

# Resist-Dyeing as a Possible Ancient Transoceanic Transfer

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## Introduction

The controversial question of whether significant cultural contact occurred between the peoples of the Eastern and Western Hemispheres before the time of Columbus is one of paramount cultural-historical and theoretical importance. Its potential resolution rests on many kinds of evidence.<sup>1</sup> Among these are cultural similarities of various sorts. A principal aim of research on this issue is determining which shared traits may have been the result of cultural exchange. From an evidentiary standpoint, the most convincing cultural commonalities involve either highly arbitrary traits (such as most lexemes) or highly complex phenomena whose independent development in distant geographical areas seems very improbable. Of the latter type is the technology of cloth manufacture, which includes fiber extraction, carding, spinning, and weaving, often in elaborate ways. When advanced coloring methods are added to all the other sophisticated aspects of textile production, the result is an exceedingly complicated system of phenomena. As one scholar noted, “Textiles are one of the strangest inventions ever produced by man.”<sup>2</sup>

Unfortunately, very little research has been undertaken comparing Old and New World textile arts in the context of the transoceanic-diffusion question. In 1985 science historians Joseph Needham and Lu Gwei-Djen observed, “We have not found any comparative summary of textile technology in the Old and New Worlds, and without this it would be fruitless to offer any observations.”<sup>3</sup> In view of this gap, I have attempted to address in a preliminary way the topic of textile manufacture as evidence for cultural diffusion between the hemispheres.

This complex topic offers many avenues for research, among them the technical attributes of spinning and ordinary weaving, including spindle and loom forms (e.g., the backstrap and vertical looms) and textile structures (the arrangements of the threads—e.g., in slit-tapestry weaves and cut pile); design motifs such as the stepped fret and the eight-pointed star; and textile coloring and the methods of obtaining designs through dyeing. The latter is a potentially fruitful area of investigation for cultural comparisons and is the basis for this study. In an earlier article examining four classes of dyestuffs, I compared their production and use in the two hemispheres. In their developed forms, each of these dyes—madder and its allies, indigo, insect dyes, and shellfish dyes—involved highly elaborate, even unlikely, procedures.<sup>4</sup> For instance, textiles specialists John Gillow and Nicholas Barnard have concluded that “red dyeing with a mordant is complex. It is a wonder that the many chemical interactions required should have been developed at all.”<sup>5</sup> Although in my study I found no actual proof of transoceanic diffusion, or transfer, the co-occurrence in the ancient Old and New Worlds of all four categories of dyestuffs—in highly developed form, in the case of three of them—indicated to me the improbability of independent invention. These three categories of highly developed dyestuffs are attested for the first millennium BC or earlier on both sides of the Pacific, while shellfish dyes are not known to have appeared in the Americas until later pre-Columbian times and did not involve elaborate techniques there.

To create pattern on cloth, a weaver has several options: weaving the design into the fabric using structures and techniques involving manipulations or additions of warps and wefts, with or without contrasting colored threads; embroidery; sewn-on appliqué; and, probably the most ancient method, painting the cloth with the fingers, a

brush, or a stamp. All these approaches were known anciently in both the Old and New Worlds, with structural approaches becoming dominant in southwestern Asia and in the Andean region.

A variant of painting is applying mordant (a chemical required for certain dyes to “take”) to those portions of the cloth that are intended to receive a mordant-dye color. Undoubtedly also deriving from painting is resist-dyeing. A resist is a substance or material that, when applied to a fiber such as cotton or wool, makes the reserved portion of the fiber impermeable to the dyestuff. Resist decoration, as opposed to structural decoration, came to be particularly characteristic of southern and southeastern Asia. Two broad categories of resist are used: impermeable-fiber wrapping and applied liquid or paste (stencils or stamps are sometimes employed with the latter). In the first method, the wrapping is removed after the yarn or cloth is dyed, revealing the design in undyed, negative form. In applying liquid or paste, the resist is washed, dissolved, or melted out of the yarn or cloth after it has been dyed, and a negative image (formed by the now-exposed blank areas) is unveiled. The three basic types of resist-dyeing carry Indonesian-derived names: ikat, tie-dye (the usual method is called *plangi*), and batik. I will examine each of these in the context of interhemispheric comparisons.

The two principal ancient world centers of textile manufacturing technology appear to have been southwestern Asia (Persia, Transcaucasia, southwestern Turkestan) and the central Andean area of what are now Bolivia and Peru. In the latter region, “textile construction was the primary technology of the Pre-Columbian world.”<sup>6</sup> In the Eastern Hemisphere, the use of dyes and dyeing skills was concentrated somewhat to the east of that of pattern weaving, in the northwestern Indian subcontinent. Because textiles are perishable, direct archaeological evidence is in most cases scarce or absent. The major exception to this is the desert coast of South America, where preservation is remarkable—in fact, unique—although there have also been a certain number of finds from Old World drylands such as Egypt and inner Asia. Outside of the central Andean coastal region and a few other arid zones, we are obliged to depend almost entirely on evidence of historical and even contemporary textiles. This is less than fully satisfactory, but we must work with what we have.

### **Tie-Dye**

Tie-dyeing involves using string, thread, or ribbon to bind woven fabric in any of several ways in order to prevent the dye from reaching the tied- or stitched-off portions of the cloth when the bundle is dipped (the terms *tie-dye* and *tying and dyeing* are sometimes used to include ikat).<sup>7</sup> The term *plangi* (from the Indonesian *pelangi*, “multicolored”) is increasingly used in reference to all non-ikat tie-resist methods, although *plangi* is technically a subclass of tie-dyeing that involves tying off knobs of woven cloth. After dyeing, the binding is removed to reveal the negative, reserved zones. Experts can control the color patterns to a remarkable degree, making intricate designs and color combinations. Closely related to true *plangi* is fold-resist dyeing, in which the fabric is rolled or folded and tied or sewn in different places. Another related technique is stitch-dyeing (*tritik*), in which a sewn thread gathers the cloth, thereby excluding the dye from certain portions. Two other forms of resist-dyeing are reserving by knotting and plaiting the cloth itself.

Tie-dyeing in its evolved forms is quite complex. Because cultures in both hemispheres stressed the design motif of the spot or bar in a rectangle—a motif not entirely easy to achieve—the art of tie-dyeing would seem to be a good candidate for ancient interhemispheric transfer.

### **Old World Tie-Dye**

Widespread in the Old World, tie-dyeing is found in southwestern, central, southern, southeastern, and eastern Asia; in southeastern Europe; in Hungary and Sweden; and in northern, western, and central Africa.<sup>8</sup> Plangi—called *bandhana* or *bandhei*, meaning “bound”—is particularly well developed in the Indian subcontinent, especially in Rajasthan (where tradition places its origin) and among Gujarati Muslims and Sindi Hindus. It also occurs in Punjab, Madhya Pradesh, Maharashtra, Hyderabad, Bengal, and Tamilnadu. The patterns produced are termed *chunari*, *chundadi*, or *shumgri*. Roll-resist dyeing (*lahariya*) is also found in Rajasthan.<sup>9</sup> In Southeast Asia, plangi occurs in Yunnan, in Thailand among the Mon and some Lao, in northeastern Malaya, in Cambodia (particularly among the Austronesian-speaking Cham), and sporadically in the islands from Sumatra to Lombok, along the western and southern coast of Borneo, on Sulawesi (among the Toradja people), and on Mindanao. The dot- and bar-in-square motifs are known in Indonesia and also in tie-dyed cloth produced in China and Japan.<sup>10</sup>

Because of a paucity of preserved specimens, it is impossible to date the origin of tie-dyeing, but it is presumably quite ancient. A number of archaeological plangi specimens found in dry Chinese Turkestan date from the fourth through the eighth centuries. Appearing in the written record about AD 700, tie-dyed (*jiao-xie*) silk cloth with a dotted-lozenge pattern is known archaeologically in China as early as AD 418, and tie-dyeing of the tritik type is recorded at AD 683 during the Tang period as well as later, in Gansu Province a bit to the east. Specimens before AD 749—some or all of Chinese origin—are known from Nara, Japan, where the various kinds of tie-dye are lumped under the term *shibori* (from *shiboru*, “to wring”). The ancient Japanese word *yuhata* (“knotting fabric”) implies a pre-sixth-century use of tie-dye, and an AD 238 document suggests an even earlier presence in Japan. The more recent term, *kechi*, derives from the Chinese term for resist, *xie*, and the technique may have been imported from China. The Japanese emperor gave gifts of *kechi* in AD 720. The Nara specimens (and more recent ones) include variations on the dot-in-square design (*yokobiki*, “square ring dot”).<sup>11</sup>

Ajanta Caves frescoes (AD 400–700) in Hyderabad State, India, depict simple roll-resist fabrics from about AD 500 to 700, and tie-dye (*pulaka bandha*) is mentioned in an Indian text from the early seventh century.<sup>12</sup> An archaeological plangi specimen from the eleventh or twelfth century in Mali, West Africa, displays a merged-double-dot-in-square design, a design still found in that country among the Soninke, Manding, and Dyula.<sup>13</sup> Interestingly, although the stiffer bast fiber and, in some areas, wild cotton were always available in Southeast Asia, cotton cultivation seems not to have been introduced there from India until the mid-first millennium AD. Wanda Warming and Michael Gaworski suggest that tie-dyeing was first introduced into Indonesia by Indian and Moslem traders in the fourteenth and fifteenth centuries.<sup>14</sup> The earliest attestation of tie-dye in Indonesia is from the sixteenth century. In that archipelago “true plangi is not as firmly rooted in tradition as the other resist patterning techniques”; it was practiced mainly in ports by non-natives.<sup>15</sup>

Because of the complexity of designs of early Chinese plangi textiles and the breadth of resist techniques in China, Jack Lenor Larsen, following Alfred Bühler, suggested that “China or Central Asia may have been the cradle of plangi and other resist types as well.”<sup>16</sup>

## **New World Tie-Dye**

Tie-dyeing—mainly true plangi but including roll resist and tritik—was also an important and widely distributed dyeing method in the New World and is archaeologically the most frequently represented of the resist methods.<sup>17</sup> Concerning the specific occurrences of New World plangi, Mary Elizabeth King has observed: “In the Americas, plangi techniques are said to have occurred here and there in the Southwestern United States and Mexico.

Centers of the craft are widely scattered on the west coast of South America and in parts of Argentina, [Paraguay, and Chile. Other ethnographic occurrences are in Mexico and Guatemala]. . . . The great majority of these American processes, whether pre-Columbian or post-Conquest, are extremely elementary . . . [involving] reserved circles or squares.”<sup>18</sup>

In South America, tie-dye is said to have begun during the Formative period (1700–500 BC).<sup>19</sup> The earliest-known New World evidence of tie-dye is from the Chavín culture of Peru, the first “high culture” (beginning circa 1400 BC) of South America, which adopted the technique during an era in which textile technology blossomed.<sup>20</sup> These textiles, which include the bar-in-oblong motif,<sup>21</sup> may be the oldest tie-dyed ones known anywhere. However, according to King, “These earliest examples may instead be resist-painted to resemble tie-dye rather than actual tie-dye . . . [which] lead[s] me to suspect that craftsmen familiar with one resist method (batik) were copying [imported] fabrics decorated by an unfamiliar method in the only way they knew.”<sup>22</sup> Later, clear evidence of tie-dyeing that employed up to five colors appears at Cañete on the central coast and at Paracas on the southern coast about 450–175 BC and again about AD 100.<sup>23</sup> A resist-painted Vicús pottery figurine of about the time of Christ depicts a plangi shirt.<sup>24</sup> Tie-dye is also recorded from the Lima area and in the southern coastal region from the middle horizon of the Nazca-Huari transition period (circa AD 500–800) and later, in the form of dotted rectangles appearing especially on patchwork tunics but also on effigy pots of the period.<sup>25</sup> Similar plangi fabrics are known from the Late Intermediate period (AD 1000–1476) of the central coast as well, and at Nazca on the southern coast.<sup>26</sup> But as Jane Feltham observed, “Forms of tie-dyeing go back to the Early Horizon, but neither ikat nor the *plangi* method was well developed in Peru” in terms of design and color complexity, although both were “carried to a certain degree of perfection.”<sup>27</sup>

The easily achieved dot-in-circle tie-dye design is known from postclassic times in Mexico’s Tehuacán region in the state of Puebla.<sup>28</sup> The process is also recorded ethnographically from Guatemala and Mexico (e.g., among the Otomí of Hidalgo and Querétaro).<sup>29</sup> Early Spanish colonial codices depict indigo-colored tie-dyed clothing featuring the spot-in-lozenge design. Worn by the Aztec emperor and by others of high status, such cloth was apparently called *xiutlapili* (“turquoise[-colored] tied item”) and was a tribute article from eleven of the thirty-eight Aztec-controlled provinces. Its use was evidently a legacy from the pre-Aztec Toltec culture and likely predates the Toltec as well (see the section on batik).<sup>30</sup> The Aztecs also practiced roll resist (*tzitilli*).

Dot-in-circle and dot-in-square tie-dyed cloth has been reported archaeologically from central and northern Arizona, New Mexico, and southern Utah, where the Anasazi were influenced by practices from Mexico and possibly from South America. An apparent red-colored example of tie-dyeing from the late prehistoric Mississippian Caddoan culture of the southeastern United States has also been reported.<sup>31</sup>

Tie-dyeing has been suggested as a possible transoceanic transfer,<sup>32</sup> but because of the relative technical and design simplicity of American tie-dyed textiles, Larsen, following Bühler, stated that “the view that they were borrowed from Asia is ill-founded.” Larson also believed that plangi patterns are technique driven and thus are not of use in historical reconstruction.<sup>33</sup> However, the overall context of American tie-dye suggests that introduction from overseas is an excellent possibility. Textile specialist M. D. C. Crawford asserted, “Among the many fabrics from Peru which suggest so forcibly the textiles from Asia, none is so difficult to explain as a form of resist dye known as tie dyeing.” Crawford saw all the occurrences in the Old World as certainly being historically related and

as coming from Punjab, with only Peru providing a possible question mark.<sup>34</sup> Archaeologist Paul Tolstoy also considered tie-dye to be one of the “more convincing” evidences for possible overseas origin in the Americas.<sup>35</sup> In 1928 anthropologist Roland B. Dixon, referring to the extremely high development of weaving in Peru, wrote, “If anywhere, then, we might expect the invention of tie-dyeing . . . to have occurred here.” On the other hand, he added that “if the simple tie-dyeing found in Peru is to be attributed to diffusion, it must certainly have been brought from Indonesia,” because it is absent in Polynesia. However, Dixon also thought that if tie-dyeing had been introduced into Peru, ikatting and batikting also would have been introduced there. It turned out later that those techniques were present in Peru.<sup>36</sup>

If Peruvian tie-dyeing is of Asian origin, the puzzling association of it with a kind of patchwork may be illuminated by old Javanese practice: “[Non-tie-dye p]atchwork garments have a long-standing ceremonial importance” and were thought to afford protection from malevolent influences and misfortune for priests, rulers, and (by extension) rulers’ subjects.<sup>37</sup>

## Ikat

The Indonesian term *ikat* (“bundle,” from *mengikat*, “to bind”) refers to a highly laborious method of resist-dyeing that involves coloring the yarn prior to weaving rather than afterward, as in the case of tie-dyeing. Like tie-dyeing, ikat usually involves impermeable ties. “Before dyeing, skeins of yarn are reserved by knotting, partial wrapping, pressing by means of plates and other methods.”<sup>38</sup> In the most common approach, the threads running in one direction (warp or weft, usually the former) that will ultimately be part of the woven web are stretched on tying frames with a disposition like that which they will have in the cloth after it is finally woven. Then individual stretched threads or small bunches of adjacent threads are tightly wrapped with an impenetrable fiber in those areas where it is intended that the cloth be free of the color in order to produce the pattern. When the wrapping has been accomplished, the yarn is dismounted, steeped in the dye, and then allowed to dry. The wrappings are then removed, revealing the absence of color underneath. The process is often repeated, with successive reductions or additions of wrapping and with different dyes, to produce sometimes highly complex patterns in several tints. After all the dyeing has been completed, the threads are stretched out on the loom and the weaving is accomplished. Although the pattern may be definitively created on the threads as they are stretched out for wrapping, sometimes the threads are adjusted before weaving to create or perfect the pattern.<sup>39</sup> According to Nora Fisher, “To separate the made-up weft into logical groups, to bind and dye it, and then to set up a system whereby the weft will be reeled back into the fabric in a logical order to form the desired pattern is a technically advanced and complicated procedure”<sup>40</sup>—a practice one might suppose unlikely to have developed independently in multiple areas and therefore an excellent subject for illuminating the transoceanic-contacts question.

What is termed single ikatting may be done on the warp threads alone or the weft threads alone. In combined ikat, both warp and weft are ikatted, with little or no overlap between the reserved areas in the two directions. Double ikatting also involves binding the threads in both directions, producing integrated patterns by the interaction of the warp and the weft resist areas—a very difficult and “highly labor-intensive process” indeed, yielding what is known in India as *patolu*.<sup>41</sup> Warp ikat, the most common, is the only kind of ikat known from South America. The technical complexity and laboriousness of even simple warp ikat is sufficient in my mind to suggest a single invention and elaboration, with all subsequent occurrences being historically derived from the place of first innovation.<sup>42</sup>

## Old World Ikat

Textiles specialist Chelna Desai wrote: "While numerous legends and oral traditions indicate the existence of the single ikat technique in India in prehistoric times, the 6th century frescoes of the Ajanta Caves [in Hyderabad] provide the first visual records of it. Many of the world's ancient cultures practiced the single ikat craft, but the more complex double ikat exists only in India, where it is known as 'patolu' (plural 'patola'), in Bali, where it is called 'geringsing,' and in Japan, where it is named 'kasuri.'"<sup>43</sup> Centers of single-ikat (*khanjari*) production exist in India's Coromandel Coast states, Orissa (where the term *bandha* is used), Andhra Pradesh (since the turn of the twentieth century), and Gujarat in the northwest. In Gujarat the famous double-ikat silk *patola* have long been produced and are believed to date back to the fifth century AD, with the name appearing in literature by the tenth century. Some double ikat is also produced in Maharashtra, Madhya Pradesh, Orissa, and Andhra Pradesh.<sup>44</sup> *Patola* are depicted in sixteenth- and seventeenth-century frescoes in temples in South India, and records indicate that the cloth was exported to Indonesia in the thirteenth century and to China and Japan in the 1500s, though it was "probably much earlier."<sup>45</sup> The designs and, in Bali and Japan, technique were widely copied.<sup>46</sup>

Single ikat in both southeastern and southwestern Asia is often attributed to diffusion from India.<sup>47</sup> Another possible source for at least Indonesian warp ikat is the Dongson culture centered in northern Vietnam during the first millennium BC. Reflected in textiles, Dongson design motifs and objects diffused widely in the East Indies, especially in the Sunda Islands, and elsewhere.<sup>48</sup> Warming and Gaworski note that "sometime between the eighth and second centuries BC, the Neolithic people who then lived in Indonesia came into contact with a bronze culture that developed in what is now northern Vietnam. This Dong-Son culture, as it is known, introduced metalwork and advanced agricultural methods to many islands in Indonesia, and it is generally believed that the backstrap loom and warp ikat appeared during this period, although a direct connection . . . has not been proven."<sup>49</sup>

The backstrap loom and the ikat technique are known today in North Vietnam, southern and southwestern China, Cambodia, Thailand, and Burma,<sup>50</sup> as well as in Madagascar,<sup>51</sup> which was settled from Indonesia about the time of Christ. Thelma R. Newman unequivocally asserted that "we do know that it [ikatting] emanated from the Dongson and Late Chou [Zhou] cultures."<sup>52</sup> In Indonesia, warp ikatting occurs in Sumatra, Sumba, Timor, Flores, Savu, Roti, the Solor and Alor Islands, Bali (where the technique is called *endek*), Borneo (in Kalimantan among the Dyak people and in the Malaysian state of Sarawak), Sulawesi (among the Toradja people), and the Moluccas; in the Philippines on Mindanao, Luzon, and (archaeologically) Banton;<sup>53</sup> and elsewhere.

Weft ikatting is known from Japan, among the Tais of Thailand (where the technique is called *mat mii/mud mee*) and Laos, and in Cambodia (among the Khmer people), northeastern Malaya (the technique is called *kain cindai/kain limar*), Mindanao, Sumatra, Java, Bali, Lombok, and Sulawesi (among the Buginese).<sup>54</sup> Warming and Gaworski state that weft ikat, as well as double ikat, was introduced into Indonesia during the fourteenth and fifteenth centuries by Indian and Moslem traders.<sup>55</sup> In Japan, although imported warp ikats of unknown provenance have survived from the seventh and eighth centuries, and although ikatting of braided sashes was introduced during Heian times (AD 794–1185), warp, weft, and double ikat *kasuri* ("blurred," "hazy") was not introduced into the southern Ryukyu Islands (where it is called *kashiri*) until the fourteenth century, possibly by the same traders mentioned above. It spread to the main Japanese islands around 1700.<sup>56</sup>

In most areas, perishability of cloth has made it difficult or impossible to ascertain the age of ikatting. However, desert conditions at the medieval cemetery of Fostat, near Cairo, Egypt, have preserved inscribed ikats imported

from Yemen (which had maritime trade relations with India) that date to the eighth through twelfth centuries,<sup>57</sup> and the Cleveland Museum of Art has a specimen from Sanaa, Yemen, dating to the tenth century. Written sources indicate the presence of ikat in the Yemen “perhaps as early as the seventh century.”<sup>58</sup> Ikats from Egypt and Nara, Japan, date to the sixth and eighth centuries, and those from the Middle East date to the eighth century.<sup>59</sup> Ikat is not directly documented in central Asia until the fifteenth century, but sources indirectly suggest a presence at least as early as the seventh century.<sup>60</sup>

Widespread in the Old World,<sup>61</sup> single ikatting (in several regions called by its Persian name, *abr*, “cloud”) is important not only in southern Asia, mainland southeastern Asia, and Indonesia but also in central Asia, Japan, Turkey, the formerly Ottoman-occupied Balkans, Syria and Persia (both once controlled the Yemen), Arab North Africa (once part of the Ottoman Empire), and in Nigeria, Burkina Faso, Ghana, and Ivory Coast,<sup>62</sup> the African areas possibly influenced by Indonesians.<sup>63</sup> The earliest-documented ikat is from China, although Bühler believed this to reflect adoption from an older tribal tradition in neighboring areas.<sup>64</sup> As mentioned, ikat is produced in Japan, and in the West it spread into Mallorca, northern Italy, France, the Alpine countries, and Scandinavia. Larsen wrote, “It seems possible that ikat, like the other resist techniques, spread from these tribal cultures [of south and southwestern China]” to China proper and India, and from these putatively newer centers to other regions.<sup>65</sup>

## New World Ikat

Its presence unrecognized by archaeologists before 1930,<sup>66</sup> warp ikat appears to have been widespread in the pre-Columbian New World, although archaeological evidence is lacking outside the central Andean area, where ikat is known in Quechua as *watado*.<sup>67</sup> It is conceivable that the word *watado* is related to the lexeme *patolu*, because they both involve the following phonetic pattern: bilabial consonant, vowel, *t*, vowel, labio-palatal stop, and vowel (note that the Gujarati word for resist is *wa*, discussed later).

Unwoven “proto-ikat” fringe is recorded from Paracas (circa 600–400 BC) in combination with plangi,<sup>68</sup> but this may or may not be a precursor to woven true ikat. Speaking of true ikat, J. Alden Mason wrote, “Relatively few examples are known, and all are limited to the late Tiahuanaco horizon of the Chimú area [of the north coast of Peru, circa AD 900–1000]; however, the process is well known today in the Andean highlands and in Guatemala.”<sup>69</sup> In 1977 Ann Pollard Rowe wrote that fifteen examples of pre-contact cotton ikat were known, largely from the Chimú area, with apparent exports to Pachacamac on the central coast as well, followed by alpaca ikats in Inca times.<sup>70</sup> King cited eighteen pre-Spanish ikat examples from the late intermediate and late horizons (circa AD 1000–1532), observing that the “designs are usually simple, and they are not expertly executed,” but include both geometric and figurative motifs.<sup>71</sup> Currently, pre-Columbian ikatting is documented not only in Peru but also from Los Ríos Province, Ecuador, and from the Arica culture (AD 1000–1476) in northernmost Chile.<sup>72</sup> “Reconstructions of the [Peruvian] ikat patterns indicate a high stage of technical development,” according to resist-dyeing specialist Jack Larsen.<sup>73</sup> But in the opinion of archaeological-textile expert Ann Pollard Rowe, “In South America, the ikat technique is not used with great finesse or elaboration, especially in comparison with ikats from other areas.”<sup>74</sup>

Ethnographic studies indicate that at the turn of the nineteenth century the warp ikat method was in use among Indians in Bolivia (Potosí area), Peru (Cuzco, Piura, and Cajamarca areas), Ecuador (Riobamba area), northern Colombia (Department of Bolívar), the Pampas of Argentina, the Arica area of northern Chile and the Araucanian area of south-central Chile, and Guatemala (where the technique is called *jaspe* or *jaspeado*—"jasper," "streaked"<sup>75</sup>—and whence large quantities are exported today), as well as in the Mexican states of Oaxaca (among the Mixtec people), Mexico, and Morelia.<sup>76</sup> Verla Birrell speculated that the technique may have spread to Central America from a Peruvian hearth,<sup>77</sup> while King felt that both northward and southward diffusions took place from northern coastal South America, perhaps in Classic times.<sup>78</sup> Ikat *rebozo* making in Mexico may reflect influences from Southeast Asian slaves imported in post-Columbian times, although the codices depict what seems to be maguey-fiber ikatted cloth (*netlapilli ixtlapalia*, which in Nahuatl means to be tied on the surface to dye something for someone).<sup>79</sup> Weft ikat is common among contemporary Mayas in Guatemala and occasional in Mexico, El Salvador, and possibly Honduras. It was introduced to New Mexico around 1800. Double ikat appears to be unique in Guatemala, as far as the Western Hemisphere is concerned.<sup>80</sup>

Ethnologist Erland Nordenskiöld wrote that, in connection with the textile complex, "it is especially the ikat and batik methods that have engaged the attention of those who have compared Indian culture with that of the Old World. Why especially ikat and batik should be considered such remarkable inventions I do not quite understand."<sup>81</sup> Daniel Shaffer, apparently following Larsen, wrote that the "ikat technique is so ubiquitous that it is unlikely to have spread only through cultural contact and diffusion, but was probably self-generated."<sup>82</sup> However, neither author specifies why wide distribution should imply independent development rather than diffusion. On the other hand, in 1916 M. D. C. Crawford, apparently speaking particularly about ikat (which was then yet to be recognized as having been present in pre-Columbian Peru), opined that "there are certain features of originality about this technique which make it difficult to see how it could have developed gradually. The whole process is required to produce design, and the several operations apparently owe their invention to a single mind."<sup>83</sup> Pierre Paris felt that ikat in the two hemispheres should be looked at in the context of transpacific contacts, and Gunnar Thompson believed that ikat was introduced to Peru from the Old World.<sup>84</sup> Textiles expert Peggy Gilfoy's observation concerning West African ikats is also applicable to South American ones: "Because there is so little ikat in Africa, and it is such a difficult technique, there seems justification for suspecting Indonesian influence rather than assuming the technique developed independently."<sup>85</sup> Alfred Bühler, the foremost expert on ikat and its history in the Old World, seemed to think that a unitary origin of the process was possible and advanced the opinion that east Asian ikat was probably the root of American ikat.<sup>86</sup> In an earlier article he was more explicit: "It is, therefore, to be assumed that the craft [in Peru] was very much under the influence of that of south-east Asia [specifically Indonesia]."<sup>87</sup> Following Bühler's lead, Larsen wrote, "Even the pre-Columbian American ikats may have very remote connections with east or southeast Asia."<sup>88</sup> Anthropologist Julian Steward considered ikat a plausible candidate for introduction from Asia,<sup>89</sup> and archaeologist G. H. S. Bushnell stated, "It [ikatting] was extremely rare in ancient Peru. . . . The rare occurrence of such a highly specialized technique suggests introduction from outside Peru, and it is tempting to look to Indonesia, but until something is known of its age there, speculation will be profitless."<sup>90</sup> Textiles specialist Mary Elizabeth King, in fact, contended that ikatting was introduced to America from the East Indies or elsewhere in Southeast Asia.<sup>91</sup>

The batik (from the Indonesian word *titik*, “dot,” “drop”) method involves applying a resist to the surface of woven cloth before applying the color. The resist is either a paste of some sort (e.g., starch, gum, mud, resin) or, most common today, melted wax, both of which may be applied by finger, brush, or pen painting; by block or roller stamping; or by using a stencil. The cloth is then dyed and subsequently washed or boiled to remove the resist. The reserved design is normally negative. Batikting may have evolved from the earlier practice of painting dark-colored wax on a fabric to create a design directly.<sup>92</sup> Also sometimes used, at least in Asia, is negative resist, in which selected threads are of a dye-resistant fiber.<sup>93</sup>

## Old World Batik

Batik is known in Eurasia from Yugoslavia through the northern Middle East to Turkestan, in Yemen (which long traded with India via the Sabaeen Lane), in parts of West Africa (which may have been influenced in recent centuries from Indonesia via the Dutch), among some Chinese peasants and in non-Han Miao- and Yao-speaking southern and southwestern China (and adjacent parts of Laos and Thailand) and Fujian, in Japan (where the technique is known as *rô-kechi*), in southern and southeastern Asia (including India, Burma/Myanmar, and Cambodia [among the Cham people]), and in parts of Indonesia (including southern Sumatra, Java, Madura, Bali, and Sulawesi [among the Toradja people]).<sup>94</sup> Although batik is best known today in the form of status-related wax-resist products from Java, its roots there appear to lie in India, where batik has a long history in Gujarat State and continues to be produced there, as it is in Bombay, Andhra Pradesh, Bengal, and, importantly, on the Coromandel Coast. In Gujarat, at least, use of both painted wax and block-printed wax (*wa*, “resist”; *ajrakh*, “resist-printed fabric”) is old, as is block printing with mordants followed by dyeing (producing mordant-resist *sarasa*).<sup>95</sup> Rice-paste resist (Indonesian *kain simbat*) may precede wax historically and still survives in western Java (where modern batik seems to have been introduced along with Islam), central Sulawesi, and West Africa. Tofu-paste resist survives in China.<sup>96</sup>

The oldest-known resist-dyed cloths come from Greek-affiliated tombs in the Crimea, Ukraine, dating to the fourth century BC.<sup>97</sup> Resist-dyeing involving a paste resist and entailing painting, printing, and stenciling on silk is recorded archaeologically from the Tang Dynasty (AD 618–907) in Gansu Province, China, as well.<sup>98</sup> The sophistication of this work implies a considerable history of batik in China. In India the Ajanta Caves paintings of the sixth and seventh centuries AD suggest the presence of batik, although it is not recorded historically until the 1500s.<sup>99</sup> Inner Asia provides specimens from about AD 520 to 700 and later. Eighth-century batiks of possible Chinese origin have been found in Japan, where wax printing became common. Stencil-resist indigo dyeing using a paste resist (*katazome* method) is traditional in southeastern Honshu. The technique was introduced there from China, and the oldest Japanese specimen dates to the sixteenth century.<sup>100</sup> (The use of stencils themselves as resists are omitted from the present discussion.) Early examples of batik, with classical and Christian iconography, also come from Fostat, Egypt. They date from the second through the tenth century AD, and it seems likely that the method derived from India.<sup>101</sup> Indian batik specimens from the twelfth century and later, probably from Gujarat, have also been found at Fostat—even specimens dating to the first century, according to Stuart Robinson. A sixth-century piece, possibly imported, was found in Arles, France.<sup>102</sup>

Following Bühler, Larsen hypothesized that batik originated among the non-Han peoples, such as the Tibeto-Burman-speaking Miao in what today is southern and southwestern China. The technique was adopted and improved by the conquering Chinese, and it then diffused via the Chinese silk trade to Japan, central Asia, the Caucasus, the Middle East, and India, with West African batiks deriving from Indian ones.<sup>103</sup> However, a diffusion

from central Asia to China has also been suggested. Birrell felt that wax batik probably spread to Indonesia from southern India, presumably during the period of Indianization in Southeast Asia peaking during the middle of the first millennium AD.<sup>104</sup> Repeat designs appearing on temple walls from around AD 800 and on statues from 1291 could represent batik, although it is not definitely recorded in Indonesia until the seventeenth century.<sup>105</sup>

## **New World Batik**

It is not widely known that forms of batik existed in ancient nuclear America, and the process does not appear to have survived among American Indians into historic times. In fact, in 1976 Larsen wrote, "There are no known traces of indigenous batik resists in the Americas," although he also stated more equivocally in the same book that "it is not certain whether batik methods are or were once known in America. Pre-Columbian cotton fabrics found in Peru may be batiks but could also have been painted. Certain kinds of ceramics decorated with 'negative patterns' may also point to a kind of batik technique. Post-Conquest calabashes from El Salvador and Guatemala were also resist-patterned with wax."<sup>106</sup> Peruvian batik was reported as early as 1942<sup>107</sup> but was little noted. In reporting in 1963 a presumably batiked fabric from Pachacamac, Peru, Ina VanStan broke "a long-standing taboo against mentioning the likelihood of a batik or batiklike technique in pre-Spanish America."<sup>108</sup>

Although details are scarce, painted-on resist-dyeing (as well as ordinary painting and printing) is found from pre-contact South America and appears to have commenced in the Formative period (1700–500 BC) and extended to the late Post-Classic period (AD 1000–1532). As far as is known, the resists were clay and resin.<sup>109</sup> Batik is earliest recognized in northern Peru's Chavín culture, which began about 1400 BC.<sup>110</sup> It is also reported in later periods at such places as Pachacamac (after AD 1000), Maranga, and the Post-Classic Chancay culture of Peru's central coast.<sup>111</sup> One possibly resist-patterned painted cloth from around AD 1200 in Colombia has been described,<sup>112</sup> but because of environmental conditions hostile to the preservation of fabrics, there are no specimens of cloth, potentially batiked, from most of the pre-contact northern Andean region. However, various flat and roller clay stamps and seals, probably used to print cloth with colors or resist, have been found there; and resist-painted pottery was widespread in pre-Conquest Colombia, Ecuador, and Peru as early as the first millennium BC, and in Costa Rica, Guatemala, and southern Mexico.<sup>113</sup>

King mentioned an evident batik for the Post-Classic Maya of Chiapas, Mexico, as well: "If so, this is the only known [archaeological] example of a resist-painted textile from Mesoamerica."<sup>114</sup> Nevertheless, experiments based on Spanish colonial depictions of the Aztec emperor's garments indicated that the patterns on such cloths were a combination of tie-dyeing and batikking. Colonial codices indicate that thousands of such cloths were taken to the Aztec capital, Tenochtitlán. As far as we know, New World batik was not highly evolved; it involved only simple resist painting (although, as mentioned, ceramic stamps could easily have been used as well).

Although he did not consider it particularly significant, Nordenskiöld noted the sharing of batik between Peru and Asia, displaying as evidence a cloth fragment that he labeled "batik" and that carried the typical bar-in-oblong motif often seen in tie-dyeing but also, apparently, in Mexican batiks.<sup>115</sup> While it is true that the principle of batikking could easily have been discovered by accident (e.g., by spilling some wax onto a cloth prior to dyeing), the fact is that the process remained absent in many areas and in developed form is sufficiently sophisticated that its reinvention as an evolved art seems less likely than its being imitated, especially in light of the interhemispheric sharing of the other two principal resist-dyeing techniques. Anthropologist Gunnar Thompson felt that batik was, in fact, introduced to South America.<sup>116</sup>

## Conclusions

Conventional opinion is that Old and New World civilizations did not have important pre-Columbian interaction. For instance, in a discussion of ancient central Andean textiles, Mario Vargas Llosa wrote, “The ancient Peruvians with no contact with the occident or the great oriental civilizations of their time, created an original and complex culture”<sup>117</sup>—a culture that nevertheless supposedly independently duplicated many aspects of the civilizations of the Mediterranean/southwest Asian ecumene.<sup>118</sup> However, minority opinion favors the idea that significant, even fundamental, ancient transoceanic inputs took place, a hypothesis based on a great variety of evidence, little of which can be included here.<sup>119</sup>

This study stresses nonstructural techniques for the production of designs on cloth. Besides patterned weaves and simple and stamp painting, what Miguel Covarrubias, in reference to Peru, called “typically Oriental techniques”<sup>120</sup>—resist-dyeing by tie-dyeing, ikatting, and batikting—are all shown to have been shared between the two hemispheres, suggesting possible transoceanic transfer, most likely from southern Asia. Although some scholars have viewed these shared traits as comparable but coincidental,<sup>121</sup> several others have expressed a diffusionist opinion, if only tentatively,<sup>122</sup> or have at least acknowledged the plausibility of contact as an explanation.<sup>123</sup> Alfred Bühler, the world’s expert on resist-dyeing and its history, opined that warp ikat was an Asian introduction to Peru and added, “This is in accordance with a fact which has been repeatedly verified with regard to the Pacific coast of the New World. Civilizational influences of many kinds have reached the Americas across the ocean from southwest Asia. Such influence must go a long way back.”<sup>124</sup>

Although large, stone-faced platform mounds reminiscent of the pyramids of Egypt and ziggurats of Mesopotamia appear in Peru before 3000 BC,<sup>125</sup> and although cotton raising and textiles can be documented in Peru as early as the first half of the third millennium BC and rebun dyeing with mordant is known from that same period as well,<sup>126</sup> resist-dyeing appears to date only from the Chavín period, which began around 1400 BC. “The [Chavín] Early Horizon was a time of far-reaching technological changes in many media, including textiles [e.g., tapestry weave and discontinuous supplemental warps]. . . . Painted, tie-dyed, and batik cloth appeared. These innovations revolutionized Andean textile production.”<sup>127</sup> The second millennium BC—a time of great population growth in Peru and growth of complex irrigation agriculture and urban centers there<sup>128</sup>—has sometimes been suggested as reflecting, among other things, stimulus from outside locations, including Asia.<sup>129</sup> Although “there is widespread consensus among archaeologists that Andean civilization developed *in situ* without any significant input from other autochthonous civilizations,”<sup>130</sup> the northwestern Indian subcontinent—with its irrigated cotton raising, the antiquity of its textiles and dyestuffs, and its adobe architecture—is increasingly being looked at by a few scholars as one conceivable source area of cultural contributions over an extended period.<sup>131</sup>

The Indus Valley region shows the earliest Eastern Hemisphere evidence of cotton cloth and mordant dyeing.<sup>132</sup> “Above all, . . . the hallmark of Indian textile genius was its mastery of dyes and the use of mordants to form different colour combinations,”<sup>133</sup> to which may be added methods of obtaining patterns with dyes.

Certainly, vigorous Indian Ocean trade ranging from Africa, the Mediterranean, Indonesia, and China and involving Indians, Malays, Arabs, and others was well developed by the first century AD.<sup>134</sup> “Gujarat . . . has been one of the foremost textile producing areas of India for many centuries,” along with the Coromandel and Bay of Bengal

coasts. “The Indian traders obviously had the maritime skills to travel over vast areas of oceans and the diplomatic or coercive talent to be widely accepted as trading partners.”<sup>135</sup> “Gujarat, with its long coastline and many harbours, dominated the seaborne cotton trade.”<sup>136</sup> As of AD 1512, “the textile trade was dominated by Gujarati merchants.”<sup>137</sup> These merchants from India’s Gulf of Cambay (Khambhat) region were very familiar with the Indian Ocean shipping routes. In BC times, “on the west coast by far the most important port was Bharukaccha (Broach), near the mouth of the Narmada river [on the gulf].”<sup>138</sup> As I have argued elsewhere, this maritime cloth-trading tradition may go back to at least Harappan times in the third millennium BC, and the dyestuffs evidence points to this region as a center of origin.<sup>139</sup> The Old World geographical distributions of resist-dyeing techniques also seem consistent with the idea of their origins in and diffusions from the northwestern Indian subcontinent, although this is, at present, impossible to directly demonstrate. Mainland Southeast Asia, including southern China, is another possible area of their inception.

There are many other textile-related matters worth investigating in this connection. For example, pioneering student of Peruvian textiles Junius Bird wrote the following of the Peruvian coast: “With the [archaeological] spindles are various small cups or bowl-like supports in which the lower ends of the spindles rested while they rotated. . . . Similar equipment has been used by cotton spinners in other parts of the world, such as Dakar, East Pakistan [Bangladesh].”<sup>140</sup> Roland B. Dixon noted that all Old World occurrences of gauze weaving are traceable to India and that Peru provides the only other ancient occurrence.<sup>141</sup>

The present chronological evidence, which begins earlier in South America than in Asia, allows for the possibility that plangi and batik (but not ikat) were invented in the New World and diffused to the Old World. However, the much higher degree of elaboration of resist-dyeing (as an alternative to the use of textile *structures*) in Asia argues –although not definitively–against true priority in the Western Hemisphere, where accidents of preservation are likely the explanation for the apparent priority.

Robert Heine-Geldern and others have suggested that the Chavín culture exhibits some influence from China’s Zhou dynasty of the first millennium BC.<sup>142</sup> Resist-dyeing could be among such imported traits, a theory specifically forwarded by Pierre Honoré, Wolfgang Marschall, and Paul Tolstoy.<sup>143</sup> In the New World, double ikat (and, largely, weft ikat) appears to have been confined to Guatemala, where it is known ethnographically among the Maya. In the Eastern Hemisphere, double ikat (and, possibly, weft ikat) is generally agreed to have had a single origin, in northwestern southern Asia, whence it was introduced to Japan and Bali. Crawford asserted that “we can safely say that the Moors carried the [ikat] craft into Spain, and the Spaniards in turn carried it to Mexico along with the silkworm. Today the weavers of Guatemala apply this craft of ancient India to silk and cotton fibers.”<sup>144</sup> Bühler also felt that weft ikat was a modern introduction to Guatemala.<sup>145</sup> However, in Guatemala the craft is practiced by American Indians, not by those of Hispanic culture. That fact, coupled with extensive evidence of pre-Columbian Hindu-Buddhist influence on the Maya, from Cambodia and possibly Java and southern India during the first millennium AD,<sup>146</sup> makes an earlier, Asian origin of Guatemalan weft ikat and double ikat plausible, although warp ikat could have come even earlier and from another source.

Migrations to northwestern South America from Indonesia, beginning in perhaps the fourth millennium BC, have been suggested,<sup>147</sup> and the latest of these (perhaps in the middle of the first millennium BC) could conceivably have introduced resist-dyeing—if that technique was already present in Indonesia. In fact, King noted that the backstrap loom, certain resist-dyeing techniques, and the Indonesian *slendang* (Mexican *rebozo*) co-occur in

Southeast Asia and ancient America. She observed: "I would postulate a Southeast Asian origin for the American backstrap loom. . . . One possibility is that ikat, plangi, and the loom were introduced together to [northern] coastal South America in Chavín times (after 1000 BC), but that either the complicated ikat technique did not really take hold until much later or . . . the dearth of early textiles from the North Coast has simply skewed our sample."<sup>148</sup> However, tie-dye and weft and double ikat seem to have been comparatively late introductions into Indonesia, and it is rather doubtful that even batik was present there early enough to account for Cha-vn use.

Other significant possibilities include proposed inputs to South America from Neolithic southeastern China (probably Tibeto-Burman Miao and Yao speaking at the time), which strikes me as a better possibility than Indonesia for the source of the American backstrap loom and perhaps tie-dye and batik. Still, evidence for sufficient antiquity of these things in southern China (or anywhere else in the Old World) is not yet forthcoming. The highly influential Dongson culture (circa eighth to first centuries BC) of Tonkin and Yunnan, which may have inner Asian and even Pontic ties and which has been suggested to have introduced much metallurgical technology to northeastern South America,<sup>149</sup> would be too late to account for the first appearances of any of the resist methods in America other than ikat. It does, however, look like a potential source for warp ikat in northwestern South America, a region that might have served as a center for diffusion southward and perhaps northward as well. Michelle Pirazzoli-T'Serstevens wrote the following of the Kingdom of Dian, probably a Tibeto-Burman-speaking "cultural confederation" at the end of the first century BC and consisting of "Yue, Đông-son, and Shizhai shan": "At their apogee, at the end of the Bronze Age, these cultures found themselves subject to the pressure of the Chinese Iron Age civilization. Once caught in this grip, part of their populations may have emigrated, prolonging former contacts in Southeast Asia and as far as the Pacific, and increasing the dispersion of certain features particular to this confederation."<sup>150</sup>

The present survey is only a preliminary examination of the question of the possible origins and dispersals of resist-dyeing; much more research and synthesis are needed to fill in some of the many gaps and produce a more complete picture. Although some scholars view plangi, ikat, and batik as definite Old World introductions to the New World,<sup>151</sup> the study of resist-dyeing is not in itself sufficient to make a highly persuasive case for transoceanic transfer. In fact, Larsen, following Bühler, opined that resist "is so obvious and natural that patterning with resists, at least in their simple forms, is found in every major geographical area except the Arctic. Because such resists are so universal . . . we may assume that to a large extent discovery of the resist principle was local and spontaneous."<sup>152</sup> But while we may agree that the basic principle of resist might easily have been discovered repeatedly and that the New World forms of at least plangi and batik are relatively little elaborated, when these methods are seen in the context of many other traits held in common, transoceanic cultural transfer seems more than likely. Larsen did acknowledge that "the more sophisticated developments of the techniques, on the other hand, seem to have occurred in a few major centers, then slowly spread with the migration[s] of peoples, or at least of artisans." He also recognized the possibility that at least New World ikat derived from Asia.<sup>153</sup> Although he was uncertain whether these centers of resist-dyeing were all genetically related, Bühler acknowledged that "the possibility of a joint origin should not be ruled out." In fact, he felt that Peruvian ikat derived from Indonesia,<sup>154</sup> an opinion foreshadowed or echoed to a greater or lesser degree by other authors as well (e.g., Crawford, King, Steward, Paris, Martnez, Covarrubias, Bushnell, Thompson). Again, given the plethora of evidence for transoceanic contacts,<sup>155</sup> I believe that the presence of these resist techniques in the Americas seems most simply explained by contact and diffusion from the Old World.

## Notes

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1. For a discussion of these evidences, see my "Before Columbus: The Question of Early Transoceanic Interinfluences," *BYU Studies* 33/2 (1993): 245–71; and my "Diffusion versus Independent Development: The Bases of Controversy," in *Man across the Sea: Problems of Pre-Columbian Contacts*, ed. Carroll L. Riley et al. (Austin: University of Texas Press, 1971), 5–53.
2. Daniel F. Rubin de la Borbolla, introduction to *Textiles of Oaxaca*, by Gerald Williams (Hanover and Manchester, N.H.: Hopkins Center, Dartmouth College; Currier Gallery of Art, 1964), 3.
3. Joseph Needham and Lu Gwei-Djen, *Trans-Pacific Echoes and Resonances: Listening Once Again* (Singapore and Philadelphia: World Scientific Publishing, 1985), 52.
4. See my "Dyestuffs and Possible Early Contacts between Southwestern Asia and Nuclear America," *New England Antiquities Research Association Journal* 28/1–2 (1993): 31–8.
5. John Gillow and Nicholas Barnard, *Traditional Indian Textiles* (London: Thames and Hudson, 1991), 32; see Tamara E. Wasserman and Jonathan S. Hill, *Bolivian Indian Textiles: Traditional Designs and Costumes* (New York: Dover Publications, 1981), 7.
6. Elizabeth P. Benson, William J. Conklin, and Masakatsu Yamamoto, *Museums of the Andes* (New York: Newsweek; Tokyo: Kodansha, 1981), 132.
7. For definitions of resist-dyeing techniques, see Annemarie Seiler-Baldinger, *Textiles: A Classification of Techniques* (Washington: Smithsonian Institution Press, 1994), 143–8; see also Alfred Bühler, *Ikat, Batik, Plangi: Reservemusterungen auf Garn und Stoff aus Vorderasien, Zentralasien, Sudosteuroopa und Nordafrika*, 3 vols. (Basel: Pharos Verlag, 1972); Verla Birrell, *The Textile Arts* (New York: Harper & Brothers, 1959), 405–9; Stuart Robinson, *A History of Dyed Textiles* (Cambridge, Mass.: M.I.T. Press, 1969); and Wanda Warming and Michael Gaworski, *The World of Indonesian Textiles* (Tokyo: Kodansha International, 1981), 122–6.
8. See, for example, Bühler, *Ikat, Batik, Plangi*; Christopher Spring, *African Textiles* (New York: Crescent Books, 1989), plates 7, 30; Jack Lenor Larsen et al., *The Dyer's Art: Ikat, Batik, Plangi* (New York: Van Nostrand Reinhold, 1976); Robinson, *History of Dyed Textiles*, 83; Renée Boser-Sarivaxévanis, *Les tissues de l'Afrique Occidentale*, Basler Beiträge zur Ethnologie, vol. 13 (Basel: Pharos, 1972); and Thelma R. Newman, *Contemporary African Arts and Crafts: On-Site Working with Art Forms and Processes* (New York: Crown, 1974), 69–72.
9. See Alfred Bühler, "Indian Resist-Dyed Fabrics," in *Handwoven Fabrics of India*, ed. Jasleen Dhamija and Jyotindra Jain (Ahmedabad: Mapin, 1989), 87–93; Alfred Bühler, Eberhard Fischer, and Marie-Louise Nabholz, *Indian Tie-Dyed Fabrics* (Ahmedabad, India: Calico Museum of Textiles, 1980), 102–42; Gillow and Barnard, *Traditional Indian Textiles*; Rustam J. Mehta, *The Handicrafts and Industrial Arts of India* (Bombay: D. B. Taraporevala, 1960), 126–8; Rustam J. Mehta, *Masterpieces of Indian Textiles: Hand Spun—Hand Woven—Traditional* (Bombay: D. B. Taraporevala, 1970), 38; T. M. Abraham, *Handicrafts in India* (New Delhi: Graphics Columbia, 1964), 142–3; Ethel-Jane W. Bunting, *Sindhi Tombs and Textiles: The Persistence of Pattern* (Albuquerque: Maxwell Museum of Anthropology and University of New Mexico Press, 1980), 62; Caroline Stone, "The Dye That Binds," *Aramco World* 47/5 (1996): 41; and Veronica Murphy and Rosemary Crill, *Tie-Dyed Textiles of India* (London: Victoria and Albert Museum, 1991).
0. See Larsen et al., *Dyer's Art*, 28–31; Sylvia Fraser-Lu, *Handwoven Textiles of South-East Asia* (Singapore: Oxford University Press, 1988), 118, 133; and Bronwen Solyom and Garrett Solyom, "Notes and Observations on Indonesian Textiles," in *Threads of Tradition: Textiles of Indonesia and Sarawak*, ed. Joseph Fischer (Berkeley: Fidelity Savings and Loan Association, 1979), 17.

1. See Bühler, *Ikat, Batik, Plangi*, 133–4; Larsen et al., *Dyer's Art*, 34; Murphy and Crill, *Tie-Dyed Textiles of India*, 9; Thelma Newman, *Contemporary Southeast Asian Arts and Crafts* (New York: Crown Publishers, 1977), 37; Shih Hsio-Yen, "Textile Finds in the People's Republic of China," in *Studies in Textile History: In Memory of Harold B. Burnham*, ed. Veronika Gervers (Toronto: Royal Ontario Museum, 1977), 317, 320, 321, 323; and Yoshiko Wada, Mary Kellog Rice, and Jane Barton, *Shibori: The Inventive Art of Resist Dyeing: Tradition, Techniques, Innovation* (Tokyo and New York: Kodansha International, 1983), 11–13, 58–64.
2. See Mehta, *Handicrafts and Industrial Arts of India*, 95; Mehta, *Masterpieces of Indian Textiles*, 38; Stone and Perlman, "The Dye That Binds," 39, 41; Robinson, *History of Dyed Textiles*, 17, 79–81; Bühler, "Indian Resist-Dyed Fabrics," 93; and Murphy and Crill, *Tie-Dyed Textiles of India*, 9–11.
3. See Rita Bolland, *Tellem Textiles: Archaeological Finds from Burial Caves in Mali's Bandiagara Cliff*, trans. Patricia Wardle (Amsterdam: Tropenmuseum, 1991), 57, 67, 164.
4. See Joseph Fischer, "The Value of Tradition: An Essay on Indonesian Textiles," in *Threads of Tradition*, ed. Fischer, 9; Andrew M. Watson, "The Rise and Spread of Old World Cotton," in *Studies in Textile History*, ed. Gervers, 357; and Warming and Gaworski, *World of Indonesian Textiles*, 122.
5. See Larsen et al., *Dyer's Art*, 27, 34; see also Bühler, *Ikat, Batik, Plangi*, 131, 133; and Gillow and Barnard, *Traditional Indian Textiles*, 9.
6. Larsen et al., *Dyer's Art*, 34.
7. See M. D. C. Crawford, "Peruvian Fabrics," *Anthropological Papers of the American Museum of Natural History* 12/4 (1916): 153–4, 156, figs. 28–9.
8. Mary Elizabeth King, "Possible Indonesian or Southeast Asian Influences in New World Textile Industries," in *Indonesian Textiles*, ed. Mattiebelle Gittinger (Washington: Textile Museum, 1980), 367; see Larsen et al., *Dyer's Art*, 32, 47; and Robinson, *History of Dyed Textiles*, 82, 85.
9. See Yukihiko Tsunoyama, ed., *Textiles of the Andes: Catalogue of Amano Collection* (South San Francisco: Heian/Dohosha, 1979), 7–8.
0. See Fernando de Szyszlo, "The Excellence of Pre-Columbian Textile Art," in *The Textile Art of Peru*, ed. James W. Reid (Lima: Industria Textil Piura, 1991), 26.
1. See Karen Olsen Bruhns, *Ancient South America* (Cambridge: Cambridge University Press, 1994), 134.
2. King, "Possible Indonesian or Southeast Asian Influences," 367. For a discussion of later false tie-dyeing from the central coast, see Wolfgang Haberland, "Geweben mit unechtem Plangi von der Zentral-Peruanischen Kste," *Baessler-Archiv* 12 (1964): 271–9.
3. See Anne Paul, *Paracas Ritual Attire: Symbols of Authority in Ancient Peru* (Norman: University of Oklahoma Press, 1990), 151; and Larsen et al., *Dyer's Art*, 34, 50.
4. See Bruhns, *Ancient South America*, 163.
5. See Rebecca Stone-Miller, *To Weave for the Sun: Ancient Andean Textiles in the Museum of Fine Arts*, Boston (New York: Thames and Hudson, 1992), 21, 36–7, 99–101, 246, 252, 261; *Textile Art of Peru*, ed. Reid, 212–19; Benson, Conklin, and Yamamoto, *Museums of the Andes*, 95; Mary Elizabeth King, *Ancient Peruvian Textiles from the Collection of the Textile Museum, Washington, D.C.* (New York: Museum of Primitive Art, 1965), 28–9; Larsen et al., *Dyer's Art*, 47–9; Heinrich Ubbelohde-Doering, *The Art of Ancient Peru* (New York: Frederick A. Praeger, 1952), 29, 83, 131; Andre Emmerich, *Art of Ancient Peru* (New York: Andre Emmerich, 1969), 32; Lila M. O'Neale and A. L. Kroeber, *Textile Periods in Ancient Peru* (Berkeley and Los Angeles: University of California Press, 1930), pl. 27a, "Basic Table"; and Ann Pollard Rowe, "Textiles from the Nasca Valley at the Time of the Fall of the Huari Empire," in *The Junius B. Bird Conference on Andean Textiles, April 7th and 8th, 1984*, ed. Ann Pollard Rowe (Washington: Textile Museum, 1986), 161, 182 (hereafter cited as *Junius B. Bird Conference, 1984*).

6. See Stone-Miller, *To Weave for the Sun*, 230; and Larsen et al., *Dyer's Art*, 47. See also Ina VanStan, *The Fabrics of Peru* (Leigh-on-Sea, England: F. Lewis, Publishers, 1966), 15–16, figs. 49–51; Ina VanStan, *Textiles from Beneath the Temple of Pachacamac, Peru: A Part of the Uhle Collection of the University Museum, University of Pennsylvania* (Philadelphia: University Museum, 1967), 71–2, 84, 114, 124, 157, 158; G. H. S. Bushnell, *Peru* (New York: Frederick A. Praeger, 1957), 101; O'Neale and Kroeber, *Textile Periods in Ancient Peru*, pl. 27a, "Basic Table"; and Tsunoyama, *Textiles of the Andes*, 7–8, 12.
7. Jane Feltham, *Peruvian Textiles* (Aylesbury, England: Shire Publications, 1989), 89.
8. See Crawford, "Peruvian Fabrics," 154 (see n. 17).
9. See Alba Guadalupe Mastáche de Escobar, "Dos fragmentos de tejido decorados con la técnica de plangi," *Anales, Instituto Nacional de Antropología e Historia* 4 (1972): 251–62; and Mary Elizabeth King, "The Prehistoric Textile Industry of Mesoamerica," in *The Junius B. Bird Pre-Columbian Textile Conference, May 19th and 20th, 1973*, ed. Ann Pollard Rowe, Elizabeth P. Benson, and Anne-Louise Schaffer (Washington, D.C.: Textile Museum, 1979), 272.
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2. See, for example, Pierre Paris, "L'Amérique précolombienne et l'Asie Méridionale," *Bulletin de la Société des Études Indochinoises* 17/2 (1942–43); and Paul Tolstoy, "Transoceanic Diffusion and Nuclear Mesoamerica," in *Prehistoric America*, ed. Shirley Gorenstein (New York: St. Martin's Press, 1974), 131.
3. See Larsen et al., *Dyer's Art*, 34–5; and Alfred Bühler, "Plangi—Tie and Dye Work," *CIBA Review* 104 (1954): 3726–48, 3752.
4. See Crawford, "Peruvian Fabrics," 153.
5. See Tolstoy, "Transoceanic Diffusion and Nuclear Mesoamerica," 131.
6. See Roland B. Dixon, *The Building of Cultures* (New York: Charles Scribner's Sons, 1928), 199–202.
7. K. R. T. Hodjonogoro, "The Place of Batik in the History and Philosophy of Javanese Textiles: A Personal View," in *Indonesian Textiles*, ed. Gittinger, 227.
8. Seiler-Baldinger, *Textiles*, 148 (see n. 7).
9. See Alfred Bühler, "The Ikat Technique," *CIBA Review* 44 (1942): 1586–96; his "Dyes and Dyeing Methods for Ikat Threads," *CIBA Review* 44 (1942): 1597–1603; and his *Ikat, Batik, Plangi*. See also Larsen et al., *Dyer's Art*, 131; Birrell, *Textile Arts*, 409–10 (see n. 7); and Warming and Gaworski, *World of Indonesian Textiles*, 56–76 (see n. 7). The theoretical possibility of treating the threads with a liquid or paste resist rather than by wrapping has not, to my knowledge, been recorded.

0. Nora Fisher, "Weft Ikat Blankets," in *Spanish Textile Tradition of New Mexico and Colorado: Museum of International Folk Art*, ed. Sarah Nestor (Santa Fe: Museum of New Mexico Press, 1979), 133.
1. John Grey, "Sarasa and Patola: Indian Textiles in Indonesia," *Orientalia* 20/1 (1989): 55.
2. For discussions of geographical origins and spreads of resist-dyeing methods in the Eastern Hemisphere, see Bühler, *Ikat, Batik, Plangi*, 316–40; Larsen et al., *Dyer's Art*; and Robinson, *History of Dyed Textiles*.
3. Chelna Desai, *Ikat Textiles of India* (San Francisco: Chronicle Books, 1987).
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7. See, for example, Larsen et al., *Dyer's Art*, 131.
8. See, for example, Jan Fontein, *The Sculpture of Indonesia* (Washington, D.C.: National Gallery of Art; New York: Harry N. Abrams, 1990), 24, 116–21; and Fischer, *Threads of Tradition*, 9 (see n. 10).
9. Warming and Gaworski, *World of Indonesian Textiles*, 53, 92.
0. See Alfred Bühler, "The Origin and Extent of the Ikat Technique," *CIBA Review* 44 (1942): 1604–11; Larsen et al., *Dyer's Art*, 131–2; Fraser-Lu, *Handwoven Textiles of South-East Asia* (see n. 10); and Robinson, *History of Dyed Textiles*, 81.
1. See Spring, *African Textiles*, pl. 37 (see n. 8).
2. Newman, *Contemporary Southeast Asian Arts and Crafts*, 54 (see n. 11).
3. See Wilhelm G. Solheim II, "Philippine Prehistory," in *The People and Art of the Philippines*, ed. Gabriel Casal et al. (Los Angeles: Museum of Cultural History, University of California, Los Angeles, 1981), 78–9; Hauser-Schaublin, Nabholz-Kartaschoff, and Ramseyer, *Textiles in Bali*, 12–30, 94–114; and Roy W. Hamilton, ed., *Gift of the Cotton Maiden: Textiles of Flores and the Solor Islands* (Los Angeles: Fowler Museum of Cultural History, University of California, Los Angeles).
4. See Newman, *Contemporary Southeast Asian Arts and Crafts*, 54–5; Bühler, "Origin and Extent of the Ikat Technique"; Larsen et al., *Dyer's Art*, 22–3, 130–1; Fraser-Lu, *Handwoven Textiles of South-East Asia*; Robyn Maxwell, *Textiles of Southeast Asia: Tradition, Trade and Transportation* (Melbourne: Australian National Gallery and Oxford University Press Australia, 1990), 165, 169–70, 228; and Mattiebelle Gittinger and H. Leedom Lefferts Jr., *Textiles and the Tai Experience in Southeast Asia* (Washington, D.C.: Textile Museum, 1992), 35–7.
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6. See Mary Dusenbury, "Kasuri: A Japanese Textile," *Textile Museum Journal* 17 (1978): 41–5, 47.
7. See Bühler, *Ikat, Batik, Plangi*, 23, 27; and Larsen et al., *Dyer's Art*, 134.
8. Larsen et al., *Dyer's Art*, 134; see also Crawford, "Peruvian Fabrics," 153 (see n. 17).

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0. See Doris Rau, Andy Hale, and Kate Fitz Gibbon, *Ikats, Woven Silks from Central Asia: The Rau Collection* (Oxford: Basil Blackwell, 1988), 8; and Janet Harvey, *Traditional Textiles of Central Asia* (New York: Thames and Hudson, 1996).
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2. See Rau, Hale, and Gibbon, *Ikats*; Max Klimburg, *Ikat: Textile-kunds von der Seidenstrasse* (Textile art from the Silk Road) (Vienna: Kirdk, 1993); Robinson, *History of Dyed Textiles*, 80; Hecht, *Art of the Loom*, 92, 102–5, 109–11; Gavin, *Woman's Warpath*; van Gelder, *Ikat*, 18–19; and Boser-Sarivaxévanis, *Les tissus de l'Afrique Occidentale* (see n. 8).
3. See Peggy S. Gilfoy, "Textiles in Africa and Indonesia: A Connection?" in *Indonesian Textiles*, ed. Gittinger, 360 (see n. 37).
4. See Bühler, "Introduction," 14–15.
5. See Larsen et al., *Dyer's Art*, 131–5.
6. See P. Aug. Driessen, "Een Inka- of zelfs pré-Inka-ikat," *Nederlandsh Indië, Oud en Nieuw* 15/3 (1930–31): 66–7; and E. H. Snethlage, "Ein figurliches Ikat-Gewebe aus Peru," *Der Weltkreis, Zeitschrift für Völkerkunde, Kulturgeschichte und Volkskunde* 2/3–4 (1931): 49–51.
7. See Wasserman and Hill, *Bolivian Indian Textiles*, 7 (see n. 5).
8. See Larsen et al., *Dyer's Art*, 50.
9. J. Alden Mason, *The Ancient Civilizations of Peru* (Harmondsworth, Middlesex: Penguin Books, 1957), 256; see Bushnell, *Peru*, 96 (see n. 26).
0. See Ann Pollard Rowe, *Warp-Patterned Weaves of the Andes* (Washington, D.C.: Textile Museum, 1977), 18; and Dieter Eisleb, "Altperuanische Ikat-Gewebe aus den Sammlungen des Berliner Museums für Völkerkunde," *Baessler-Archiv* 12 (1964): 179–91.
1. See King, "Possible Indonesian or Southeast Asian Influences," 367–8 (see n. 18).
2. See Feltham, *Peruvian Textiles*, 28 (see n. 27); Joan S. Gardner, "Pre-Columbian Textiles, Los Ríos Province, Ecuador," *National Geographic Society Research Reports* 18 (1985): 327–42; and Stone-Miller, *To Weave for the Sun*, 219 (see n. 25).
3. Larsen et al., *Dyer's Art*, 133.
4. Rowe, *Warp-Patterned Weaves*, 18; see Ina VanStan, "A Peruvian Ikat from Pachacamac," *American Antiquity* 23/2, pt. 1 (1957): 150–9.
5. See O'Neale, *Textiles of Highland Guatemala*, 25–7 (see n. 30); Hecht, *Art of the Loom*, 160–1; Feltham, *Peruvian Textiles*, 28; Rowe, *Warp-Patterned Weaves*, 19–23; Laura Matin Miller, "The Ikat Shawl Traditions of Northern Peru and Southern Ecuador," in *Textile Traditions of Mesoamerica*, 337–58 (see n. 30); Gerardo Reichel-Dolmatoff, "On the Discovery of the Ikat-Technique in Colombia, S.A.," *American Anthropologist* 59/1 (1957): 133; and Margot Blum Scheville, *Maya Textiles of Guatemala: The Gustavus A. Eisen Collection, 1902* (Austin: University of Texas Press, 1993), 62–3.
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7. See Birrell, *Textile Arts*, 409 (see n. 7).
8. See King, "Possible Indonesian or Southeast Asian Influences."
9. See Davis, "Resist Dyeing in Mexico," 312, 315 (see n. 30); King, "Possible Indonesian or Southeast Asian Influences," 368–9; and Anawalt, "Aztec Knotted and Netted Capes," 192–3 (see n. 30).
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and King, "Possible Indonesian or Southeast Asian Influences," 368.

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2. Daniel Shaffer, "History and Technique [of Ikat]," *Hali* 7/3 (1985): 44; see Larsen et al., *Dyer's Art*, 13, 15.
3. Crawford, "Peruvian Fabrics," 154 (see n. 17).
4. See Paris, "L'Amérique précolombienne" (see n. 32); and Gunnar Thompson, *American Discovery: The Real Story* (Seattle: Misty Isles Press, 1992), 65.
5. Gilfoy, "Textiles in Africa and Indonesia," 360.
6. See Bühler, "Introduction," 14 (see n. 61).
7. Bühler, "Origin and Extent of the Ikat Technique," 1607 (see n. 50).
8. Larsen et al., *Dyer's Art*, 135.
9. Julian H. Steward, "South American Cultures: An Interpretive Summary," in *Handbook of South American Indians*, ed. Julian H. Steward (Washington, D.C.: U.S. Government Printing Office, 1949), 5:744.
0. Bushnell, *Peru*, 101 (see n. 26).
1. See the quotation that corresponds to n. 148.
2. Alfred Steinmann, "Batik Work: Its Origin and Spread," *CIBA Review* 58 (1947): 2102.
3. Bühler, *Ikat, Batik, Plangi*; Birrell, *Textile Arts*, 411–12; and Robinson, *History of Dyed Textiles* (see n. 7). Discharge (bleaching out a design from an already-dyed cloth) is unknown ethnographically.
4. See Bühler, *Ikat, Batik, Plangi*; 158, 161–2, 164–6, 179–81, 191–205, 297; Larsen et al., *Dyer's Art*, 77, 79, 82–3; Steinmann, "Batik Work"; Fraser-Lu, *Handwoven Textiles of South-East Asia* (see n. 10); Spring, *African Textiles*, plates 5, 6, 27 (see n. 8); Robinson, *History of Dyed Textiles*, 39–43; Newman, *Contemporary Southeast Asian Arts and Crafts*, 73–8 (see n. 11); and Gilfoy, "Textiles in Africa and Indonesia," 360–1.
5. Grey, "Sarasa and Patola," 50–3, 58–60 (see n. 41). For a discussion of early block printing and mordant resist and their distributions, see Bühler, *Ikat, Batik, Plangi*, 189, 272–93, 297–8; Gillow and Barnard, *Traditional Indian Textiles* (see n. 5); Mehta, *Handicrafts and Industrial Arts of India*, 123 (see n. 9); Mehta, *Masterpieces of Indian Textiles*, 34–6 (see n. 9); Abraham, *Handicrafts in India*, 143–4 (see n. 9); Robinson, *History of Dyed Textiles*, 17, 39–40, 43; and Dhamija and Jain, eds., *Handwoven Fabrics of India*, 159 (see n. 9).
6. See Steinmann, "Batik Work," 2103, 2108–9; Fraser-Lu, *Handwoven Textiles of South-East Asia*, 2; and Hodjonogoro, "Place of Batik," 224, 227–8 (see n. 37).
7. E. J. W. Barber, *Prehistoric Textiles: The Development of Cloth in the Neolithic and Bronze Ages* (Princeton: Princeton University Press, 1991), 206–7, 226, 379.
8. See Shih, "Textile Finds in the People's Republic of China," 320–2.
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1. See Bühler, *Ikat, Batik, Plangi*, 161–2; and Robinson, *History of Dyed Textiles*, 14, 40, 53.
2. See Gillow and Barnard, *Traditional Indian Textiles*, 11–12; Cooper, Gillow, and Dawson, *Arts and Crafts of India*, 91 (see n. 44); and Robinson, *History of Dyed Textiles*, 40, 74.
3. See Larsen et al., *Dyer's Art*, 84–5.
4. See Birrell, *Textile Arts*, 412; and George Coedès, *The Indianized States of Southeast Asia*, trans. Susan Brown Cowing (Honolulu: East-West Center Press, 1968).

5. See Sylvia Fraser-Lu, *Indonesian Batik: Processes, Patterns and Places* (Singapore: Oxford University Press, 1986), 1–2.
6. Larsen et al., *Dyer's Art*, 47, 83; see Dixon, *Building of Cultures*, 201 (see n. 36).
7. See Julius Rath, "Ein altperuanisches Batikmuster," *Paideuma* 2/4–5 (1942): 239–42.
8. Ina VanStan, "A Problematic Example of Peruvian Resist-Dyeing," *American Antiquity* 29/2 (1963): 173.
9. See Tsunoyama, *Textiles of the Andes*, 7–8, 12 (see n. 19).
0. See Szyszlo, "Excellence of Pre-Columbian Textile Art," 26 (see n. 20); Dwight T. Wallace, "A Technical and Iconographic Analysis of Carhua Painted Textiles," in *Paracas Art and Architecture: Object and Context in South Coastal Peru*, ed. Anne Paul (Iowa City: University of Iowa Press, 1991), 64; and Richard L. Burger, *Chavín and the Origins of Andean Civilization* (London: Thames and Hudson, 1992), 201.
1. See Benson, Conklin, and Yamamoto, *Museums of the Andes*, 130–2 (see n. 6); Robinson, *History of Dyed Textiles*, 40; and VanStan, "Peruvian Resist-Dyeing."
2. See Marianne Cardale Schrimppff, "Painted Textiles from Caves in the Eastern Cordillera, Colombia," in *Junius B. Bird Conference, 1984*, 207, 215 (see n. 25).
3. See Armand Labbé, *Colombia before Columbus: The People, Culture, and Ceramic Art of Prehistoric Colombia* (New York: Rizzoli International Publications, 1986); Alain Jacob, *Cerámica de los Paises Andinos, Colombia Ecuador, Céramiques des Pays Andines* (Paris: ABC Décor, 1975), 8, 22; Rafael Larco Hoyle, *Peru* (Cleveland and New York: World Publishing Company, 1966), 233, 239, plates 13, 132; Luis G. Lumbreras, *The Peoples and Cultures of Ancient Peru* (Washington, D.C.: Smithsonian Institution Press, 1974), 87, 98–9, 111–15; Mason, *Ancient Civilizations of Peru*, 255–6 (see n. 69); Emmerich, *Art of Ancient Peru*, 12, 13 (see n. 25); Christopher B. Donnan, *Ceramics of Ancient Peru* (Los Angeles: Fowler Museum of Cultural History, University of California, Los Angeles, 1992), 13, 22, 38–9, 70–9, 124; Nordenskiöld, "Origin of the Indian Civilizations," 66 (see n. 81). Note that seemingly wax-resist-painted pottery was also made in Tang times in China (see Larsen et al., *Dyer's Art*, 24).
4. King, "Prehistoric Textile Industry of Mesoamerica," 274 (see n. 29); see Irmgard Weitlaner Johnson, "Hilado y tejido," in *Esplendor de Mexico Antiguo* 1 (1959): 439–78, 464, 468.
5. See Nordenskiöld, "Origin of the Indian Civilizations," 44–6.
6. See Thompson, *American Discovery*, 65 (see n. 84).
7. See Mario Vargas Llosa, "Loquacious Weavings," in *Textile Art of Peru*, ed. Reid, 11 (see n. 20).
8. See John Howland Rowe, "Diffusionism and Archaeology," *American Antiquity* 31/3 (1966): 334–7.
9. See my "Diffusion versus Independent Development" (see n. 1); my "Pre-Columbian Transoceanic Contacts," in *Ancient South Americans*, ed. Jesse D. Jennings (San Francisco: W. H. Freeman and Company, 1983), 337–93; and my "Hypotheses of Mediterranean/Southwest [Asian] Influences on New World Cultures," *New England Antiquities Research Association Journal* 26/3–4 (1992): 82–5.
0. Miguel Covarrubias, *The Eagle, the Jaguar, and the Serpent: Indian Art of the Americas; North America: Alaska, Canada, the United States* (New York: Alfred A. Knopf, 1954), 99.
1. See, for example, Dixon, *Building of Cultures* (see n. 36); Nordenskiöld, "Origin of the Indian Civilizations," 45–6; and Herbert W. Krieger, "Indian Cultures of Northeastern South America," *Smithsonian Institution, Annual Report 1934* (1935): 401–21.
2. See, for example, Pierre Honoré, *In Quest of the White God* (New York: G. P. Putnam's, 1964), 194, 198; and Wolfgang Marschall, *Transpazifische Kulturbeziehungen: Studien zu ihrer Geschichte* (Munich: Klaus Renner, 1972), 135–43.
3. See, for example, Crawford, "Peruvian Fabrics," 153 (see n. 17); Steward, "South American Cultures," 744 (see n. 89); and Pablo Martínez del Río, *Los orígenes americanos* (Mexico City: A. V. Chavez, 1943).
4. Bühler, "Origin and Extent of the Ikat Technique," 1607 (see n. 50).

5. See Burger, *Chavín*, 27–8; and Michael E. Moseley, *The Incas and Their Ancestors: The Archaeology of Peru* (London: Thames and Hudson, 1992), 110–12, 116–17.
6. See Terence Grieder, “Fiber Arts,” in *La Galgada: A Pre-ceramic Culture in Transition*, ed. Terence Grieder et al. (Austin: University of Texas Press, 1988), 181.
7. Moseley, *Incas and Their Ancestors*, 157–8; see Burger, *Chavín*, 201.
8. See Luis Guillermo Lumbreras, “Textiles in Ancient Peru,” in *Textile Art of Peru*, ed. Reid, 19 (see n. 20).
9. See my “Pre-Columbian Transoceanic Contacts,” 354–5.
0. Burger, *Chavín*, 222.
1. See, for example, my “Dyestuffs,” 35–6. Joseph B. Mahan has gone so far as to say that “it is beyond doubt that for more than a thousand years sailors from the Indus were to be seen throughout most of the inhabited world,” colonizing widely (see Joseph B. Mahan, *The Secret: America in World History before Columbus* [Columbus, Ga.: J. B. Mahan, 1983], 188–91).
2. See Bridget Allchin and Raymond Allchin, *The Rise of Civilization in India and Pakistan* (Cambridge: Cambridge University Press, 1982), 191.
3. Cooper, Gillow, and Dawson, *Arts and Crafts of India*, 89 (see n. 44).
4. See Peter Muller and Raghubir Singh, “Kerala, Jewel of India’s Malabar Coast,” *National Geographic* 173/5 (1988): 597, 609.
5. Ruth Barnes, *Indian Block-Printed Cotton Fragments in the Kelsey Museum, The University of Michigan* (Ann Arbor: University of Michigan, 1993), 9–10.
6. Cooper, Gillow, and Barnard, *Arts and Crafts of India*, 91.
7. See Grey, “*Sarasa* and *Patola*,” 49, 51 (see n. 41).
8. See F. R. Allchin, *The Archaeology of Early Historic South Asia* (Cambridge: Cambridge University Press, 1995), 141.
9. See my “Dyestuffs,” 31. On Harappan overseas trade, see S. R. Rao, *Lothal: A Harappan Port Town* (New Delhi: Archaeological Survey of India, 1985), 685–8; compare Thor Heyerdahl, *The Maldive Mystery* (London: George Allen & Unwin, 1986), 294–5.
0. Junius B. Bird, “Fibers and Spinning Procedures in the Andean Area,” in *Junius B. Bird Conference, 1984*, 15.
1. See Dixon, *Building of Cultures*, 202.
2. See my “Pre-Columbian Transoceanic Contacts,” 354–5.
3. See Honoré, *In Quest of the White God*, 194, 198; Marschall, *Tranzpasifische Kulturbeziehungen*, 135–43; and Tolstoy, “Transoceanic Diffusion,” 131 (see n. 32).
4. Crawford, “Peruvian Fabrics,” 154.
5. See Bühler, “Origin and Extent of the Ikat Technique,” 1607.
6. See my “Pre-Columbian Transoceanic Contacts,” 374–81.
7. See my “Malaysia and Tropical America: Some Racial, Cultural, and Ethnobotanical Comparisons,” *Congreso Internacional de Americanistas, Actas y Memorias 37/4* (1968): 133–77; my “The Development and Distribution of the Blowgun,” *Annals of the Association of American Geographers* 60/4 (1970): 662–88; and my “Further Information on the Geography of the Blowgun and Its Implications for Early Transoceanic Contacts,” *Annals of the Association of American Geographers* 81/1 (1991): 89–102.
8. King, “Possible Indonesian or Southeast Asian Influences” (see n. 18).
9. See my “Pre-Columbian Transoceanic Contacts,” 360–2; and Tolstoy, “Transoceanic Diffusion,” 133–5.
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2. Larsen et al., *Dyer's Art*, 13, 15.
3. See *ibid.*
4. See Bühler, "Origin and Extent of the Ikat Technique," 1606; and his "Introduction," 14 (see n. 61).
5. See my "Pre-Columbian Transoceanic Contacts"; Eugene R. Fingerhut, *Explorers of Pre-Columbian America? The Diffusionist-Inventionist Controversy*, 2nd ed. (Claremont, Calif.: Regina Books, 1996); and John L. Sorenson and Martin H. Raish, *Pre-Columbian Contact with the Americas across the Oceans: An Annotated Bibliography*, 2nd ed., 2 vols. (Provo, Utah: Research Press, 1996).