 9,12,14), and also at sites of the Stutsman. Focus (Wheeler, 1963: Pl. 32, f).

Sherd \#4 is similar in design, surface finish and general rim profile to the sherds of Type 31. However it is much thicker than those sherds, and has a coarser texture. Also, the lip is decorated with broad notches. This sherd may represent a local attempt to reproduce pottery of the Middle Missouri pattern. (Pl. XIV, c)

Sherds \# 776, 826, and 1053 are distinguished by their rim decoration, which consists of short deep lines pressed into the clay, and set in a herringbone pattern. There are also oblique incised lines on the lip. The surfaces are
cord-wrapped-paddle impressed. The rims are incurved and flare is absent. The lips are flat and have slight overhang; the lipslopes are horizontal or insloping (PI. XIV, e).

Sherds with herringbone designs on the rim exterior have been found in Minnesota and are described by Evans as his Group H (196l: Pl. 9, c; Fig. 7, h). Pottery with similar decorations has been recovered from the Spain site (Smith and Grange, 1958: Pl. 30, b; Pl. 3l, j)。

Sherds \# 217 and 477 are characterized by thin lips, strongly outcurved rim profiles, smoothed surfaces, and flat horizontal lips. Flare and overhang are absent. One sherd is completely undecorated; the other has an incised. line running along the lip surface parallel to the lip edge. (P1. XIV, f).

Sherd \# 367 has a smoothed over cord-wrapped-paddle impressed finish, and is undecorated except for a crude nubbin of clay pinched out about 14 mm . below the lip on the rim exterior. The rim is straight, the lip is flat and slightly outsloping. Flare and overhang are absent.

Sherd \#332 has a straight rim, and extreme flare. The lip is flat and horizontal. It is decorated by horizontal cord-wrapped-stick impressed lines on the rim exterior. Sherd \#ll72 has an outcurved rim; its lip is flat and
outsloping. The surface is smoothed. There are small notches on the lip surface and shallow round and oblong punctates on the upper rim interior. (Pl. XIV, d)

Sherd \#l214 has a strongly outcurved rim. The lip is convex, and the surface is smoothed. There are small notches on the lip surface, and shallow round punctates on the rim interior.

TABLE 11
GEOGRAPHICAL DISTRIBUTION OF THE LOWION TYPES
GROUP I


TABLE 11
GEOGRAPHICAL DISTRIBUTION OF THE LOWTON TYPES
GROUP II

| TYPES | FREQUENCIES |  | COMPARABLE TYPES | GEOGRAPHIEAL DISTRIBUTION |
| :---: | :---: | :---: | :---: | :---: |
| 49 of 7a, | 110 | 9.18 | Cemetery Point | S.E., S. Cent., S.W. Man.; Cent. and N. Minn.; |
| 12 of 8a. |  |  | Cordmarked | S.E., S. Cent. Sask.; S. Alta.; N. North Dakota |
| 7b, 8b, |  |  |  |  |
| 11 of 9 |  |  |  |  |
| 21 of 7a, | 26 | 2.2\% | Alexander Fabric | S. E., S. Cent., S.W. Man.; S.E., S. Cent. Sask. |
| 3 of 8 a |  |  | Impressed | S. Alta. |
| 2 Of 9 |  |  |  |  |
| 7c. 8c | 26 | 2.2\% | $?$ | The decorative motif occurs on mortuary ware |
| 4 of 9 |  |  |  | found in S.W. Man. |
| 10 | 21 | 1.78 | $?$ | Unknown |
| 15b, 16 | 37 | 3.18 | $?$ | Some varieties of these types are comparable to material from North and South Dakota. |

TABLE 11
GEOGRAPHICAL DISTRIBUTION OF THE LOWTON TYPES
GROUP II


TABLE 11
GEOGRAPHICAL DISTRIBUTION OF THE LOWTON TYPES
GROUP III

| TYPE | FREQUENCIES | COMPARABLE TYPES | GEOGRAPHICAL DISTRIBUTION |
| :---: | :---: | :---: | :---: |
| 13a, 15a | 171.38 | Stanley Braced <br> Rim Ware | North and South Dakota |
| 13b, 14 | $121.0 \%$ | GROUP <br> Blackduck (Man- <br> itoba Corded) Ware: <br> Manitoba Horizontal, <br> Stott Noded. | ```IV S.E., S. Cent., S.W. Man.; Cent. and N. Minn.; S.E., S. Cent. Sask.``` |
| 28, 29, 30 | $31 \quad 2.5 \%$ | GROUP $?$ | VI <br> Unknown |
| 31, 32 | 393.38 | GROUP <br> Fort Yates <br> Cord Impressed | VII <br> The Missouri Valley region of North and South Dakota; scattered occurrences in southern Manitoba. |

TABLE 11
GEOGRAPHICAL DISTRIBUTION OF THE LOWTON TYPES
MISCELLANEOUS

| TYPES | FREQUENCIES | COMPARABLE TYPES | GEOGRAPHICAL DISTRIBUTION |
| :---: | :---: | :---: | :---: |
| 11 | 20.23 | ? | Unknown |
| 12 | $4 \quad 0.38$ | ? | Unknown |
| 19 | 10.18 | ? | Unknown |
| Misc. <br> Sherds | $29 \quad 2.43$ | ? | Sherds similar to some of the miscellancous <br> Lowton sherds occur elsewhere in Manitoba, in Minnesota, and in the Dakotas. |
| Unident- | $14 \quad 1.2 \%$ |  |  |
| ifiables |  |  |  |
| TOTAL | $1204100.1 \%$ |  |  |



## CHAPTER IV

CULTURAL AFFILIATIONS OF THE LOWTON SITE
When Vickers first encountered the Lowton ceramics in the '40's, he was struck by their differences from the other then known ceramic manifestations of southern Manitoba (1946:7-8; 1950:11). The presence of Middle Missouri ware suggested that the site's cultural affiliations ought to be sought to the south, and Vickers originally hypothesized that the Lowton site might represent an outlier of the Mandan or Hidatsa cultures (1945:17; 1947:93; 1948a:5; 1948b:8; 1949:11). "The Lowton people are subject to a similar identification", that is, "an aspect of the Upper Missouri Phase of a still unknown pattern." (1947:21). Vickers eventually assigned the Lowton site to its own focus: "the Pelican Lake Focus of an un-named Aspect" (1950:12). By that time, he had revised somewhat his earlier opinions as to the site's cultural affiliations: "The twisted cord impressions in a rainbow design found on Lowton site pottery could be a diffusion from the Upper Missouri, acquired by people who had lived in close connection with the Mandan or Hidatsa." (1950: 13). The discovery of "a series of sherds (which) have a marked resemblance to the lip decorated pottery of the Pelican Lake Culture" near Dundurn, Saskatchewan (reported by Vickers, 1950:13) suggested that the Lowton site was part of a cultural manifestation that extended over the Canadian

Plains: "The Lowton site...may well be an eastern base of a people that drifted west; an early home of one of the historic tribes... of Saskatchewan and Alberta." (1950:13)

Although the destruction of the site in 1947 rendered impossible an in situ confirmation of Vickers' hypotheses, it is now possible to go a little further than he could in suggesting affiliations for the site, by comparing its ceramics with material that has come to light since Vickers did his work. My own conclusions must of necessity be tentative, but I think that some reasonable statements can now be made about the site's affiliations.

One of the salient facts which emerges from an examination of the Lowton collection is that pottery types and attributes from both southeastern Manitoba and the Dakotas are mixed in the ceramic assemblage. Most of the pottery in the three major groups have either fabric impressed or cord-wrapped-paddle impressed surface finishes, similar to the finishes of types from southeastern Manitoba. Furthermore, approximately $25 \%$ of the collection can be assigned without too much difficulty to the southeastern types Cemetery Point Cordmarked, or Alexander Fabric Impressed. However, the decoration of most of the Lowton ceramics seems to be derived from the south. Notching and other forms of lip decoration are widespread in the Dakotas and adjacent areas, but do not occur frequently in southeastern Manitoba. (An ex-
ception are some of the sherds of the Sturgeon Falls Fabric Impressed type which have cord-wrapped-stick impressed designs on the lip.) On the other hand, the various techniques and motifs of rim exterior decoration, which are so important in the Middle Missouri assemblages, are absent from the bulk of the Lowton collection.

In addition to attributes, these two regions are represented in the collection by their more distinctive pottery types, which occur as small but significant elements in the Lowton ceramics. Types 13a, 15a, 31, and 32 relate to the Middle Missouri cultures, while the connection with the Woodland cultures to the east is suggested by Types 13 b and 14.

In his discussion of diffusion, Deetz (1967:96-101) characterizes secondary diffusion as "the spread of ideas... with no accompanying population movement on any large scale." (as distinct from primary diffusion, involving the wholesale permanent migration of relatively large numbers of people.). Secondary diffusion would be indicated in the archaeological record by a "random mixing of attributes". I would suggest that such a mixing of attributes occurred at the Lowton site, and is evident in the ceramics of the site. This would indicate that the cultures which occupied the area were exposed to secondary diffusion from both southeastern Manitoba, and the American northern Plains. Deetz
(1967:96) suggests that intermarriage or trade between two populations can result in secondary diffusion. It is also possible that, in the course of their seasonal food quest, the Lowton peoples came in contact with the cultures of both the eastern Woodlands and the Northern Plains.

As was noted in the previous chapter, notched and lip decorated pottery with cord-wrapped-paddle or fabric impressed surface finishes has a wide, if sporadic, distribution in the Plains region of southwestern Manitoba, Saskatchewan, and Alberta. Kehoe (1959) and Griffin (1965) speculate on the possible tribes responsible for these ceramic manifestations, but the evidence seems to me to be too slender as yet for definite conclusions to be reached on these matters.

In conclusion, I would suggest that the Lowton site was part of one or perhaps several cultural manifestations which extended across the Canadian Plains. It seems to have been linked with the Middle Missouri Village Farming cultures, as Vickers suggested, but $I$ would say that it also derived in part from the Woodland cultural traditions of southeastern Manitoba, Minnesota, and the Upper Great Lakes area.

## Dating:

No absolute date can be assigned to the Lowton manifestation, because no dateable material was recovered, in context, from the site. A temporal range can be inferred from the cer-
amics; however, two problems must be borne in mind. It was not possible to date the notched and decorated lip pottery which make up the bulk of the Lowton ceramic assemblage, since no dated pottery was found which could be compared to these types. Also, there is no way of knowing whether the Lowton pottery represents a single cultural component or not, since most of it was collected from the surface. With no evidence available to the contrary, it is entirely possible that the ceramics were deposited by several cultures over a long period of time, perhaps as much as 1000 years.

Vickers suggested a date of between 1600 and 1650 A.D. for the "Pelican Lake Culture" represented at Lowton (1950: 13). This dating is supported by the presence of pottery comparable to the Cemetery Point Cordmarked and Alexander Fabric Impressed types, which MacNeish assigns to his Selkirk Focus (1958:162, 166). This Focus is dated between 1350 and 1750 (MacNeish, 1958:55). Futhermore, Woods states (1967:128, 133-34, 138-39, Fig.15) that the Fort Yates Cord Impressed type, present at Lowton, occurs in all three foci of the prehistoric Mandan culture (Thomas Riggs, Huff, and Heart River). But the type is more characteristic of the later two foci, which are dated 1400 to 1600 A.D. and 1600 to 1797 A.D., respectively (Woods, 1967:166). This would make the Lowton manifestation contemporaneous with Lehmer's Initial and Extended Coalescent Traditions, of the Missouri
trench (Lehmer, 1966: Fig. 7).
The absence of European trade goods from the site (Vickers, personal communication) indicates a prehistoric date, that is, no later than the mid-seventeenth century. The presence of a small amount of Blackduck ware may indicate a much earlier occupation of the site, perhaps as far back as 1000 A.D. or earlier. Some of the smoothed pottery in Group I may be comparable with the Riggs Plain type from the Middle Missouri area. This suggests a date in the range of Wood's Thomas Riggs Focus ( 1100 to 1400 A.D.), (Wood, 1967:166), or Lehmer's Fort Yates Phase of the Extended Middle Missouri Tradition (Lehmer, 1966, Fig.7).

The absence of Laurel pottery from the Lowton assemblage makes it unlikely that the manifestation was contemporary with the Laurel ware-using culture at the nearby Avery site, which Joyes dates between 300 and 500 A.D. (1969:198). This puts an outside lower limit on the dating of the Lowton manifestations.

In summary, therefore, I would suggest that the presence of Selkirk pottery and late prehistoric material from the Dakotas indicates a date of between 1350 and 1650 A.D. for the Lowton site. This however does not exclude the possibility of an earlier date, for at least part of the assemblage.

## CHAPTER V

SUMMARY AND CONCLUSIONS

## Methodology:

The technique of association analysis was used to derive a typology for the Lowton ceramics. It was partially successful in that it distinguished the major groups or wares in the collection. The 32 types finally derived by the technique were not comparable to the types derived by other archaeologists for Plains ceramics, and so had to be modified for purposes of comparison. It is suggested, however, that no absolute criteria exist at this time to evaluate the validity of pottery types in western Canada. Ways in which this technique might be improved were suggested in Chapter II; what is principally needed for an attribute analysis is a statistical method for selecting the attributes. Further work of this sort is needed to assess the value of statistical techniques for typology, and I would suggest that a useful project would be to apply several techniques to one collection, for which a priori information about its typology is available.

The Lowton Culture:
Some 25\% of the Lowton ceramics is comparable to ceramics of MacNeish's Selkirk Phase. The notched and lip decorated pottery which makes up most of the rest of the collection combines attributes from southeastern Manitoba
and from the U. S. northern Plains. I suggest therefore that the Lowton manifestations represent a population or populations which were in contact with both the Woodland traditions of southeastern Manitoba and Minnesota, and adjacent regions, and the Village Farming Traditions of the Dakotas. I further suggest that the Lowton manifestations are part of a cultural complex that existed on the Canadian Plains in prehistoric times.

On the basis of some of the pottery in the collection, I would date the site to the late fourteenth, fifteenth, sixteenth, or early seventeenth century. It is possible, however, that earlier material is present in the ceramic assemblage.

## APPENDIX

THE ATTRIBUTE LIST
This list is based on that used by McPherron in his analysis of the Juntenen ceramics (1967:303-06). Owing to the differences between his collection and the Lowton material, I have modified McPherron's list rather extensively. For the discrete attributes, the sherds were described in terms of the states of that attribute which they showed; for the continuous attributes, the measurements themselves were originally recorded. After these attributes had been rationalized, the sherds were described in terms of the new discrete categories.

The continuous attributes were measured in millimetres to the nearest half millimetre, except for Neck Angle, which was measured to the nearest ten degrees.
Vessel Djameter:
I had originally intended to measure the vessel diameter, in order to get some idea of the size of the vessels represented by the rim sherds. This was to have been done by matching the curve of the rim sherd to a template of concentric arcs of circles. Understandably, the smaller the rim sherd, the less reliable was the measure of the diameter taken in this fashion. This attribute was dropped from the analysis because too few sherds were large enough to give a reliable measure of vessel diameter.

## I. FORM:

A. NECK:

I defined the neck as the area of junction between the rim and the body. Neck form was originally described in terms of three attributes.

1. Neck Angle: This continuous attribute is the measure of the angle that the body makes with the rim, measured at approximately the mid-point of the junction, on the outside of the sherd. It was measured by applying the sherd to a template of angles drawn with a protractor. Only 169 sherds were complete enough to for this measurement to be taken from them. This attribute has three states after rationalization: (i) Small (less than $145^{\circ}$ ), (ii) Medium ( $145^{\circ}$ to $165^{\circ}$ ), and (iii) Large ( over $165^{\circ}$ )。
2. Neck Thickness: This continuous attribute was measured at the junction of the body and the rim. Only 235 sherds were complete enough to be measured for this attribute. Three states were present after rationalization: (i) Small (under 5 mm ) , (ii) Medium ( $5 \mathrm{~mm}-7 \mathrm{~mm}$ ), and (iii) Large (over 7 mm .).

Neck Form is a discrete attribute that has two states, Angular and Rounded, depending on whether the body makes a distinct angle with the rim, or the junction is continuous and rounded. Since almost all the sherds with necks had rounded necks, the attribute was dropped from the analysis.
B. RIM:

I defined rim as that part of the vessel above the neck, including the lip. For this analysis, a rim sherd was one on which a portion of the lip was present. A whole rim sherd includes enough of the neck so that the neck thickness and neck angle can be measured. In the Lowton collection there were 169 whole rim sherds; the rest consisted of the broken off upper halves of rims.

1. Rim Thickness: This continuous attribute was measured about half way between the lip and the bottom of the sherd. There were three states after rationalization:
(i) Small (under 4.5 mm.$)$, (ii) Medium ( 4.5 mm . to 6.0 mm ), and Large (over 6.0 mm.$)$.
2. Rim Height: This continuous attribute was measured as the vertical distance between the lip and the neck on the rim sherd, and thus could only be measured on whole rims. There were three states after rationalization: (i) Small (under 18 mm.$)$, (ii) Medium (18 mm. - 32 mm.$)$, and (iii) Large (over 32 mm. ).
3. Rim Curvature: This is a discrete attribute. I had originally considered trying to quantify this attribute by measuring the angle made by the upper rim with the lower rim, or by applying the sherd to a template. But the validity of both techniques depends on how much of the rim is present to be measured, and therefore both techniques were discarded as
unreliable. I arbitrarily divided the curvature continuum into four states: (i) Straight, (ii) S-curved, (iii) Incurved, and (iv) Outcurved.
4. Rim Flare: McPherron refers to this continuous attribute as "splaying" (1967:303). It is the measure of the degree to which the lip thickness is greater than the rim thickness, without having clay overhanging the lip edges. It is expressed as an index: lip thickness divided by rim thickness, and has four states after rationalization:
(i) Absent, (ii) Small (under l.26), (iii) Medium (1.26 to 1.45), and (iv) Large (over 1.45).
5. Rim Flare Position: This discrete attribute has four states: (i) Absent, (ii) Interior, (iii) Exterior, (iv) Both.

Collar: Originally, I included several attributes to cover various possible combinations of collar form. But since only three sherds in the collection had anything like a collar, this group of attributes was dropped from the analysis. I defined collar as the upper part of the rim, seperated from the lower part of the rim by a perceptible discontinuity.
C. LIP:

I defined lip as the surface between the interior and exterior surfaces of the rim, at the top of the rim sherd.

1. Lip Thickness: This continuous attribute was taken as the thickness of the sherd across the lip. It was
measured along a line parallel to the lip slope. There were three states after rationalization: (i) Small (under 5.5 mm ), (ii) Medium ( 5.5 mm . to 8.0 mm .) , and (iii) Large (over 8.0 mm ).
2. Lip Overhang: This discrete attribute refers to the amount of clay hanging over the lip. There are four states: (i) Absent, (ii) Small, (iii) Medium, and (iv) Large。
3. Lip Overhang Position: This discrete attribute has four states: (i) Absent, (ii) Interior, (iii) Exterior, (iv) Both.
4. Lip Surface: This discrete attribute has three states: (i) Flat, (ii) Convex, and (iii) Concave.
5. Lip Slope: This discrete attribute is defined as the direction in which the lip surface deviates from the horizontal. There are three states: (i) Outsloping, (ii) Insloping, (iii) Horizontal.
6. Lip Edge: This discrete attribute is defined as the discontinuity between the lip surface and the rim exterior and interior. There are four states: (i) Absent, (ii) Interior, (iii) Exterior, and (iv) Both. II. SURFACE FINISH:

Surface finish refers to the treatment of the surface of the vessel prior to decoration, by some technique applied uniformly over the entire vessel, or a large portion of it. I originally described surface finish for the lip, the rim exterior and the rim interior. But only the exterior surface
finish showed any variation in the collection, and therefore the other two were dropped from the analysis. The discrete attribute (Exterior) Surface Finish has five states: (i) Smoothed (ii) Fabric Impressed, (iii) Smoothed Over Fabric Impressed, (iv) Cord-Wrapped-Paddle Impressed. and (v) Other. The last state includes those few sherds that were brushed or checkstamped.
(iv) Cord-Wrapped-Paddle Impressed: Because the majority of the Lowton rim sherds had this kind of surface finish, four attributes 'dependant' on this state were included in the original description of the collection:
(a) Cord Size: This discrete attribute has four arbitrarily defined states: (i) Small, (ii) Medium, (iii) Large, and (iv) Absent.
(b) Distance Between Cords: This discrete attribute has four states: (i) Absent, (ii) Small, (iii) Medium, and (iv) Large.
(c) Degree of Smoothing: This discrete attribute has three states: (i) Absent, (ii) Smoothed, and (iii) Unsmoothed
(d) Cord Direction: This discrete attribute has four states: (i) Absent, (ii) Right Oblique, (iii) Left Oblique, (iv) Vertical.

These four attributes were dropped from the analysis before the calculations of the second set of sum of ChiSquares, and Mean Chi-Squares.
III. DECORATION

1. Decoration Location: This discrete attribute has six states, which, with the exception of the first, are not necessarily mutually exclusive: (i) Absent, (ii) Upper Rim Exterior, (iii) Rim Exterior, (iv) Lip, (v) Upper Rim Interior, and (vi) Rim Interior.
2. Decorative Technique: This discrete attribute has ten states, which, except for the first one, are not necessarily mutually exclusive: (i) Absent, (ii) Cord-WrappedStick Impressed, (iii) Cord Impressed, (iv) Incising, (v) Punctating, (vi) Pinching and Effigies, (vii) Lip Flattening, (viii) Lip Grooving, (ix) Tool Impressed, (x) Notching.
(x) Notching: Almost half of the Lowton sherds were decorated by notching, and therefore, five dependant attributes, concerned with this technique were included in the original description of the collection.
(a) Notch Width: This continuous attribute has four: states, after rationalization: (i) Absent, (ii) Small (under 3 mm.$)$, (iii) Medium ( 3 mm . to 5 mm .), (iv) Large (over 5 mm .)
(b) Distance Between Notches: This continuous attribute has four states after rationalization: (i) Absent, (ii) Small (under 3.5 mm ), (iii) Medium ( 3.5 mm . to 5.0 mm 。), and (iv) Large (over 5.0 mm ).
(c) Notch Depth: This discrete attribute has four arbitrarily defined states: (i) Absent, (ii) Small, (iii) Medium, (iv) Large.
(d) Notch Direction: This discrete attribute has four states: (i) Absent, (ii) Vertical, (iii) Right Oblique, and (iv) Left Oblique.
(e) Notch Position: This discrete attribute has five states: (i) Absent, (ii) Interior, (iii) Exterior, (iv) Both, and (v) Lip Surface.
3. Decorative Motif: This discrete attribute has eleven states, not necessarily mutually exclusive, except for the last one: (i) One row of discrete small items (notches, punctates, impressed or incised lines, etc.); (ii) Pinched out clay designs (nubbins and effigies); (iii) Groove or line running along the lip surface parallel to the lip edge; (iv) Short vertical or oblique lines; (v) Oblique lines set in a herringbone pattern; (vi) Adjacent zones of oblique lines set more or less at right angles to each other; (vii) Zones of oblique lines bounded by horizontal lines; (viii) A series of parallel horizontal lines; (ix) Designs with curvilinear lines; (x) Scalloped lip; and (xi) Absent. Note: The attributes described in the Appendix, identified by Arabic numbers, were those used to describe the collection before the attributes were dichotomized. The dichotomized attributes correspond to the attribute states described here, identified with lower case Roman numbers.

FIGURE 14


PARTS OF A VESSEL

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FIGURE 14 - Continued


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-128-

PLATES


On rim profiles interiors are to the left.



-135-






-141-


-143-







$$
\begin{gathered}
\text { Plate XI } \\
\text { a: Type } 28 \\
\text { b: Type } 29 \\
\text { c: Type } 31 \\
\text { d, e: Type } 32 \\
\text { f, } g: \text { Miscellaneous Sherds } \\
\text { h: Type } 5
\end{gathered}
$$



Sherds are life size.

Plate XIII
$a-c:$ Miscellaneous Sherds
$d:$ Type 21
$e:$ Miscellaneous Sherd
$f:$ Type 26

-155Plate XIV
a - f: Miscellaneous Sherds
On rim profiles interiors are to the right.
Sherds are life size.



[^0]:    NOTE: Roman numerals, caps, (I) refer to large attribute
    classes. Roman letters, caps, (A) refer to small attribute
    (1) refer to individual undichoto-
    
    
     to certain undichotomized undichotomized attributes, as shown.

[^1]:    
    

[^2]:    The broken line indicates the 3.84 chi-square cut-off point in this hierarchy.
    (see text, pg. 36)

