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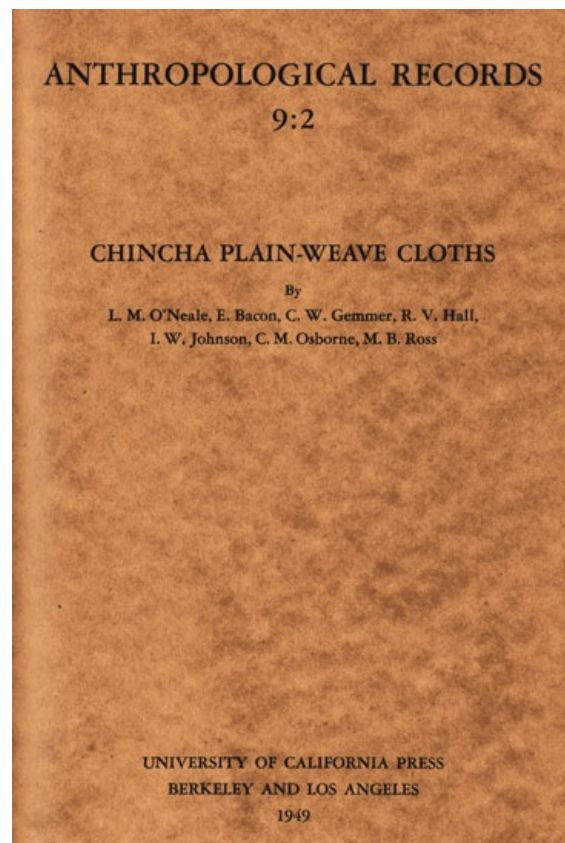
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### **Transcriber's Note:**

Inconsistent spelling and hyphenation in the original document have been preserved. Obvious typographical errors have been corrected.



# CHINCHA PLAIN-WEAVE CLOTHS

BY

L. M. O'NEALE, E. BACON, C. W. GEMMER,  
R. V. HALL, I. W. JOHNSON, C. M. OSBORNE,  
M. B. ROSS

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### FOREWORD

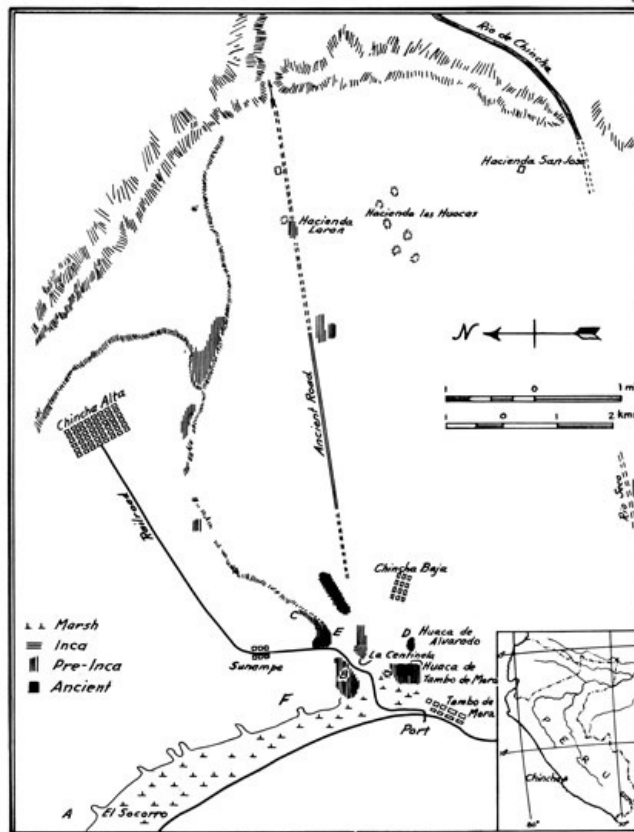
The study presented here was one of a series planned by Professor Lila M. O'Neale, Associate Curator of Textiles in the Museum of Anthropology. The fundamental idea was to make use of the wealth of material in the collections of the Museum of Anthropology, particularly its pre-Columbian Peruvian textiles, as source material for study and analysis by advanced students. Professor O'Neale's sudden death on February 2, 1948, means that, although the paper was completed and in the hands of the Board of Editors of Anthropological Records, the final proofreading has not been done by Professor O'Neale.

The Board greatly regrets that this outstanding contribution will not be followed by others produced under the direction and guidance of a highly esteemed colleague.

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**Map 1**  
**Chincha Environs**

## CHINCHA PLAIN-WEAVE CLOTHS

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### INTRODUCTION

### The Material

The Chincha collection, excavated in 1900 by Dr. Max Uhle during the Peruvian expedition financed by Mrs. Phoebe Apperson Hearst, is catalogued under two lot prefixes: 4- and 16-. Specimen numbers with the prefix 4- indicate that the precise provenience as to site and grave is known. The cloths in this lot have been previously analyzed and a preliminary report has been published.<sup>[1]</sup> The cloths in the 16- lot, as is explained in the report on the pottery,<sup>[2]</sup> did not identify perfectly with entries in the collector's field catalogue or their identification was dubious.

Six Chincha sites described in Uhle's field catalogue<sup>[3]</sup> are shown on [map 1](#). The number of cloth specimens representing each of these sites varies from 2 to 52 ([table 1](#)). Briefly, the time periods indicated by finds forming the basis of this report are as follows.

Site A (2 specimens). "On the declivities of the valley towards the sea, 5 km. from Tambo de Mora to the north." Late Chincha period.

Site B (3 specimens). La Cumbe cemetery; nearly exhausted; the few graves opened were "ordinary ones." Late Chincha period.

Site C (37 specimens). In "the higher Northern part of the valley." Late Chincha period.

Site D, and "near" site D (52 specimens). "Chamberlike tombs, which had been dug out in a mound-like older huaca." Late Chincha period.

Site E, and "near" site E (20 specimens). "The dry natural terrace ... in front of the ruins of La Centinela." Several graves at this site held European articles. Late Chincha period, in part after the Spanish Conquest.

Site F (2 specimens). "The natural terraces with slopes directed to the sea north of La Cumbe (circa Las Palmas)."<sup>[4]</sup> Late Chincha period.

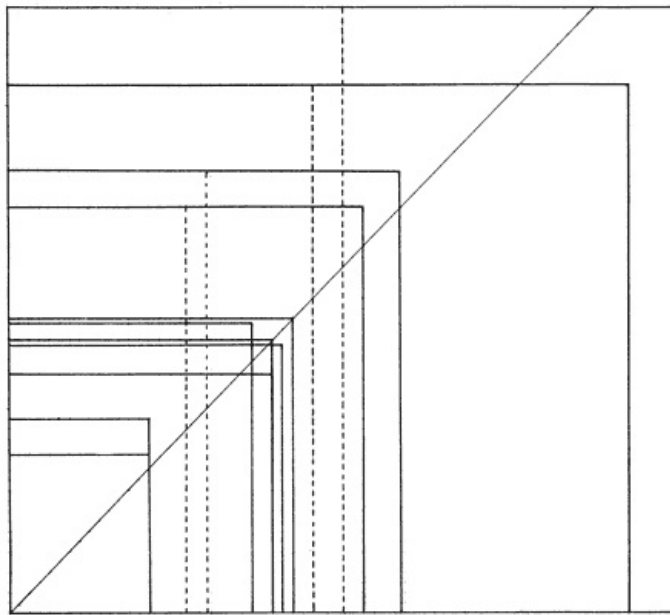
Table 1

Basic Table: Sites, Periods, and Number of Specimens in Study

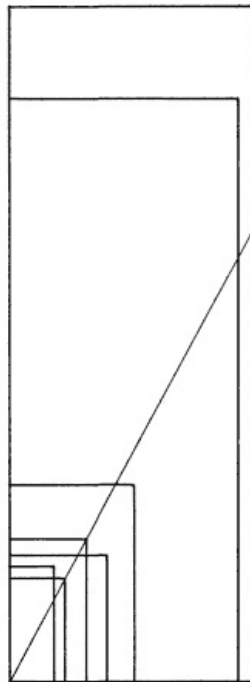
Site	Period	No. 4-specs.	No. 16-specs.	Total specs.
A	Late Chincha	2	...	2
B	Late Chincha	2	1	3
C	Late Chincha and Inca	...	37	37
D	Late Chincha	7	41	48
"Near" D		4	...	4
E	Late Chincha and Inca	10	9	19
"Near" E		1	...	1
F	Late Chincha	2	...	2
Totals		28	88	116

Most of the fabrics described in the literature on ancient Peruvian textiles are characterized by beauty of coloring or arresting designs or unusual workmanship—sometimes by all three. These all-cotton Chincha specimens have none of the expectable features. First and last they seem to have served utilitarian purposes; for that reason, most of them are comparable to our so-called domestics. The larger ones are probably mantles: the proportions of the largest two-breadth pieces with full dimensions (4-3973d, 59.5 in. by 66 in. and 16-1250, 52 in. by 61 in.) place them in this group; a third specimen (16-1292), also formed of two breadths (intact breadth 35 in. plus fragmentary breadth 28 in.) was probably a mantle 62 inches by 70 inches over all. The smaller specimens suggest scarves (or incomplete mantles), carrying cloths, or kerchiefs (figs. [1](#), [2](#)).

The fact that many of the Chincha cloths in the 16- lot had apparently been roughly torn to rectangular shapes leads us to believe that the excavator used them to wrap pottery specimens. Indeed, the majority seem to have been used even by their makers as wrappings. A number of them have long loose stitches or hanging cordlike threads, which originally may have held several layers together. Many of the single breadths have traces of seaming stitches on one or both selvages, indicating that the original wrapping was two or three times its preserved width.



**Fig. 1. Diagrams of eleven specimens with length-to-width proportions approximately 1:1, as indicated by diagonal. Seams in two-breadth textiles shown as broken lines. Largest specimen, 59.5 inches by 66 inches.**



**Fig. 2. Diagrams of seven rectangular specimens with length-to-width proportions approximately 2:1 as indicated by diagonal. Largest specimen, 62 inches by 22.5 inches.**

A large proportion of the cloths in this group are badly worn and clumsily patched. Two, three, and sometimes more pieces of irregular shape applied to the base material and even on top of a first patch are not infrequent ([pl. 3, d](#)). The mended fragments do not appear to be either the original sizes or shapes. Many of them have been reduced to their present rectangular shape by tearing off tattered (?) edges.

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One small group of striped textiles in the 16- lot is a noteworthy exception to the majority. Finely striped cottons similar to the one in [plate 5, d](#) must certainly have been made for other than utility cloths, probably for garments.

There are four small bags (or pads?) in the Chinchá 4- lot. Three of these were formed of small whole cloths sewed together at the sides with running, double running, and whipping stitches respectively. The fourth is made of a piece of an edge-stripe material and has one loomstring end and one side selvage. On this bag the torn edges have been turned in and seamed with a running stitch.

Ties for one of the bags have been made by plaiting in a 4-strand flat braid the elements

consisting of the two loomstrings plus an additional 12-ply cord drawn through the corner of the bag to its center point, thus giving two ends. Another of the bags has a draw string formed by a 9-ply cord drawn through the top end with a running stitch.

## DIMENSIONS OF THE CHINCHA CLOTHS

One hundred twelve cloths in the plain-weave group were measured. Because some of the specimens could not be placed under tension, the forefinger was drawn along the cloth beside a steel tape to smooth out wrinkles. Measurements taken by this method approximate those on a cloth stretched between the bars of a loom.

### Lengths

Complete dimensions can be taken on eighteen Chincha specimens in lots 4- and 16-. As figures [1](#) and [2](#) show, these dimensions cluster around two sets of proportions: the eleven cloths represented in the diagram in [figure 1](#) are squarish; the seven in [figure 2](#), with a length-to-width proportion of approximately two-to-three to one, are rectangular. Four of the squarish cloths are formed of two separately woven breadths of material. All the rectangular cloths are single breadths.

Measurements of these specimens with complete dimensions are given below under the two classifications.

Squarish cloths	Measurements in inches
Specimen 4-3633b	15.5 by 14
16-1260	19 by 14
4-3890a	23.5 by 26
4-3883a	26.5 by 27
4-4056	27 by 26
16-1253	28.5 by 24
4-4027	29 by 28
4-4022a	40 by 35 (2 breadths)
4-3883b	43.5 by 38.5 (2 breadths)
16-1250	52 by 61 (2 breadths)
4-3973d	59.5 by 66 (2 breadths)
Rectangular cloths	
Specimen 4-3889c	9.5 by 5
4-4029	10.5 by 4
4-3962	11.5 by 9
4-3882f	13 by 7
4-3710m	18 by 11.5
4-3883d	53.5 by 21
4-4059a	62 by 22.5

From the twenty Chincha plain-weave cloths with intact lengths ([fig. 4](#)) it is possible to know (1) that the cloths were woven by methods standard among the ancient Peruvians; (2) that each breadth represents a separate warping operation which established its ultimate length; (3) that each breadth was made singly on the loom. The evidence for such procedures and the identifying features of the end selvages on Peruvian cloths are to be recognized in the continuous thread which forms the warp skein—in contradistinction to cut ends of warps—and in the presence of two or more heavy wefts, the first ones put across the web. The cords binding the end loops of the warp skein to the loom bars hold the first of these loomstring wefts, as they are called, to the bars. The two or more succeeding wefts, which are interlaced with the warps, establish the width of the piece and give it a certain firmness. On the ends of some cloths the strand of cord for loomstrings was long enough to carry across the web only twice. In the majority of our plain-weave cloths it was carried across three times; in over a fifth of the total number of intact ends in the 16- lot the loomstring carried across four times. The frequencies of two, three, and four loomstrings at the ends of webs in this group are approximately as 6:32:16. A number of these occurrences are on cloths in which the heavy cord is not long enough to make a complete crossing; the remainder of the breadth is completed with weft of the size used for the regular weaving.

In the Chincha 4- lot, loomstrings of from 2- to 12-ply formed the weft for from two to six courses of weaving. In seven of the twenty-four specimens showing finished ends, the loomstring stopped

partway across its course in the web and was there joined to the regular weft yarn. In two the joining was effected by finger knots, in the other by splicing (?). The two specimens (4-3889c and 4-4029) having strong 12-ply loomstrings were small but complete cloths which had been doubled and stitched along the sides to form bags. The loomstrings thus served to reinforce the open mouth of the bag.

In eleven specimens the loomstrings had an initial S and final Z twist; twelve show the opposite combination. In one specimen (4-4056) the separate plies have an S twist, but the final yarn is untwisted.

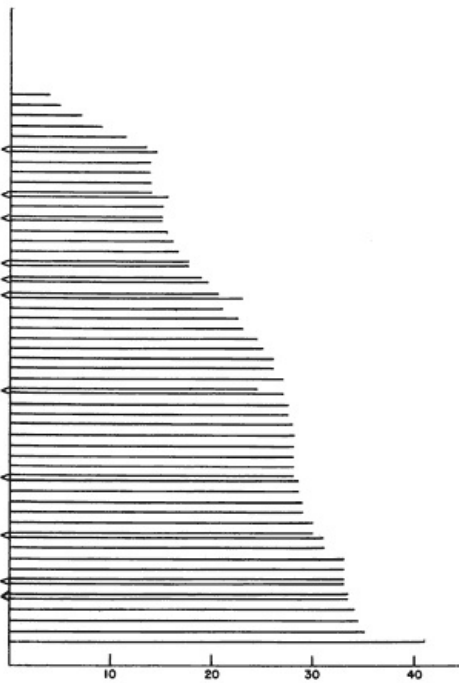
Complete lengths of Chincha plain-weave cloths in order from shortest to longest:

Spec. no.	Inches
4-3889c	9.5
4-4029	10.5
4-3962	11.5
4-3882f	13
4-3633b	15.5
4-3710m	18
16-1260	19
4-3890a	23.5
4-3882a	26.5
4-4056	27
16-1253	28.5
4-4027	29
4-4022a	40 (× 2)
4-3883b	43.5 (× 2)
16-1250	52 (× 2)
16-1290	53
4-3883d	53.5
4-3973d	59.5 (× 2)
4-4059a	62
16-1292	62

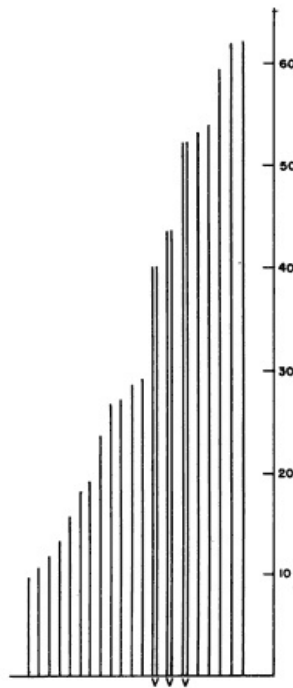
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Ninety-odd of the measured cloths are incomplete as to length. These preserved lengths fall within arbitrary groupings as follows:

From 5 inches to 20 inches in length	29 pieces
From 21 inches to 30 inches in length	33 pieces
From 31 inches to 40 inches in length	17 pieces
From 41 inches to 50 inches in length	7 pieces
From 51 inches to 60 inches in length	4 pieces
From 61 inches to 70 inches in length	2 pieces



**Fig. 3. Complete widths of textiles in Chinchu plain-weave group. Separately woven webs of two-breadth cloths indicated by chevrons. Narrowest width, 4 inches.**



**Fig. 4. Complete lengths of textiles in Chinchu plain-weave group. Separately woven webs of two-breadth cloths indicated by chevrons. Shortest length, 9.5 inches.**

### Widths

There are three times as many weavings with complete widths as with complete lengths; 60 as compared to 20. Clues to the wrappings or blankets of which these breadths were sections are frequently furnished by traces of stitchery and broken threads on the side selvages. As shown by [table 2](#) and [figure 3](#), the five narrowest complete breadths (Group 1) are within a range of 4 to 12 inches. Narrow widths can be woven most rapidly on the backstrap loom. Complete breadths in Group 2 (18 specimens) fall within the range of 14 to 20 inches. These widths, also, can be woven without much effort. Seaming together narrow breadths appears to have been preferred to weaving wider ones equal to the two or three which compose some of the rectangular specimens.

Table 2

#### Frequencies of Complete Width Measurements

---



	Width in inches	Number of occurrences	Total occurrences
<b>Group 1</b>			
4-4029	4	1	
4-3889c	5	1	
4-3882f	7	1	
4-3962	9	1	
4-3710m	11.5	1	5
<b>Group 2</b>			
4-3633b, 16-1240, -1256, -1260, -1274	14	5	
4-3970, -4075d, 16-1274, -1280 (2)	15.5	5	
16-1240, -1248	16	2	
4-4022a (2), 16-1225	17.5	3	
4-3883b (2)	19.5	2	
4-4068b	20.5	1	18
<b>Group 3</b>			
4-3883d	21	1	
4-4059a	22.5	1	
4-4068b, 16-1291	23	2	
16-1237, -1238, -1242, -1251, -1253	25	5	
4-3890a, -4056	26	2	
4-3883a, -4068d, 16-1251, -1265	27	4	
4-4023 (2), -4027, 16-1257, -1265, -1271, 1272, -1289	28	8	
4-3633a, -4055, 16-1261	29	3	26
<b>Group 4</b>			
16-1259	30	1	
16-1250, -1294	31	2	
4-3973d (2), 16-1283, -1304d	33	4	
16-1252, -1269b	34	2	
16-1266, -1292	35	2	
16-1286	41	1	12

Group 3, as listed in [table 2](#), comprises breadths falling within a range of 21 inches through 29 inches. These widths reduce weaving speed and bring about problems in manipulation of the loom parts. The twelve widest complete breadths in the Chinchá lot range from 30 inches to 35 inches with a single specimen measuring 41 inches. For this last piece, and possibly for several of the narrower ones in the same group, a two-bar loom not attached to the weaver's waist seems indicated.

Complete widths of Chinchá plain-weave fabrics in order from narrowest to widest:

Spec. no.	Inches
4-4029	4
4-3889c	5
4-3882f	7
4-3962	9
4-3710m	11.5
16-1274	13.5 + 14.5
4-3633b	14
16-1256	14
16-1260	14
16-1240	14.5 + 15.5
4-3970	15
16-1280	15 + 15
4-4075d	15.5
16-1248	16
16-1225	16.5

4-4022a	17.5 + 17.5
4-3883b	19 + 19.5
4-4068b	20.5 + 23
4-3883d	21
4-4059a	22.5
16-1291	23
16-1253	24.5
16-1237	25
4-3890a	26
4-4056	26
4-3883a	27
16-1251	27 + 24.5
4-4068d	27.5
16-1265	27.5
4-4027	28
16-1257	28
16-1271	28
16-1272	28
16-1289	28
4-4023	28 + 28.5
16-1261	28.5
4-3633a	29
4-4055	29
16-1259	30
16-1250	30 + 31
16-1294	31
16-1283	33
16-1304b	33
4-3973d	33 + 33
16-1252	33.5 + 33.5
16-1269b	34
16-1266	34.5
16-1292	35
16-1286	41

Seventy-odd individually woven breadths of material are incomplete as to width. The arbitrary groupings in which these fall are as follows:

Under 10 inches in width	3 specimens
11 inches to 20 inches	42 specimens
21 inches to 30 inches	22 specimens
31 inches to 40 inches	7 specimens

Side selvages strengthened by any one of the several methods we know from commercial weavings are rare in textiles from primitive looms. It is not uncommon, however, to find four or five edge yarns drawn more closely together than are the others in the web. Familiarity with these two facts made our discovery of a unique selvage finish a matter of unusual interest. The edges of specimens 16-1228 and 16-1236 have been reinforced by two stitchery techniques. [Plate 8,i](#) shows the ordinary whipping stitches which form the foundation for the second technique. [Plate 8,h](#) shows this second line of work to consist of a double strand twined, but always from back to front, with the tops of the whipping stitches.

On one of the Chíncha 4- specimens (4-4068a) the half-inch selvage is distinguished from the body of the fabric by the use of warp yarns lighter in color than those appearing in the body of the fabric and by the two-over-one weave of the right-hand selvage in contrast to the one-over-one weave found elsewhere in the fabric. In specimen 4-4027 the edges are strengthened on each side for some six inches of the length by a single heavy 4-ply warp unit.

In the Chíncha 4- specimens, where congestion of edge yarns occurs, its extent in from the edge varies from 5 threads (in 3 specimens) to 24 threads (1 specimen); in the majority of these

specimens, the congestion ranges from 6 to 12 threads (8 specimens). Textures in [plate 4, a, c](#) are comparable to those in which maximum congestion occurs.

## YARNS

All yarns are initially spun as single plies. In the ancient Peruvian textiles, there are evidences of preferences for single-ply yarns or at least the use of them even in fabrics we should consider called for heavier elements. The Chincha domestic cloths are good examples. We made yarn analyses on half of the total number of cloths in the study. All but ten of the fifty-seven examined were woven with single-ply warp and weft elements and of these ten, only one coarse cloth had 2-ply warps and wefts; the remaining nine had 2-ply warps crossed by single-ply wefts. The majority of these fabrics classified as "fine" weavings.

Yarns may be twisted (spun) in two directions. The spirals formed by twisting may extend upward to the left (the S-twist) or to the right (the Z-twist). The frequencies of the left and the right twist in yarns are indicative of motor habits, if nothing more.

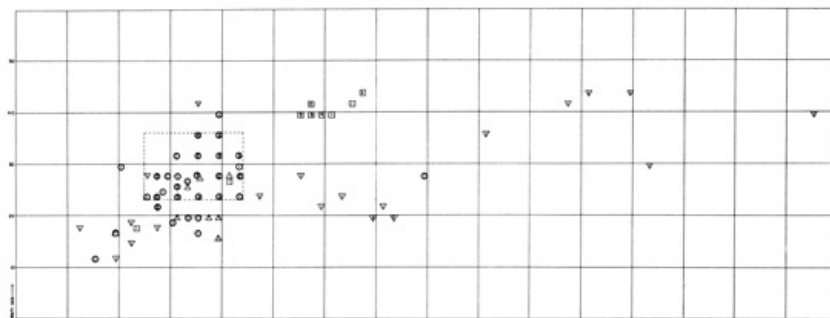
The largest Chincha group comprises twenty-nine cloths in which the warp and weft elements have left spirals; a much smaller group (5 specimens) shows yarns with right spirals. Two other groups (6 and 3 pieces, respectively) have warps with left spirals crossed by wefts with right spirals and vice versa. The other cloths in which yarns with different twists are combined perhaps may represent the use of odds and ends of yarns. The following combinations were found:

1. Single-ply S-twist and Z-twist warps crossed by single-ply S-twist wefts (2 specimens) or crossed by single-ply Z-twist wefts (1 specimen).
2. Single-ply S-twist warps crossed by single-ply S-twist and Z-twist wefts (1 fine-texture specimen).

Yarns are characterized as soft- or slack-twist, medium-twist, hard- or tight-twist, with various intermediate degrees depending upon the angle taken by the spiral in relation to a vertical axis. A 25-degree angle, for example, characterizes a medium-twist yarn tending toward hard-twist. Yarns with 30-degree to 45-degree angles of twist are hard-twist yarns. More than half of an unselected sample of twenty yarns fell within the 25-degree to 45-degree range. The remaining seven had angles from 50 degrees to 90 degrees in some sections of their lengths. An idea of the variations in any one weaving element may be gained from [plate 4, c](#) and the enlarged section of fabric in [plate 7, c](#).

## TEXTURES AND WEAVING TECHNIQUES

In general, the Chincha weavings are smooth and closely woven (pls. [3, b](#), and [4, b](#)). There appears to have been little or no interest in varying the textures by employing yarns of different weights, although the usual irregularities to be noted in lengths of hand-spun yarns are also evident in these. Counts taken on the warps and wefts per inch give a fair indication of the textures, but these are to a degree dependent upon the spinning.



**Figure 5. Scatter diagram of thread counts per inch. Figures indicate number of specimens. Symbols: triangle, apex down, unit consists of one warp and one weft element; open square, unit consists of one warp, two weft elements; concentric circles, unit consists of two warps, one weft element; triangle, apex up, unit consists of warp and weft pairs.**

Several variations of the elemental over-one-under-one plain weave are exemplified by the Chincha cloths. Included are the following: combinations of pairs of warps or wefts with single yarns of the opposite system, and pairs of warps and wefts as in the two-by-two basket weave. The one hundred and twelve specimens represented in the scatter diagram ([fig. 5](#)) fall into groups, according to the variations of the plain weave these are listed below in the order of their frequency:

- Group 1. Paired warps crossed by paired wefts: 8
- Group 2. Single warps crossed by paired wefts: 20  
The thread counts of 18 in this group are approximately 58 warps by 40 wefts per inch.
- Group 3. Single warps crossed by single wefts: 22  
Thread counts in this group range from 13 warps by 18 wefts to 156 warps by 40 wefts per inch. [Pl. 5, d](#) shows a fabric with count of 108 warps by 42 wefts per inch.
- Group 4. Paired warps crossed by single wefts: 62  
Thread counts range from 16 warp pairs by 12 wefts to 44 warp pairs by 32 wefts per inch with one specimen having the high count of 80 warp pairs by 28 wefts per inch.

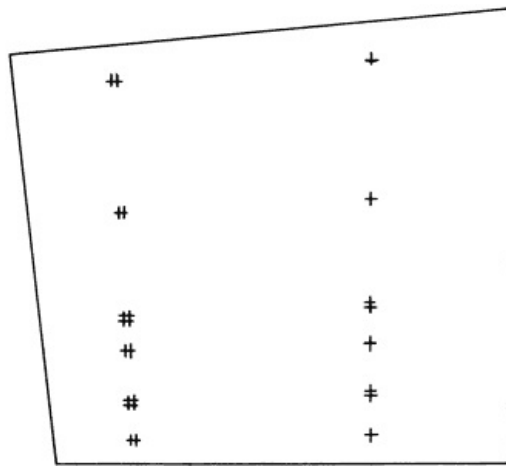
In terms of weaving units, whether single yarns or pairs of yarns, 56 of the 112 counts taken fall within a range of 26 to 44 warp units and 24 to 36 weft units. [Figure 5](#) shows this concentration within the frame.

Weaving techniques, other than the basic structural types, are few in number. Drawing in colored warps for stripes is a preliminary to the actual interlacing of the elements. The results of this procedure can best be discussed under the heading "Pattern."

The join is a technical feature that indicates standards of craftsmanship. It is customary in weaving materials with end as well as side selvages to give more or less attention to the closing of the space between the weaving proper and the heading strip. When the warps in the form of a skein had been spread out evenly and bound in place to the end bars, the ancient weavers on two-bar looms first wove a shallow heading strip to secure the warps in their positions and to establish the ultimate width of the fabric, a practice followed by some modern weavers today. Then the weaver reversed the loom end for end to begin what became the weaving proper, and continued until the length was complete. Difficulties or indifference to appearance very often resulted in a general looseness of texture where standard-size tools had to be removed and the interlacing done more or less by the fingers. [Plate 2, a, b](#) shows heading strips of different depths, fairly wide join areas in which the wefts are more widely spaced, and above these, the compact texture of the weaving proper.

Three finely woven cloths, one of them shown in [plate 5, d](#), exemplify warp locking, end-to-end. This technique is known from the earliest periods on the coast in the so-called patchworks from Nazca Valley graves. It occurs also in Middle- and Late-period textiles.<sup>[5]</sup> The methods of lengthening the warps by the addition of new ones vary, but one feature is common to all those examined: the supplementary transverse yarns are in effect scaffold or skeleton wefts.<sup>[6]</sup> In the Chincha cloths, the two warps interlock as shown in the reconstruction in [plate 5, a](#). In two Chincha plain-weave cloths, as in the Nazca patchworks, the warps of two colors meet on the skeleton weft.

Two specimens in lot 4- (3890a and 4056) are poor in quality of craftsmanship. Careless weaving resulted in the breaking of several warps, uneven shedding, and puckering in the center of the web. A three-inch difference in the length between the two side edges of specimen 4-4056 was probably due to slanting of the warping stakes ([fig. 6](#)). There is also a difference between the widths of the ends of each cloth, in one of them as much as three inches. Different weights of yarn are used, their twists ranging from soft-to-medium to crepe.



4-4056

**Fig. 6. Diagram of a web showing an irregular shape which may have resulted from careless warping. Occurrences of plain-weave variations are indicated by symbols for units: +, one-by-one; ‡, one-by-two; #, two-by-one; and ##, two-by-two (27 in. × 26 in. over all).**

In specimen 4-3890a the warps were grouped in pairs throughout the breadth of the cloth. In the first eight and one-half inches of the length, the weft is single and for the remaining fifteen and one-half inches the wefts are paired. This results in plain-weave variations of two-by-one, or semibasket weave, and two-by-two, or basket weave.

In setting up the loom for specimen 4-4056, twelve inches of the breadth were warped with units of single 2-ply warp yarns (fig. 6, right) and the remaining fourteen inches were set up for units of twin warps (fig. 6, left). Several plain-weave variations were found. The weaver introduced single and twin wefts at irregular intervals throughout the length of the cloth. Therefore, in the portion where the single warp unit interlaces with single wefts, a simple one-by-one, or plain weave results; where the single warp unit interlaces with twin wefts, a one-by-two, or semibasket weave occurs. In the portion of the breadth where warps are paired, interlacings of two-by-one, or semibasket weave, and two-by-two, or basket weave, occur.

Owing to the difference in length between the two side edges of specimen 4-4056, the weaver started making adjustments before she had woven half the length of her cloth. In order to restore a working edge at right angles to her warps, she introduced incomplete or fill-in wefts; that is, weft yarns entered on the long side and carried a distance across the web and then turned back in the next shed (pl. 8, a). The largest number of fill-in wefts occurs roughly at a point about a third up from the end. Here, seven wefts were introduced, one after the other, all entering from the same side of the web (pl. 5, e). The distance across the web that these various wefts were carried ranges from ten to twenty inches. At each turning point of the weft there is a kelim slit.

## STITCHERY

Three very familiar needle techniques occur on the Chincha plain-weave cloths. Breadths are seamed together with whipping stitches or running stitches, or are laced together with the antique seam, often called the baseball stitch (pl. 8, d). The effects vary with the depth and tightness of the seaming. Some of the whipping stitches are left loose so the two breadths lie flat, their selvages barely touching; other stitches are drawn so tightly that the selvages form a ridge (pl. 5, b). The smallest stitches are taken under two or three warps less than one-eighth inch deep and about one-eighth inch apart. Deeper stitches found on the coarse wrappings and one bag (4-3889) range from a quarter-inch to three-eighths of an inch in depth and the same distances apart.

The baseball stitch, if well done, can bring the selvages of two breadths together in a flat seam (pl. 5, d). The Chincha types range from very loosely drawn to tightly drawn threads.

Running and double running stitches (pl. 8, b, c), never very carefully executed on the plain-weave specimens, fasten down all the patches, hems, and occasionally the edges of lapped seams in which one breadth is extended conspicuously over another. Specimen 16-1229 has such a seam with a six-inch overlap. When running stitches are small, they range from one-eighth to one-quarter inch in length with approximately the same distance between them. Many more are from one-quarter to one-half inch long, especially on the numerous patches (pl. 3, d), and the distances between the stitches may be even longer. When running stitches are used for the hems, the cloth edges, including selvages, are turned under twice, just as is our customary procedure.

Double running stitches on a bag (4-3889c) are about a quarter-inch long.

Because of the variety of uses to which running stitches are put, they outnumber the other types two to one in the 16- lot, being often combined with the whipping and baseball techniques.

Needleknitting, a decorative stitch which occurs frequently on Cahuachi (Early Nazca) textiles<sup>[7]</sup> is the edge finish on four of the Chincha plain-weave cloths (pl. 5, c). From the side, the stitch resembles a whipping stitch except for its compactness and the fact that the lines of thread are upright, not slanting; from the edge, the stitch resembles a chain (pl. 8, f, g). The Chincha variety differs slightly from that on the Early Nazca textiles: stitches taken straight over the edge alternate with those linked together with the chain effect.

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## Patching and Mending

Any form of repair technique in Peruvian textiles is rare. Many of the materials show wear and occasionally coarse stitches are put through the cloth to draw the edges of a tear together; otherwise there is little to suggest concern with prolonging the life of a garment.

In a series of Chincha domestic cloths there are eleven patched specimens but not one trace of reweaving as in darning techniques. Apparently the unusual number of mended cloths interested the collectors in the field for, although a half dozen fragments appear to have been reduced to their present size, the patched portions have been carefully preserved. Fragmentary lengths of these textiles ranged from 14 to 28 inches; widths ranged from 13 to 30 inches.

Certain generalizations are pertinent to all the mended fragments. There is no evidence of the use of a cutting tool; the edges of the patching pieces were torn or snagged along a thread. If the selvages were somewhat worn, the seamstress did not remove them but made a deep turn to fold the worn part to the underside. Much of the patching material was perceptibly worn to begin with; three brown specimens were badly disintegrated. On specimen 16-1259 there are four overlapping layers of patching material in one spot. Generally, the worn spot covered by a patch or several patches is an area in which the weaving was poorly done.

The patched fabrics are in the medium- and coarse-texture groups with the exception of one fine cloth (16-1224). The repair materials fall within all three texture groups. A third of the patches (11 out of 31) were of striped materials, most of which are of better quality than the base fabric. Patches too small to cover the entire worn area are pieced out by overlapping them with a second piece of material. More than a third of the patches were taken from the edges of the breadths, as the stripes indicate.

Techniques used to fasten down the edges are hemming and whipping. The workmanship is fairly coarse, the lengths of the individual stitches approximately a quarter-inch long. Standards were much below those held by the weaver, but this difference is not surprising.

Threads employed for the patching suggest that the seamstress used odds and ends of weaving yarns. Two or more kinds ordinarily appear on a single patch, one of them usually a coarse white cotton thread of fairly loose twist. Some threads are used single in the needle, some double. Colors are browns, blues, orange, yellow, the last happening to be short lengths of wool. There is no evidence that the seamstress attempted to match the yarn to either the ground or the patch materials. Where we start a new length of thread with a knot made at the end, these Chincha threads begin with a half-hitch around the first stitch taken through the cloth (16-1238) or with a stitch through the cloth and a knot tied with the short and long sections of the thread (16-1261).

Plate 3, d shows one of the typical patched cloths. Four fabrics are represented: the base material, medium fine; and the three patching fabrics, the lower patch very fine and the upper right and left patches coarse. The most complicated arrangement of patches is found on a specimen (16-1240) composed of two breadths seamed together. The overall measurements of the torn rectangular fragment are 17 inches warpwise by 30 inches weftwise. Within this area are nine different pieces of cloth, seven of them covering worn spots or poorly woven areas.

## PATTERN

The only colored decoration on the Chincha domestic cloths is in the form of stripes. This section presents an analysis of the types found on thirty-odd specimens.

Stripes in this sample group either border the edge of the cloth or make an allover pattern. With the exception of four cloths, the stripes are warpwise of the materials; these four have stripes both warpwise and weftwise, and thus may be classified as plaids. Edge stripes occur in combination with an allover strip pattern in specimen 16-1287 and in combination with plaid in specimen 4-3973d (pl. 6, f). There are no cloths crossbanded only with colored wefts.

Apparently there was no preference as to the texture most appropriate for patterning by stripes; both fine and coarse cloths are thus decorated. For example, specimen 16-1225 is very fine (thread count, 102 warps by 42 wefts per in.) and specimen 16-1234 is medium coarse (count, 36 warps by 28 wefts per in.). Both cloths are allover striped. Edge stripes occur on a relatively fine

cloth, specimen 16-1255a (count, 62 warps by 40 wefts per in.), and also on a coarse cloth (count, 28 warps by 24 wefts per in.).

Five cloths in the Chinchu lot are all-over striped. One (16-1252) has solid blue and brown stripes at irregular intervals. The arrangement contrasts with the regularity of the other all-over-striped materials and of the symmetrical plaids. Other all-over stripes (fig. 8, a; pl. 7, c) have units a quarter-inch wide, brown on a neutral ground. There is both color and texture interest in these specimens. The brown warp units are in pairs, the neutral-color warp units between each two brown units are alternately all single warps and all pairs of warps. As a result, every other neutral-color stripe is appreciably thinner than its neighbor stripes (pl. 7, c). The third all-over striped specimen (16-1224) is alternately blue and neutral color, each stripe unit approximately one-sixteenth inch wide (fig. 8, c). Specimen 16-1225 has striping in the same colors and to it is seamed a piece with blue on a reddish-orange ground. The blues appear to have been the same, but the cloth, otherwise in good condition, is so badly faded that the photograph does not reveal the stripes in the blue-orange section (pl. 5, d). The fourth all-over-stripe pattern is common to two specimens, one of them shown in figure 8, b. The colors blue and tan stand out from a neutral ground. The sequence is blue-blue-tan, blue-blue-tan, and repeat. The stripes measure one-sixteenth inch in width and are about the same distance apart.



**Fig. 7. Schematic representations of stripings with color changes indicated by symbols. Units consisting of pairs of warps represented by pairs of triangles. Chevron marks center of bilateral groupings of colors.**

[View larger image.](#)

The four fragments symmetrically plaided with an identical arrangement of warp and weft stripes (16-1279; 16-1303) probably came from the same cloth despite the different numbers.

Edge stripes, the most numerous group, vary in width from three-sixteenths inch to one and three-eighths inch. They are simple in construction, eight of the thirteen being symmetrical both in arrangement and count of colored warps. The semblance of balance is marked, also, in those stripes which are not symmetrical.

The edge stripes with two exceptions (16-1260, a kerchief, and full breadth 16-1287) border only one of the selvages on the complete widths analyzed for this section. The opposite selvages have hanging threads, remnants of the stitchery which originally seamed two breadths together. The stripes decorated the outside edges of this seamed rectangle.

No specimen in the Chinchu plain-weave group has stripes showing more than three colors, exclusive of the color of the ground material. The ground color is usually neutral and may originally have been white or brown cotton. The most frequently occurring color in the stripes is brown, followed by blue. Red and rose occur only twice.

In five specimens we found the warps used in pairs. In specimens 16-1224 (fig. 7, a) and 16-1280 (fig. 7, k) the colored warps are paired, the ground is set up with single warps; in 16-1240 (fig. 7, j), the stripe warps and certain sections of the ground warps are paired, the greater portion is set up with single warps. In several specimens the otherwise uniform setup of single colored warps is broken by a warp unit comprising a pair (fig. 7, f), and in two specimens (cf. fig. 7, d) the series of single warps is broken by two pairs of warps in one of the stripes. These units may have been deliberately planned by the weaver, since they are maintained for the entire length of the preserved stripe.

All of the Chinchu striped cloths examined for this study were woven either in the over-one-under-one interlacing or its variation, twin warps crossed by single weft, a technique sometimes designated as the semibasket weave. What textural differences there are between the colored

stripes and the ground material are the results of combining the single-warp plain weave with its twin-warp variation. The following tabulation shows the occurrences of these two techniques among the thirteen striped pieces in [figure 7](#):

Weave of ground material	Weave in stripes	No. of specimens
Single warps, single wefts	same as ground	1
Single warps, single wefts	single and twin warps, single wefts	2
Twin warps, single wefts	single warps, single wefts	7
Twin warps, single wefts	same as ground	1
Twin warps, single wefts	single and twin warps, single wefts	2

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## COLOR

Fifty-odd yarns, samplings from the striped and plain cloths of the Chincha lots, were matched against the printed samples in Maerz and Paul's *Dictionary of Color*.<sup>[8]</sup> We found yarns corresponding to thirty-two samples representing five of the eight color groups. We found no dyed yarns in these cloths for colors in the yellow-to-green, the blue-to-red, and the purple-to-red groups. Only four yarns out of three hundred and fifty matched in a previous study,<sup>[9]</sup> corresponded to colors in the purple-to-red group and these four matched very dark samples on plate 56. The available evidence indicates either that the ancients had not developed dyestuffs to produce such hues as our fuchsias, magentas, and heliotropes or that they did not favor these colors.

Over a dozen yarns matched samples on plates 14 and 15 of the orange-to-yellow groups; as many more matched the browns on plate 37. Some of the yarns in this series are darker than any of the printed samples on plate 39. The third largest series, approximately twenty, match eight samples in the blue-green-to-blue group. The fewest number represent the green-to-blue-green group. Yarns in four cloths are similar to poplar and bottle greens.

Stripes are in one, two, or three colors ([fig. 8](#)). Most of the one-color stripes (approximately 10) are blue (37F3, 37I5), one is an orange-red (5K10), and one clay color (14F8). For the two-color stripes we were able to distinguish blue (37F3), golden browns (approximating 15A12), and orange reds (approximating 5K10). In only one of the six two-color examples, however, were the two colors sufficiently clear to match the printed samples. Specimen 16-1251 combines brown (15A12) and blue (38C3) stripes.

The three-color stripes in the 16- lot were similarly difficult to match with the samples in the Dictionary. Yarns from the four specimens matched samples as follows:

16-1268: yellow (10C7) and two browns (14L10, 15A12)

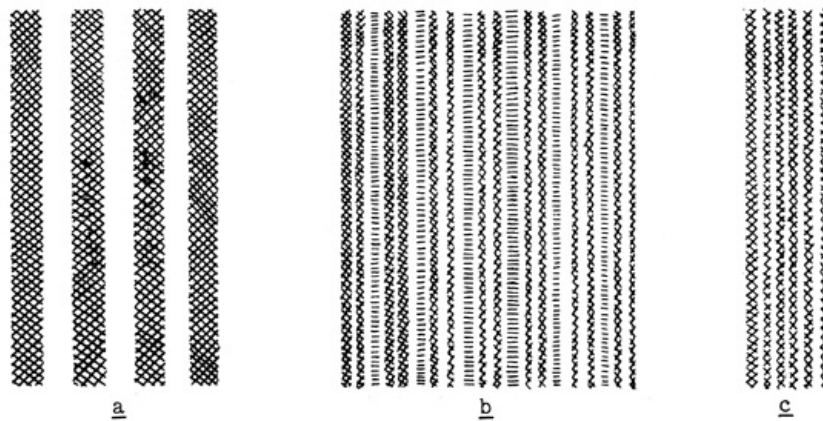
16-1277: two yellows (11K8 and one other darker than any in the group) and blue (36F6)

16-1283: yellow (9J5), blue (35D4), and one other color too dull to match any printed sample in the blue group

16-1287: yellows and browns (7C12, 11K6, and 14F6)

One three-color specimen in the 4- lot ([pl. 6, f](#)) has a number of well-preserved portions. The weaving proper is natural-color white cotton with plaiding in dark brown (15C12) and gray similar to adobe (14D7). The wide edge stripe has the same dark brown, a lighter, more golden brown (14D12), and central pinkish stripes which approximate printed samples 3C10 or 3C11.





**Fig. 8. Diagrams of stripings in Chincha plain-weave cloths: *a*, two-color stripe, blue and natural color cotton; *b*, two-color stripe, blue and brown on natural-color ground; *c*, all-over stripe of blue on natural-color ground.**

## SUMMARY

Analyses of over a hundred plain-weave cloths in the Max Uhle collection from Late-period sites at Chincha form the material of this report.

The utilitarian character of most of the cloths is conspicuous. A few plain-weave fabrics undoubtedly belong to garments of the better type, although these specimens, too, are without decoration except for stripings.

Measurements and textures suggest that some weavings may have been mantles or other large wrappings. All the intact ends have the customary Peruvian selvages with heavy loomstring wefts. Intact single breadths range in widths between 4 inches and 41 inches. The wider breadths suggest that the loom upon which these specimens were woven was not the type ordinarily attached to the weaver's waist.

Smooth textures and the uniformly good edges indicate that the weaving yarns were of the high quality we have learned to expect in the ancient cloths. Thread counts show a wide range, as shown in [figure 5](#).

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Technical features in these plain cloths are the standard ones in most respects. Warp locking of the end-to-end variety and a unique finish on a side selvage are the most noteworthy deviations from the norm. Perhaps the least expected feature is the patching of weak or worn spots in the cloths. In their present condition, the several repaired examples reveal hard wear subsequent even to the patching.

Ornamentation in the Chincha plain-weave cloths analyzed for this study consists solely of stripes and plaids; an occasional edge finish is as much a strengthening device as a decorative detail. A few cloths are all-over striped; a greater number are bordered on one edge with a series of colors, mainly yellow, browns, and blues.

The group as a whole represents the many fabrics which must have been woven solely for ordinary wear or use, being used later as grave wrappings.

## PLATES

### EXPLANATION OF PLATES

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(Numbers preceded by 4- and 16- are University of California Museum of Anthropology specimen-catalogue numbers.)

#### [Plate 1](#)

Chincha doll (4-4116) dressed in scrap of plain-weave material. Height overall, 7 inches. Head, a knob wrapped with fiber; black human hair folded over top and drawn in at neck with fiber string. Body composed of 2 tortoras separated to form legs; all elements wrapped with fiber and with one extra "toe" applied to each foot. Arms of wrapped tortora with fingers (3) applied at ends.

Garment of plain cotton material torn crosswise; fold at one side; lapped seam held with coarse stitches at opposite side; seam across shoulders; no openings for arms. Tatters at bottom edge

turned to outside and secured with running stitches. Length 5¼ inches; breadth 7¼ inches.

#### [Plate 2](#)

Loomstring ends of Chincha fabrics, *a, b*, detail of ends of two webs (16-1304b, 16-1270) to show heading strip (1) and weaving proper (2) comparable in texture; (3) section between them, the join, more loosely woven. Width of sections shown, 3.5 inches.

#### [Plate 3](#)

*a, b, c*, examples of medium-coarse Chincha fabrics (16-1282, 16-1217, 16-1252), fair to good qualities of weaving; *d*, worn material reinforced by patches held down by running stitches (16-1222). Dark section of *b*, 1.25 inches wide; *a* and *c* in proportion; upper patch of *d*, 9 inches by 6 inches.

#### [Plate 4](#)

Textures of fine fabrics. *a*, comparable to modern cheesecloth (4-4058b); *b*, canvaslike (16-1255a); *c*, open plain weave showing high twist of single-ply yarns (4-3883b).

#### [Plate 5](#)

*a*, reconstruction of end-to-end warp locking, shown in *d*, by methods which make possible the change from monochrome to stripes; *b*, close-texture, semibasket weave with three heavy loomstring wefts at end selvage, whipped seam (16-1292); *c*, end selvage reinforced with needleknitting (16-1217) (cf. [pl. 8, f, g](#)); *d*, fine cotton garment material with stripes below monochrome section (16-1225), right-hand striped section faded; *e*, section of textile (×2) with turn of fill-in straightening wefts indicated by black threads (4-4056) (cf. [pl. 8, a](#)). Width of *b* and *c*, 3 inches.

#### [Plate 6](#)

*a-e*, border stripes on Chincha cloths (16-1268, 16-1277, 16-1214, 16-1251, 16-1255a), colors, brown and blue; *f*, section of plaid with border stripe (4-3973d). Selvages at left. Width of narrowest border stripe, one-fourth inch; others in proportion.

#### [Plate 7](#)

*a*, reconstruction of border stripes of fabric in [plate 6, e](#); *b*, reconstruction of stripe found on several specimens; *c*, section of fabric (×2) showing variations in plain weave and amount of twist given to weaving elements (16-1240); *d*, section of fabric (×2) showing two-and-two basket weave varied in appearance by arrangement of colored yarns (4-3962).

#### [Plate 8](#)

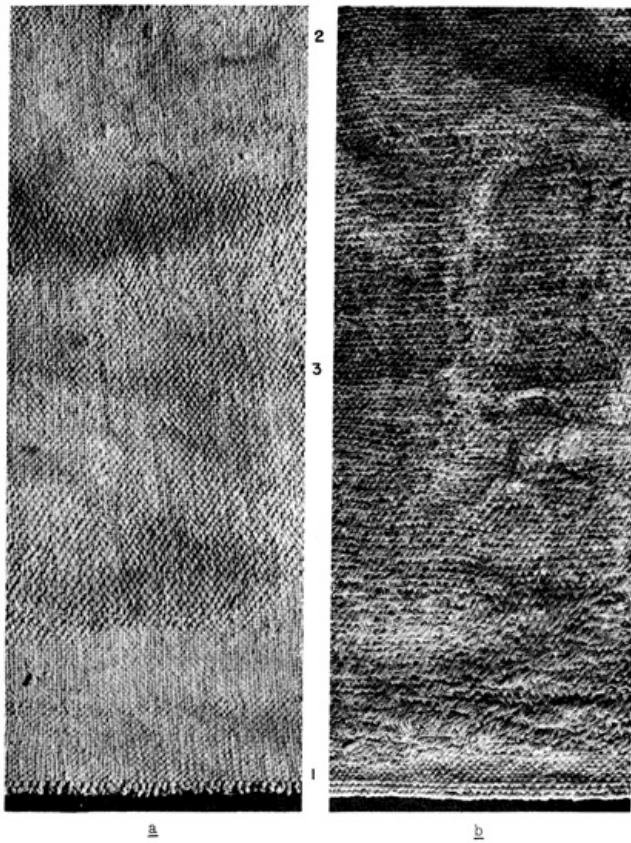
Reconstructions, *a*, fill-in weft to straighten working edge (cf. [pl. 5, e](#)); *b*, plain running stitch; *c*, double running stitch shown in two colors for clarity; *d*, seam in saddler's or baseball stitch, also called antique seam; *e*, seam in whipping stitch; *f, g*, top and side view of needleknitting type found on Chincha edge ([pl. 5, c](#)), alternate stitches plain whipping stitches; *h, i*, two views of reinforced selvage showing strand of twining through tops of whipping stitches.

#### [Plate 9](#)

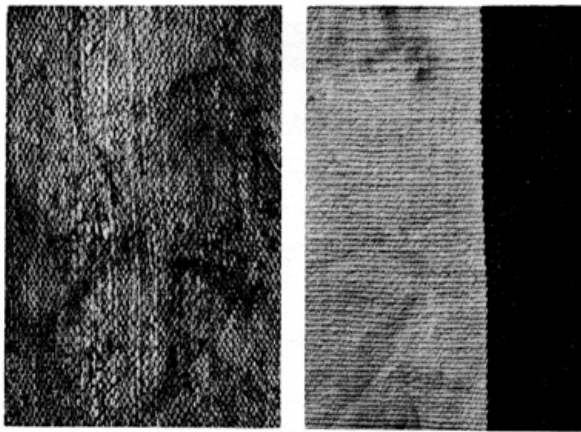
Weaving and sewing equipment: *a-g*, undressed thorns, 3.5 to 6 inches long (4-3653); *h-o*, bunch of fine wooden needles (*n* shows eye) 4.5 inches long, black and pale color wood (4-3651); *p*, copper needle (4-4094); *q*, headed and pointed stick, possibly a warp-lifter (4-3865f); *r-w*, sticks, some of cane including pointed and headed tools (4-3865a-e, g, h); *s, u*, weaving swords; *t*, loom bar; *x*, weaving sword, 18 inches long.



**Plate 1. Chincha Doll**

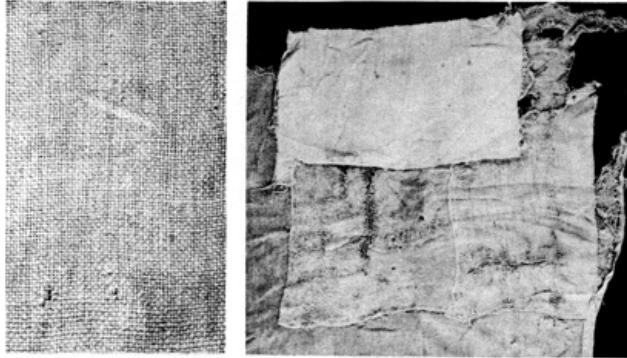


**Plate 2. Loomstring Ends**



a

b

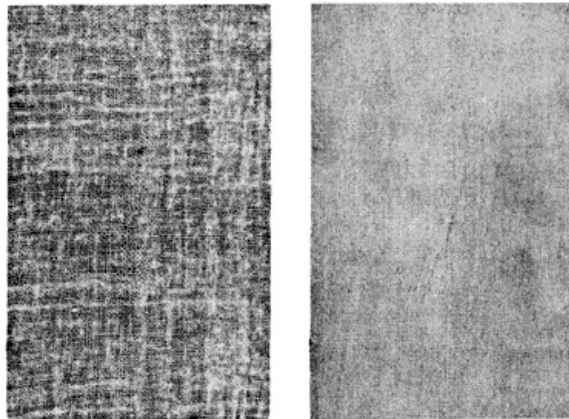


c

d

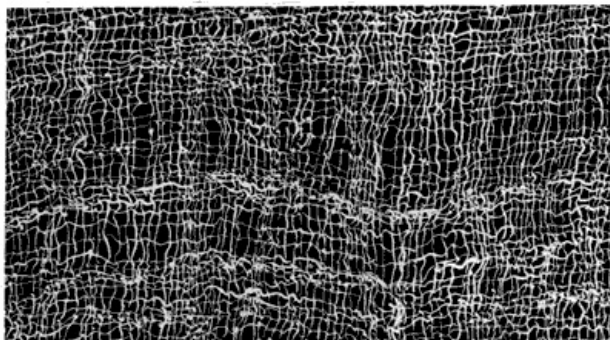
**Plate 3. Chincha Fabrics**

[View larger image.](#)



a

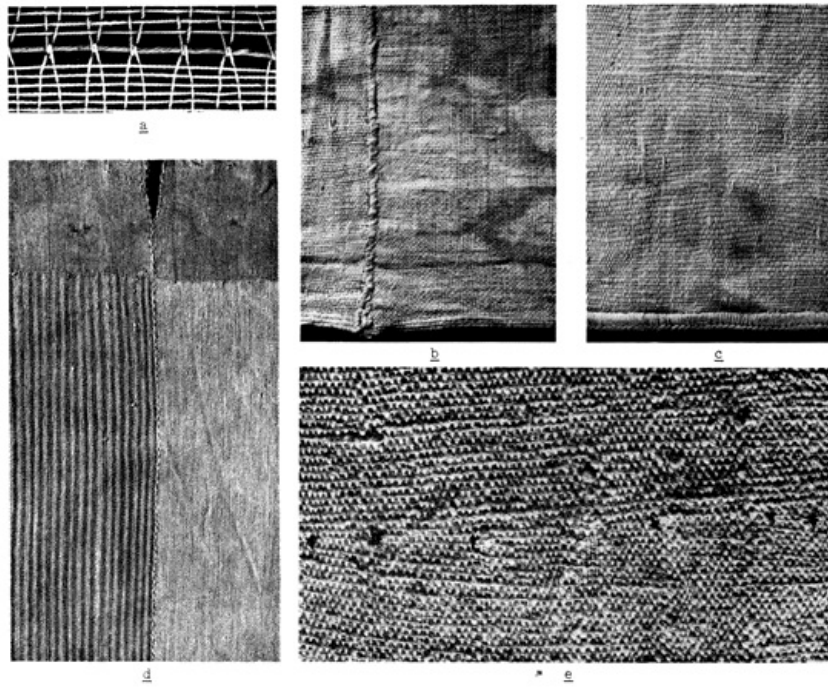
b



c

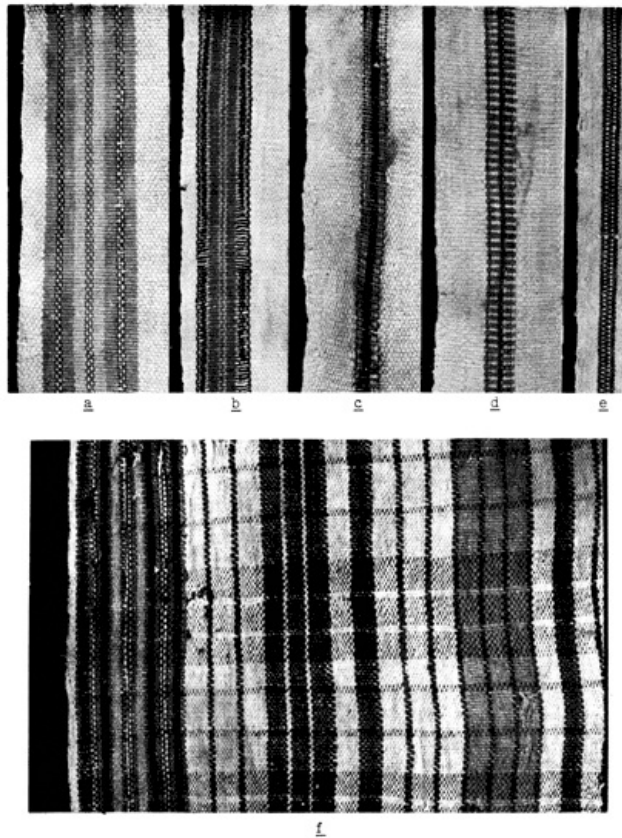
**Plate 4. Textures of Fine Fabrics**

[View larger image.](#)

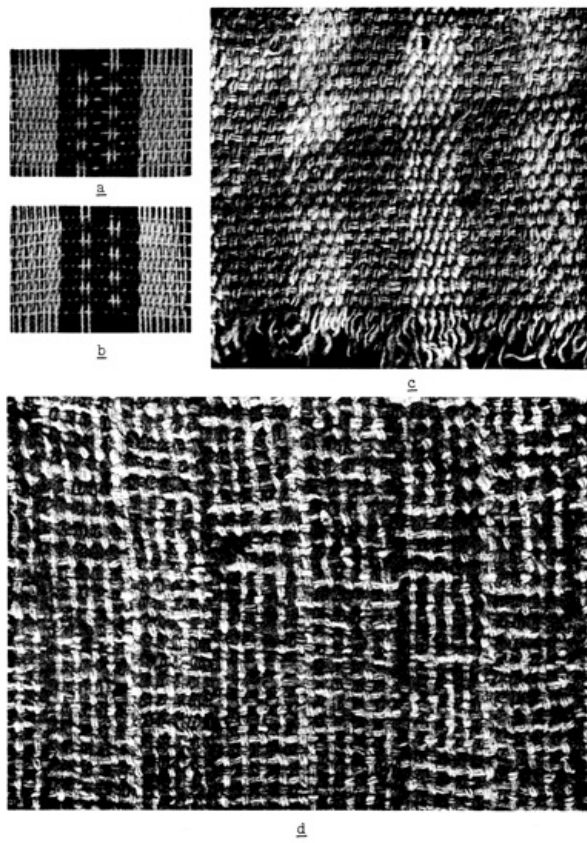


**Plate 5. Weaving Techniques**

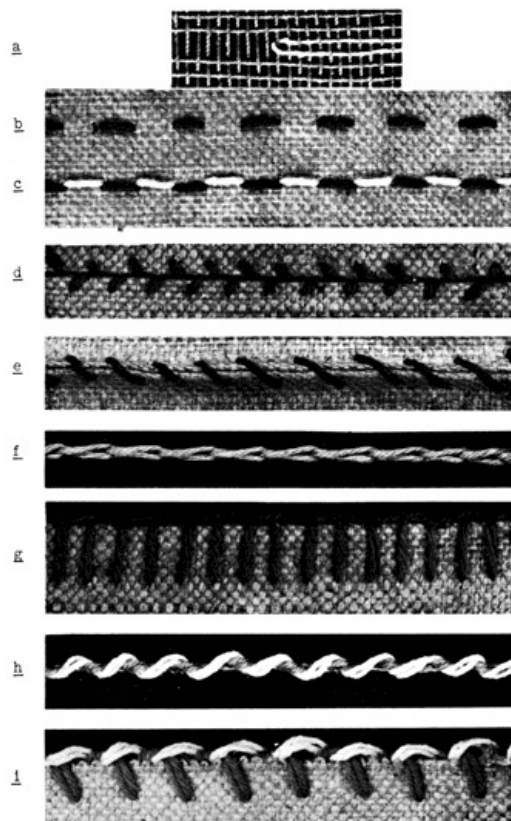
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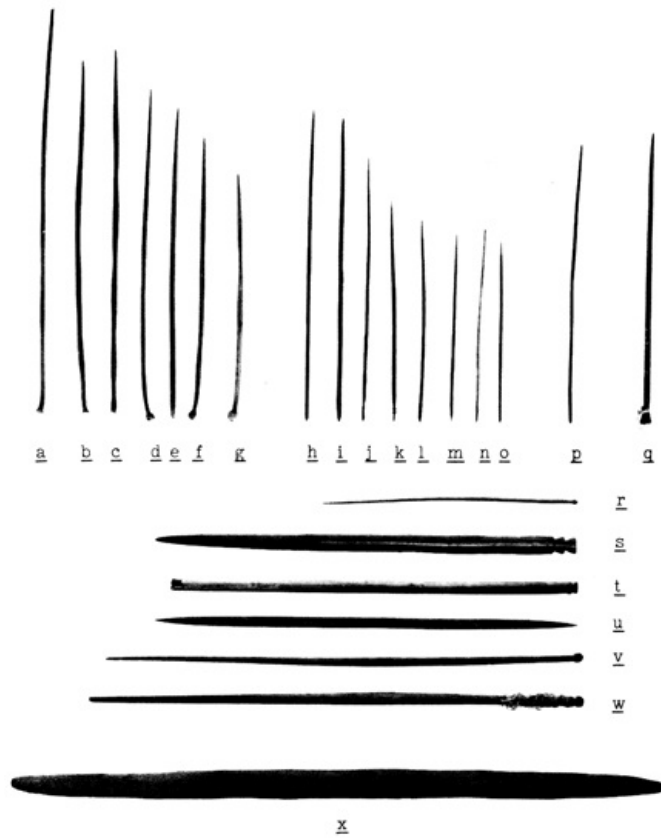
**Plate 6. Pattern: Stripes and Plaids**



**Plate 7. Pattern: Stripes and Variations in Plain Weaves**



**Plate 8. Reconstructions of Stitches**



**Plate 9. Weaving and Sewing Equipment**

**FOOTNOTES:**

- [1] L. M. O'Neale and A. L. Kroeber, *Textile Periods in Ancient Peru: I*, UC-PAAE, 28:23-56, 1930.
- [2] A. L. Kroeber and W. D. Strong, *The Uhle Collections from Chincha*, UC-PAAE, 21:1-54, 1924; Max Uhle (A. L. Kroeber, ed.), *Explorations at Chincha*, UC-PAAE, 21:55-94, 1924.
- [3] Max Uhle, *Explorations at Chincha*, pl. 1, pp. 87-90.
- [4] *Ibid.*, pp. 68, 69.
- [5] L. M. O'Neale and A. L. Kroeber, *Textile Periods in Ancient Peru: I*, basic tables at end of plates.
- [6] L. M. O'Neale, *Textiles of the Early Nazca Period*, *Field Mus. Nat. Hist., Anthropol. Mem.*, 2:180, 1937.
- [7] *Ibid.*, pl. 53, a-c, p. 210.
- [8] A. Maerz and M. R. Paul, *A Dictionary of Color*, 1930.
- [9] L. M. O'Neale, *Textiles of the Early Nazca Period*, p. 144.

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