

ARROW RELEASE DISTRIBUTIONS

BY

A. L. KROBBER

UNIVERSITY OF CALIFORNIA PUBLICATIONS IN AMERICAN ARCHAEOLOGY
AND ETHNOLOGY

Volume 23, No. 4, pp. 283-296, 1 map

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

1957

UNIVERSITY OF CALIFORNIA PUBLICATIONS
DEPARTMENT OF ANTHROPOLOGY

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Issued April 16, 1927

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BERKELEY, CALIFORNIA

CAMBRIDGE UNIVERSITY PRESS
LONDON, ENGLAND

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In 1885 the late Edward S. Morse wrote one of the rare monographs which become classical because they discover and found a subject of study on an enduring basis: *Ancient and Modern Methods of Arrow-Release*.¹ So exact was the working out of the topic that when Morse issued a supplementary paper² nearly forty years later, he was able to add many new facts but was under no necessity of revising his ideas.

The matter of arrow "releases" or "looses" is of some intrinsic and general interest because it lends itself to exact treatment, a fact due in part to the limited number of possible ways in which a human hand can effectively manipulate the drawing and letting go of an arrow. The present examination is an inquiry into what historic growths or spreads are traceable, and into aspects of the subject that may have theoretical bearing on the fundamental but still obscure problem of "invention" or the origins of culture material. With a few exceptions,³ the data dealt with are Morse's. I suspect that a thorough review of published literature, photographs, and works of art might double the cases assembled by Morse. But the accretions would hardly be notable unless search were systematic, and this would be a task of magnitude, calling either for cooperation or for prosecution simultaneously with other researches of world-wide scope.

Five releases are recognized, plus sub-varieties that seem of no great significance. They are differentiated, under the names originally given them, in the little table below. The usage of modern English speech varies between recognizing five fingers or four fingers

¹ Bull. Essex Inst., Salem, 17:145-189, 1885.

² Additional Notes on Arrow Release, Peabody Museum, Salem, 1922, pp. 1-48.

³ Californian data: Maidu, Primary (and perhaps Tertiary): Dixon, Bull. Am. Mus. Nat. Hist., 17:204, 1905. Luiseño, Mediterranean (and Primary for simple arrows of arrow-weed): Sparkman, Univ. Calif. Publ. Am. Arch. Ethn., 8:206, 1908. Kato, according to a native informant tested in 1923: transitional between Mediterranean and Tertiary; the tips of the index and middle fingers pull the string, the arrow lies between them, the thumb rests on the butt. Compare Andaman modification of Tertiary, Morse, 1922, fig. 22.

and a thumb—in which case the middle or third finger of the hand becomes the second of the four fingers in the more specific sense. I shall try to avoid ambiguity by using either *number* designations of the *digits* or popular *names* for the fingers; thus: 1, thumb; 2, index; 3, middle; 4, ring; 5, little finger.

RELEASE CLASSIFICATION

kn: Knuckle; b: Base

	<i>Pull on:</i>	<i>Pull by:</i>	<i>Butt between:</i>	<i>Unique in:</i>
<i>Primary</i>	Arrow	1 + 2kn	1 + 2kn	Arrow pull
<i>Secondary</i>	Arrow + string	[1 + 2kn] + [3(+4)]	1 + 2kn	Combination pull
<i>Tertiary</i>	String	2 + 3 (+4)	1 + 2	
<i>Mediterranean</i>	String	2 + 3 (+4)	2 + 3	Thumb not used
<i>Mongolian</i>	String	1 (+ ring)	1b + 2b	Thumb pull

The Primary release is that almost invariably attempted by children and uninstructed novices. The pull is administered wholly on the arrow, whose butt is clasped between the end of the thumb and the middle knuckle of the index. The pull depends wholly on friction, there being no engagement unless the butt of the arrow is thickened into a knob—a device frequently found where this release is standard. Morse in fact has made several of his determinations of Primary release from butts alone—a proceeding justified in the absence of other data. This is the weakest of all releases⁴ on an ordinary arrow. The strength of the pull can be increased by knobbing, but probably with some impairment of velocity and trueness of flight. The Primary release has been reported from all continents, but has a very scattered distribution.

The Secondary is the rarest of the five fundamental releases, and has been reported beyond doubt from but one continent. It is the only release that draws on both arrow and string. The hold on the arrow is like the Primary one. Simultaneously, the tip of finger 3, plus sometimes 4, engages the string. The name Secondary was applied by Morse in the belief that this release was probably an outgrowth of the Primary. It seems simplest to retain the established name without commitment as to developmental implication.

⁴Pope, Univ. Calif. Publ. Am. Arch. Ethn., 13:121, 1918, found that the pounds he could pull with the several releases were: Primary, 25, with thickened arrow butt, 35; Secondary, 40; Tertiary, 60; Mediterranean, 80; Mongolian, with bare thumb, 45, with archer's glove, 55. His training having been in the Mediterranean, it seems possible that continued practice in the other releases might have improved their strength somewhat, particularly the Mongolian, which is the antithesis of the Mediterranean.

The Tertiary release, like those that follow, draws only or mainly on the bow string. The arrow is held between the thumb and the side of the index, chiefly for its guidance. The index knuckles are unbent sufficiently to allow the tip of the index to join with the tip of the middle, and sometimes of the ring and perhaps even little finger, in engaging and pulling the string. Similarity to the Primary release lies only in the fact that the butt of the arrow lies between the same fingers—1 and 2. The main difference from the Mediterranean release is that the latter puts the arrow between fingers 2 and 3, thus wholly freeing the thumb and enabling the pulling fingers to engage the string at a right angle. As a matter of fact transitions occur, as among the Andamanese and the Kato. Morse speaks of the index being "not bent" in the Tertiary method but this statement is true only in comparison with the Primary and Secondary releases. A straight index would lose either the arrow or the string. The palm tends to turn upward in this release, leading to a frequent diagonal or horizontal position of the bow. This is another release of wide and somewhat scattered occurrence.

The Mediterranean release is distinctive in that the thumb is kept entirely out of the way. The string is engaged by the inner surfaces of the tips of the index and middle fingers, with or without the ring finger. The engaging finger ends are at right angles to the string. They are often protected from the scrape of the cord by casings, but these never enter integrally into the engagement. This release is further unique in not laying the arrow end between some part of the thumb and index. Instead, the butt rests between the index and middle fingers, which lightly guide it. This is probably the most powerful of releases. The name Mediterranean appears to have been bestowed as an intended synonym of Indo-European, but is best retained, the earliest record of the release being among a Hamitic people.

The Mongolian release is the only one in which the engagement is wholly by the thumb, which is hooked round the cord. The index finger aids in the pull by being bent over the thumb end to reinforce the crook of this, but does not touch the string. The arrow butt rests in the hollow between thumb and index. The three outer fingers are thus not used at all except that 3 may be clasped over 2 to reinforce it. In the classical Mongolian release a ring or similar device is always worn on the thumb, not only to protect this but to give a sharper engagement without slip. Occurrence of these thumb rings

may properly be taken as evidence of the custom of Mongolian release when attitude of the hand is unknown. This release is closely but not necessarily associated with the composite bow; its occurrence is essentially Asiatic.

The Yahi variety of the Mongolian release differs in that no ring is used, that the middle instead of the index finger reinforces the thumb, and that the arrow is held between the distal knuckles or phalanges of thumb and index, the latter being bent double. Pope, the discoverer, classes this as a variant of the Mongolian.⁵ Morse holds it to be a distinct release, entitled to a name of its own. On historic grounds he is probably right; but the similarity to the Mongolian hold in pure thumb engagement and finger reinforcement is so fundamental, logically and mechanically, that a joining of the two methods in one type seems warranted.

I omit from the present consideration releases like the African Wute one,⁶ in which the hold is entirely dependent on a manufactured contrivance, or which like the Temiang Malay release⁷ are so unnaturally stilted that they could not be employed in hard shooting.

The principal distributional facts assembled by Morse, together with my few additions, are condensed in the map. In this, modern or recent occurrences of the five releases are indicated by the symbols 1, 2, 3, E, O. For ancient occurrences, the same symbols are put in parentheses. Symbols connected by hyphens stand for co-occurrence of different releases among the same people.

The distributions being most definite for the Mongolian and most irregular for the Primary release, it will be more satisfactory to consider the five releases in the opposite sequence from that in which they have been described.

The Mongolian or thumb release is middle Asiatic, from Japan to Persia and Anatolia. It is not characteristic of any part of southern Asia, except for an introduction into India, presumably since the Mohammedan or Mongol periods. Morse is inclined to consider the thumb rings attributed to India as imported from Persia; the custom of wearing them almost certainly is so.

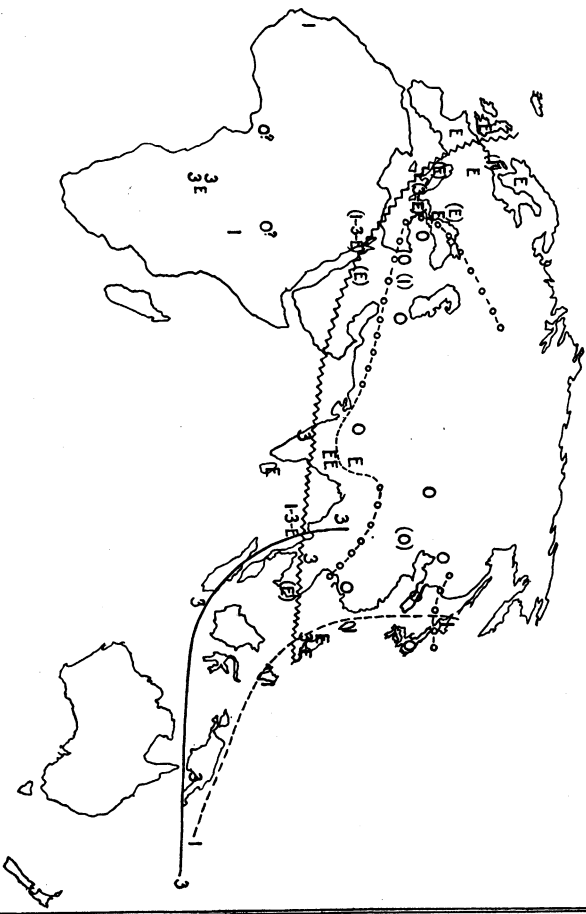
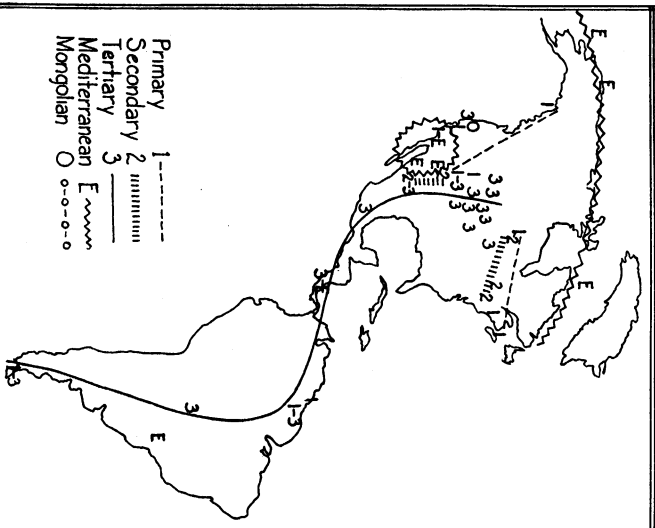
The oldest indubitable reference to this release is to the rings which are its constant accompaniment, and, as might be expected, comes from China. Morse cites two lines from the Shi-king which

⁵ Univ. Calif. Publ. Am. Arch. Ethn., 13:120, 1918.

⁶ Von Luschan, Verh. Berlin Ges. Anthr., 1891, pp. 670-678; Morse, 1922, pp. 29, 44.

⁷ Morse, 1885, p. 163, fig. 19.

Primary 1 - - - - -
 Secondary 2 - - - - -
 Tertiary 3 - - - - -
 Mediterranean E ~~~~~
 Mongolian O o-o-o-o



are quite clear. This sixth century compilation, being a collection of songs then extant, probably carries the use of thumb rings somewhat farther back, perhaps to 1000 B.C. It is of course no proof that the release and ring were first devised in China; for all we know they may have been imported from central Asia to China long before the date mentioned; or, they may indeed have spread from China westward.

It is significant that there are three forms of "ring": a simple cylindrical or polygonal tube; a ring with a sharp flange or "visor"; and a three-fingered glove hardened at the crook of the thumb. The first is Chinese; the second, west Asiatic and probably central and north Asiatic also, since it reappears in Korea; the third Japanese. That Korea goes with the Ural-Altaians rather than with China is not surprising in the case of an old and simple device like this, used largely in war. The separateness of Japan is also interesting as one instance out of hundreds of how the predominantly Chinese higher civilization of that country has been made over with unusual originality.

In the west, the Mongolian release seems pretty well established for Sassanian Persia of about 400. Morse's interpretations of certain Greek, Scythian, Egyptian XIX dynasty, and Hittite representations as pictures of Mongolian releases seem more dubious, especially as they are unsupported by finds of thumb rings. Von Luschan reports modern thumb rings from the upper Nile and lower Niger, but these are as yet without data.

In this connection the question of ancient association of thumb release and the double flexed composite bow of horn, sinew, and wood becomes important. For the modern period the association is close. It appears, however, that the composite bow was older than the Mongolian release in the Near East. Aramaean eighth-century reliefs from Sendjirli seem to show it; it may have been represented under the V dynasty in Egypt. There may be confusion here between the "compound" bow of two joined horns, and the "composite" one of layers of wood, horn, and sinew. The compound horn bow is known from specimens from Egyptian dynasty I, and may prove to be the ancestor of the composite form. The latter is established for dynasty XIX, thirteenth century, by a specimen assumed to have been imported into Egypt from Syria.⁸

The other known extra-Asiatic occurrence of the Mongolian release is that of the ringless form practiced by the Yahi or southernmost

⁸ Summary in article Bogen in *Reallexicon der Vorgeschichte*, 2:49, 1925.

Yana in northern California. The life-history of the last survivor of this group⁹ precludes his having learned the method from modern Caucasians or East Asiatics. Also, he knew that other releases, at any rate the Primary one, had been used by neighbor tribes. While data for American groups north of the Yahi and for Asiatic ones north of the Manchu are scant, a glance at the map suggests the improbability of transmission by diffusion. As the sinew-backed bow of northwestern North America is generally regarded as due to a diffusion from Asia of a simplified form of the composite bow, we may have here another case where the spread of this bow type outstripped the release.

The Yahi release is thus indicated as an independent invention: a parallel, or more strictly a convergence, since it is by no means identical with the Asiatic form. It stands in line with the observation that analysis generally reveals seeming culture parallels to be really convergences—similarities and not identities. How the Yahi manipulation could have originated is puzzling, because while the Mediterranean release can be derived from the Tertiary, or vice versa, by relatively slight alterations, the thumb pull sets the Mongolian method well apart, muscularly and dynamically, from all other releases.

In contrast with the compact Mongolian distribution, the Mediterranean release is practiced in at least three areas, plus sporadic occurrences. The largest area stretches from Europe to southeastern Asia, and was apparently continuous until the introduction of the Mongolian method in western Asia. The earliest record is Egyptian in the reign of Usertesens I, dynasty XII, twentieth century B.C. Assyrian and Greek sculptural evidence is conflicting, but includes clear Mediterranean instances. Roman, Dacian, Byzantine, eighth-century Saxon, Medieval, and modern European practice is consistently Mediterranean. Only thickened arrow butts from Denmark and Schleswig, of the beginning of the Christian era, suggest an early or barbarian Primary usage in Europe. Morse mentions Arabia as Mediterranean, without further specification. For India, the sculptural and ancient literary evidence uniformly suggests the Mediterranean release, which is corroborated by modern Bhil, Korwa, and Vedda practice. Eastward, occasional occurrences crop out in the available data as far as Hindu influence penetrated, but no farther: Andaman, Angkor sculptures in Cambodia, Tinguian and Negrito

⁹ Univ. Calif. Publ. Am. Arch. Ethn., 13:35-102, 1918 (Waterman), 13:103-152, 1918 (Pope).

in Luzon. The inclusion of the two Pygmy peoples indicates that the release was introduced into this area as part of the great cultural diffusion from India into Indonesia, and has probably no connection with original racial or speech relationships of the Pygmies. Similarly, India may have received the release at an earlier time by transmission from the Near East, rather than as part of the common Indo-European heritage as Morse inclines to believe.

The second Mediterranean area is that of the Eskimo, for whom the evidence is definite from Siberia, Alaska, and Baffinland.

The third area includes the Luiseño of southern California, the San Carlos Apache of Arizona, and the Seri of Sonora. Consistent records of other releases to the north make it probable that this area is not connected historically with the Eskimo. On the other hand, it is possible that this third or Southwestern area was connected with Mediterranean occurrences to the south. Aztec pictures, as Morse states, usually merely indicate the act of shooting without showing a release, yet there are some that suggest Mediterranean usage. From Costa Rica, among the Bribri Talamanca, there is an oral report of Mediterranean usage, although photographs show the Tertiary. Finally, far in South America there are two independent reports of Mediterranean release among the Botocudo. As these stand alone in the continent, no interpretation is warranted. But there are so few release data of any sort from Mexico south, and so many other familiar indications of cultural connections over the whole area between the Southwest and Argentina, that it will be worth while observing whether new data may not interpret the small but indubitable Southwestern area as merely the outpost of a bi-continental middle American diffusion of the Mediterranean release.

Somewhat similarly, the one recorded African Negro occurrence, among the Baluba, might prove to be due to cultural penetrations of the usage of nations on the Mediterranean; but the minimal African data allow of no present interpretation.

As between the Eur-Asiatic, Eskimo, and Southwestern distributions, it seems fairly but not unduly conservative to construe these as cases of separate origins.

The Tertiary release appears on first glance at the map to have a remarkably irregular release, much as it might have if it represented a "natural" or expectable development in higher savagery out of an earlier Primary and Secondary usage in lower savagery, as Morse seems to believe. However, most of the occurrences prove

to fall in a few areas, which look as if they might represent the usual sort of culture growths by diffusion or imitation.

The best established of these areas is in central North America, where it includes Menomini, Sioux, Assiniboin, Blackfeet, Crow, Omaha, Cheyenne, Arapaho, Comanche, Navaho, Tarahumare. To the northeast of this tract there are records only of Primary and Secondary releases; to the southwest it abuts on the Mediterranean release area. The Kato in California may represent an influence from the latter or from the central Tertiary area: their release is intermediate in type.

From Mexico south, records are again very scattered: Aztecs, probably, on the basis of their inadequate pictures; Talamanca of Costa Rica, according to photographs; Arawak, Carib, Galibi, and Bush Negroes of Guiana, though Surinam arrow butts indicate Primary; the Bororo in Brazil, though von den Steinen's description—"thumb not used at all"—suggests Mediterranean; Ona of Tierra del Fuego, Primary and Tertiary. All these cases are either doubtful or conflicting. Yet the fact that every known American record or indication south of Sonora, except for the Botocudo, points at least in part to a Tertiary release, suggests that this method enjoyed a wide vogue.

For Europe and the Near East, there are only some cases of ancient Greek and Egyptian representations.

In Africa the Basonge and Bakuba of the Congo use the Tertiary release.

Between India and Melanesia there are eight recorded Tertiary cases. These suggest a connection in their history, although this history has evidently become intertwined in the area with both Primary and Mediterranean developments. The instances are: Kader of western India; Burma; Siam; Andamans; Java; Luzon Negrito; Papua; Santa Cruz Island. The distribution of the three types suggests an origin, or at least centering, of the Mediterranean release in India; of the Tertiary in or near Indo-China or Malaysia; of the Primary along the eastern or Pacific edge of the area.

The Secondary is the least widespread of the releases. Apart from some doubtful constructions of ancient Assyrian and Indian representations, and an Andaman description, the method has been reported only from North America: Seneca Iroquois, Ottawa, Ojibwa, Zuni, Tarahumare. These tribes are marginal to the large Tertiary group.

The Primary release has the most irregular distribution. Some of the records of its occurrence must be taken with reserve, since they may have been obtained from novice or otherwise inadequate bowmen. It is only when several representatives of a tribe consistently exhibit this release that it can be accepted as standard for their group, either as the sole or as one of several recognized releases. But, with all allowance for this factor, it is clear that most of the reported Primary releases occur either among tribes whose technological and general cultural habits are simple, or among groups to whom the bow is a relatively unimportant weapon. The distribution is thus evidently the result of two separate factors: persistence of originally "primitive" or simple methods; and secondary acquisition of simplicity through degeneration or retrogression. With the Primary release the product of two sets of causes as different as these, its unusual irregularity of distribution becomes expectable, although the history of most of its occurrences remains to be accounted for in detail.

Northeastern North America shows one area of relatively backward culture in which only the Primary release has been found: the New England-Nova Scotia area of the Penobscot and Micmac. Immediately adjoining on the west is a definite Secondary area. This extends to the Ojibwa, whose usage is both Primary and Secondary; beyond them, southwesterly, lies the large area of Tertiary release in the center of the continent.

Beyond this Tertiary area the Primary method reappears among the Navaho and the Maidu and Luiseño of California, and is inferred for the Ute and, from butts, for the Tlingit. The latter possibly represent separate history; but the three or four Southwest-California cases support one another and link with Secondary instances in the same part of the continent. While the data are none too full, it therefore looks as if we had here a distribution of the "central and marginal" type: the more effective and sophisticated Tertiary release in the middle, the weaker and more spontaneous Secondary and Primary in one or perhaps two surrounding belts, continuous or interrupted. Such distributions being normally interpretable as indications of a later origin of the centrally occurring trait, it seems that, unless future data confuse the picture, Morse's derivation of the Tertiary release from the Secondary, and of this from the Primary, is likely to be confirmed as an actual sequence on North American soil.

South America offers three cases: Surinam, Demerara, Ona, two of them with accompanying Tertiary practice. Interpretation would be premature.

So as to Africa, where the release occurs on the west in the Senegal and on the east in the Albert Nyanza region.

In the area of Occidental civilization, there are some representative indications for Egypt, Assyria, and possibly Greece. These should be cited with caution. The Primary release may have been occasionally used in these countries without being standard; or the artists may not have been archers; or their depiction is sometimes misinterpretable by us. The established existence of the Mediterranean release and composite bow show that archery had reached an advanced development in this part of the world as early as the second millenium B.C. Any authenticated Primary occurrences may therefore be construable as temporary regressions or local survivals, and must certainly be considered with specific reference to the long archery history of this area as a whole, rather than as indications of a stage in a consistently regular development.

The case is rather better for the Primary release inferred from the thickened arrow butts of the Danish peninsula in the incipient Christian era, because of the definite cultural backwardness of remote Scandinavia at that period.

The remaining known instances of Primary release fall in the region of southeastern Asia and western Oceania and may therefore represent a true historical unit, although if so this has certainly come into relations of some complexity with the Tertiary and Mediterranean methods that also obtain in the area, and with the Mongolian to the north. The instances are Ainu; Formosa; Bagobo of Mindanao; Andamans; Solomons. In the main, these Primary occurrences constitute an easterly fringe of the area in question, suggesting a marginal though interrupted survival indicative of a former more central extension.

It is interesting that both the Pygmy peoples from whom there are data, the Andamanese and the Luzon Negritos, certainly practice the Primary alongside the Mediterranean release, and that the former in addition use a form of the Tertiary and possibly the Secondary and Mongolian methods. This circumstance, like so many others, points to the heterogeneousness of the Negrito cultures. These cultures are "primitive" in the sense that they have incorporated and retained an unusually small sum total of culture elements. Their characteristic tendency is toward economy of cultural means. This

tendency toward economy may well be a survival from a truly ancient and primitive condition. In specific content, the Pygmy cultures are far from primitive, in fact possess a surprisingly high proportion of elements of advanced and late origin—pottery, occasionally iron, musical instruments, perhaps the bow itself. To infer, from this primitiveness of cultural form or organization, the primitiveness or antiquity of any included element of culture substance, is likely to lead to erroneous conclusions. Interpretation of the age of traits on the basis of mechanical consideration of their presence or absence becomes unusually misleading in Pygmy culture.

The apparent irregularity of arrow release distributions thus resolves itself into a seemingly limited number of normal growth or spread distributions, plus several probabilities of independent origins. The simplicity and definiteness of the subject make it unusually favorable for further investigation. On the whole, the specific historical conclusions inferable in the present state of knowledge tally rather well with the conclusions derived from culture material of broader range. The same may be said as to the processes discernible, such as diffusion, continuity, degeneration, and convergence, all of which appear.

The most important areas from which additional data on releases are desirable are: all of Africa; all of Latin America; in North America, the southeast, the Pacific coast, and northern Canada; in Asia, the whole sub-Arctic region, ancient southern China, Indo-China, and the East Indies inclusive of Melanesia.

Shortly after the above was written, there appeared a new book by Wissler,¹⁰ in which he devotes a section of his first chapter to Arrow Release. Wissler's volume is an attempt to examine and exemplify the method of working with distributions. Most of his inferences as to release agree with mine. These conclusions may therefore be considered as corroborated to the extent that two workers have independently arrived at them. At some points Wissler reaches interpretations different from mine. These interpretations will now be examined.

Wissler considers Primary, Secondary, and Tertiary closely related typologically, whereas Mediterranean and Mongolian stand apart. His schematic classification is therefore into an extended "Primary" or Primitive, a Mediterranean, and a Mongolian type. Within his

¹⁰ *The Relation of Nature to Man in Aboriginal America* (New York, Oxford University Press, 1926); section on Arrow Release, pp. 30-40, figs. 16-19.

Primitive, he considers the transition from Primary to Secondary less easy than from Primary to Tertiary. I cannot agree to the first point and am dubious on the second. The Tertiary and Mediterranean releases are both essential string pulls, as contrasted to the pure arrow pull of the Primary. There are actual transitional releases between Tertiary and Mediterranean, as mentioned above. In type, these are just as intermediate as Secondary is between Primary and Tertiary, although they have not been given a name. If this consideration holds, Wissler's schematic plotting of releases in concentric world-wide areas of Mongolian, Mediterranean, and Primitive, suffers from a dubiously valid compounding of his Primitive.

On the basis of restricted distribution, the method developed by Wissler leads him to infer that Secondary is of recent origin, although he adds that the "total distribution" of Mongolian in central position is more consistent with its recency than that of Secondary. Having perhaps a more timid faith in developmental inferences from concentric distributions, I applied this method not to the relation of Primary-Tertiary, Mediterranean, and Mongolian the world over, as does Wissler, but to the relation of Primary, Secondary, and Tertiary in North America alone. At that Wissler's point is valid, that the very limited occurrence of Secondary carries a possibility of comparative recency, and is not necessarily the result of survival marginal to Tertiary. Secondary might then prove to be a localized specialization, or historical hybrid, an imperfect attempt perhaps of Primary archers to adopt the Tertiary method with which they had come in contact.

The schematic distribution of Wissler's three fundamental release types¹¹ seems precarious, apart from the doubt whether Tertiary deserves to be included with Primary and contrasted with Mediterranean. Northern Asia is so complete a blank on the actual distribution map that its use as a link between the Eur-Asiatic and the Eskimo occurrences of the Mediterranean release is hazardous. With this link removed, the distribution of Mediterranean is left so broken up, and so largely unrelated to Mongolian distribution, that the grand sequential scheme becomes shaky except for Eur-Asia and perhaps Africa. Within this central area of the eastern hemisphere, however, the concentric distribution inference method, which I also accepted in principle, does seem applicable in this case; and credit is due Wissler for having applied it consistently and without hesitation. The documentary evidence, though it does not reach back to

¹¹ Fig. 19, p. 39.

beginnings, confirms him so far as it goes. As pointed out above, the earliest recorded occurrence of the Mediterranean release in Egypt is at least a thousand years earlier than the earliest record of the Mongolian in China.

What this situation indubitably shows is the need of more complete data if the distribution method or any other method of historical induction is to lead to conclusions of higher probability. Conceivably the picture and its story may then be more complex; but the outlines will at any rate be more certain.

Wissler also shows imagination in connecting the sporadic Californian occurrence of the Yahi form of the Mongolian release with the somewhat wider California-Southwest occurrence of Mediterranean, the two together being engulfed in a much larger area of Primary, Secondary, and Tertiary. He goes on to raise the question whether "there may not be something in the nature of the mechanisms involved which predetermines this order of invention"—that is, from "Primitive" to Mediterranean to Mongolian, as deducible from the parallel distributions and inferred sequences in the Old and New Worlds. He does not hesitate to refer to predispositions, grooves, and more or less inevitable appearances in fixed order, although, as he says, it has of late become orthodox to shy away even from consideration of such possibilities.

With his willingness to consider such possibilities, and consider them specifically, no issue can be taken, for they would be of the greatest importance if substantiable. But in the present state of knowledge, arrow releases in western North America seem to furnish a slender basis of evidence on which to reopen a problem of the magnitude of this one. A few considerations will suffice. The Yahi release is so far a wholly isolated occurrence. It is an aberrant variant of Old World Mongolian. It is not central to the known distribution of Southwestern Mediterranean, but external to it, even separated. This area of Mediterranean release may itself be merely a periphery of a larger distribution centering far away in Middle America, as suggested above. It is clear from these discrepancies that even the tentative reconstruction of a predetermined parallel sequence in releases is too speculative to give serious support to a theory of such import.

On other matters which we both touch, Wissler and I seem to have come to the same conclusions. Where we differ in construal of the evidence, I wish to acknowledge his breadth of view and readiness to confront fundamental problems.

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