Chapter 4

THE ORIGIN OF NUMBER WORDS (Cont.).

By the slow, and often painful, process incident to the extension and development of any mental conception in a mind wholly unused to abstractions, the savage gropes his way onward in his counting from 1, or more probably from 2, to the various higher numbers required to form his scale. The perception of unity offers no difficulty to his mind, though he is conscious at first of the object itself rather than of any idea of number associated with it. The concept of duality, also, is grasped with perfect readiness. This concept is, in its simplest form, presented to the mind as soon as the individual distinguishes himself from another person, though the idea is still essentially concrete. Perhaps the first glimmering of any real number thought in connection with 2 comes when the savage contrasts one single object with another—or, in other words, when he first recognizes the *pair*. At first the individuals composing the pair are simply "this one," and "that one," or "this and that"; and his number system now halts for a time at the stage when he can, rudely enough it may be, count 1, 2, many. There are certain cases where the forms of 1 and 2 are so similar than one may readily imagine that these numbers really were "this" and "that" in the savage's original conception of them; and the same likeness also occurs in the words for 3 and 4, which may readily enough have been a second "this" and a second "that." In the Lushu tongue the words for 1 and 2 are *tizi* and *tazi* respectively. In Koriak we find *ngroka*, 3, and *ngraka*, 4; in Kolyma, *niyokh*, 3, and *niyakh*, 4; and in Kamtschatkan, *tsuk*, 3, and *tsaak*, 4. Sometimes, as in the case of the Australian races, the entire extent of the count is carried through by means of pairs. But the natural theory one would form is, that 2 is the halting place for a very long time; that up to this point the fingers may or may not have been used—probably not; and that when the next start is made, and 3, 4, 5, and so on are counted, the fingers first come into requisition. If the grammatical structure of the earlier languages of the world's history is examined, the student is struck with the prevalence of the dual number in them—something which tends to disappear as language undergoes extended development. The dual number points unequivocally to the time when 1 and 2 were *the* numbers at

mankind's disposal; to the time when his three numeral concepts, 1, 2, many, each demanded distinct expression. With increasing knowledge the necessity for this differentiatuin would pass away, and but two numbers, singular and plural, would remain. Incidentally it is to be noticed that the Indo-European words for 3—*three*, *trois*, *drei*, *tres*, *tri,* etc., have the same root as the Latin *trans*, beyond, and give us a hint of the time when our Aryan ancestors counted in the manner I have just described.

The first real difficulty which the savage experiences in counting, the difficulty which comes when he attempts to pass beyond 2, and to count 3, 4, and 5, is of course but slight; and these numbers are commonly used and readily understood by almost all tribes, no matter how deeply sunk in barbarism we find them. But the instances that have already been cited must not be forgotten. The Chiquitos do not, in their primitive state, properly count at all; the Andamans, the Veddas, and many of the Australian tribes have no numerals higher than 2; others of the Australians and many of the South Americans stop with 3 or 4; and tribes which make 5 their limit are still more numerous. Hence it is safe to assert that even this insignificant number is not always reached with perfect ease. Beyond 5 primitive man often proceeds with the greatest difficulty. Most savages, even those of the tribes just mentioned, can really count above here, even though they have no words with which to express their thought. But they do it with reluctance, and as they go on they quickly lose all sense of accuracy. This has already been commented on, but to emphasize it afresh the well-known example given by Mr. Oldfield from his own experience among the Watchandies may be quoted. "I once wished to ascertain the exact number of natives who had been slain on a certain occasion. The individual of whom I made the inquiry began to think over the names … assigning one of his fingers to each, and it was not until after many failures, and consequent fresh starts, that he was able to express so high a number, which he at length did by holding up his hand three times, thus giving me to understand that fifteen was the answer to this most difficult arithmetical question." This meagreness of knowledge in all things pertaining to numbers is often found to be sharply emphasized in the names adopted by savages for their numeral words. While discussing in a previous chapter the limits of number systems, we found many instances

where anything above 2 or 3 was designated by some one of the comprehensive terms *much*, *many*, *very many*; these words, or such equivalents as *lot*, *heap*, or *plenty*, serving as an aid to the finger pantomime necessary to indicate numbers for which they have no real names. The low degree of intelligence and civilization revealed by such words is brought quite as sharply into prominence by the word occasionally found for 5. Whenever the fingers and hands are used at all, it would seem natural to expect for 5 some general expression signifying *hand*, for 10 *both hands*, and for 20 *man*. Such is, as we have already seen, the ordinary method of progression, but it is not universal. A drop in the scale of civilization takes us to a point where 10, instead of 20, becomes the whole man. The Kusaies, of Strong's Island, call 10 *sie-nul*, 1 man, 30 *tol-nul*, 3 men, 40 *a naul*, 4 men, etc.; and the Ku-Mbutti of central Africa have *mukko*, 10, and *moku*, man. If 10 is to be expressed by reference to the man, instead of his hands, it might appear more natural to employ some such expression as that adopted by the African Pigmies, who call 10 *mabo*, and man *mabo-mabo*. With them, then, 10 is perhaps "half a man," as it actually is among the Towkas of South America; and we have already seen that with the Aztecs it was *matlactli*, the "hand half" of a man. The same idea crops out in the expression used by the Nicobar Islanders for 30—*heam-umdjome ruktei*, 1 man (and a) half. Such nomenclature is entirely natural, and it accords with the analogy offered by other words of frequent occurrence in the numeral scales of savage races. Still, to find 10 expressed by the term *man* always conveys an impression of mental poverty; though it may, of course, be urged that this might arise from the fact that some races never use the toes in counting, but go over the fingers again, or perhaps bring into requisition the fingers of a second man to express the second 10. It is not safe to postulate an extremely low degree of civilization from the presence of certain peculiarities of numeral formation. Only the most general statements can be ventured on, and these are always subject to modification through some circumstance connected with environment, mode of living, or intercourse with other tribes. Two South American races may be cited, which seem in this respect to give unmistakable evidence of being sunk in deepest barbarism. These are the Juri and the Cayriri, who use the same word for man and for 5. The former express 5 by *ghomen apa*, 1 man, and the latter by *ibicho*, person. The

Tasmanians of Oyster Bay use the native word of similar meaning, *puggana*, man, for 5.

Wherever the numeral 20 is expressed by the term *man*, it may be expected that 40 will be 2 men, 60, 3 men, etc. This form of numeration is usually, though not always, carried as far as the system extends; and it sometimes leads to curious terms, of which a single illustration will suffice. The San Blas Indians, like almost all the other Central and South American tribes, count by digit numerals, and form their twenties as follows:

20. tula guena = man 1.

40. tula pogua = man 2.

100. tula atala = man 5.

120. tula nergua = man 6.

1000. tula wala guena = great 1 man.

The last expression may, perhaps, be translated "great hundred," though the literal meaning is the one given. If 10, instead of 20, is expressed by the word "man," the multiples of 10 follow the law just given for multiples of 20. This is sufficiently indicated by the Kusaie scale; or equally well by the Api words for 100 and 200, which are

duulimo toromomo = 10 times the whole man.

duulimo toromomo va juo = 10 times the whole man taken 2 times.

As an illustration of the legitimate result which is produced by the attempt to express high numbers in this manner the term applied by educated native Greenlanders for a thousand may be cited. This numeral, which is, of course, not in common use, is

inuit kulit tatdlima nik kuleriartut navdlugit = 10 men 5 times 10 times come to an end.

It is worth noting that the word "great," which appears in the scale of the San Blas Indians, is not infrequently made use of in the formation of higher numeral words. The African Mabas call 10 *atuk*, great 1; the Hottentots and the Hidatsa Indians call 100 great 10, their words being *gei disi* and *pitikitstia* respectively.

The Nicaraguans express 100 by *guhamba*, great 10, and 400 by *dinoamba*, great 20; and our own familiar word "million," which so many modern languages have borrowed from the Italian, is nothing more nor less than a derivative of the Latin *mille*, and really means "great thousand." The Dakota language shows the same origin for its expression of 1,000,000, which is *kick ta opong wa tunkah*, great 1000. The origin of such terms can hardly be ascribed to poverty of language. It is found, rather, in the mental association of the larger with the smaller unit, and the consequent repetition of the name of the smaller. Any unit, whether it be a single thing, a dozen, a score, a hundred, a thousand, or any other unit, is, whenever used, a single and complete group; and where the relation between them is sufficiently close, as in our "gross" and "great gross," this form of nomenclature is natural enough to render it a matter of some surprise that it has not been employed more frequently. An old English nursery rhyme makes use of this association, only in a manner precisely the reverse of that which appears now and then in numeral terms. In the latter case the process is always one of enlargement, and the associative word is "great." In the following rhyme, constructed by the mature for the amusement of the childish mind, the process is one of diminution, and the associative word is little.

One's none,

Two's some,

Three's a many,

Four's a penny,

Five's a little hundred.

Any real numeral formation by the use of "little," with the name of

some higher unit, would, of course, be impossible. The numeral scale must be complete before the nursery rhyme can be manufactured.

It is not to be supposed from the observations that have been made on the formation of savage numeral scales that all, or even the majority of tribes, proceed in the awkward and faltering manner indicated by many of the examples quoted. Some of the North American Indian tribes have numeral scales which are, as far as they go, as regular and almost as simple as our own. But where digital numeration is extensively resorted to, the expressions for higher numbers are likely to become complex, and to act as a real bar to the extension of the system. The same thing is true, to an even greater degree, of tribes whose number sense is so defective that they begin almost from the outset to use combinations. If a savage expresses the number 3 by the combination 2-1, it will at once be suspected that his numerals will, by the time he reaches 10 or 20, become so complex and confused that numbers as high as these will be expressed by finger pantomime rather than by words. Such is often the case; and the comment is frequently made by explorers that the tribes they have visited have no words for numbers higher than 3, 4, 5, 10, or 20, but that counting is carried beyond that point by the aid of fingers or other objects. So reluctant, in many cases, are savages to count by words, that limits have been assigned for spoken numerals, which subsequent investigation proved to fall far short of the real extent of the number systems to which they belonged. One of the south-western Indian tribes of the United States, the Comanches, was for a time supposed to have no numeral words below 10, but to count solely by the use of fingers. But the entire scale of this taciturn tribe was afterward discovered and published.

To illustrate the awkward and inconvenient forms of expression which abound in primitive numeral nomenclature, one has only to draw from such scales as those of the Zuni, or the Point Barrow Eskimos, given in the last chapter. Terms such as are found there may readily be duplicated from almost any quarter of the globe. The Soussous of Sierra Leone call 99 *tongo solo manani nun solo manani*, *i.e*. to take (10 understood) 5 + 4 times and 5 + 4. The Malagasy expression for 1832 is *roambistelo polo amby valonjato*

amby arivo, 2 + 30 + 800 + 1000. The Aztec equivalent for 399 is _caxtolli onnauh poalli ipan caxtolli onnaui_, (15 + 4) x 20 + 15 + 4; and the Sioux require for 29 the ponderous combination _wick a chimen ne nompah sam pah nep e chu wink a._ These terms, long and awkward as they seem, are only the legitimate results which arise from combining the names of the higher and lower numbers, according to the peculiar genius of each language. From some of the Australian tribes are derived expressions still more complex, as for 6, *marh-jin-bang-ga-gudjir-gyn*, half the hands and 1; and for 15, *marh-jin-belli-belli-gudjir-jina-bang-ga*, the hand on either side and half the feet. The Mare tribe, one of the numerous island tribes of Melanesia, required for a translation of the numeral 38, which occurs in John v. 5, "had an infirmity thirty and eight years," the circumlocution, "one man and both sides five and three." Such expressions, curious as they seem at first thought, are no more than the natural outgrowth of systems built up by the slow and tedious process which so often obtains among primitive races, where digit numerals are combined in an almost endless variety of ways, and where mere reduplication often serves in place of any independent names for higher units. To what extent this may be carried is shown by the language of the Cayubabi, who have for 10 the word *tunca*, and for 100 and 1000 the compounds *tunca tunca*, and *tunca tunca tunca* respectively; or of the Sapibocones, who call 10 *bururuche*, hand hand, and 100 *buruche buruche*, hand hand hand hand. More remarkable still is the Ojibwa language, which continues its numeral scale without limit, furnishing combinations which are really remarkable; as, *e.g.*, that for 1,000,000,000, which is _me das wac me das wac as he me das wac_, 1000_1000 x 1000. The Winnebago expression for the same number, _ho ke he hhuta hhu chen a ho ke he ka ra pa ne za_ is no less formidable, but it has every appearance of being an honest, native combination. All such primitive terms for larger numbers must, however, be received with caution. Savages are sometimes eager to display a knowledge they do not possess, and have been known to invent numeral words on the spot for the sake of carrying their scales to as high a limit as possible. The Choctaw words for million and billion are obvious attempts to incorporate the corresponding English terms into their own language. For million they gave the vocabulary-hunter the phrase *mil yan chuffa*, and for billion, *bil yan chuffa*. The word *chuffa* signifies 1, hence these

expressions are seen at a glance to be coined solely for the purpose of gratifying a little harmless Choctaw vanity. But this is innocence itself compared with the fraud perpetrated on Labillardiere by the Tonga Islanders, who supplied the astonished and delighted investigator with a numeral vocabulary up to quadrillions. Their real limit was afterward found to be 100,000, and above that point they had palmed off as numerals a tolerably complete list of the obscene words of their language, together with a few nonsense terms. These were all accepted and printed in good faith, and the humiliating truth was not discovered until years afterward.

One noteworthy and interesting fact relating to numeral nomenclature is the variation in form which words of this class undergo when applied to different classes of objects. To one accustomed as we are to absolute and unvarying forms for numerals, this seems at first a novel and almost unaccountable linguistic freak. But it is not uncommon among uncivilized races, and is extensively employed by so highly enlightened a people, even, as the Japanese. This variation in form is in no way analogous to that produced by inflectional changes, such as occur in Hebrew, Greek, Latin, etc. It is sufficient in many cases to produce almost an entire change in the form of the word; or to result in compounds which require close scrutiny for the detection of the original root. For example, in the Carrier, one of the Dene dialects of western Canada, the word *tha* means 3 things; *thane*, 3 persons; *that*, 3 times; *thatoen*, in 3 places; *thauh*, in 3 ways; *thailtoh*, all of the 3 things; *thahoeltoh*, all of the 3 persons; and *thahultoh*, all of the 3 times. In the Tsimshian language of British Columbia we find seven distinct sets of numerals "which are used for various classes of objects that are counted. The first set is used in counting where there is no definite object referred to; the second class is used for counting flat objects and animals; the third for counting round objects and divisions of time; the fourth for counting men; the fifth for counting long objects, the numerals being composed with *kan*, tree; the sixth for counting canoes; and the seventh for measures. The last seem to be composed with *anon*, hand." The first ten numerals of each of these classes is given in the following table:

1. gyak gak , g'erel , k'al , k'awutskan, k'amaet , k'al

2. t'epqat , t'epqat , goupel , t'epqadal , gaopskan , g'alp[=e]eltk, gulbel

3. guant , guant , gutle , gulal , galtskan , galtskantk , guleont

4. tqalpq , tqalpq , tqalpq , tqalpqdal , tqaapskan , tqalpqsk , tqalpqalont

5. kct[=o]nc, kct[=o]nc, kct[=o]nc, kcenecal , k'etoentskan, kct[=o]onsk , kctonsilont

6. k'alt , k'alt , k'alt , k'aldal , k'aoltskan , k'altk , k'aldelont

7. t'epqalt , t'epqalt , t'epqalt , t'epqaldal, t'epqaltskan, t'epqaltk , t'epqaldelont

8. guandalt , yuktalt , yuktalt , yuktleadal, ek'tlaedskan, yuktaltk , yuktaldelont

9. kctemac , kctemac , kctemac , kctemacal , kctemaestkan, kctemack , kctemasilont

10. gy'ap , gy'ap , kp[=e]el , kpal , kp[=e]etskan, gy'apsk , kpeont

Remarkable as this list may appear, it is by no means as extensive as that derived from many of the other British Columbian tribes. The numerals of the Shushwap, Stlatlumh, Okanaken, and other languages of this region exist in several different forms, and can also be modified by any of the innumerable suffixes of these tongues. To illustrate the almost illimitable number of sets that may be formed, a table is given of "a few classes, taken from the Heiltsuk dialect. It appears from these examples that the number of classes is unlimited."

	One.	Two.	Three.
Animate.,	menok,	maalok,	yutuk,
Round.	menskam,	masem,	yutqsem,
Long.,	ments'ak,	mats'ak,	yututs'ak,
Flat.,	menaqsa,	matlqsa,	yutqsa,
Day.,	op'enequls,	matlp'enequls,	yutqp'enequls,
Fathom.,	op'enkh,	matlp'enkh,	yutqp'enkh,

Grouped together., —, matloutl, yutoutl,

Groups of objects., nemtsmots'utl, matltsmots'utl, yutqtsmots'utl,

Filled cup., menqtlala, matl'aqtlala, yutqtlala,

Empty cup., menqtla, matl'aqtla, yutqtla,

Full box., menskamala, masemala, yutqsemala,

Empty box., menskam, masem, yutqsem,

Loaded canoe., mentsake, mats'ake, yututs'ake,

Canoe with crew., ments'akis, mats'akla, yututs'akla,

Together on beach., —, maalis, —,

Together in house, etc., —, maalitl, —,

Variation in numeral forms such as is exhibited in the above tables is not confined to any one quarter of the globe; but it is more universal among the British Columbian Indians than among any other race, and it is a more characteristic linguistic peculiarity of this than of any other region, either in the Old World or in the New. It was to some extent employed by the Aztecs, and its use is

current among the Japanese; in whose language Crawfurd finds fourteen different classes of numerals "without exhausting the list."

In examining the numerals of different languages it will be found that the tens of any ordinary decimal scale are formed in the same manner as in English. Twenty is simply 2 times 10; 30 is 3 times 10, and so on. The word "times" is, of course, not expressed, any more than in English; but the expressions briefly are, 2 tens, 3 tens, etc. But a singular exception to this method is presented by the Hebrew, and other of the Semitic languages. In Hebrew the word for 20 is the plural of the word for 10; and 30, 40, 50, etc. to 90 are plurals of 3, 4, 5, 6, 7, 8, 9. These numerals are as follows:

10, eser, 20, eserim,

3, shalosh, 30, shaloshim,

4, arba, 40, arbaim,

5, chamesh, 50, chamishshim,

6, shesh, 60, sheshshim,

7, sheba, 70, shibim,

8, shemoneh 80, shemonim,

9, tesha, 90, tishim.

The same formation appears in the numerals of the ancient Phoenicians, and seems, indeed, to be a well-marked characteristic of the various branches of this division of the Caucasian race. An analogous method appears in the formation of the tens in the Bisayan, one of the Malay numeral scales, where 30, 40, ... 90, are constructed from 3, 4, ... 9, by adding the termination *-an*.

No more interesting contribution has ever been made to the literature of numeral nomenclature than that in which Dr. Trumbull embodies the results of his scholarly research among the languages

of the native Indian tribes of this country. As might be expected, we are everywhere confronted with a digital origin, direct or indirect, in the great body of the words examined. But it is clearly shown that such a derivation cannot be established for all numerals; and evidence collected by the most recent research fully substantiates the position taken by Dr. Trumbull. Nearly all the derivations established are such as to remind us of the meanings we have already seen recurring in one form or another in language after language. Five is the end of the finger count on one hand—as, the Micmac *nan*, and Mohegan *nunon*, gone, or spent; the Pawnee *sihuks*, hands half; the Dakota *zaptan*, hand turned down; and the Massachusetts *napanna*, on one side. Ten is the end of the finger count, but is not always expressed by the "both hands" formula so commonly met with. The Cree term for this number is *mitatat*, no further; and the corresponding word in Delaware is *m'tellen*, no more. The Dakota 10 is, like its 5, a straightening out of the fingers which have been turned over in counting, or *wickchemna*, spread out unbent. The same is true of the Hidatsa *pitika*, which signifies a smoothing out, or straightening. The Pawnee 4, *skitiks*, is unusual, signifying as it does "all the fingers," or more properly, "the fingers of the hand." The same meaning attaches to this numeral in a few other languages also, and reminds one of the habit some people have of beginning to count on the forefinger and proceeding from there to the little finger. Can this have been the habit of the tribes in question? A suggestion of the same nature is made by the Illinois and Miami words for 8, *parare* and *polane*, which signify "nearly ended." Six is almost always digital in origin, though the derivation may be indirect, as in the Illinois *kakatchui*, passing beyond the middle; and the Dakota *shakpe*, 1 in addition. Some of these significations are well matched by numerals from the Ewe scales of western Africa, where we find the following:

1. de = a going, *i.e*. a beginning. (Cf. the Zuni *toepinte*, taken to start with.)

3. eto = the father (from the middle, or longest finger).

6. ade = the other going.

9. asieke = parting with the hands.

10. ewo = done.

In studying the names for 2 we are at once led away from a strictly digital origin for the terms by which this number is expressed. These names seem to come from four different sources: (1) roots denoting separation or distinction; (2) likeness, equality, or opposition; (3) addition, *i.e*. putting to, or putting with; (4) coupling, pairing, or matching. They are often related to, and perhaps derived from, names of natural pairs, as feet, hands, eyes, arms, or wings. In the Dakota and Algonkin dialects 2 is almost always related to "arms" or "hands," and in the Athapaskan to "feet." But the relationship is that of common origin, rather than of derivation from these pair-names. In the Puri and Hottentot languages, 2 and "hand" are closely allied; while in Sanskrit, 2 may be expressed by any one of the words *kara*, hand, *bahu*, arm, *paksha*, wing, or *netra,* eye. Still more remote from anything digital in their derivation are the following, taken at random from a very great number of examples that might be cited to illustrate this point. The Assiniboines call 7, _shak ko we_, or *u she nah*, the odd number. The Crow 1, *hamat,* signifies "the least"; the Mississaga 1, *pecik*, a very small thing. In Javanese, Malay, and Manadu, the words for 1, which are respectively *siji*, *satu*, and *sabuah*, signify 1 seed, 1 pebble, and 1 fruit respectively—words as natural and as much to be expected at the beginning of a number scale as any finger name could possibly be. Among almost all savage races one form or another of palpable arithmetic is found, such as counting by seeds, pebbles, shells, notches, or knots; and the derivation of number words from these sources can constitute no ground for surprise. The Marquesan word for 4 is *pona*, knot, from the practice of tying breadfruit in knots of 4. The Maori 10 is *tekau*, bunch, or parcel, from the counting of yams and fish by parcels of 10. The Javanese call 25, *lawe*, a thread, or string; 50, *ekat*, a skein of thread; 400, *samas*, a bit of gold; 800, *domas*, 2 bits of gold. The Macassar and Butong term for 100 is *bilangan*, 1 tale or reckoning. The Aztec 20 is *cem pohualli*, 1 count; 400 is *centzontli*, 1 hair of the head; and 8000 is *xiquipilli*, sack. This sack was of such a size as to contain 8000 cacao nibs, or grains, hence the derivation of the word in its numeral sense is perfectly natural. In Japanese we find a large number of terms which, as applied to the different units of the number scale, seem almost purely fanciful. These words, with

their meanings as given by a Japanese lexicon, are as follows:

10,000, or 10^4, maen = enormous number.

10^8, oku = a compound of the words “man” and “mind.”

10^{12}, chio = indication, or symptom.

10^{16}, kei = capital city.

10^{20}, si = a term referring to grains.

10^{24}, owi = —

10^{28}, jio = extent of land.

10^{32}, ko = canal.

10^{36}, kan = some kind of a body of water.

10^{40}, sai = justice._10^{44}, s[=a] = support.

10^{48}, kioku = limit, or more strictly, ultimate.

$.01^2$, rin = —

$.01^3$, mo = hair (of some animal).

$.01^4$, shi = thread.

In addition to these, some of the lower fractional values are described by words meaning “very small,” “very fine thread,” “sand grain,” “dust,” and “very vague.” Taken altogether, the Japanese number system is the most remarkable I have ever examined, in the extent and variety of the higher numerals with well-defined descriptive names. Most of the terms employed are such as to defy any attempt to trace the process of reasoning which led to their adoption. It is not improbable that the choice was, in some of these cases at least, either accidental or arbitrary; but still, the changes in word meanings which occur with the lapse of time

may have differentiated significations originally alike, until no trace of kinship would appear to the casual observer. Our numerals "score" and "gross" are never thought of as having any original relation to what is conveyed by the other meanings which attach to these words. But the origin of each, which is easily traced, shows that, in the beginning, there existed a well-defined reason for the selection of these, rather than other terms, for the numbers they now describe. Possibly these remarkable Japanese terms may be accounted for in the same way, though the supposition is, for some reasons, quite improbable. The same may be said for the Malagasy 1000, *alina*, which also means "night," and the Hebrew 6, *shesh*, which has the additional signification "white marble," and the stray exceptions which now and then come to the light in this or that language. Such terms as these may admit of some logical explanation, but for the great mass of numerals whose primitive meanings can be traced at all, no explanation whatever is needed; the words are self-explanatory, as the examples already cited show.

A few additional examples of natural derivation may still further emphasize the point just discussed. In Bambarese the word for 10, *tank*, is derived directly from *adang*, to count. In the language of Mota, one of the islands of Melanesia, 100 is *mel nol*, used and done with, referring to the leaves of the cycas tree, with which the count had been carried on. In many other Melanesian dialects 100 is *rau*, a branch or leaf. In the Torres Straits we find the same number expressed by *na won*, the close; and in Eromanga it is *narolim narolim* (2x5)(2x5). This combination deserves remark only because of the involved form which seems to have been required for the expression of so small a number as 100. A compound instead of a simple term for any higher unit is never to be wondered at, so rude are some of the savage methods of expressing number; but "two fives (times) two fives" is certainly remarkable. Some form like that employed by the Nusqually of Puget Sound for 1000, i.e. *paduts-subquaetche*, ten hundred, is more in accordance with primitive method. But we are equally likely to find such descriptive phrases for this numeral as the *dor paka*, banyan roots, of the Torres Islands; *rau na hai*, leaves of a tree, of Vaturana; or *udolu*, all, of the Fiji Islands. And two curious phrases for 1000 are those of the Banks' Islands, *tar mataqelaqela*, eye blind thousand, *i.e.* many beyond count; and of Malanta,

warehune huto, opossum's hairs, or *idumie one*, count the sand.

The native languages of India, Thibet, and portions of the Indian archipelago furnish us with abundant instances of the formation of secondary numeral scales, which were used only for special purposes, and without in any way interfering with the use of the number words already in use. "Thus the scholars of India, ages ago, selected a set of words for a memoria technica, in order to record dates and numbers. These words they chose for reasons which are still in great measure evident; thus 'moon' or 'earth' expressed 1, there being but one of each; 2 might be called 'eye,' 'wing,' 'arm,' 'jaw,' as going in pairs; for 3 they said 'Rama,' 'fire,' or 'quality,' there being considered to be three Ramas, three kinds of fire, three qualities (guna); for 4 were used 'veda,' 'age,' or 'ocean,' there being four of each recognized; 'season' for 6, because they reckoned six seasons; 'sage' or 'vowel,' for 7, from the seven sages and the seven vowels; and so on with higher numbers, 'sun' for 12, because of his twelve annual denominations, or 'zodiac' from his twelve signs, and 'nail' for 20, a word incidentally bringing in finger notation. As Sanskrit is very rich in synonyms, and as even the numerals themselves might be used, it became very easy to draw up phrases or nonsense verses to record series of numbers by this system of artificial memory."

More than enough has been said to show how baseless is the claim that all numeral words are derived, either directly or indirectly, from the names of fingers, hands, or feet. Connected with the origin of each number word there may be some metaphor, which cannot always be distinctly traced; and where the metaphor was born of the hand or of the foot, we inevitably associate it with the practice of finger counting. But races as fond of metaphor and of linguistic embellishment as are those of the East, or as are our American Indians even, might readily resort to some other source than that furnished by the members of the human body, when in want of a term with which to describe the 5, 10, or any other number of the numeral scale they were unconsciously forming. That the first numbers of a numeral scale are usually derived from other sources, we have some reason to believe; but that all above 2, 3, or at most 4, are almost universally of digital origin we must admit. Exception should properly be made of higher units, say

1000 or anything greater, which could not be expected to conform to any law of derivation governing the first few units of a system.

Collecting together and comparing with one another the great mass of terms by which we find any number expressed in different languages, and, while admitting the great diversity of method practised by different tribes, we observe certain resemblances which were not at first supposed to exist. The various meanings of 1, where they can be traced at all, cluster into a little group of significations with which at last we come to associate the idea of unity. Similarly of 2, or 5, or 10, or any one of the little band which does picket duty for the advance guard of the great host of number words which are to follow. A careful examination of the first decade warrants the assertion that the probable meaning of any one of the units will be found in the list given below. The words selected are intended merely to serve as indications of the thought underlying the savage's choice, and not necessarily as the exact term by means of which he describes his number. Only the commonest meanings are included in the tabulation here given.

1 = existence, piece, group, beginning.

2 = repetition, division, natural pair.

3 = collection, many, two-one.

4 = two twos.

5 = hand, group, division,

6 = five-one, two threes, second one.

7 = five-two, second two, three from ten.

8 = five-three, second three, two fours, two from ten.

9 = five-four, three threes, one from ten.

10 = one (group), two fives (hands), half a man, one man.

15 = ten-five, one foot, three fives.

20 = two tens, one man, two feet.