

PLATE 1 — A pre-Columbian Peruvian fabric displaying an unusual combination of tapestry weaving and openwork. (Florida State University Museum, specimen number 1-597.)

A PERUVIAN TAPESTRY WITH A KNOTTED OPENWORK GROUND

by

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THE weavers of ancient Peru produced a number of types of openwork textiles, some of which, although basically loom-made, involved techniques that do not fall into the standard classifications of weaving. Notable among these are a few pieces which include mesh sections produced by means of eccentric "weft" yarns, which have been looped or knotted around groups of two or more warps. In so far as is known, all of these fabrics display some added decorative device or devices, either woven-in or superimposed. One specific example (Florida State University Museum specimen number 1-597) may be cited, which, because it is less complex than the others, is more appealing to modern tastes. The decorative features in this case all consist of woven-in polychrome tapestry. The knotted openwork, which is the most interesting feature of the cloth technically, and the one which provides its distinctive character, serves, in so far as the design is concerned, primarily as a monochrome background. In addition, it supplies a texture contrast causing each of the various pattern segments to stand out as an individually distinct unit.

Although only a part of this cloth has been preserved, a design unit remains which is almost completely intact (Plate 1). The ornamental areas include the section of tapestry and openwork, which covers the major part of the remaining web, and a terminal tapestry border. The former shows a small bird motive enclosed in an hexagonal frame and repeated against the openwork ground. The border carries an anthropomorphic figure in a wide central band, and adjacent to this, in each of two narrow bands, an interlocking fish pattern. These ornamental areas appear to have constituted the end section of a plain cotton cloth. The whole cloth was woven in one piece, fifteen and one-half inches in width, and with a length in excess of twenty-nine inches. As is frequently the case with Peruvian fabrics, only the decorative sections have been preserved, the plain undecorated cloth being cut or torn away close to the patterning and discarded. As a consequence, neither the original extent nor form of the textile can be ascertained. Of the twenty-nine inch length that is now intact, twenty-six and one-fourth inches are patterned, while only a two and three-fourths inch fragment remains of the plain cotton cloth which probably constituted the larger section as originally woven. At the opposite end of the web, four



PLATE 2— A section of the openwork and tapestry fabric of Plate 1 showing the rings of knots encircling the birds and the pattern adjustments adjacent to the narrow tapestry band at one end.

inches of the patterned area have been used for the tapestry border. Along the lower edge of this, a bit of an end selvage is intact, indicating that the cloth was constructed with end, as well as side, selvages. The twenty-two and one-fourth inches spreading between the remnant of plain cotton cloth and the border comprise the combination of tapestry and openwork that is distinctive to this fabric. The single web, with its selvage-to-selvage breadth (weft-wise) of fifteen and one-half inches, seems to have been complete in itself, in so far as width is concerned, since it bears no evidence of sewing or extraneous threads of any kind along the sides. At the lower edge of the border a few bits of gold-color thread passing through the fabric suggest that a fringe or other decorative end-finish probably was once sewed along this selvage. Aside from the general assumption that only a small part of the plain cloth remains and that a fourth selvage was present, nothing can be determined regarding the original length or the terminal finish of the other, now ragged, end of the fabric.

Textile analyses show the small remaining undecorated end section to be a plain weave, square count in appearance. The two-ply cotton yarns of the warp, set twenty per inch, extend for the full length of the specimen, but are visible only in this undecorated part and in the openwork section. The weft yarns for the plain area are identical with those used in the warp. Both are of the undyed brown cotton which is common to many ancient Peruvian textiles. All are hard twist, Z-S spun, about one-forty-eighth of an inch in diameter. The weft count is twenty-six per inch.

Adjacent to this is the central area with its allover pattern. It shows an ogee-like arrangement of hexagons formed by red tapestry bands approximately one-fourth of an inch in width. These produce a series of hexagonal spaces, each measuring about one and three-eighths inches from side to side. One of the small bird figures, tapestry-woven and surrounded by the knotted mesh, occupies the center of each of these spaces. The mesh is all brown, like the plain section, and consists of exposed warps held together in pairs by means of additional matching yarns which serve in place of standard wefts. Some of these describe more or less complete circles around the birds, instead of crossing all or part of the warps at right angles (Plate 2). This ring of knots is about three-sixteenths of an inch from the tapestry framework and an equal distance from additional short rows of knots placed adjacent to the bird figure (Plate 3). The warp count of the tapestry of the birds and the hexagonal frames is like that of the plain weave area, since the same warps continue throughout. In the knotted sections the warp yarns have been drawn together in pairs, each pair being split and regrouped

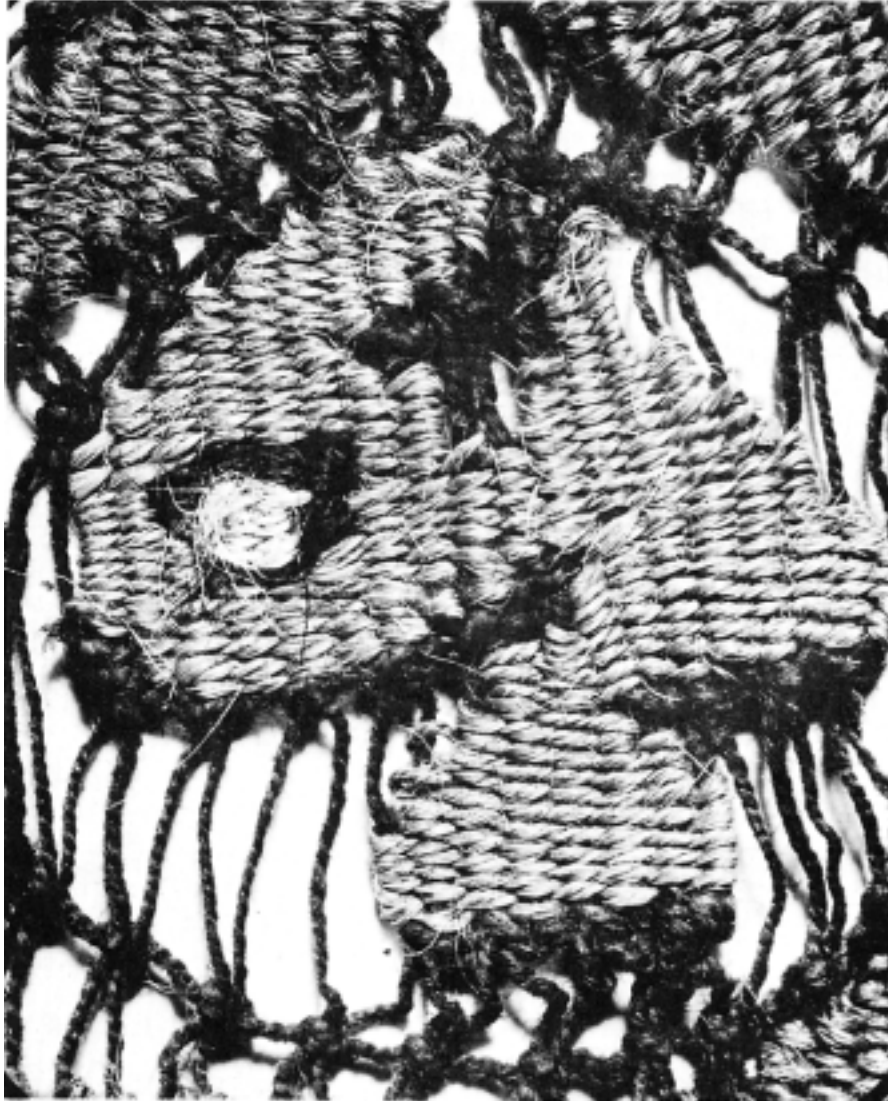


PLATE 3 — A detail of the bird design of the textile presented in Plate 1 enlarged in order that the method of construction of the tapestry figures and of the openwork may be seen.

by the succeeding row of knots, but there is no change in the total number of warps per inch. The weft yarns used for the tapestry weaving are of wool, chiefly two-ply, medium twist, and about one-thirty-second of an inch in diameter. The twist direction is Z-S throughout. (Details are shown in the Table). The weft count averages eighty per inch. All the tapestry weaving is of the traditional one-over-one plain weave in which the wefts cover the warps completely.

The border has been constructed with like yarns and in the same style as that of the other tapestry weaving. As with the above, the warp is continuous and the count remains the same. Although no obvious change in the texture is present, the weft is more compact, the average count being eighty-six per inch, which is somewhat higher than that appearing in the birds and the hexagonal frames. This weaving is of the usual kelim or slot type, in which the weft yarns turn back at the edges of their respective color units. It is technically like that used for the fabrication of the other tapestry sections, but without the unwoven spaces between. Being completely hidden, the warp plays no part in the design, and the demarcations between design segments are dependent upon color change only, rather than upon both color and texture variation. The design of the border consists of a central horizontal band with a simple repeat of a single, full-face anthropomorphic figure. Above and below this band are narrow bands of an interlocking fish design in which the motives are arranged reciprocally, but with an extraneous motive serving as a filler between each pair of fish motives. Three pin stripes, edging both sides of each of the narrow bands, complete the design unit.

Red is the predominant color of the cloth fragment, red forming the framework surrounding the birds and the ground of the central band of the border. One segment of the fish design in every fifth repeat and a few small details, such as eye outlines, are also in red. Second in importance is the gold-color, of which there are several variations, with blue, purple, cream, and pink following in order, the brown staying in its place as background throughout. All the colors mentioned appear in both the bird figures and the border, the border showing in addition two shades of mauve, a henna, a darker blue, and black and white, the latter appearing only as eye outlines, while the black serves both for segments of the fish design and for outlines for the anthropomorphic figures.

The motives of any one type, bird, fish or man-like, differ from each other only in coloring. Each follows a fixed pattern of arrangement.

TABLE
YARN DETAIL
Peruvian Tapestry with Knotted Openwork

Yarn Use	Color Tag Name	Maerz & Paul Classification*		Fiber	Ply	Twists**		Diameter	Count	OCCURRENCE
		Color Group	Plate			Direction	Degree			
Warp	Brown	Red to Orange	8-E-11	Cotton	2	Z-S	Hard	1/48"	20	All warp.
Weft	Brown	Red to Orange	8-E-11	Cotton	2	Z-S	Hard	1/48"	26	All of plain section.
	Brown	Red to Orange	8-E-11	Cotton	2	Z-S	Hard	1/48"	--	Knotted "wefts" of openwork.
	Red	Red to Orange***	5-K-2	Wool	2	Z-S	Medium-Soft	1/32"	76	Hexagonal tapestry bands and bird eye rings and spots.
	Red	Red to Orange***	5-K-2	Wool	2	Z-S	Medium-Soft	1/32"	94	Border ground, detail and lower edge.
	Pink	Red to Orange***	4-J-2	Wool	2	Z-S	Medium-Soft	1/32"	96	Birds, eye spots, border detail.
	Mauve	Red to Orange***	7-E-3	Wool	2	Z-S	Medium	1/48"	96	Border detail.
	Light Mauve	Red to Orange	6-D-8	Wool	2	Z-S	Medium-Soft	1/48"	112	Border detail.
	Henna	Red to Orange	6-J-8	Wool	2	Z-S	Medium	1/32"	88	Border detail.
	Gold	Orange to Yellow	12-F-7	Wool	2	Z-S	Medium	1/32"	96	Birds, eye spots and rings; border detail.
	Light Gold	Orange to Yellow	12-C-5	Wool	2	Z-S	Medium	1/32"	72	Birds, eye spots and rings; border detail.
	Orange-gold	Orange to Yellow	12-L-8	Wool	2	Z-S	Hard	1/32"	80	Border detail.
	Dull Gold	Orange to Yellow	13-G-7	Wool	2	Z-S	Medium	1/32"	72	Border detail.
	Cream	Orange to Yellow	11-C-3	Wool	2	Z-S	Medium-Soft	1/32" - 1/48"	88	Birds and border detail.
	"White"	Orange to Yellow	10-B-2	Wool	2	Z-S	Medium-Soft	1/32"	96	Eye spots.
	"Black"*****	Orange to Yellow	16-A-3	Wool	2	Z-S	Medium	1/32"	72	Border detail, eye rings.
	Darker Blue	Green to Blue-Green	31-H-1	Wool	2	Z-S	Medium	1/32"	64	Birds, eye rings, border detail.
	Lighter Blue	Green to Blue-Green	29-F-1	Wool	2	Z-S	Medium-Soft	1/32"	64	Birds, eye rings.
	Purple	Blue to Red	48-E-7	Wool	2	Z-S	Medium	1/32"	80	Birds, eye spots and rings.

*Maerz, A. and M. Rea Paul. *A Dictionary of Color*, 2nd ed. New York, 1950.

**Osborne, Douglas and Carolyn Osborne. *Twines and Terminologies*. *American Anthropologist*, Vol. 56, No. 6, Pt. 1, pp. 1096-1097. Menasha, 1954.

***Purple Red to Red, Maerz and Paul, *ibid.*, p. 3.

****Cannot be matched exactly, darker than 16-A-3.

All of the birds have been placed in horizontal rows, the figures of alternate rows facing in opposite directions. Each bird is monochrome, with the exception of its eye, which adds two additional hues or values. A horizontal herringbone pattern has been produced through the diagonal arrangement of birds of like colors. The arrangement follows a planned sequence with a basic repeat of seven colors: pink, dull gold, gold, blue, cream, purple, light gold. Although, due to the limited size of the cloth, only one full design repeat is present, the repetitive use of the sequence is clearly evident. It is broken only by the substitution of a darker for a lighter blue in some of the birds of the one complete blue row of the herringbone. These darker birds, presumably, were the last-woven of this group, and the color variation probably indicates a change in the dye-lot of the yarn and not a deliberate difference in the color arrangement. The darker blue is present, also, in the second repeat of the blue birds. In this case there is a minor break in the sequence, a difference appearing in the eye coloring only. In the complete blue row, the center dot of the eye of each bird is red, the ring gold; in the final, partial row, the eye center is cream-color, the outline red. While in this instance the variation in eye color appears to have been wholly incidental, eye-color contrasts seem to have been used deliberately to emphasize the differences between the various rows of gold colors where the color variations are slight. For example, for the eyes of one row of birds, red has been used with cream-color, in a second, blue with light gold, and in another, red with blue.

The basic design of this central section is an all-over pattern, its potential extent being limited only by the dimensions of the fabric. However, at the two ends of the pattern section, minor terminal design adjustments have been made. The row of openwork figures which abuts against the border has been altered so that each figure appears with an extra side, added along the lower edge, changing it from a hexagon to a heptagon (Plate 2). Small rectangular openings help to retain a semblance of the ogee figures and denote the position for the intervening points of the next lower row of hexagons, had these continued in their normal sequence. At the opposite end of the fabric, the openwork hexagons of the final row are intact, but have been slightly flattened at their tops. This flattening is due to the insertion of a few red wefts across the complete breadth of the cloth prior to the beginning of the plain brown section. These continuous red yarns have disrupted the ogee form, since no yarn of the body of the red framework of this central area continues completely across the web. At both ends of this section the final rows of bird figures surrounded by brown knotted

openwork have been kept intact. This is not the case at the sides of the fabric. Where the pattern meets the selvages, it ends with alternate bird figures complete, but with only segments of the intervening set, no pattern adjustment of any kind having been made along these edges. The hexagonal figures are open-sided where the straight lines of the selvages have interrupted completion of the design motives.

It is impossible to determine at the present time the exact sequence of construction within the openwork and tapestry area. There seems to be little doubt that all of this section was completed before being removed from the loom, and that the insertion of the weft proceeded irregularly, various sections of the red tapestry framework, the birds, and the brown openwork being put in part-way across the web, instead of pick by pick across the whole breadth, as is customary in present day weaving. Apparently, after the red framework was woven in any small area, the bird and knot combination was built up so that a single row of knots encircled each bird (Plate 2). In addition, a second row of knots was packed against those edges of the bird motive which are weftwise (Plate 3), or nearly so; that is, where the tightly packed weft yarns of the tapestry weaving would tend to slip along the warps, ruining the compactness of the bird figure and obliterating the mesh. These latter knotted sections vary in length from one-fourth to five-eighths of an inch. They appear to be independent of the circular row and of each other, each length of brown thread being discontinuous, with its ends concealed by being worked back along the row of knots. This knotting, strictly speaking, cannot be classed as weaving, the yarn being twisted around the warps (Plate 3), not interwoven with them. Presumably it was put in while the web remained on the loom, its fabrication moving along parallel to that of the tapestry weaving. Like the tapestry wefts, these yarns may have been inserted by means of either a needle or a very small shuttle. Resembling in many respects one of the techniques common to European drawn-work, this knotting differs in being a part of the original construction and not a replacement for yarns that were removed after fabrication had been completed and the cloth removed from the loom. Yarn slippage was avoided in the red framework by placing four sides of each hexagon diagonally and the other sides vertically or warpwise, thus eliminating straight weftwise lines where the wefts would not stay in place. Only above the upper edge of the border, where the hexagons terminate, have these been modified in a manner which leaves open horizontal lines, where slippage is evident.

The tapestry border offers nothing which is unusual to Peruvian weav-

ing. All the border figures show a greater degree of conventionalization than do the birds. In both the wide and narrow bands, the motives remain the same throughout, color changes producing an impression of variation. The color repeats of the fish design have been set up on a five unit basis, those of the anthropomorphic figures on a four unit plan. Although the colors of the two narrow bands are generally alike, a few divergences are present. A simple sequence of blue, pink, blue appears in the pin-stripes which separate the wide and narrow bands and finish the top and bottom edges of the border section, but no design finish has been provided where the tapestry border ends at the sides of the cloth. The figures terminate abruptly where they meet the side selvage, leaving incomplete motives along the one side that is intact.

If the whole decorative area is considered as a unit of design, it will be noted that the upper and lower limits of the patterning, both as a whole and as separate units, are well defined and leave no unfinished design segments, while along the vertical edges the design is incomplete, simply ending as if cut off along the lines of the selvages. While this radical termination without pattern adjustment provides a certain element of implied continuity, it gives the impression, despite the lack of supporting evidence, that other sections of the pattern, woven separately, were intended to be added at the sides. Given a larger area, the elements of unity and rhythm, already present, would be strengthened, and the feeling of continuity would be enhanced. However, the color arrangement of the central section displays a bilateral balance within the single web, and this one web may have been considered to be a complete decorative entity in itself. The border, similarly, seems to have had a bilaterally balanced accent of light and dark, although damage to one side of the fabric makes the accuracy of this judgment questionable. The chief figures of the wide band have not been placed with respect to a central axis but appear as if a random section had been taken from a continuous strip. To a certain extent the same is true of the narrow bands, but less conspicuously so. In view of this, it might be said that from an artist's point of view, the piece is unfinished, laterally, and needs additional sections to balance and round out the design as a whole; while from the weaver's viewpoint, in so far as the decorative part is concerned, the fabric constitutes a complete entity as woven.

Decoratively, the border and the central section are bound together by the matching colors and the texture of their tapestry areas, and to a lesser degree by the simple repetition present in the arrangement of the motives. The plain brown fabric and the openwork sections show a certain continuity

through their like yarns and matching color. Within the tapestry and openwork area, both the brown background and the red ground and framework act as binders, as does the repetition of the like hues and motives, so that the design holds together within the woven area despite the multiplicity of elements appearing within so small a space. And the number of these is quite impressive. In addition to the variety of motives, the distinct subdivisions, the wide range of colors, and the contrasting textures, complexity is increased by the differing rhythms of the color repeats and the horizontal design emphasis opposed to the diagonal color emphasis. Considering the central section only, there are 161 small bird figures, plus parts of eighteen more, in a space twenty-two and one-fourth by fifteen and one-half inches. These birds, arranged in seventeen rows, are in seven different colors with a greater number of combinations in the eye coloring. Add to this the manner in which the rows of gold-color birds have been placed, with two hues which are very closely akin in adjacent diagonal rows, at the beginning of the color sequence, followed by single rows of alternate dark and light colors, which, while adding interest and a broader rhythm than would have been provided by a simple repeat of light and dark values, also increases the complexity. Likewise, strong value contrasts between the blue, cream, and purple tend to emphasize these rows of the herringbone above the over-all rhythm of the total sequence.

The extensive following of customary Peruvian procedures, such as the use of repetitive designs, interlocking and reciprocal conventionalized figures, repeated color sequences, diagonal color emphasis, and selected tapestry-weaving techniques, indicates a heavy weight of conformity to established practices. However, a few small breaks with traditional methods appear to have been made. In the present instance, the details of the major design areas show evidence of non-conformity in the combination of exposed warps with tapestry weaving, as well as in the method used for making these warps into a network. The idea of using non-continuous weft yarns, which are characteristic of most tapestry, has been carried one step further than is usual to Peruvian weaving. Part of the yarns which generally produce blocks of contrasting color contiguous to one another, as in the border of the specimen, have been omitted to create the openwork spaces. As a result, warps, which normally are completely covered in tapestry weaving, have been left exposed and the problem of weft slippage, introduced by this omission of some of the weft sections, has been met in part by the knotting added over these exposed warps. This, in turn, while not constituting a major decorative feature in itself, has become a basic characteristic

of the design, the factor responsible for the distinctive quality of the specimen.

While appearing to be basically a craftsman's rather than an artist's design, and highly tradition-bound, the result pays tribute to the ancient Peruvian's artistic ability as well as to his skill as a craftsman. It shows the remarkable cohesion between diverse elements which is characteristic of the structure and design of many Peruvian textiles. The specimen exhibits, likewise, the high quality of weaving which distinguishes the finer Peruvian textiles and, in addition, displays an intricacy of technical manipulation which attests to the ingenuity of these pre-Columbian weavers.

No data have been recorded concerning the specific associations or the locale from which this fabric came and, therefore, its immediate relationships to other artifacts are not known. However, it may be said that as compared to the pre-Columbian textiles generally, without regard to specific time and place associations, no single technical feature is unique to this cloth, although the particular use of knotting to produce openwork is by no means prevalent among known Peruvian fabrics. Similarly, from a design viewpoint, only the effect produced through the combination of the openwork with tapestry, in the particular interpretation of small repeating figures enclosed within frames, distinguishes this particular cloth from others.

APPENDIX

The reader who is interested in comparing the various types of Peruvian openwork fabrics is referred to the following sources which include illustrations of some of the numerous varieties:

- Bird, Junius and Louisa Bellinger, "Paracas Fabrics and Nazca Needlework": *The Textile Museum Catalogue Raisonné*, Pls. XXIX, XXX, XLIV, Washington, 1954.
- Crawford, Morris DeCamp, "Peruvian Fabrics", *American Museum of Natural History, Anthropological Papers*, Vol. XII, Part 4, pp. 105-191, Figs. 21-24, 34. New York, 1916.
- Doering, Heinrich Ubbelohde, *The Art of Ancient Peru*, Pl. 90. New York, 1952.
- Harcourt, Raoul d', *Les Textiles Anciens du Pérou et Leurs Techniques*. Les Editions d'Art et Histoire, Pls. X 4, XI-XIII, XXXII-XXXVII, XXXVIII 1, 2, XXXIX-XLVI, XLIX, LV 2, LVII 2, LX, LXII 3. Paris, 1934.
- Kelemen, Pál, *Medieval American Art*, Pls. 183 b, c, 184, 185 b, c, 199 a. New York, 1950.
- O'Neale, Lila M., "Textiles of the Early Nazca Period." "Archaeological Explorations in Peru, Part III." *Field Museum of Natural History, Anthropology, Memoirs*, Vol. 2, No. 3, pp. 119-218, Pls. XLI a, LIII, LIV. Chicago, 1937.
- O'Neale, Lila M. and Bonnie Jean Clark, "Textile Periods in Ancient Peru III: The Gauze Weaves." *University of California Publications in American Archaeology and Ethnology*, Vol. 40, No. 4, pp. 143-222, Pls. 3-22. Berkeley, 1948.
- O'Neale, Lila M. and Alfred L. Kroeber, "Textile Periods in Ancient Peru." *University of California Publications in American Archaeology and Ethnology*, Vol. 28, No. 2, pp. 23-56, Fig. 1, Pls. 4 a, 5, 7 a, 35 b, c. Berkeley, 1930.

- Reiss, Wilhelm and Alphons Stübel, *The Necropolis of Ancon*, Vol. 2, Pls. 70 4, 5, 6, 70a, 71, 74, 12, 13, 16. Berlin, 1880-1887.
- VanStan, Ina, "Problems in Pre-Columbian Textile Classification." *Florida State University Studies*, No. 29, Figs. 3, 4. Tallahassee, 1958.
- VanStan, Ina, "Problems in Pre-Columbian Textile Classification." *Florida State University Studies*, No. 29, Plate IIa, Fig. 1. Tallahassee, 1958 a.
- VanStan, Ina, "A Peruvian Tasseled Fabric." *Notes in Anthropology*, Vol. III, Figs. 3, 4. Tallahassee, 1958 b.

Some repetition of examples will be noted among the reproductions in the above references.

Only a few of the items show any close resemblance to the fabric described in the present paper. One of these, presented by d'Harcourt (1934 pl. XII, diagram p. 31, fig. 13, desc. p. 127) has a similar repeat of small bird figures that are almost identical with those of the above cloth. These birds, woven in tapestry in red, old rose, pale yellow, white, and clear brown wool yarns, are set at regular intervals and provide the sole means of holding the spaced brown cotton warps in place. These warps are in groups of eight and form the ground of the textile. Two fabrics which have the same type of knotted background as that of the present cloth and also tapestry insets are among those illustrated. One of these is shown by both d'Harcourt (*ibid.*, pl. XIII 2) and Kelemen (1958 pl. 185 c); one was reported previously by the present author (1958 b). Both of these examples have elaborate tasseled trimmings.