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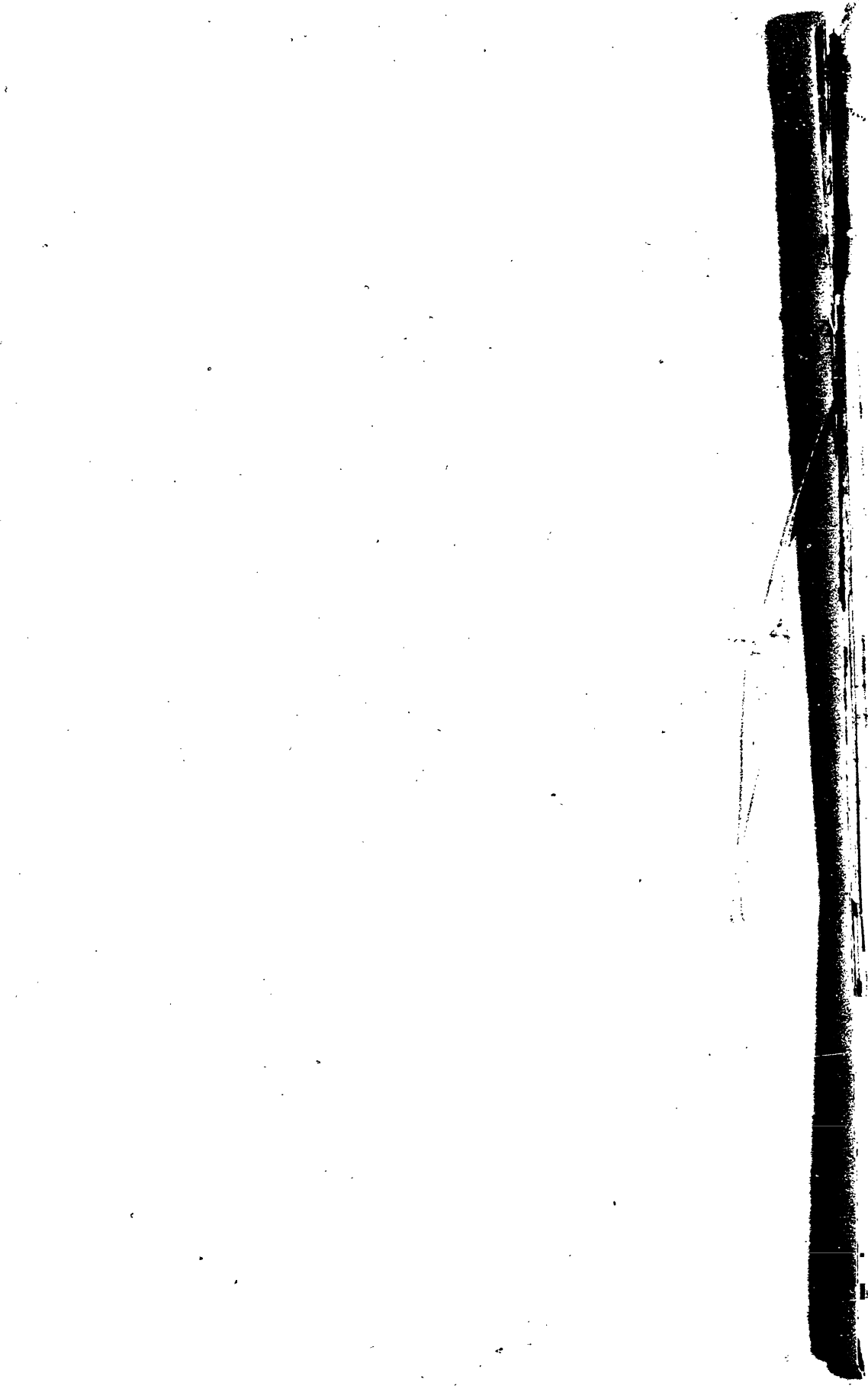
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ON
NUMERALS
IN
AMERICAN INDIAN LANGUAGES,
AND THE
INDIAN MODE OF COUNTING.

By J. HAMMOND TRUMBULL, LL.D.

[From the Transactions of the Am. Philological Association, 1874.]

HARTFORD, CONN.
1875.

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ON NUMERALS

IN AMERICAN INDIAN LANGUAGES, AND THE INDIAN MODE OF COUNTING.

THAT "all numerals are derived from the fingers"¹ is as generally true for languages of the new world as for those of the old. The North American Indians have, with comparatively few exceptions, adopted *decimal* systems, reckoning the fingers of *both* hands. Some South American tribes have not advanced beyond a *quinary*; and a few are said to be poorer even than this. The Brazilian Tupis had, at one time, no names for numbers higher than 3,² and the Abipones of Paraguay, as Dobrizhoffer states,³ could not count beyond 4, giving to that number the name of 'the ostrich's toes,' *geyènknute*. Some nations, particularly those of Mexico and Central America, and the Eskimos, have reckoned by twenties instead of tens or ~~fives~~, counting toes with fingers for the base of their numeral system. The Tule Indians of Darien reckon in this way: 20 is 'a man,' i. e. all his fingers

¹ "Alle Zahlwörter gehn aus von den Fingern der Hände." — Grimm's Gesch. der deutschen Sprache, i. 167.

² The fact that the Tupis *lost* their names for 4 and 5, after the coming of Europeans, is worth noting. J. de Léry, who was in Brazil in 1557, writes that the "Tououpenambaults usque ad numerum *quinque* verbis notare, hoc modo: *augepé* 1, *mocouein* 2, *mossaput* 3, *oioicoudic* 4, *ecoinbo* 5." — Hist. Navig. in Brasiliam, 1586, p. 272. (In the 5, we recognize *po* 'hand.') Jos. de Anchieta, in his Tupi Grammar, 1595, says: "Os numeraes não chegao mais que até numero de *quatro*: ut *oiepé* 1, *mocóin* 2, *moçapir* 3, *oyoirundic* 4." Eckart, a Jesuit missionary in Brazil, 1753-57, gives the same names for 1, 2, and 3, adding: "Non plus ultra Brasili *hodie* numerant," though he had seen names for 4 and 5 (*monherondye, ambó*) in 'an ancient grammar by Father Anchieta'; "sed uterque hic numerus modo jam exolevit." — Specimen Ling. Brasiliæ, 1778.

³ Dobrizhoffer's account of the Abipones, ii. 168.

and toes, 100 is '5 men,' and so on.⁴ Gallatin has given a good account of these vigesimal systems in his "Notes on the semi-civilized Nations of Mexico," etc.,⁵ the substance of which was incorporated by Pott in his *Zählmethode* (Halle, 1847). Mr. Gallatin had previously observed, in a note to his Comparative Vocabulary of fifty-three North American nations, "that all these had resorted to a decimal numeration." More recently, Buschmann has shown⁶ that the system of the Athapascan family is clearly decimal, exhibiting traces of the vigesimal in two languages only—the Umpqua of Oregon and the Kinai; while of the languages of his Sonora group (including the Comanche, Paiute, Pima, and Shoshoni), seven have the decimal and five the vigesimal system, one (the Tarahumara) possessing both.⁷ In some dialects, indications of a former vigesimal system, abandoned for or in progress of change to a decimal, may be observed.

The derivation of numerals from the fingers admitted, an answer to the question, *In what order* are the fingers counted? becomes a necessary preliminary to the investigation of any table of numerals. Which finger marks 'one'? Is it the *little* finger—or, as in the designation of numbers by educated deaf-mutes, the *thumb*? And, in passing from 5 to 6, i. e. from one hand to the other, is the sequence from finger to finger—thumb to thumb, like the Zulu⁸—or thumb to little finger, like the Veis?

Nearly all the information given by Gallatin and Pott on these points relates to the Eskimo numerals. In the language of "the Eskimos of Hudson's Bay, the names of the numerals 8, 9, 10, mean respectively, the middle, the fourth, and the

⁴ See Lull's Darien Vocabulary, in the Am. Philol. Association's Transactions for 1873, p. 103.

⁵ Transactions of the American Ethnological Society, vol. i. (1845).

⁶ Worttafel des Athapask. Sprachstamms, §§ 114, 115, 157.

⁷ Grammatik der Sonorischen Sprachen, Abth. 3, p. 141.

⁸ "The Zulu, counting on his fingers, begins in general with the little finger of his left hand. When he comes to 5, this he may call *edesanta* 'finish hand'; then he goes on to the thumb of the right hand, and so the word *tatisitupa* 'taking the thumb' becomes a numeral for 6."—Tylor's *Primitive Culture*, i. 228. "The Veis people and many other African tribes first count the fingers of their left hand, beginning, be it remembered, from the little one, then in the same manner those of the right hand."—Id. 227.

little finger.”⁹ Pott, transferring this from Gallatin, infers (Zählmethode, 301) that the thumb of the second hand designates 6, i. e. 1 + 5 of the first hand. The account given by Cranz,¹⁰ of the Eskimo mode of counting, is quoted by Pott as the starting point of his work: “Their numerals fall very short. However, they can with difficulty make a shift to mount as high as 20, by counting the fingers of both hands and the toes of both feet. But their proper numeration is five: *attausek*, 1 — *arlæk*, 2 — *pingajuak*, 3 — *sissamat*, 4 — *tellimat*, 5. If they must go further, they begin with the other hand, counting upon their fingers. The sixth [i. e. the thumb] they call *arbennek*, but the rest, till 10, have no other names but, again, ‘two,’ ‘three,’ ‘four,’ ‘five.’ They call ‘eleven’ *arkangat*, and ‘sixteen’ *arbarsanget*, and these *-teens* they count upon their toes. Thus they muster up 20. Sometimes they say instead of it, ‘a man,’ that is, as many fingers and toes as a man has;” etc.

That the fingers of the two hands were counted by other North American nations in the same order as by the Eskimos, several writers inform us:

“The Dakotas, in counting, use their fingers, bending them down as they pass on, until they reach ten. Then they turn down a little finger, to remind them that one ten is laid away, and commence again. When the second ten is counted, another finger goes down, and so on.”¹ “The Aubsároke or Crows [who are of the Dakota stock] like all the Indians with whom I am acquainted,” says Dr. F. V. Hayden, “use their fingers in counting, bending them down temporarily against the inside of the hand as they proceed,” etc.²

Mr. Say, describing the Indian sign-language, says: “To indicate the digits, they clench the hands and extend the *little finger of the left hand* for one, the ring finger for two,”

⁹ Gallatin's “Notes on the Semi-Civilized Nations of Mexico,” etc. (*ut supra*), p. 49.

¹⁰ History of Greenland (English translation, i. 225). The Greenland numeral system is more clearly and accurately exhibited by O. Fabricius, Grönlandsk Grammatik, 58–63.

¹ Riggs, Dakota Grammar, p. 36.

² Contributions to the Ethnography and Philology of the Indian Tribes of the Missouri Valley, p. 396.

and so on to "the thumb for five, . . . the thumb of the right hand for six," etc. "When enumerating a small number, where a considerable exertion of the memory is requisite, the Indians extend the left hand with the palm upward, whilst, with the index of the right, the fingers are successively bent in to the palm, beginning as before with *the little finger*, and the greater difficulty in recalling to mind the numbers or events, the more apparent resistance is offered to the inflexion of the finger."³ Prince Maximilian von Wied⁴ gives a similar description, observing that "wenn man an den Fingern abzählt, so fängt man an der *linken Hand* an." Mr. Swan, in his account of the Makahs of Cape Flattery (Straits of Fuca), says of their mode of counting: "They commence with the little finger of the left hand, closing each finger as it is counted; then pass from the left thumb, which counts five, to the right thumb, which counts six, and so on to the little finger of the right hand, which counts ten."⁵

The Muskokis (Creeks), Mrs. A. E. W. Robertson writes, "turn the back of the hand towards the face and, beginning with the left hand little finger, end with the right hand little finger." In continued intercourse with the whites, the Creeks, like some other tribes, have learned to indicate numbers by *holding up* instead of *bending down* the fingers: but, as Mr. Say observes, "when any considerable exertion of the memory is requisite" Indians naturally recur to the earlier mode. Major J. W. Powell informs me, that the Yutes commonly answer the question "how many?" by raising the fingers, but he has seen Indians of that nation, when alone, reckon numbers by turning down the fingers successively, from left to right, in the manner described by Say.

Whether an Indian marks 'one' by a thumb or a finger does not seem at first sight a question of much interest to students of language. It is, however, one of the thousand questions which every philologist must be prepared to answer

³ Long's Expedition to the Rocky Mountains (Philadelphia, 1823), i. 388.

⁴ Reise in das Innere von Nord-America, Bd. II. 650.

⁵ Indians of Cape Flattery (Smithsonian Contributions, vol. xvi.), p. 100, note.

before he is fully competent to discuss the subject of Mr. Robert Ellis's lately published volume "On Numerals as Signs of Primeval Unity among Mankind" (London, 1873). Mr. Ellis thinks that he has detected "a great number of coincidences, affecting not only numerals, but also the names of the members of the body from which those numerals are derived, in languages far removed from each other in position," and he presents these coincidences as "the result of primeval affinity — indications of unity of origin in human speech and, probably, in the human race" (p. 4). He assumes that "the names of numerals commonly carry in themselves the proofs of their own great antiquity" (p. 2). For the Indo-European and Semitic languages this assumption is perhaps well grounded; for the American, it is untrustworthy and unsustained by evidence, except — for reasons to be mentioned presently — as regards names for the first three numerals in languages of the same linguistic group. Admitting the original unity of American speech, it is yet certain that its division into widely separated families must have preceded the origin not of numerals only, but of the verbal or nominal roots from which names of numerals in the several families were derived. Even in the same linguistic group these names, as compared with other portions of the vocabulary, carry no indications of high antiquity, but rather the contrary; and in dialects of the same language names for the same number are often radically unlike. Compare, for example, the Algonkin 'fives': Massachusetts *napanna tahshe*, Micmac *nán*, Chippeway *nánan*, Abnaki *bareñesku*, Delaware *palenach*, Illinois *miaranui*, Blackfoot *nisito*. Such dissimilarity is more apparent and more general in numerals above 'five,' which are with few exceptions composite. The Arikaras or 'Riccarees' of the upper Missouri speak nearly the same language as the Pawnees and, probably at no very remote period, belonged to the same nation. Their numerals correspond with the Pawnee numerals, to 'five,' inclusive; but here the likeness ends, not merely the *names* but the *primary conceptions* of the higher numbers differing in the two dialects. One Yuma dialect of the Colorado, the Mojave, repeats 1, 2, 3, in the

names for 6, 7, and 8, and marks 9 as 'next to ten'; another, the Cuchan, near akin, regards 6 and 9, respectively, as a pair and a triplet of 'threes,' and 8 as a doubled 4. All these in some sense "gehn aus von den Fingern," but the same finger of the same hand or the hand itself may be — and in fact very often is — differently named, or the number it marks is differently expressed, by tribes speaking dialects of the same language; nor may we expect always to find *names* either of 'hand' or 'finger' in the numeral.

In the investigation of the origin of American numerals and in inferences as to their antiquity, two facts must be borne in mind:

1. The primitive mode of indicating numbers by the *fingers* is still in use. The *name* is not completely independent of the *sign*, and, consequently, the constancy of the name in passing from one dialect to another is less assured. When an Indian marks 'five' by showing or bending down all the fingers of his left hand, the vocal utterance — whether *nánan* or *baranesku* — is of secondary importance. In the Indo-European languages the *vocal* was long ago substituted for the *digital* expression. "It was no easy task for the linguistic faculty to arrive at a suitable sign," as the exclusive designation of a number, "and when the sign was once found, it maintained itself thenceforth in use every where, without danger of replacement by any other, of later coinage."⁶ But this is necessarily true only of languages in which the earlier sign — by show of fingers — is obsolete.

2. The origin of names for 'one,' 'two,' and probably 'three,' in all languages, preceded formal numeration. Pairs, couples, doubles, were known before 'two' was counted on or marked by the fingers. The conception of *duality* dates from the first conscious separation of the 'not-I' from the 'I': and, with the first perception of differences in the 'not-I' — as 'this' and 'that,' 'here' and 'yonder,' 'thou' and 'he,' 'before' and 'after,' came the notion and name of 'three,' as something 'beyond,' 'besides,' or 'above'

⁶ Whitney, *Language and the Study of Language*, 195.

(tar, tri, trans, tres, très) the primary distinction; and thereupon, the exclusive and inclusive dual, 'thou-he' (and not 'I'), 'I-thou' (and not 'he'); after this, the conception of *plurality*, and *numeration*. Some nations, as we have seen, never advanced beyond the 'three.' Others (to be mentioned hereafter) only found their way to 'ten' by help of 'pairs' and 'triplets.' Hence, as Mr. Gallatin observed of American languages generally, "there is much confusion and but little regularity in the formation of the names expressing the higher numbers," even in nearly related dialects.

Mr. Ellis's first group of coincidences, and the one he regards as most important of all, includes North American words "of which different names for 'finger' supply the elements." These words, he thinks, "sufficiently illustrate the manner in which names for 'finger' and 'hand' are employed to form numerals; and by showing, moreover, that *hand* may = *fingers* = *finger-finger* (which last would be the rude plural of *finger*), they explain how 'hand' and 'two' may be the same word, as in the Omaha *nomba* which has both these meanings" (p. 6). He goes on to detect in the Basque language terms for 'finger,' 'one, i. e. finger,' and 'five = hand = fingers = finger-finger,' that correspond nearly with terms derived from North American languages, and finds coincidences with one or another of these in European and Asiatic names for 'thumb,' 'finger,' 'palm,' 'five,' 'six,' 'arm,' 'ten,' etc. (pp. 13, 14). He suggests the probability that "the Aryan languages virtually contain the forms *svas* and *saz* for 'five,' as the Basque contains *zaz* and as the North American languages contain forms like *azbaz*, such as Natchez *ispeshe* 'hand.'" And he argues (p. 18) that "if the resemblances between all these *s fives*, as they may be called by way of definition, were sufficient to imply affinity wherever they were detected, such affinity could be no other than a primeval one," — an inference the justice of which no one is likely to question. Even those much-vexed Etruscan dice of Toscanella are made to testify to primeval unity; for why may not *mach* [conjectured by Mr. Isaac Taylor to stand for] 'one,' be

connected with "California (Sekumne) *ma* 'hand'" and "Comanche *mowa* 'hand,' 'arm,'" as well as with Siamese *mee* 'hand,' Armenian *mi* and Greek *μία* 'one,' and African (Melon) *moe* 'finger'?

Rigidly examined, these and a host of other coincidences which Mr. Ellis with much ingenuity presents, would prove to be less remarkable than they seem to him. It is not my purpose, however, to discuss them in detail, or to seek for them, collectively, any other explanation than the one which I am assured in advance "is not satisfactory" — namely, that so far as they are not imaginary, they "are merely accidental." I propose instead to make some observations on the composition and primary meaning of Indian names for numbers, and first, to point out such relation as I can find between some of these and names for the hand and the fingers. The examples will be taken chiefly — but not exclusively — from two great families of North American speech, the Algonkin and the Dakota, because, in these, published grammars and dictionaries facilitate etymological research and afford means of noting differences, phonetic and radical, between names in one and other dialects of the same stock.

I. In some languages we find only one name for 'hand' and 'fingers' collectively; and generally, for designating the fingers individually, names are formed from the word for 'hand,' with a descriptive prefix, e. g. the third finger is 'middle of the hand.'

Pott (*Zählmethode*, 234 ff.) has given illustrations from American languages of the recognition of a likeness between *men* and *trees*, and of figures of speech drawn from it. The arms are 'limbs' or 'branches' of the human 'trunk'; the hands and fingers are 'branches' of the arms; the fingers 'sprouts' or 'leaves'; the thumb a 'spur' or 'off-shoot.' Sometimes the fingers, collectively, are a 'row of branches,' or a 'fence.' Compare

| | |
|-----------|---|
| Dakota | . <i>nape</i> 'hand'; <i>napsukáza</i> ('small piece of hand') 'finger.' |
| Iowa | <i>náwe</i> 'hand'; <i>nawépa</i> ('hand point') 'finger.' |
| Chippeway | - <i>nindj</i> 'hand'; <i>biné</i> 'in a row'; - <i>ikwan</i> 'branch'; <i>binakwanindj</i> 'finger,' '(one of) a row of branches of the hand.' |

Massachusetts -*nutch* 'hand'; *pochi* 'divided'; *pochatuk* 'a branch, or division';
pochanutch 'a finger.'⁷
 Cree (Western) -*tchitchiy* 'hand'; *yiyiki* 'forked,' 'branching'; *yiyikitchitchan*
 'finger.'⁸

In some of the Algonkin languages, the name for 'hand' seems to be formed from a verbal root meaning 'to seize,' 'to lay hold of': ANŪN 'he lays hold of, catches,' *anutch* 'the layer hold of, the seizer'; -*nutch* (with pronominal prefix) 'hand.' In the western Cree, -*tchitchiy* (in composition, *otchi*) 'hand' is from the same root as the Mass. -*tchan* 'nose' (Chip. *odjanj*), which is found again in the final *tchân* of Cree 'finger,' meaning 'projecting,' 'point,' 'vertex.' The names for 'nose,' 'head,' 'fore-arm,' 'hand,' in the Dakota are apparently related one to another, their common root denoting 'pointed,' 'a projection, vertex, or extremity.' Compare with Dakota *pe* 'pointed, sharp,' *pe* 'top of the head,' *pa* 'head,' *paha* 'hill,' *pa-sû* 'beak or bill,' 'snout of an animal,' *apâ* 'a part,' *apé* 'a leaf,' 'a fin,' *etâpa* 'the right hand,' *ishpâ* 'the fore-arm'; and Iowa *nâwe* 'hand,' *nâwé* 'leaf,' *nawépa* 'finger,' *pa* 'nose,' *pa-thûkh* 'beak.'

⁷ Compare Hawaiian *lima* 'arm' and 'hand'; *manamâna* 'branching,' 'a branch' (redupl. of *mana* 'to be divided,' 'to branch'); *manamana lima* 'fingers.'

⁸ My principal authorities for ALGONKIN languages are: *Massachusetts*, Eliot's Indian Grammar and version of the Bible; *Chippeway*, Baraga's Otchipwé Dictionary and Grammar; *Cree*, Lacombe's Grammaire et Dictionnaire de la Langue des Cris, and (Hudson's Bay dialect) Howse's Cree Grammar; *Delaware*, Zeisberger's Grammar, and Vocabulary; *Abnaki*, Rasles's Dictionary, by Pickering; *Micmac*, Maillard's Grammar; Dr. Hayden's *Vocabularies of the Blackfoot, Shyenne, Arapoho, and Atsina*. For the DAKOTA, my chief reliance is, necessarily, the invaluable Dictionary compiled by the Rev. S. R. Riggs and his associates in the Dakota mission of the American Board; and for other dialects, Dr. W. Matthews's *Hidatsa* (Minitari) Dictionary; Dr. Hayden's *Assiniboin, Aubsaroke* (Crow), *Mandan, Omaha, Iowa, and Winnebago* Vocabularies, the Rev. Wm. Hamilton's *Iowa* Grammar; for the *Ponka* numerals, a primer, "Ponka ABC Wa-bâ-ru" (prepared by the Rev. J. Owen Dorsey, of the Episcopal mission); and for the *Osage*, Prince Maximilian von Wied-Neuwied's Vocabulary, compared with Gallatin's (in his Comparative Vocabulary).

The vowels are to be sounded as in German, except *ü* which is the short English *ü* in *but*, or the neutral vowel, variously represented in vocabularies as *ä*, *ÿ*, *u*, and *v*. For the *n* which marks a nasalized vowel, I have substituted a 'superior' (*), and for the gutturals—variously represented by *ch*, *h*, *h*, *χ*, etc.—I have used *ch* or *kh*. The italic *ch* has the English sound (as in *church*), and *th*, *sh*, and *zh* (used interchangeably with *j*) are as in English.

II. Counting the fingers from left to right, the numerals are distributed thus: Little finger, 1 and 10; Fourth finger, 2 and 9; Middle finger, 3, 8; Fore finger, 4, 7; Thumb, 5, 6.

1. 10. The fifth or little finger is variously designated in American languages, as 'the last of the hand,' 'the least,' 'the youngest son,' 'the little daughter of the hand,' etc. From one or another of these names, that of the numeral 'one' has, in many languages, been taken; but in others we find another expression for *unity*, 'one by itself,' which is probably of earlier origin than finger-counting. A distinction corresponding to that which is marked by the Indo-European cardinal and ordinal, between one *single* and one *coming before* others, 'fore-est,' first of a numeral series, seems to be universal in language.

In the Algonkin, these two names are represented by

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|---------------|------------------------|-----|---|
| Massachusetts | <i>pásuk</i> | and | <i>n'qut, nequt.</i> |
| Chippeway | <i>payzhik (béjig)</i> | | <i>ningoto.</i> |
| Cree | <i>péiak, patak,</i> | | <i>nikut</i> 'some one,' <i>nikuton</i> 'formerly.' |

A note in Cotton's vocabulary of the Massachusetts language distinguishes these names thus: "*Nequt*, a thing that is past. *Pasuk*, a thing in being." This note has puzzled more than one writer on the Algonkin languages.⁹ Cotton himself had only half caught the true distinction between *pásuk* 'one only,' literally, 'a small thing,' and *n'qut* 'first' or 'fore-est,' 'beginning.' The latter was used when speaking of a *one* which had been (or necessarily must be) followed by *another*, and in this way came its appropriation to "a thing that is past," i. e. a *former* thing. Hence, Mass. *nukkone* 'old,' i. e. passed by, and the ordinal *ne-gonne* 'first,' and *ne-kutche* 'the beginning,' 'it begins.' The prefixed *n'* in eastern Algonkin numerals is merely demonstrative.

Pásuk is a contraction of *piasuk* (*peasik*, Eliot) 'very small,' the diminutive of *piak* 'small, little.'¹⁰ Comp. Chip. *pangi* 'a little,' *pangishe* 'very little.' The root, *pi*, is seen

⁹ See Mr. Pickering's note, in his re-print of Eliot's *Indian Grammar* (2 Mass. Hist. Soc. Coll., ix.) p. xlv.; Duponceau's *Mémoire*, 389, 390.

¹⁰ Abn. *bi*, plu. *bi-ak*, Mass. *piak*, a 'grain,' 'bit,' or 'bead' of shell money; whence the name adopted by the English for unstrung 'peag' = Abn. *wa-ban-biak* 'white beads,' Eng. 'wampompeag.'

in Cree *peïak* 'one' and *api-s* 'small,' dimin. *apïsis* 'very small.' The little finger being counted as 'one,' *pâsuk*, *bêzhik*, 'the very small' has, as a result of association, been substituted in several dialects for *n'qut*, *nikoto*, as the name for 'one,' but the latter reappears in the composition of the higher numerals: e. g. Cree *peïak* 1, *nikot-wassik* 6, i. e. 'one over'; Abnaki *pezuku* 1, *nekud-a's* 6, *nekuda'nkdo* 11.

The following are some of the names of the little finger, in North American languages:—

- ALG. Cree *iskwe-itchchanis* 'last little finger.'
 Chippeway *ishkwe nindj* 'last of the hand.'
 Abnaki *askwanmi-retsi* 'youngest (last born) of the hand.'
 Massachu. *muttâsonitch* 'youngest son (*muttâsons*) of the hand.'
 DAK. (Sioux) *shashé* ? Comp. *chi'stin* 'little'; *chatan* name of a fourth son.
 Minnitari (Hidatsa) *shâki-kazhi* diminutive of *shâki* 'hand.'
 Mandan *ungknt-ingka* 'little finger.' Comp. Iowa *i-yangke* 'one.'
 MUSKOKI (Creek) *enke-echhuswuche* 'hand's little daughter.'¹
 Choctaw *ibbak-ûshi-ûhli* 'hand's little son.'
 PAWNEE *skâts-pit* 'finger little.'

Gallatin's vocabulary (from Parry) of the Hudson's Bay Eskimo gives *eerkittkoka* (Greenl. *ekékkok*) 'little finger' as the name for 'ten.' The Algonkin 'tens' are related to—but not derived from—names of this finger. These will be noticed hereafter.

2. 9. The Fourth finger—second by Indian reckoning—is in some American languages, as it has been in many languages of the eastern world, 'the nameless' (Sansk. *anâman*, *anâmikâ*; Lithuan. *bewardis*; Tibet. *mingmed*). In others, it is designated only by its position 'next the little' or 'next the middle' finger. In mission-Indian it has received the name of 'ring finger.' Lacombe gives Western

¹ For translations of this and other Muskoki (or Creek) finger-names, I am indebted to Mrs. A. E. W. Robertson of the Tullahasse mission, and to Buckner and Herrod's Muskoki Grammar. For other languages of this group, I use the Rev. Cyrus Byington's "English and Choctaw Definer" (1852) and his Choctaw Grammar (posthumous) edited by Dr. D. G. Brinton (1870), and valuable vocabularies (MSS.) of the Muskoki, Hitchitee, Coassatti, and Alabama, collected by Gen. Albert Pike, in possession of the Smithsonian Institution, which I hope will soon be published, and with them, one of the Muskoki language, compiled by the Rev. W. S. Robertson and Mrs. Robertson. For the Pawnee and related *Arikara*, I rely on Dr. Hayden's vocabularies.

Cree *atchani-tchitchân* (from *atchanis* 'a ring'), and so Von Tschudi in his *Wörterbuch* of the Kechua of Peru has *siuirucanu* 'ring finger,' from *siui* 'ring.' In a few languages, its name denotes 'becoming smaller'—whether from its shape, more 'tapering' than other fingers, or from its size, as between the middle and little fingers, is not certain.

Dakota *shaste iyokihe* 'little-finger next-to.'

Min̄tari *shaki-kazi-utidu* 'that which the little finger joins,' or, as Dr. Matthews (*Hidatsa Dictionary*) translates, 'base of the little finger.'

Muskoki *enke-hochefkû sekû* 'hand's name-without,' 'the nameless.'

As a numeral I find the name of this finger only in the 'nines,' and here only in the

Eskimo, Hudson's Bay *mikkeelukkamoot* 'nine' = 'fourth finger' (Parry).

Greenland *mikkelerak*, 'fourth finger,' literally 'it becomes smaller.'

Algonkin, Shyenne *na-so'toyôs* 'my fourth finger'; *soh'itu* 'nine.'

3, 8. The 'Middle' finger is so named in almost all languages, but it not unfrequently has the additional designation of 'the great' or 'chief.' It gives in many dialects a name—but not generally *its own* name—in the numerals 'three' and 'eight.' In the Algonkin languages, of two expressions for 'in the middle' or 'half-way between' (Mass. *noë'u* and *nashaüe*, Chip. *nawaii* and *nassawaiï*), one is given to the *finger*, the other to the *numeral*.

| | | |
|-----------------|---|--|
| Abnaki | <i>na'wi-retsi</i> 'middle of hand'; | <i>nass</i> 'three.' |
| Chippeway | <i>náwi-nindj</i> " " | <i>nisswi</i> 3; <i>ntjwassi</i> 8. |
| Cree | <i>táwi-tchitchân</i> 'middle finger;' | <i>nistoo</i> . |
| Mass. | (<i>nashaue</i> , 'shawe' 'half-way'); <i>nish</i> , <i>nishwé</i> , 'shwi- 3; <i>shwosuk</i> 8. | |
| Arapoho | (<i>naüthi</i> 'in the middle'); | <i>nais</i> 3; <i>naisa-toh</i> 8. |
| Sauki | | <i>nissoa</i> 3; <i>shóashic</i> 8. |
| Shyenne | <i>no'toyôs</i> 'middle finger'; | <i>ná'a</i> 3; <i>na-nóh'ku</i> 8. |
| ? Blackfoot | <i>nohkh</i> , <i>noho-ka</i> 'three.' | [Mass. <i>noëü</i> 'in the middle.'] |
| DAKOTA | <i>napéochókaya</i> 'middle finger' (<i>ochókaya</i> 'in the middle'). | |
| Minitari | <i>sháki-dumátadu</i> 'middle of the hand'; <i>dámi</i> , <i>náwi</i> 'three' | (<i>dumáta</i> 'in the middle,' <i>nuwah'taru</i> 'between'). |
| MUSKOKI (Creek) | <i>enke nürkíphuerü</i> 'hand's middle-stander.' | |
| Choctaw | <i>íbbak úshi ikli'na</i> 'hand's middle son.' | |
| Pawnee | <i>skétsi-kad'ka</i> 'half-way finger.' | |
| Navajo | <i>hullah náizi</i> " " (<i>hulah</i> , <i>elá</i> 'hand'). | |

In one dialect of the Eskimo (Hudson's Bay) the name, as in the Shyenne above-noted, appears only in 'eight:'

kittuklimüt 'the middle finger,' 'eight' (Parry).

4, 7, The Fore finger has been, almost universally, the 'showing finger' or 'index.' Names for 4 and 7 are in Algonkin languages, taken from it, or from the act of showing, or their connection with it is established through the demonstrative pronouns:

| | |
|------------------|--|
| Eskimo (Greenl.) | <i>tikek</i> 'the pointer.' |
| ALGONKIN, Chip. | <i>inoi-nindj</i> 'showing finger'; <i>niwin</i> (= <i>niouin</i>) 'four.' |
| Cree | <i>itwahigani-tchitchiy</i> 'pointer finger'; <i>néwu</i> 'four.' Comp. <i>naah</i> 'that yonder!,' <i>awdh</i> 'this one.' [As was before remarked, the <i>n</i> prefixed to the Algonkin numerals is a demonstrative particle, and does not belong to the root.] |
| Massachusetts | <i>yau</i> (Eliot; = <i>iéu</i>) 'four'; <i>yew</i> 'this,' 'there.' |
| Narragansett | <i>yòh</i> " <i>yò</i> 'there,' 'that way!' |
| Illinois | <i>niwi, niui</i> " <i>néwa, néwe</i> "voilà, regarde là," <i>iwa, iive</i> "le voilà." |
| Shyenne | <i>na-ni'sotoyòs</i> 'my fore finger'; <i>nisoto</i> 'seven'; ² compare <i>nisiwo</i> 'that.' But Shyenne <i>nipa</i> 'four' has a different origin. |
| Arapoho | <i>yen</i> 'four'; <i>ti'èna</i> 'to touch one to call his attention to anything' (Hayden). |
| Blackfoot | <i>ni-sui</i> 'four'; <i>súmis</i> 'look!' |
| DAKOTA | <i>nape' tokaheya</i> 'hand's first' (modern?). <i>nape' apazo</i> 'hand's pointer' (<i>pázo, apázo</i> 'to point to, to show by pointing' — \sqrt{pa} denoting action of the <i>hand</i>). |
| MUSKOKI (Creek) | <i>enke-esmelkú</i> 'hand's pointer.' |
| Choctaw | <i>ibbak-ushi-tikba</i> 'foremost (or eldest) son of the hand.' (The name for 4 is not, in any language of the Chahta-Muskoki group, taken from this finger.) |
| Navajo | <i>tí</i> 'four'; <i>tí</i> 'here,' 'this'; <i>n'la'-te</i> 'there' (<i>la</i> = hand). |
| Apache | <i>ti-s</i> " <i>ti</i> 'this,' 'who'; <i>ti-tchi</i> 'this day.' |

5, 6, The Thumbs mark 'five' and 'six,' but rarely, if ever, give a name to either number, in American languages. In Algonkin, and in many other American languages, the thumb is the 'big,' 'thick,' or 'stout' finger; sometimes, 'the chief.'³

² The Zulu corresponds with the Shyenne in taking numeral names from the fingers of the *second* hand. "The Zulu verb *komba* 'to point,' indicating the fore finger or 'pointer,' makes the numeral 7. Thus, answering the question, 'How much did your master give you?' a Zulu would say, '*U kombile*' 'He pointed with his fore finger,' i. e. 'he gave me seven,' and this curious way of using the numeral verb is shown in such an example as '*amahasi akombile*' 'the horses have pointed,' i. e. 'there were seven of them.'" — Tylor's *Primitive Culture*, i. 228.

³ Compare Latin *poller*, "vocatus quod inter cæteros *poller* virtute et potestate." — Isidori *Origines*, quoted by Pott, 'Zählmethode,' 288.

| | |
|----------------|--|
| ALG. Chippeway | <i>mitchitchi-nindj</i> 'great finger.' |
| Cree (Western) | <i>misi-tchitchân</i> " " |
| Abnaki | <i>aghitkwe-retsî</i> 'chief (greatest) finger.' |
| Massachusetts | <i>kettiquanitch</i> , Blackfoot <i>omakîchis</i> (<i>omukh-u</i> 'great'), and Shyenne <i>nama-a-im'ôik</i> , have the same meaning. |
| DAKOTA | <i>napâhunka</i> 'the hand's elder' (<i>hunka</i> 'parent, ancestor elder brother.' Riggs). |
| MUSKOKI | <i>enke ichhki</i> , and Choctaw <i>ibbak ishke</i> , 'the hand's mother.' ⁴ |
| PAWNEE | <i>skêts-skûts</i> 'large finger.' |
| NAVAJO | <i>hullah tsó</i> 'thick' or 'big finger.' |

III. Names of number that are not derived from the fingers individually. - Names for 'one' and 'two,' as has been said (p. 6), must have preceded digital numeration.

1. There are, as we have seen, two expressions for the numeral 'one'; namely, 'only one' and 'first (fore-est) one.' In Algonkin languages these are represented in Mass. *pâsuk* and *n'qut*. The former expression is sometimes related to the pronoun of the first person singular and to the demonstrative 'this'; sometimes it has the meaning 'alone,' 'single,' or 'by itself.' Its root in Algonkin and Dakota languages denotes 'small.' The other expression for 'one' (= Mass. *n'qut*) is from a root denoting *priority* or *fore-coming*, in order or time, 'beginning:' and it has in many languages the secondary meanings, 'old,' 'aforetime,' etc.

In the Dakota family, one of these expressions is used for the cardinal, the other to form the ordinal: e. g. Dak. *wanzhi*, *wa"zhi-da*,⁵ *wa"cha* 'one'; *toka'heya* 'first' (from *toka* 'at the first'); Hidatsa (Minitari) *duétsa*, *luétsa* 'one,' *itsika* 'first'; Iowa *iyagke* 'one,' *pakranaha* 'first.' Between phonetic decay and dialectic growth,⁶ the Dakota 'ones'

⁴ So in Malayan (Pott, 'Zählmethode,' 299), and in American Maya, Huasteca, Tamanaca, etc.; and in Botocudo *nipo-diik* 'hand's mother.'

⁵ Ihankton *wa"zhi-na*. The suffix, *dan*, Ihank. *na*, is restrictive; 'one only.' "The form in counting is *wancha*" (A. L. Riggs) or, as Dr. Hayden writes it, *wunch*. This is further contracted in the Ponka to *win*, and in the Omaha to *wi*.

⁶ Or rather, between "laziness and emphasis," as Mr. A. H. Sayce (Principles of Comparative Philology, 16) prefers to call the two great causes of phonetic change. Compare Whitney, Language and the Study of Language, 70, 95. In no American family of language is the operation of these principles more apparent and more troublesome than in the Dakota. Not merely that *wa"zhi-dan* is shortened to Omaha *wi* or changed to Mandan *makh'ana* and Iowa *iyangke*, but in the same dialect, and from the lips of the same speaker, a name

have become so widely variant that they cannot all be confidently referred to a common root. In several dialects, if not in all, the numeral has lost all *consciousness* of its roots, becoming a mere phonetic mark. Compare

| | | | |
|------------|--|--------|--------------------------------|
| Dakota | <i>wa^{zhi}da^a</i> | Ponka | <i>win</i> |
| Assiniboin | <i>washi^ana</i> | Omaha | <i>wi</i> and <i>miaxtchek</i> |
| Winnebago | <i>izhakⁱida, hezunkera</i> | Mandan | <i>makhⁱana</i> |
| Iowa | <i>iya^agke</i> | Osage | <i>minche</i> |
| Hidatsa | <i>duetsa, luetsa</i> | | |

and — least conformable of all — Aubsaroke *hamat^a*.

I was at first inclined to refer the Dakota *wa^{zhi}* to the root *wi^{zhi}* 'to bend,' from the *bending down* of the little finger in counting. Comparison of ten dialects of the same family makes it more probable, if not absolutely certain, that it is the equivalent of Algonkin *pâsuk* 'the least' or 'very small': compare with *wa^{zhi}*, *wa^{nikhadan}* 'very little' and *wa^{icha-dan}* 'very little, none'; *wa^{ske}*, the name of the fourth child in a family, if a daughter (remembering that the *thumb* is 'parent' or 'elder' of the hand), and *wânka* 'soft, weak, tender.' With Iowa *iya^agke*, comp. Mandan *ungkni-ingke* 'hand's little one'; and Winneb. *izhâki-da*, with *wachek* 'young.'⁷ In the Assiniboin, *nape* 'hand,' with

may vary as *nowassa, duetsa, luetsa* (Minitari) 2; *pitika, pirika*, 10; *nahwi, dami*, 2; *bira, mida* 'a tree,' etc. In this last-mentioned Dakota dialect, the Hidatsa (called Minitari and Gros Ventres), Dakota *y* becomes *d* (*ya* 'thou' and *ya* 'to go' = *de*), *b* and *w* are interchangeable with *m*, and *l*, *n*, and *r*, with *d* (Matthew's Hidatsa Dictionary and Grammar, p. 28).

⁷ Since this paper was written, I have been favored by the Rev. A. L. Riggs of the Dakota mission (Santee Agency, Nebr.), with some notes on the Dakota numerals, to which his father, the Rev. Stephen L. Riggs, contributed some suggestions. For the grammar and vocabulary of the language, I could have no higher authority; and when I have ventured to differ from Mr. Riggs's conjectures as to the origin of the numerals, it has been only after thorough comparison of the names in eleven languages of this family, with whatever light was to be had from published and manuscript vocabularies. Of the names for the lower numbers, Mr. Riggs writes: "I have thought that, as high as 'three,' the names of numbers arose from sight of outward objects, as 'one' evidently does." "*Wanji*, root *wan*, interjectional, 'see!'; *ji* [*zhi*] is not necessary, as the form in counting is *wancha* (for *wan-e-cha*). *Ji* means 'separately'; *dan* added has something the force of 'only.' *Nonpa*, 2. Root, *onpa* 'to lay on,' 'to add.' The origin of the *n* will be sought in different directions, according to the theory of the numeral. . . . It may be that it comes from *nape*. While *nape* is the whole hand, in composition it may stand for a 'finger,' which is *nape-sukaza* = 'a single hand' [or, 'a portion, *particle* of hand' ?].

nape-washi 'finger,' i. e. 'hand's little one,' and *washi-na* 'one' = 'a finger only.' The Dakota for 'fingers' is *nap-sukáza* 'hand's small portions,' from *su* 'seed, grain,' i. e. 'a particle,' which in Dakota more commonly becomes, in composition, *chi* or *cho*, as in Dak. *chika-da* 'very small' = Assiniboin *chika-na* = Omaha *shinga* 'young,' Mandan *-sük*, and diminutive *shúke*, as a suffix.⁸

In Hidatsa *duetsa* (otherwise *luetsa*, *nowassa*) there is wider divergence from the root; but we recover the meaning through *shaki-adutsa'mike* 'fingers' (*shaki* = hand), *adutsúa* 'a seed,' *adutsóhi* 'a point, a tapering end or part' (Matthews).

Aubsaroke (Crow) *hamat'* has the same meaning. Comp. Mandan *hámahe* 'small,' *sük-hámahe* 'little child'; and Aubs. *amue* 'a grain, a kernel.' The suffix *-at*, *-ate*, is the common Aubs. diminutive. *Hamat'* 'one' = 'the least.'

In the CHAHTA-MUSKOKI family, we find the two forms — 'one only' and 'the first,' represented in

Choctaw *achüfa* 1; 'sole, single, only one.'
tikba 'the first'; also, 'before,' 'ancient,' 'of time past.'
ümmona 'once.'

Muskoki *hüm'kin* 'one.'

Coassatti *chafáka* and Alabama *chafahka-schie* 'one.'

Without attempting an exact analysis of these names, I remark (1) that Ch. *ümmona* 'first,' *hümmona* 'once,' is merely a demonstrative: *himo*, *himak* 'now,' 'at this time,' 'to-day'; *himonasi* 'instantly,' &c.; obviously related to Muskoki *hüm'kin* 1,⁹ and *homa* 'before': (2) that Ch. *achüfa*, and Coas. *chafáka*, seem, like the Algonkin and Dakota 'ones,' to be derived from a root meaning 'very small,' 'a grain, particle, or point'; comp. Ch. *chufak* 'an awl,' 'a nail,'

⁸ Comp. also, Dk. *su'ka* 'a younger brother' (Omaha *sanga*), contracted to *su'*; *sha-ké* 'a claw, a nail' (Om. *sha-ge*); *cho* and *su* 'a kernel,' 'grain,' 'seed.'

⁹ Mrs. A. E. W. Robertson (wife of the Rev. W. S. Robertson, of Tullahassee, Ind. Territory), whose knowledge of the Creek language is as thorough as that of any one now living, writes (under date of Aug. 3d, 1874): "I see no connection between the [lower] Muskoki numerals and the names of *hand* or *fingers*, unless *hümke* 1, may be a contraction of *heyü enke* 'this hand.' In contraction, *m* and *n* seem to run into each other: e. g. *momet* becomes *mont*, *heyün* becomes *hüm*, before words beginning with *m*; as *heyün mechetü* 'to do this' becomes *hümmechetü*, *heyün maketü* 'to say this' becomes *hümmaketü*. In a similar way, *heyün enke* ['this hand'] might become *hümke* 'one.'"

chush 'tip,' 'point' (e. g. *ibbak-chush* 'finger nail' = 'hand's. point'), *ibak-chufanli* 'tapering,' *chubi* 'hasi' 'little, not much.'

Pawnee *úska* 1, is evidently from a root found in *pid-úski* and *pir-úski* 'young,' *kitalús'ki* 'small,' and probably in *skéts* 'finger.'

2. Names for two seem to come from roots denoting (1) separation or distinction, as 'that,' 'the other,' (2) likeness, equality, or opposition, (3) addition, 'putting to' or 'putting with,' (4) coupling, pairing, or the like. These names, as has been said, must have preceded finger-counting or any formal numeration. They are often related to—possibly may have in some languages been derived from—names of natural pairs, as 'arms,' 'hands,' 'feet,' 'wings,' etc. From them or from the same roots come, by later derivátion, names of *artificial* pairs, e. g. 'moccasins,' 'leggings,' etc., and of dual relation, as 'wife,' 'husband,' 'brother,' etc.¹ And here is the explanation of that connection between names of the 'hand' and 'two,' which Mr. R. Ellis regards as evidence "that *hand* may = *fingers* = *finger-finger*," and as "helping to exhibit the radical affinity which unites the North American languages" (p. 6).

Of natural 'pairs,' the *hands* have most often given a name to—or received it from—the numeral; because they *are* two, not because they " = finger-finger." Pott (*Zählmethode*, 29) notes Puris (Brazilian) *core* 'hand,' *curiri* 2; Hottentot *t'koam* 'hand' and 2; Sanskrit *kara* 'hand,'

¹For example, Kioway *ki-ia* 'husband,' *ki-u* 'wife,' *gi-ä* 'two,' and *ki-atsi* 'near,' i. e. 'next to'; of all which the common root is found in *ki-n* 'he,' i. e. 'another'; and Choctaw *tuk-lo* 'two,' *tek-chi* 'wife.' The connection of the grammatical dual with the idea of correlation, or of collocation merely, is illustrated by a peculiarity of Kechuan speech. The regular termination of the plural is *-cuna*, but there is a special plural in *-ntin*, for objects belonging to or associated with the noun in the singular: e. g. *hhuasi* 'house,' *hhuasintin* 'all who belong to the house' or are 'of the household'; and with a noun denoting affinity or consanguinity this suffix *-ntin* forms a *dual*, including two individuals in correlation: e. g. *chosa* 'husband,' *chosantin* 'husband and wife'; *muma* 'mother,' *mamantin* 'mother and child'; *ususi* 'daughter,' *ususintin* 'daughter and mother'; *pana* 'sister,' *panantin* 'sister and brother'; with *masi* 'companion' and *yana* 'servant' it forms nouns meaning 'a pair,' *masintin* being more commonly used for persons and *yanantin* for inanimate objects.—Von Tschudi, *die Kechua Sprache*, pp. 95, 161.

báhu 'arm,' *paksha* 'wing,' and *nêtra* 'eye,' all used also for 'two.' The Samoyed Tawgi, also, expresses the number 2 and the substantive 'hand' by terms nearly identical.² In Labrador Eskimo, Richardson's vocabulary has *maggok* and *aggait* for 2, *agga* 'hand' and *aggait* 'the hands.' In the Algonkin and Dakota languages names for 2 and for 'hands' or 'arms' seem to be nearly related, either by derivation of one from the other or of both from a common root. In Algonkin dialects, compare —

| | | | | |
|----------|------------------------------|-------------|-----------------|--|
| Chip. | - <i>nindj</i> 'hand' | <i>nij</i> | 'two.' | |
| Cree | - <i>nisk</i> " | <i>niso</i> | " | (- <i>nisk</i> , however, being used only in composition, as <i>kitchi-nisk</i> 'right hand'). |
| Mass. | - <i>nutch, nitch</i> 'hand' | <i>nis</i> | " | cf. <i>nisin</i> 'copulat,' <i>nichai</i> 'she gives birth to a child.' |
| Abnaki | - <i>retsi</i> | " | <i>niss</i> | " |
| Illinois | | | <i>ninch-ui</i> | " |
| Miami | | | <i>nichué</i> | " |
| Arapoho | - <i>ichet</i> | " | <i>nis</i> | " cf. <i>inush</i> 'arm,' <i>inachása</i> 'the other side,' <i>neshíse</i> 'eyes.' |
| Shyenne | | " | <i>nich</i> | " |

In one Algonkin language only, the Micmac (of Nova Scotia), we find another name for 2, *tabu*, i. e. 'equal' ('par,' 'pair'); but that it had once a wider range, we have proof in the Cree *tepa-kup*, Abnaki *ta"ba-wa"s*, Mohegan *tupou-wus*, and Montauk (L. I.) *tu"pa-wa* 7, i. e. 2+ (or 2 of the second hand). The root, in the sense of 'equal,' and of 'enough,' 'sufficient,' is found in all Algonkin languages: e. g. Mass. (redupl.) *tatup, tatuppi*, Abn. *tetebi-wi* 'equally,' etc.; Cree *níya-tipiyaw* 'I my-self,' *tipiyaw* 'he him-self,' etc., *tipi-new* 'he measures it,' i. e. 'makes it equal to,' *tepi* 'enough,' etc. Mass. *tatup-pin* 'a string' or 'cord' is as near akin to Micmac *tabu* 2, as is Engl. 'twine' to 'twain.'

[The presence of this 2 in one Algonkin language, and evidence (in the 'sevens') of its former use in others, suggested a doubt as to the origin of the relation I had believed to exist between 'twos' and 'hands' in this family of speech. The authority of W. von Humboldt³ and of Pott

² Benloew, Recherches sur l'Origine des Noms de Nombre, p. 50.

³ Die Kawi-Sprache auf der Insel Java, Bd. I. s. 20 ff.

disposed me to recognize this relation. A comparison of the several Algonkin dialects and evidence supplied by other American languages led me to question it, and now I am nearly convinced that the connection of the numeral with natural duals, 'hands' or the like, is not by derivation of one name from the other; that the likeness, if not accidental, is a consequence of derivation from a common root; and that the primary conception of the Algonkin 'two,' whether expressed by Micmac *tabu* or Chip. *nij*, is that of 'sameness,' 'likeness,' or 'equality,' represented in the modern Chip. *iji*, Cree *issæ* 'so,' 'such.'

The first three numerals are, in the Massachusetts dialect,

1. *ne qut*, 2. *n is*, 2. *n ish*;

in the Chippeway,

1. *nin goto*, 3. *n ij*, 3. *n isswi*.

In these the prefix is, apparently, merely demonstrative (Mass. *ne* 'this,' 'that'), and does not belong to the root. In the 'two,' we have, I think, the Chip. *iji*, Cree *issi* and *iji*, 'so,' 'so as,' 'like'—which Baraga (Otchipwe Grammar, 493) classes as a conjunction, and Howse (Cree Grammar, 132, 142) as "the relative adverb of manner" and also "a generic noun." As a *verb*, it signifies, in the Chippeway, 'to be like' or 'the same as': e. g. *anishinabeg nind-IJI* 'I dress like (appear like) an Indian'; *iji-nagwad* 'it looks like' something, etc. *Niji*, contr. *nij*, 'two,' is 'this, such as' or 'like' the first—corresponding nearly to Micm. *tabu* 'par,' 'that which pairs.' The same root is in the Chip. *nidji*, or *nidj* 'like myself,' 'my fellow,' 'alter ego,' which is only distinguished from the numeral by the change of pronoun in the second and third persons—*kidji*, *kidj* 'thy fellow,' 'thy equal,' *widj* 'his fellow, or equal'—used chiefly as adjectives, as *widj-anishinaben* 'his fellow-man.' The dialectic variations of this particle correspond with those of the numeral 'two': Chip. *iji* and *n'ij*, Cree *isi* and *niso*, etc. In the Illinois dialect, *ninchui* is 2, *nichi* or *nigi* "comme cela" (Gravier).

If, then, Algonkin 'hands' and 'twos' are directly related, it is nearly certain that their relation is that of derivatives

from a common root, or that the former receive their name from—instead of giving it to—the numeral. And this appears to be true of the relation of corresponding names in other American families of speech.]

The Dakota 'two' is the most constant of all the numerals, and dialectic variations nowhere disguise its relation to natural 'pairs.' The 'twos' are:

(Sioux) Dakota *noⁿpa*, *nōm*, Omaha *nombá*, *wamba*, Mandan *nūmⁿpa*, Osage *nombaugh*, Ponka *nánba*, Iowa *nówe*, Winnebago *nōmp*, Aubsaroke *nōmpe*, Hidatsa *nópa*, *dópa*.

With these compare: Dak. *nape* 'hands' and *napin* 'a pair, they two,' *haⁿpa* (a pair of) 'moccasins,' etc., Om. *nomba* 'hands,' 'fingers,' Osage *nambe* 'hands,' Ponka *nanpé*, Iowa *nawé-pa* 'finger' = 'hand's head, or tip,' Winneb. *nábara* 'hands,' *namp-weisara* 'fingers,' Aubs. *núpere* 'both,' Hidatsa *huupa* 'moccasins.'

The primary meaning of the root, *oⁿpa*, seems to be 'to put to, with, on, or against,' 'ap-ponere' or 'op-ponere'; as a verb, *oⁿpa* is 'to place or lay any thing' on or with another: comp. *oⁿpa* 'to go with,' 'to be at' or 'on,' and (contr.) *om* 'with';⁴ *aoⁿpa*, contr. *aoⁿ*, 'to lay or place on' (as, wood on the fire); *saⁿpa* 'over, beyond, more than,' used in forming the numerals 11 to 19 (e. g. *wikchemna saⁿpa topa* 14 = 10 + 4); *haⁿpa* 'moccasins,' *aka-saⁿpa* 'opposite,' 'set over against,' etc. Perhaps, *aⁿpa* 'day' (*aⁿpa-o* 'dawn') is from the same root. We shall find it again in *topa* 4. The prefixed *n* in *noⁿpa*—which in other dialects varies to *w* and *d*—seems to be merely a demonstrative or directive, as in the Algonkin numerals, and as in the Dakota verbal particle *na* 'take it' (imperative only), and in *noⁿ* or *nuⁿ* 'be it so.'

In the Chahta-Muskoki group, the 'twos' have a similar origin, in the notion of 'coupling,' 'mating,' or 'ad-joining':

Choctaw *tuklo*, Muskoki (Creek) *hokkólin*, Hitchiti *tókkⁿlun*, Coassati *tókolōō*, Alab. *tókolō-chie*.

The root is represented in Choctaw *okla*, a collective

⁴"Koelle, Gram. of Vei Language, notices that *fera* means both 'with' and 2, and thinks the former meaning original (compare the Tahiti *piti* 'together,' thence 2)." Tylor's Primitive Culture, i. 235.

pronoun used to form the plural of nouns and both the *dual* and plural (3d sing.) of verbs, with the meanings 'they two,' 'they,' 'people,' 'tribe,' etc., modified as *okluⁿhã* "all, the entire crowd, number, or quantity" (Byington, Choctaw Gram., 32, 41). The Choctaw *t'*, prefixed, probably represents the "distinctive preposition" *et* 'here, this way,' etc. (id. 42), a demonstrative. From the same root, apparently, are Ch. *ho'kohla*, conjunction copulative, 'also,' 'of the same class,' *hitukla* (= *et-okla*) 'twice,' and the verbs *tok-chi* 'to tie,' and *iba-taⁿkla* 'to go with,' 'to accompany.' Comp. Musk. *sahokolũ* 'twice,' *hlisa-hokolat* 'secondly,' etc.

Athapascan 'twos' are, more commonly, related to names for 'feet' than to 'hands.' Chepewyan "*keh* 'foot,' 'shoe,' 'track'" (or their plurals), is often used as a numeral for 2 or 'a pair.' In the Apache, 2 is *na-ki*; 'foot' or 'feet,' *ki-e*; 'moccasins,' *si-ke*; Navajo *na-ki* 2; *iké* 'foot'; *kikh* 'moccasins.'⁵

3. Names for 'three' when not taken directly from the middle finger or 'half-way' of the hand, sometimes have the meaning, 'beyond,' 'further' ('trans'), or 'greater'; sometimes 'much,' 'the many' — a *plural* as distinguished from a *dual*.

All the Algonkin 'threes' are of the 'middle' (see p. 12, ante), except the Micmac *tchicht*, which seems to have had the meaning of 'more' or 'again' (= Delaware *tchitch* 'still more').

In the Dakota family, the 'threes' exhibit wider variance than the 'twos' from the original stock:

| | |
|---------------------------|--|
| Dak. <i>yámni, yámini</i> | Winneb. <i>táⁿ, tauⁿ</i> |
| Assinib. <i>yámini</i> | Iowa <i>tányi</i> |
| Mandan <i>námeni</i> | Omaha <i>thá bathi</i> |
| Hidatsa <i>dámi, náwi</i> | Ponka <i>tháⁿ bthin</i> |
| Aubsar. <i>nam</i> | Osage <i>laubena</i> |

The etymology is obscure. Comparing the Dakota and Aubsaroke forms with the Omaha, Ponka, and Osage, it seems probable that *-am* is a contraction of *aⁿpa* — as *nom* is the contraction of *noⁿpa* 2, and *tom* of *topa* 4. This would

⁵ Gallatin, Synopsis of the Indian Tribes, p. 215.

refer the numeral to the same root with the 'two.' The prefix may be the simple verbal *ya* (Hidatsa *de*) 'going,' as in *āya* 'they go together' and 'it becomes,' or more probably the inseparable preposition *i* (combining with the following *a*, as *ya*) meaning 'next in order,' 'again.' This would make *yam* = *i-ao*"*pa* or *ya-o*"*pa* — agreeing nearly with the verb *iyáo*"*pa* 'to lay on, to place on,' of Riggs's Dictionary. The pronunciation of the numeral is marked *ya'mni*, which suggests a reference to the verbal root *mni* 'spread out' or *mna* 'gathered, collected'; but the other dialects show that this root is not essential to the name, and if it enters into the composition of the Dakota name, it is probably supplementary to the principal root, so that *ya'mni* = *yam-mni*.⁶

The Winnebago and Iowa names have, apparently, a different origin, and Winneb. *ta*" may be the (regular) contraction of *ta*"*ka* 'great.'

In many dialects of the west and southwest, the name of the numeral has this meaning of 'great,' 'much,' 'many,' or the like: e. g.

| | | |
|---------------|-----------------------------|---|
| YUMA (Mojave) | <i>hamóco</i> 3, | <i>hámik</i> 'great.' |
| (Cuchan) | <i>hamúk,</i> | <i>n'yamúk</i> " |
| PAWNEE | <i>tawit,</i> | <i>-tawio</i> (suffix) 'over, above,' <i>hawa</i> 'more.' |
| Arikara | <i>tawhít</i> (wh English), | <i>terhue</i> 'many,' <i>tiérwheu</i> 'great.' |
| NAVAJO | <i>tahh,</i> | <i>thla</i> 'much,' <i>na-tá-ni</i> 'a chief.' |

4. Above 3, traces of digital numeration become more common, but the fact that in many languages 4 is a 'doubled 2,' or pair of pairs, seems to indicate that in these its conception and name were earlier than finger-counting. All

⁶ The Rev. A. L. Riggs, in his letter of July 27th, before mentioned, regards *mni* as the root. He writes as follows:

"*Yamni*; root *MNI* or *MNA*. *Mni* is 'to gather in a circle or group'; as *yumni wachipi* 'the circle dance,' *mnichiyapi* 'assembly.' Three is the smallest number, of course, that can make a group or circle. The correlate root *MNA* is more widely in use, and the meaning clearer: *kamna* 'to acquire or gather for one's self,' *mnayan* 'to gather,' *opa-mna* 'a cluster,' as of young trees growing up out of the root or stump of an old one. If *yamni* comes from *mna*, the change of *a* to *i* would be for euphony. If *yamni* comes from the sight of outward objects [preceding formal enumeration], then we may find the *ya* to signify grouping by calling — 'calling' another to the two. If it springs from the finger count, the origin of *ya* is not clear. As *causative* affix, it should come after."

Algonkin 'fours,' as was seen, are *demonstrative*, derived from the index-finger; but in two or three dialects the 'eights' suggest a primitive numeration by *pairs*. Of this mode I will speak more particularly hereafter, and here mention only the Dakota 4, formed apparently as a 'pair of pairs':

Dak. *tópa*, contr. *tom*, Hidatsa *tópa*, Mandán *tópe*, Ponka and Omaha *dába*, Iowa *tówe*, Winneb. *chōp*, Aubsaroke *shōp*.

There are several Dakota expressions for 'pairs' and 'doubles'; *napin* (from *nape* 'hands'?) 'they two,' 'both,' *sakim* 'two together,' and from the numerals, by the prefix *ta*, as *ta-wa'zhi* 'a pair,' *ta-no'pa* '2 pairs,' *ta-yamni* '3 pairs.' In *tano'pa*, or rather in the earlier *ta-o'pa*, *ta-ōpa*, '2 pairs,' we have, I think, the origin of *tópa* 4.

In some languages 'all the fingers' give the name to this numeral, as, apparently, in Pawnee *sktiks* 4, = *skēts-iks* 'fingers [of] hand.'

5. There is much diversity, even in languages of the same stock, in expressions for 5 and 10. In these sometimes, but by no means always, is found a name of 'hand' or 'fingers,' or a suggestion of such name. In the instances—comparatively few—in which names for 'hand' and 5 are identical, or nearly so, we cannot confidently decide which of the two is borrowed from the other.⁷

Of Algonkin 'fives' there are two principal types:

(1.) Massachusetts *napanna*, meaning 'on one side,' i. e. 'one of the two hands.' It is the Chip. *nabane*, Cree *nabat*, but is not in either of those dialects used for the numeral. In Abnaki *bare-nesku*, Del. *palenach*, the name for 'hand' is added, the expression corresponding to Chip. *-bane-nindj* 'of one hand,' as in *ningoto-bane-nindj* 'one handful,' *nin*

⁷"A. v. Humboldt's plausible comparison between Skr. *pancha* 5, and Pers. *penjeh* 'the palm of the hand with the fingers spread out, the outspread foot of a bird,' as though 5 were called *pancha* from being like a hand, is erroneous. The Persian *penjeh* is itself derived from the numeral 5, as in Skr. the hand is called *panchaḍkha* 'the five-branched.' The same formation is found in English; slang describes a man's hand as his 'fives,' or 'bunch of fives,' thence the name of the game of fives, played by striking the ball with the open hand, a term which has made its way out of slang into accepted language."—Tylor's *Primitive Culture*, i. 235, note.

nabane-nindj 'I am one-handed,' 'have only one hand,' etc. The Abnaki *naⁿneda* '5 times' and *naⁿnaⁿkao* 'fifteen' (=5+) are from a different root, and are related to

(2.) Chip. *nānan*, Cree *niannon*, *niyānan*, Micm. *nān*, Moheg. *nunon*; and Shawano *nialin-ui*, Miami *yālan-ué*, Illin. *miaran-ui*, etc. These, though perhaps not all from the same root, have nearly the same meaning, 'gone,' or 'spent,' i. e. all the fingers of one hand. Comp. Cree *niyān* 'va, pars,' pl. *niyānk* 'allez, partez,' a "verb used only in these two persons of the imperative"; *niyāk* 'forwards,' 'onward' (Lacombe, Dict. Crise); Shawn. *niala*, Illin. *miara* = Cree *niyān*.

Dakota 'fives' are plainly *digital*: Dak. *zápta*⁸, Om. *sātan*, Ponka *sāta*, Iowa *thāta*, Osage *sattah*, Winneb. *satch*; Hidatsa *kíchu*; Mandan *kechūn*. Dak. *zápta* = *za* (for *suka-za* 'fingers') + *pta* 'turned down.'⁸ Hidatsa *kíchu*, from *chu* 'thrown down' or 'overturned,' with *ki*, the intensive and frequentative prefix, 'wholly, completely,' i. e. 'all turned down.' Or, if we suppose the word to have lost a syllable, and restore it as *sáki-chū*, we have 'hand turned-down' = Dak. *za-pta*.

Choctaw *tahlapi* 5, seems to be compounded of *tahli* 'to finish' or 'complete' and *ahpi* 'the first' = 'first hand ends.' In Muskoki *chagh'kih'pín*, and Hitchitee *chaghkū'pun*, the Musk. *chunggi* or *chuñki* 'my hand' may perhaps be recognized, but if so, it is nearly lost in the Musk. ordinal, *hlisa cholikepe* 'fifth.'

Pawnee *sihūks* is from *iksu-hūks* 'hands half'; still more contracted in Arikara *she'hu* (*ishū* = 'hand').

In the Athapascan, *la* 'hand' seems to be found in Navajo *dst-la*, Apache *dsht-la* 5; but only in these two of the eleven languages of that family compared by Buschmann, who remarks on the general resemblance of the Athapascan 5 to the 1. Eskimo (Labrador) *tedli-ma*, *tellimet* 10, is probably related to *tallek* 'hand.'

⁸ This agrees nearly with the meaning given by the Rev. A. L. Riggs (in his letter of July 27th): "*Zapta*. Roots *ZA* and *PTAN*. *Za* is 'the hand'; thus, *yu-za* is 'to hold,' 'to handle.' *Ptan* is 'turned over.' The whole of the *hand* [i. e. all the *fingers*] is now *turned down*."

In the Shoshoni family, Comanche *mowaka* (*mowa* 'arm, hand, fingers,') and in another dialect *mo'ovet* (*moö-oyet* 'hand all'), Shosh. *mandget*, Yute *manigin* (*moo-ninch* 'hand'), all give evidence of their *manual* origin.¹

6. Names for this numeral in Algonkin, Dakota, and some other families of language, mark it as the first that is counted on the second hand. This is done (1.) by affixing to a name for 'hand' a particle meaning 'one,' 'first,' or 'other,' or (2.) by repeating the name for 1 and affixing a word meaning 'again,' 'besides,' 'beyond,' 'more,' or the like, or (3.) by merely expressing change 'to the other side.' Of these, the second is the most common type: e. g. —

ALG. Cree *nikoto-wasik*, *niküt-wassik* = '1 on the other side' (Cree *awas* 'further on,' *awasá-yik* 'on the other side'), Chip. *ningot-wásswi* (*awássai* 'further'), Abn. *neküda's*, Moh. *n'guittus*, Shaw. *nigote-wathwi*, Sauki *kotoashek*; Mass. *nequtta-tahshe*, Del. *guttasch* (the affix, *adtahshe*, means 'counted' or 'added'). — Micmac *ashugôm* (*apch* 'again,' 'following'; *apchku* 'going back'), and Mareschit *kámachin*, seem to be similarly formed. — Illin. *kakatchui* 6 denotes 'passing beyond the middle' (*kakatahe*). — Shyenne *nasutu* (*nahsoto*, Abert) is 'one over.'

The DAKOTA presents two types — which, however, may prove to be originally identical:

| | | | |
|---------------|----------------|-----------|-----------------------|
| Dakota | <i>shá-kpe</i> | Hidatsa | <i>aka-wa, aka-ma</i> |
| Assinib. | <i>shá-kpa</i> | Winneb. | <i>aké-we</i> |
| Om. and Ponka | <i>shá-pe</i> | Aubsaroke | <i>ki-ma</i> |
| Iowa | <i>sha-kwe</i> | Mandan | <i>aká-mak</i> |
| Osage | <i>sha-pah</i> | | |
| Oto | <i>sha-kwa</i> | | |

Hidatsa *m* and *w* = Dak. *p*. The only question is as to the precise meaning of the Dakota prefix. Dakota *pe* is 'finger' or 'fingers' (hand 'points,' as in *napchu-pe*, etc.), as is more clearly shown by Ponka 7, *pe'namba* (= 2 fingers), and 8, *pe'thabthin* (= 3 fingers). The prefix I take to be Dak. *a-kshá* 'more, in addition to.' Then *shá-kpe* = *a-kshá-pe* = '1 in addition' or 'besides' (the 5); and Hidatsa

¹ For other 'fives' of Buschmann's Sonora family, including the Shoshoni, see his *Grammatik d. Sonor. Sprachen*, 3te Abth. ss. 114, 119.

akáwa = *aká-ma* 'one over'; comp. Assinib. *akán* 'above,' *hakésha* 'afterwards,' &c.²

In the Athabascan family, Buschmann³ finds 6 expressed by 3×2 in five languages (of eleven compared).

7, 8. The composition of these numerals from 2 and 3 is as common in American as in other families of speech. An independent name for either 7 or 8 is exceptional. The 8 is sometimes designated from its proximity to 10 — as 'two less,' 'two left,' or as 'coming near' the end; 7, more rarely, as 'wanting 3,' or the like. The common expression for both numerals is formed by affixing to the names for 2 and 3, respectively, a word denoting *addition* or *repetition*. In some languages, an indication of 'hand' or 'finger' is comprised in the name. The Algonkin 7 has generally the same affix as the 6, meaning 'on the other side' or 'again.' The full expression is preserved in Chip. *nij-wásswi* 7, *nish-wásswi* 8; compare *ningot-wásswi* 6: a contracted form, in Del. *chash* and, with a guttural modification, in Moh. *ghusū*. The Cree and Chippeway languages have each another name for 7: Cree *tépakūp* (*téypuckoop*, Howse), Chip. *tupowus* (= *tepu-awasswi*), the latter agreeing with the Abnaki 7, *ta"bawa"s*; all formed from a 'two' which is not now found in any Algonkin language except the Micmac (see p. 18, ante). The Crees have also two names for 8: *shwássik* (= *nishu-awássik*) and *aienánewu* or *ayenáneū*. The latter is peculiar. It seems to be formed of *iyin* 'more' and *néwu* 4 = '4 again' or 2×4 . An exceptional name for 7 is found in the Narragansett *énada* (Mass. *enotta* of Wood's Vocabulary); perhaps related to Mass. *nahohtoëu* 'second,' literally 'that which comes next,' or perhaps from the index-finger and act of 'showing' (Mass. *nátin-au* 'he shows it to,' Chip. *enoad* 'showing with the fingers'). The Sauki 7, *nówia*, may have had a similar origin.

Illinois *parare*, Miami *poláne* 8, mean 'nearly ended,' 'almost done.' The composition of Illin. *suatatchūi*, Mi. *suaxtetsūi* 7, is not clear.

² The Rev. A. L. Riggs has suggested a different derivation of Dak. *shakpe* "from *shaki* 'the nail' and *kpa* or *kpe* 'punched out.' The prominent thumb nail of the second hand is now pushed down."

³ System. Worttafel d. Athap. Sprachstamms (3te Abth. des Apache), s. 508.

In the Chahta-Muskoki group we have—

| | | |
|-------------------------------|-----|---------------------------|
| Choctaw <i>tuklo</i> 2, | and | <i>un-tuklo</i> 7. |
| <i>tuchina</i> 3, | | <i>un-tuchina</i> 8. |
| Coassatti <i>tókolōō</i> 2, | | <i>hon-tókolōō</i> 7. |
| Alabama <i>tókoló-chie</i> 2, | | <i>hon-tókoló-chie</i> 7. |

The prefix *un-* or *hon-* (= Choctaw *ont*) means 'again.' In other languages of this family, the names for 2 and 3 are similarly modified by a suffix:

| | | |
|------------------------------|-----|-----------------------|
| Musk. <i>hokkolen</i> 2, | and | <i>kólú-paken</i> 7. |
| Hitchiti <i>tokhlu</i> 2, | | <i>kola-paken</i> 7. |
| Musk. <i>tutchenen</i> 3, | | <i>chenü-paken</i> 8. |
| Hitchiti <i>tohchiñün</i> 2, | | <i>tósna-paken</i> 8. |

One of Mr. Ellis's mistakes is that of regarding these adverbial affixes as representatives of names for 'hand' or 'finger,' or 'five'; and some of the most striking of the coincidences that seem to him "to exhibit the radical affinity which unites the North American languages" vanish with the correction of this error. He finds, for example, his "az finger" or his "baz finger," or the two combined as "azbaz 'finger-finger'=hand," in Delaware *cottash* 6, *nishash* 7, old Algonkin (Nipissing) *ninshwassoo* 7, *nisswassoo* 8, Cree *nikütwassik* 6, *nishwassik* 7, etc.⁴ Whatever the Basque *zaz* (conjecturally extracted from Basque *zazpi* 'seven') or a possible *svas* of "the original Aryan vocabulary" may have denoted, it is certain that in the Del. *-ash*, Alg. *wassoo*, Cree *wassik*, etc., we have merely an adverb meaning 'further,' 'on the other side,' or the like.

In the (semi-Algonkin) Atsina dialect, 7, 8, and 9 are formed respectively from 3, 2, and 1, by a suffix that denotes the 'fingers' remaining to be counted.

In the Dakota family, there are at least two and perhaps three types of 'sevens':

| | | |
|-----------------------|-----------------------------------|-----------------------|
| Ponka <i>pé-namba</i> | Dak. <i>shakó-wi</i> ^a | Hidatsa <i>shápua</i> |
| Omaha <i>pé-namba</i> | Assinib. <i>shakó-wi</i> | Aubsar. <i>khápua</i> |
| Osage <i>pá-nompá</i> | Winneb. <i>shagó-wi</i> | Mandan <i>kípa</i> |
| | Iowa <i>sháhma</i> | |

The first three prefix to 2, *pé*, *pá* 'fingers' (lit. hand 'points'). Of the others, I find no satisfactory analysis that

⁴ Numerals as Signs of Primeval Unity, pp. 7, 8, 9.

will apply to both groups. [The Rev. A. L. Riggs has suggested, for the Dakota proper, *shake* 'a nail' and *win* 'to bend,' with the preposition *o* 'in' or 'on' interposed, the fore-finger (of the second hand) being *bent upon the nail* of the previously turned thumb.]

The Ponka and Omaha 'eights' are formed like the 'sevens' — by prefixing *pe* to 3; the Hidatsa and Aubsaroke, by suffixing *pe*, *pi*, to 2, the numbers of fingers remaining uncounted:

| | | |
|------------------------|-------------------|----------------------|
| Hidatsa <i>dópa</i> 2, | <i>dópa pi</i> 8, | (<i>pitika</i> 10). |
| Aubsar. <i>nōp</i> 2, | <i>nōpa-pe</i> 8, | (<i>ptraka</i> 10). |

Dr. Matthews (Hidatsa Grammar, 56) remarks that *dopapi* probably signifies 'ten less two,' and that *pi* seems to be the root of *pitika* 10. But the primary meaning of *pi*, *pe*, is 'pointed' (or as a verb, 'to penetrate'), and hence 'point,' 'extremity,' 'finger,' as in Hid. *icpu* and *ichpu* = Dak. *chupe* in *nap-chupe* 'fingers,' i. e. 'hand points.' In *icpe* 'the tail of a bird,' Dak. *upi*, we have another modification of this root; and again in Hid: *ipi-ta* 'at the rear, behind,' i. e. 'at the end.'

Iowa *kre-ra-pa-ne* 8, is clearly related (as a diminutive?) to *kre-pa-na* 10. Dakota *sha-hdo'gha* and Assinib. *shakando-ghah* follow the 'sevens,' the first element of the name being the same in each, but I must leave both — with Mandan *tetuk'e* — unexplained.

9, very generally, is named as being the 'last but one'; occasionally, as 'fourth' of the second hand:

ALG. Cree *kéka-mitátat* 'almost 10.' ✓ *keka* 'au point de.'

Chip. *sháng-asswi* (and contr. *shang*); comp. *cháyisse* 'used up,' 'all spent.'

Shaw. *chakatswi* " " " "

Mass. *paskugun* 'it comes near.'

Del. *pechkunk* 'coming near.'

Illin. *nigutu-manekki* 'only one left,' lit. 'only one, no more.'

Arapaho *thiatokh* or *siatokh* 'again last,' 'one after'; from *chia* 'again' and *tákh* (comp. *tákh-su* 'last,' *tákhú-ú* 'after').

DAK. (Omaha, Osage, and Ponka, *shánka*, Iowa *shangke*. Sioux *nap-chi^owanka*.)

Prince Maximilian von Wied notes the Osage as a contracted abbreviation of *grábena-tchek-winingka* = 10 less 1. This is certainly the meaning, but not a translation of the name. In the Sioux, *nap* = *nape* 'hand.' In other dialects, *shánka* is Iowa *iyangke* 'one,' 'little one' (and, as diminutive, *chínge*). Mandan *ingka* (as in *ungkni-ingka* 'the little finger'), Omaha *shinga* (redupl. *shinge-shnge* 'an infant,' very small), Sioux *chi^ochá* 'little one,' and in *chi^oka-da^o*

'very small' (with which compare *wanika-dan* 'very little,' *wa^aske* 'the fourth (female) child'). Sioux *chi^awanka* in 9, seems to contain an additional element, which may be *eché* 'only' or *echi^a* 'now.'⁵ The meaning is the same, in all these dialects, 'only one finger' remains.

Hidatsa *duetsa-pi* and Aubsaroke *amúta-pi* have the same meaning — 'one finger'; and so has Mandan *mach^ape*, from *mach^aana* 1.

CHAHTA-MUSKOKI. Choctaw *chakali* 9 = *cheki-úhli* 'soon the end,' next the last. [The root, *cha, che*, is the nearest approximation to a conjunction copulative, and may be translated 'and then,' or 'next.'] The same component is in Alabama *íbi-cháhkali-chíe* (*chíe* = finger) and Coassatti *bíh'chákáálii*. Musk. *ósta-pákhkin* and Hitchiti *ósta-pákin*, are from Musk. *óstin*, Hitch. *sítákin*, 'four.'

| | | |
|--------------|------------------------------------|---|
| NATCHEZ | <i>wítip'katipis</i> , 1 left? | from <i>wíta</i> 1. |
| CADDO | <i>hiwéísika</i> , 4 + hand, | " <i>hiwéit</i> 4, <i>séche</i> 'hand.' |
| Adaiz | <i>sikinish</i> , 'hands' minus? | " <i>sekut</i> 'hand.' |
| PAWNEE | <i>d'húk'sidi-wa</i> , 10 minus, | " <i>d'húksidi</i> 10. |
| Arikara | <i>nuchini^awan</i> , " | " <i>nuchini</i> 10. |
| Wichita | <i>chíus-skinte</i> , 1 left? | " <i>chíus</i> 1. |
| Kichai | <i>tanerókat</i> , ? | (<i>arisko</i> 1). |
| SHOSHONI | <i>shimmér-omen</i> , 10 minus? | " <i>shimmer</i> 10. |
| Comanche | <i>shéman^a-wúum</i> , " | " <i>shééman</i> 10 (Pike, MS.). |
| " | <i>séermano</i> , " | " <i>séermano-wúmpnet</i> 10. |
| Yute | <i>surrom-suene</i> , " | " <i>tom-suene</i> 10. |
| " | <i>suoóróimsoyuni</i> , " | " <i>tóamsuniguni</i> 10 (Powell, MS.). |
| YUMA: Cuchan | <i>hum-hamook</i> , 3 x 3? | " <i>hamook</i> 3 (<i>humhook</i> 6). |
| Mojave | <i>paí'a</i> 'near' | " (<i>hipaí'ac</i> 'near'). |
| " | <i>elyu-thouk</i> 'near' | " (<i>thouk</i> "). |

10 The tenth finger—the *little* finger of the second hand—gives in some languages a name to the corresponding numeral; but more often, 'ten' is designated as the 'completion' of the digital series, 'all gone,' 'none remaining,' or the like. Occasionally, the name may have been taken directly from the 'hands' or 'all the fingers.'

In ALGONKIN languages, the 'tens' are of four types—of which two are nearly related:

1. Chip. *midasswi*, *mitasui*, Illin. *matatchui*, Shawano *metathwi*, Cree *mitatat*, Shyenne *matochto*, Arapoho *metaitoch*, and Atsina *matatasits*—meaning 'no further,' 'completed.'

⁵ I formerly regarded this *chi^a* as the representative of the verbal root *chi^a* 'wanting.' To this, the Rev. A. L. Riggs objects, with good reason, that "*chi^a* is not 'want' in the sense of 'lack,' but always of 'desire';" and that, if it made part of the name, "it should come *last*, as the principal verb." I do not agree with him, however, as to the impossibility of getting 'one' (or rather 'finger,' or 'little one') out of *wanka*. The other related dialects seem to testify unmistakably to this meaning.

2. Abnaki *m'tára*, Micmac *m'teln*, Delaware *m'tellen*, *tellen*, Moheg. *m'tannit* = 'no more.'

3. Massachusetts and Narraganset *pa'uk*.

4. Sauki and (Northern) Chippeway *kwetch*, used occasionally in rapid counting. This is either a contraction of *iskwátch* (Cree *iskweyátch*) 'lastly,' 'at the end' (comp. *ishkwétchagan* 'the last or youngest child in a family'), or it is Nipissing-Algonkin *kagowetch* 'no more.'

The prefix in Illin. *mat-atchui*, Chip. *mid-asswi*, Abn. *m't-ára*, etc., is the negative and privative particle, found in all Algonkin languages, though less common in Chippeway than in eastern dialects. It is found, however, as a prefix, in many Chippeway words (e. g. *nin géssikan* 'I arrive in time,' *nin med-assikan* 'I do not arrive in time,' 'I am too late'; *nind apáb* 'I sit upon' (a seat), *nin müt-ab* 'I sit upon the bare ground, the snow, or the like,' 'have nothing to sit upon'; etc.). As a verbal prefix, it has sometimes, with a modified vowel, the meaning of 'ceasing,' 'leaving off,' 'completing'; e. g. Mass. *mahtu* 'he ceases speaking,' Abn. *met-anaskiwi* 'finally,' Illin. *mita-tewi* 'an abandoned cabin,' *ni metassa* 'I bury (i. e. have done with) him' = Chip. *mid-gwena* 'I put him aside, or out of the way.'

The suffix *asswi* is the same as in Chip. *ningot-wásswi* 6, *nishwásswi* 7, meaning 'further' or 'beyond.' At 10, there is 'no further' count, 'a completion.' Abn. *-ara*, Del. *-elen*, Moh. *-anit*, are forms of the same particle of comparison, meaning 'more,' 'above'; and *mid-asswi* = *m't-ára*.

I have the more particularly pointed out the composition of this Algonkin 'ten,' because more than one writer on American languages has been struck by the likeness of Chip. *midasso* (the ordinal) 10 and *midáss* 'a legging.' Mr. R. Ellis⁶ observes this likeness in six or seven Algonkin languages, and infers that "forms like *-doswe*, *-tathi*, *-tato*, *-tato*, etc., may be compared with Uchee (Florida) *tethah* 'shoes,' and *tetethah* 'feet,'" etc., all contributing to show that the "az finger" and the "azbaz hand" prevail, and are employed numerally, over the greater part of North America

⁶ On Numerals as Signs of Primeval Unity, etc., p. 9.

as well as on the eastern continent, "the *m*- prefix" in *midasso*, etc., "appearing the same as a Californian and New Mexican prefix *m*-, which is used to convert 'arms' into 'legs.'"

The learned author of "Études Philologiques sur quelques Langues Sauvages" (pp. 131, 132) has given an etymology of *mitasui* which is ingenious, but to which there is, I think, one insuperable objection. He derives the name from the particle *mi* 'so,' and *tasui*, *taso*, "a particle that expresses quantity and is the equivalent of [the French] adverbs *tant*, *autant*, *combien*." When an Indian would express 'ten,' he puts forward both hands and spreads the fingers saying, *mi-tasui* 'so many.' The objection to this is, that it will not apply to other Algonkin dialects, nor to other numerals in the same dialect: it will not serve either for Abn. *m'tára* and Cree *mitatat* 10, nor for Chip. *ningotasui* 6, *changasui* 9, etc., in which M. Cuoq finds, not *dasso* 'so many,' but *asui* "en sus, de plus."

In the Massachusetts and Connecticut dialects another name is found for 10, *paiuk* (*piuk*, *piogqué*, Eliot), but the Chippeway *mitasui* is represented in Mass. *muttásons* 'the youngest child in a family' (*mat-ású* 'not after,' with *-ons* diminutive), and in *muttasó-nitch* 'the little finger,' i. e. the least and last. Mass. and Narrag. *paiuk* is, probably, a similar expression, related to *pesuk* (= *pi-es-uk*, dimin. of *pi-ak*) 'least,' 'one only,' and to Cree *peyak* 'one,' 'alone,' as well as to *piko* 'only,' 'no more than,' and *piyis* 'finally,' 'lastly.'

The Dakota 'tens' may be reduced to two groups, the name having in both the same general meaning, but not formed from the same roots:

- (1) Sioux-Dak. and Assiniboin *wikchémna*, *wikchem'ini*.

Ponka *gthe-ba*.

Omaha *chrábene*, and *g'él'í'ba*,⁷ Iowa *krepána*, Oto *krahbrá*,⁸ Osage *krabra*,
Winneb. *kherapim* (or *kherapim-aze*, Hayden).⁸

- (2) Mandan *pirakh*, Aubsar. *piraká*, Hidatsa *pitika*.

⁷ Prince Maximilian's vocabulary gives *chrábene*; Dr. F. V. Hayden's (in Proc. Am. Philos. Society, x. 407), *g'él'í'ha*, but the second *h* probably is by misprint for *b*, since 20 is *g'th'eba-namba* 'two tens.'

⁸ In this group of Dakota 'tens' we have a good illustration of one difficulty in

At 10, the fingers that have been bent down are *straightened*, and "the hands *spread out side by side.*"⁹ *Wikchemna* is from *kcha* 'straight,' 'unbent,'¹ and *mna* 'spread out,' with the generalizing prefix of Sioux nouns, *wi* or *w*'. Hidatsa *pítika* is from the verb *ptíki* "to smooth out, to iron clothes," which Matthews (Hidatsa Dictionary) refers to *paktíi* (from *kiti*) 'to press to smoothness *with the hands.*'² Both expressions "gehn aus von den Fingern," but in neither does a *name* of 'finger' or 'hand' show itself.

How slowly the savage advanced in numeration may be inferred from the traces found in many languages of a mode of reckoning by *pairs* and *triplets*. There are some reasons for believing, not only that conceptions of 'one,' 'two,' and 'three' (as 'this,' 'that,' and 'beyond' — or the like) were antecedent to digital numeration, but that the first definite conception of 'four' was as a 'pair of pairs,' and that *multiplication* of the lower numbers often preceded formal numeration to the higher. *Number* begins at 'two,' and we may assume — without venturing far into the 'metaphysics of language' — that 2 was the *first named* numeral, though an earlier *conception* may be expressed in the name given to 1. Considering that every decimal system is in fact a doubled quinary, and was constructed with as constant reference to

the way of proving — or disproving — the 'primeval unity' of American speech, on no better evidence than is afforded by brief and often inaccurate vocabularies. In *wikchemna* (discarding the prefixed particle), *gtheba*, and *kherapun*, the same name appears under three dialectical variations: *kche-mna* = *gthe-ba* = *kh'a-pun*. And the results of 'laziness' and 'emphasis' are so nearly balanced that — tried by the Indo-European standard — it would be hard to say which of the three forms best represents the primitive roots.

⁹ The Rev. A. L. Riggs, MS. The derivation he suggests for *wikchemna* is "from *w*, the sign of the abstract form, *ikche* 'in a common manner,' and *mna* 'gathered together.'"

¹ *ksha* 'bent,' *yu-ksha* 'to bend, to fold, to double'; *kcha* 'straight,' 'loose' (*un-bent*), *yu-kcha* 'to untie, to loose,' etc. *yu-kcha* 'to understand, to comprehend' (i. e. to straighten out?).

² If the Hidatsa *pítika* stood alone — the more probable derivation would be from *ipí* 'extremity, end,' as in *ipíta* 'at the rear, behind,' and *ipítakoa* 'at the end'; which last might have been contracted to *pítika*. But the meaning of the name in other Dakota dialects — 'unbent' — favors *ptíki*, notwithstanding the change in accent.

the number of the hands as of the fingers, numeration by pairs would seem to be a natural expedient for rising to the higher numbers.

In various North American languages of the West and Southwest, we find 'fours' formed from 'twos,' 'eights' from 'fours,' and, more rarely, 'sixes' and even 'nines' from 'threes.' East of the Rocky Mountains, traces of similar numeration are uncommon. The Dakota *tópa* 4=2 pairs, has been mentioned (p. 23). The Catawba (North Carolina) *purre-purra* 4, apparently comes, by reduplication, from *na-perra* 2; but both may have been derived from a common root, found also in *du-punna* 1, *pukte-arra* 5, and *dipk-urra* 6. In the (Algonkin) Cree, one of the two names for 8 is *ayenâneû*, which seems to be a 'double 4' (see p. 26, ante); and in the semi-Algonkin Shyenne, *nōch* is 1, *enōka* 'a pair'; *nich* 2, *enich-anst* '2 pairs,' *nî-nish-ish'* 'you two'; *na'a*, *nā* 3, *e-na-hanst* 'a pair of threes,' '3 pairs' (Hayden).

In the Athabascan family, Buschmann's comparison of the numerals in twelve languages gives these results: 6 has an independent name in six languages and in six others is formed as 2×3 or 3×2 ; 8 is expressed as 4×2 in eight languages, and 9 is formed on the 3 in only one.³

For example, in the northern Athabascan, Howse's vocabularies⁴ give—

| | | |
|-----------|---------------------|--|
| Chepewyan | 3, <i>tah̄ee</i> , | 6, <i>elke tahey</i> . |
| | 4, <i>dinghee</i> , | 8, <i>ellkee dinghe</i> (also <i>narky-ah-ahtah</i> = 2 less). |
| Biber | 2, <i>onghaty</i> , | } 8, <i>enchet'hentir</i> (2×4). |
| | 4, <i>tenter</i> , | |
| | 3, <i>tâhtir</i> , | |

In the southern branch of this family, the same system may be found, though less distinctly marked:

Navajo 3, *t'ha*, 6, *has-târ*, 9, *nas-tai'*.

In another family, the Shoshoni (classed by Buschmann with the Sonora), doublets and triplets are common:

| | | |
|------------|---------------------|-------------------------|
| Comanche | 3, <i>pa-hist</i> , | 6, <i>ôyoh-pafist</i> . |
| Chemehuevi | 3, <i>pai</i> , | 6, <i>na-bai'</i> . |
| | 2, <i>wai'i</i> , | 4, <i>wat-chur'</i> . |

³ Worttafel d. Athapask. Sprachstamms (3te Abth. des Apache), §114, n. 2.

⁴ Proceedings of the Philological Society (London, 1850), iv. 192 ff.

| | | | |
|----------|-------------------|----------------------|----------------------------|
| Shoshoni | 2, <i>wat</i> , | 4, <i>wat-suit</i> . | |
| Cahuillo | 2, <i>mewi'</i> , | 4, <i>mewi'chu</i> . | |
| Kizh | 2, <i>huehe</i> , | 4, <i>huatsa</i> , | 8, <i>huehesh-huatsa</i> . |

In one Yuma dialect, the Cuchan, we have

| | | |
|---------------------|----------------------|-------------------------|
| 3, <i>hamook'</i> , | 6, <i>humhook'</i> , | 9, <i>hum-hamook'</i> ; |
|---------------------|----------------------|-------------------------|

though in the Mojave, of the same group, the 6, 7, and 8 are regularly formed as 1, 2, 3 of the second hand.

The numeral system of the Arikaras is peculiar, and deserves special notice. The Arikaras, or 'Rees' as they are called by the French traders, were originally the same people as the Pawnees of the Platte River, their language being nearly the same.⁵

The first five Pawnee and Arikara numerals correspond nearly. From 6 to 10, the Pawnees proceed in the more common mode, by repeating 1, 2, and 3, as 'added' to 5, or 'of the second hand,' and naming 9 as 'less than 10.' The Arikaras named 8 from 6 (by prefixing a particle), and the odd numbers 7 and 9 by a diminutive suffix to the name of the next *higher* even number: thus,

| | | |
|-------------------|---------------------------|------------------------|
| 6, <i>sha'pis</i> | 8, <i>tup-sha'pis</i> | 10, <i>nukh-int</i> |
| | 7, <i>tup-sha'pis-wan</i> | 9, <i>nukh-int-wan</i> |

And so with occasional variations, numeration proceeds to 20, which is 'a man'—for the system is vigesimal; 12 is 2 + 10; 11 is (2 + 10) *minus*; 13, *nákugit'-wan*, is 'less than' 14, *nákugit'*, which, again, seems to have been formed from 15, *akh'kogit'u* (= *akh'u git'u* 'the whole foot'). In the next quinate the names *all* come from the 20, *wi-tau'* (*wita* 'a man'), those of 16 and 18 being the less composite and probably the older:

| | | |
|------------------------------|---------------------|------------------------------|
| 20, <i>wítaw</i> | 18, <i>wítaw-an</i> | 16, <i>wítutsh'</i> |
| 19, <i>wítaw'-akhko-káki</i> | | 17, <i>wítutsh-iskugit</i> . |

The 19 is literally 'man one-not.' Dr. Hayden's vocabulary gives the numerals as high as 1000, and similar derivation of

⁵Dr. F. V. Hayden's "Contributions to the Ethnology and Philology of Indian Tribes of the Missouri Valley" (Philadelphia, 1862), p. 351. His Arikara vocabulary is the best and largest yet published. For the Pawnee numerals, I use his "Notes on the Pawnee (and other) Languages," in Proc. Am. Philos. Society, vol. x. (1868), pp. 389 ff.; and for the Arikara, have compared Prince Maximilian Wied-Neuwied's vocabulary (Reise, T. II. s. 465 ff.), and that of Geo. Catlin, in "Letters and Notes on the N. A. Indians," ii. 262.

lower from higher numbers is observable throughout, combined with the common expedients of vigesimal notation :

| | |
|---|--|
| 30, <i>saw'u</i> (<i>saiü</i> , Maxim.) | 40, <i>pit'iku-nanü</i> = 2 persons |
| 32, <i>wítâu-pítikókh'ini</i> = 20 + 12 | 38, <i>pítikunanu-wan</i> = 40 - |
| 31, <i>wítâu-pítikunákh'ini-wan</i> = (20 + 12) - | 39, <i>pítikunanu-akhokaki</i> = 40, 1 not |

100 is '5 men,' 98 is '5 men *minus*,' and 99, '5 men, 1 not'; and so on.

I will not add to the length of this paper by pointing out its shortcomings. It is offered not as a contribution to American linguistics, but with the purpose of showing, by examples taken from a few families of American speech, that it is unsafe to assume uniformity in the conception or the expression of numbers, even in dialects of the same language, much less in languages whose affinity is not yet proved; and that it is equally unsafe to assume that the 'hand' or 'finger' always gives its own name to the number it serves to mark in digital numeration—in other words, that 'two' must = 'hands' or 'fingers,' and 'five' or 'ten' = 'hand'; that although a general correspondence of numeral series in two languages may justify the inference that both came from one stock, yet no evidence of such affinity is presented by occasional coincidences between single numerals in different languages or between the name of any number in one language and that of the 'hand' or 'finger' from which in another that name might have been derived; but that the value of such coincidences must depend on the analysis of the names and the ascertained meaning of their components or roots. I have thought it not impossible that, from a field as yet almost unworked, some of the results obtained in even so partial a survey might interest comparative philologists, as bearing on the question of the origin of ideas of number and the beginnings of the art of counting—antecedent to digital numeration.

The comparison of only a few dialects is sufficient to prove that the process of mental development in the apprehension of numbers has not been uniform. The Algonkin Indian and the Arikara have not taken the same way from the primary conception of number to the full decimal system. It is

equally evident, that one tribe may have advanced further than another *before* resorting to finger-counting or establishing a regular sequence of earlier-acquired conceptions of number. The priority of the conception of 'one' to that of 'two,' or of 'three' to 'four'—or of the vocal expression of either conception—is not determined by priority in the numeral series. To one tribe, progression by *pairs* may have seemed as natural as progression by *units* does to those of higher culture; and the result would be a system—partially represented by the Arikara—in which the *even* numbers were the earlier named, and the odd numbers intercalated, just as differences by *halves* or other fractional parts might be intercalated in the Indo-European decimal system. The pre-digital numerals so formed might include the 4, the natural order being

2, 1, 4, 3,

that is:

a pair, less, 2 pairs, between (2 and 2×2).

Or it might stop at the 3, as *trans* 2. No evidence is found that any tribe has advanced beyond 4 without digital numeration, and there are few numeral systems in which some reference to the hand or the fingers may not be detected in the name either of 3 or of 4. But when 3 = 'middle,' 'between,' or 'half-way'—as in the Algonkin languages—it is not possible to decide whether this meaning comes directly from the 'middle finger' (half-way to 5), or from position between 'pair' and 'pair of pairs,' i. e. between 2 and 4.

