

ART. LXIII.—*Maori Numeration : Being a Reply to Mr. Elsdon Best's Paper on "Maori Numeration" in Trans. N.Z. Inst., Vol. xxxix.*

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IN view of the splendid contributions to science which this Institute has from time to time published in its Transactions and Proceedings, many of which I have read, I have very much pleasure indeed, and no little diffidence, in submitting for consideration an essay of a somewhat critical nature on the subject of Maori numeration. Whilst, however, conceding that many subjects discussed by the Institute are necessarily of a controversial character—that of the moa-bird, for instance, no living specimens of which have been accessible to students—I should like to make my present position quite clear by stating at the outset that there is no important subject in which I myself am interested so little open to controversial and argumentative discussion as that of Maori numeration. Looking back through the century of years just closed, we see its ample field crowded with living Native specimens, with wise men having a just knowledge of this particular subject, and a knowledge which has been readily imparted to the inquirer. Not only so, but the Maori is a keen, an eager debater and controversialist : some of his finest literary remains are found to-day in what are known as "disputation songs"—i.e., *waiata tautohetohe*, or *waiata tautitotito*. A great advocate for "correct forms," one of the readiest phrases which fell from the lips of the elders was "*Kia tika*," or "Be exact." And so, although disputes have been waged abroad on a thousand-and-one subjects of historical uncertainty and interest—such as that of descent, ancestry, traditional canoes, the introduction of the *kumara* tuber, causes of inter-tribal warfare, women, lands, and even to so minute a question as the interpretation of an historical passage or the primary meaning of a certain historical term—no marked disputation concerning either principle or detail of the system of numeration as regularly taught and practised by him has been recorded. The inference is obvious. The Maori system of numeration as generally known is at once so methodical in its arrangements, so well defined in its parts, and so comprehensive in its form that apparently no sufficient ground for disputation has presented itself.

These preliminary observations are suggested by the recent perusal of an article on Maori numeration, by Mr. Elsdon Best, which appears in the Transactions of this Institute (vol. xxxix, p. 150). Mr. Best has been long and very favourably known as a sturdy contributor to the pages of Maori literature, and containing, as his productions usually do, a large proportion of purely Native material, he has placed on record a quantity of most interesting, useful, and highly informing original Native matter. In the voluminous article under notice, however, it is strikingly apparent that Mr. Best has deviated widely from his usual course. The Native originals which he presents are comparatively few, and those few unimportant and misleading. He wanders far outside the area of Maori research, and, as a consequence, he appears to have done himself and his subject alike a very grave injustice. In the weakness of his authorities, in the enlarging of his field, and in labouring to prove that which is not possible, Mr. Best exhibits

a peculiarly capricious estimate of the whole subject. He has, in short, so clouded the outlook of otherwise clear premises that, in the name and interests of truth, I venture this protest.

In the course of submitting the following numerical tables illustrative of the original system of Maori numeration, I propose to demonstrate that Mr. Best's observations on (a) the numeral prefix are entirely inadequate, and that those on (b) the term *ngahuru* and (c) the term *tekau* require considerable modification.

(a.) THE NUMERAL PREFIX.

Mr. Best states, "To the above terms [*tahi*, *rua*, *toru*, &c.] various prefixes are applied. When using any of these expressions for numbers in conversation, or when enumerating articles, the term *ko* is prefixed to the first, which thus becomes *kotahi*. From two to nine inclusive the prefix is *e*. To *ngahuru* no prefix is applied as a cardinal, but as an ordinal *tua* is so employed: *tua-ngahuru* = tenth. *Tekau*, the modern term for ten, never bears a prefix, the ordinal being expressed by the use of the definite article: *te tekau* = the tenth. Thus we have the cardinal numbers as follows:—

"Ko-tahi = one	E-ono = six
E-rua = two	E-whitu = seven
E-toru = three	E-warū = eight
E-wha = four	E-iwa = nine
E-rima = five	Ngahuru, or tekau = ten

as used in Maori. These terms are often used when counting. But an ancient and more correct style of actual enumeration is by prefixing *ka* to the numerals. Probably, however, *ka* is not a true prefix in this case: for my own part, I do not so regard it," &c.

That extract in itself justifies my statement that the writer held a very capricious estimate of the special knowledge peculiarly required in this particular matter. In the first place, *kotahi* means single and alone rather than one of a series—as, one, two, three. We may speak of *kotahi*, a single one; of *kotahi tekau*, a single ten; of *kotahi rau*, a single hundred; and of *kotahi mano*, a single thousand: but not of *kotahi* as a first one, as a precursor to some following number. For that very reason, *kotahi* is not used by competent speakers where such a thing as progressive numeration follows. The prefix *e* of his example is derived, as I shall presently show, from a different source altogether. The numeral prefix *e*, which speaks in the plural sense, is derived from *he*, which speaks in the singular sense. Thus: *He-tahi*, *e-rua*, *e-toru*, and so on. *Ka*, too, as we shall presently see, is an undoubtedly proper and true numeral prefix. As to numeral prefixes not applying to the terms *ngahuru* and *tekau*, I will presently show that most, if not all, numeral prefixes do properly so apply.

But first I would submit that the Maori language is a scientific language—that it is not a fabric of merely adventitious texture. By way of illustrating this, let us for a moment consider such well-known terms as *arero*, *reo*, *korero* = the tongue, the voice, to speak. To the Maori ear a relationship is set up of these terms by the similitude of sounds and letters. This similitude, I submit, is intentional. Moreover, it is an indisputable fact that the Maori has given a different name to every species of bird, fish, tree, shrub, plant, weed, stone, cloud-formation, colour and tint, cardinal and intermediate wind-point—in short, to the sum total of visible phenomena as known to him—without either repetition or confusion. In the same sense, the various stages of a progressive action, from simple to

complex, can be faithfully—need I urge, graphically—described. Could such a state of things exist if his language was crude, inadequate, unscientific? I think not. In its perspicuity, in its comprehensiveness, I have found the Maori language to be, in its particular domain, absolutely reliable, and free from confusion of sense. Those good qualities, I shall now proceed to show, he has worked into his system of numeration—premising that if I fail to make this clear it is my fault, and not the fault of the system.

The Maori system of numeration was perfected by means of the ancillary prefix. He found five vowels in his language—*a, e, i, o, and u*—and those letters he appears to have deliberately employed as aids in the conveying of different senses of numeration which different situations created. By taking these letters seriatim we can learn both of the manner in which he used them and the ends which he had before him. The first vowel, then, is *a*; this he uses as *ka*. As a numeral prefix *ka* answers the question, “How many does that make?”

[NOTE.—*Ma* is used as a numeral conjunction signifying “and”; it serves as a threadle with which to catch up the successive units to loop them on to their respective tens. The definite article *te* (the), its plural *nga* (the), and the indefinite article *he* (plurally *e*) are used as occasion requires.]

TABLE A.

Ka tahi .. .. .	..	..	..	..	That makes one	= 1
Ka rua .. .. .	..	..	..	..	two	2
Ka toru .. .. .	..	..	..	..	three	3
Ka wha .. .. .	..	..	..	..	four	4
Ka rima .. .. .	..	..	..	..	five	5
Ka ono .. .. .	..	..	..	..	six	6
Ka whitu .. .. .	..	..	..	..	seven	7
Ka waru .. .. .	..	..	..	..	eight	8
Ka iwa .. .. .	..	..	..	..	nine	9
Ka tahi te tekau .. .. .	..	..	..	..	That makes the one ten	10
Ka tekau ma-tahi .. .. .	..	..	..	..	ten and one	11
Ka tekau ma-rua .. .. .	..	..	..	..	ten and two	12
Ka tekau ma-toru .. .. .	..	..	..	..	ten and three	13
Ka tekau ma-wha .. .. .	..	..	..	..	ten and four	14
Ka tekau ma-rima .. .. .	..	..	..	..	ten and five	15
Ka tekau ma-ono .. .. .	..	..	..	..	ten and six	16
Ka tekau ma-whitu .. .. .	..	..	..	..	ten and seven	17
Ka tekau ma-warū .. .. .	..	..	..	..	ten and eight	18
Ka tekau ma-iwa .. .. .	..	..	..	..	ten and nine	19
Ka rua nga tekau .. .. .	..	..	..	..	the two tens	20
Ka rua tekau ma-tahi .. .. .	..	..	..	..	That makes two tens and one	21
Ka rua tekau ma-rua .. .. .	..	..	..	..	two tens and two	22
Ka rua tekau ma-toru .. .. .	..	..	..	..	two tens and three	23
Ka rua tekau ma-wha .. .. .	..	..	..	..	two tens and four	24
Ka rua tekau ma-rima .. .. .	..	..	..	..	two tens and five	25
Ka rua tekau ma-ono .. .. .	..	..	..	..	two tens and six	26
Ka rua tekau ma-whitu .. .. .	..	..	..	..	two tens and seven	27
Ka rua tekau ma-warū .. .. .	..	..	..	..	two tens and eight	28
Ka rua tekau ma-iwa .. .. .	..	..	..	..	two tens and nine	29
Ka toru nga tekau .. .. .	..	..	..	..	the three tens	30
Ka toru tekau ma-tahi .. .. .	..	..	..	..	three tens and one	31*
Ka toru tekau ma-iwa .. .. .	..	..	..	..	three tens and nine	39
Ka wha nga tekau .. .. .	..	..	..	..	the four tens	40
Ka wha tekau ma-tahi .. .. .	..	..	..	..	four tens and one	41
Ka wha tekau ma-iwa .. .. .	..	..	..	..	four tens and nine	49

* And so on, adding successive units, to 38. To save space, in each case only the first unit and the last unit are given.

TABLE A—continued.

Ka rima nga tekau	That makes the five tens	=50
Ka rima tekau ma-tahi	five tens and one	51
Ka rima tekau ma-iwa	five tens and nine	59
Ka ono nga tekau	the six tens	60
Ka ono tekau ma-tahi	six tens and one	61
Ka ono tekau ma-iwa	six tens and nine	69
Ka whitu nga tekau	the seven tens	70
Ka whitu tekau ma-tahi	seven tens and one	71
Ka whitu tekau ma-iwa	seven tens and nine	79
Ka waru nga tekau	the eight tens	80
Ka waru tekau ma-tahi	eight tens and one	81
Ka waru tekau ma-iwa	eight tens and nine	89
Ka iwa nga tekau	the nine tens	90
Ka iwa tekau ma-tahi	nine tens and one	91
Ka iwa tekau ma-iwa	nine tens and nine	99
Ka kotahi te rau	the one hundred	100
Ka kotahi te rau ma-tahi	That makes the one hundred and one	101
Ka kotahi te rau ma-iwa	one hundred and nine	109
Ka kotahi te rau, ka kotahi te tekau	That makes the one hundred and the one ten	110
Ka rau, ka kotahi te tekau ma-tahi	one hundred, one ten, and one	111
Ka rau, ka kotahi te kau ma-iwa	one hundred, ten, and nine	119
Ka kotahi te rau, ka rua nga tekau	the one hundred and the two tens	120

So the process goes on, by simply linking up the units to the tens and the tens to the hundreds, until a thousand is reached. I will now, therefore, merely set up the hundreds :—

Ka rua nga rau	That makes the two hundreds	= 200
Ka toru nga rau	three hundreds	300
Ka wha nga rau	four hundreds	400
Ka rima nga rau	five hundreds	500
Ka ono nga rau	six hundreds	600
Ka whitu nga rau	seven hundreds	700
Ka waru nga rau	eight hundreds	800
Ka iwa nga rau	nine hundreds	900
Ka iwa nga rau, ka iwa nga tekau ma-iwa	That makes the nine hundreds, nine tens, and nine	999
Ka kotahi te mano	That makes the one thousand	1,000
Ka mano	a thousand.	
Ka mano tini	innumerable thousands.	
Ka mano tuareka	a thousand thousands.	
Ka mano tini whaioio	countless thousands.	
Ka ngea, ka ngea, ka ngea	an inconceivable number.	

In that method the uses of the numeral prefix *ka* are fully shown. It will be observed that after a hundred is reached *ka* is used both before the hundred and before its accompanying ten. The articles are used in a precisely similar way, on the principle that an article must appear before each substantive in a sentence—as, *Te waka me nga hoe* = *the canoe and the paddles*.

It is interesting to note that the Natives of Easter Island use identically the same *ka* numeral prefix method, including its repetition in a single sentence, and its process from the lowest number—*ka-tahi* = one—to the very highest, in a table of progressive numeration. The dialect of this branch of the race appears to approach Maori very closely—much more so than that of any other branch. In a publication issued by the United States Government, entitled “Report of National Museum, 1889,” specimens of this dialect are given, and its concluding page contains a table

of numerals which is of the first importance to this inquiry. There is but one table set out, and it progresses step by step. From that table I submit the following extracts :—

1. Ka-tahi.
11. Ka-tahi te angahuru, ka-tahi. (Note the repeated *ka*.)
100. Ka rau.
101. Ka tahi te rau ma-tahi. (Note the *ma-tahi*.)
200. Ka rua te rau. (Note the peculiar use of the singular article.)
201. Ka rua te rau ma-tahi.
300. Ka toru te rau.
301. Ka toru te rau ma-tahi.
400. Ka ha te rau.

And so on.

In comparing this with our Table A, internal differences are readily observed. For instance, the use of the article singular for both the singular and the plural—*ka tahi te rau*, and *Ka rua te rau*. The repeated *ka*, too, is used to usurp the place of *ma—ma*, it appears, not being used until a hundred is reached—*ka tahi te rau ma tahi*—whereas with the Maori it is after a hundred is reached that the *ka* is repeated. Obviously their *ma-tahi* means “and one,” just as it does with us, and it is as proper to their “ten and one” as it is to their “hundred and one,” in which it first appears. That, however, and the misuse of the singular article *te* in connection with the plural number—*ka toru te rau* = the three hundreds—may be entirely due to the compilers of their table. It is in nice matters that special knowledge on the part of the compiler is very much needed; the pity of it is that such knowledge is too rare. However, as the table stands, and notwithstanding its apparent defects, it is a fine (because independent) example of this particular method of Maori numeration. Under “*Ngahuru*,” we shall have occasion to further notice it.

Let us now, and more briefly, consider the uses of the next vowel, *e*. *E* speaks in a plural sense; in a singular sense it is used as *he*. As a numerical prefix, *e* or *he* answers the question, “How many is (or are) there?”

TABLE B.

He tahi	There is one	= 1
E rua	There are two	2
E toru	“ three	3
E wha	“ four	4
E rima	“ five	5
E ono	“ six	6
E whitu	“ seven	7
E waru	“ eight	8
E iwa	“ nine	9
He tekau	There is ten	10
He tekau ma-tahi	There is ten and one	11
He tekau ma-rua	“ ten and two	12
He tekau ma-toru	“ ten and three	13
He tekau ma-wha	“ ten and four	14
He tekau ma-rima	“ ten and five	15
He tekau ma-ono	“ ten and six	16
He tekau ma-whitu	“ ten and seven	17
He tekau ma-warū	“ ten and eight	18
He tekau ma-iwa	“ ten and nine	19
E rua nga tekau	There are the two tens	20
E rua tekau ma-tahi	“ two tens and one	21
E rua tekau ma-iwa	“ two tens and nine	29
E toru nga tekau	the three tens	30
E toru tekau ma-iwa	three tens and nine	39
E wha nga tekau	the four tens	40

TABLE B—continued.

E wha tekau ma-iwa	..	..	There are four tens and nine	=49
E rima nga tekau	..	..	the five tens	50
E rima tekau ma-iwa	..	..	five tens and nine	59
E ono nga tekau	..	..	the six tens	60
E ono tekau ma-iwa	..	..	six tens and nine	69
E whitu nga tekau	..	..	the seven tens	70
E whitu tekau ma-iwa	..	..	seven tens and nine	79
E waru nga tekau	..	..	the eight tens	80
E waru tekau ma-iwa	..	..	eight tens and nine	89
E iwa nga tekau	..	..	the nine tens	90
E iwa tekau ma-iwa	..	..	nine tens and nine	99
He rau	..	..	There is a hundred	100
He rau me te tahi	..	..	a hundred with one added	101
He rau me te tekau	..	..	a hundred with ten added	110
He rau, he tekau, ma-tahi	..	..	a hundred, a ten, and one	111
He rau, e rua nga tekau	..	..	a hundred with the two tens added	120
E rua nga rau	..	..	There are the two hundreds	200
E toru nga rau	..	..	three hundreds	300
E wha nga rau	..	..	four hundreds	400
E rima nga rau	..	..	five hundreds	500
E ono nga rau	..	..	six hundreds	600
E whitu nga rau	..	..	seven hundreds	700
E waru nga rau	..	..	eight hundreds	800
E iwa nga rau	..	..	nine hundreds	900
E iwa nga rau, e iwa nga te- kau, ma-iwa	..	..	nine hundreds, nine tens, and nine	999
He mano	..	..	There is a thousand	1,000
He mano tini	..	..	innumerable.	
He mano tuarea	..	..	a thousand thousands.	
He mano tini whaloio	..	..	a countless number of thousands.	
He ngea, he ngea, he ngea	..	..	an inconceivable number—myriads.	

Observe that the numeral prefix is indispensable throughout.

**Hei*, as a numeral prefix, answers the question, "How many times does this make?"

Hei tahi	..	..	One.	Hei rima	..	Five.
Hei rua	..	..	Two.	Hei tekau	..	Ten.
Hei toru	..	..	Three.	Hei rau	..	A hundred
Hei wha	..	..	Four.	Hei mano	..	A thousand.

We now proceed to consider the uses of the next vowel, *i*. This vowel is used in the term *kia*. As a numeral prefix, *kia* answers such questions as, "How many will you have?" "How many are there to be?"

TABLE C.

Kia tahi	..	..	..	Let there be one	= 1
Kia rua	..	..	..	two	2
Kia toru	..	..	..	three	3
Kia wha	..	..	..	four	4
Kia rima	..	..	..	five	5
Kia ono	..	..	..	six	6
Kia whitu	..	..	..	seven	7
Kia waru	..	..	..	eight	8
Kia iwa	..	..	..	nine	9
Kia tekau	..	..	..	ten	10
Kia tekau ma-tahi	..	..	..	ten and one	11
Kia rua nga tekau	..	..	..	the two tens	20
Kia toru nga tekau	..	..	..	the three tens	30
Kia wha nga tekau	..	..	..	the four tens	40
Kia rima nga tekau	..	..	..	the five tens	50
Kia ono nga tekau	..	..	..	the six tens	60
Kia whitu nga tekau	..	..	..	the seven tens	70

TABLE C—continued.

Kia waru nga tekau	..	..	Let there be eight tens	= 80
Kia iwa nga tekau	..	..	nine tens	90
Kia kotahi te rau	..	..	the one hundred	100
Kia rua nga rau	..	..	the two hundreds	200
Kia toru nga rau	..	..	the three hundreds	300
Kia wha nga rau	..	..	the four hundreds	400
Kia rima nga rau	..	..	the five hundreds	500
Kia ono nga rau	..	..	the six hundreds	600
Kia whitu nga rau	..	..	the seven hundreds	700
Kia waru nga rau	..	..	the eight hundreds	800
Kia iwa nga rau	..	..	the nine hundreds	900
Kia iwa nga rau, kia iwa nga tekau,	..	..	the nine hundreds, 999	
ma-iwa			nine tens, and nine	
Kia kotahi te mano	..	..	the one thousand	1,000
Kia mano tini	..	..	thousands innumerable.	
Kia kotahi te mano tuarea	..	..	one thousand thousands.	
Kia mano tini whaioio	..	..	countless thousands.	
Kia ngea, kia ngea, kia ngea	..	..	inconceivable—myriads.	

The next vowel whose processes we may consider is *o*. As a numeral prefix, *o* appears in *ko*, *toko*, and *hoko*. In each case it speaks exclusively of persons, of personal doings, and of personal possessions. In progressive numeration *ko* is used with an article, giving to its numeral the sense of an ordinal of the personal element.

TABLE D.

Ko te tahi	..	..	'Tis the first.
Ko te rua	..	..	second.
Ko te toru	..	..	third.
Ko te wha	..	..	fourth.
Ko te rima	..	..	fifth.
Ko te ono	..	..	sixth.
Ko te whitu	..	..	seventh.
Ko te waru	..	..	eighth.
Ko te iwa	..	..	ninth.
Ko te tekau	..	..	tenth.
Ko te tekau ma-tahi	..	..	eleventh.
Ko te tekau ma-rua	..	..	twelfth.
Ko te rua tekau	..	..	twentieth (singular article).
Ko te toru tekau	..	..	thirtieth.
Ko te wha tekau	..	..	fortieth.
Ko te rima tekau	..	..	fiftieth.
Ko te ono tekau	..	..	sixtieth.
Ko te whitu tekau	..	..	seventieth.
Ko te waru tekau	..	..	eightieth.
Ko te iwa tekau	..	..	nintieth.
Ko te iwa tekau ma-iwa	..	..	ninety-ninth.
Ko te tahi o nga rau	..	..	first of the hundreds.
Ko te rua o nga rau	..	..	two hundredth.
Ko te toru o nga rau	..	..	three hundredth.
Ko te mano	..	..	thousandth.

In proceeding to discuss the allied prefixes *toko* and *hoko* it is necessary to bear in mind that we are considering various clearly defined methods of progressive numeration. Those who have read the article under notice, by Mr. Best, are doubtless aware that he himself had this object in view. Now, on page 152 Mr. Best sets out a table in which the numeral prefix *toko* substantially operates. In that table unity of method is completely destroyed by the intrusion of the initial term *kotahi* and the final term *tekau*, neither of which is proper to it. Apparently in justification of the *kotahi*, Mr. Best writes, "During a residence of eleven years' duration among the Tuhoe

Tribe, once only have I heard *toko* prefixed to *tahi*." Premising that a typical instance of the use of *toko-tahi* is to be found in Grey's "Polynesian Mythology" (page 51), it is a rule in good Maori speech that an answer to a question conforms verbally to the question itself. A few examples will illustrate this rule :—

1. Ko whea koe ? Ko Hokianga Au. (Ko—Ko.)
2. Kei hea tena whenua ? Kei raro (Kei—Kei.)
3. E haere ana koe ko te aha ? E haere ana Au ko te toro i aku whanaunga.
(E haere ana ko—E haere ana ko.)
4. A hea koe hoki mai ai ? A te Marama ki tua nei. (A—A.)
5. Toko-hia o hoa haere ? Toko-tahi tonu. (Toko—Toko.)

And so on.

That rule holds good in numeration. Thus, when the question is—

Ka hia ?	Answer,	Ka tahi.
E hia ?	„	E rua.
Kia hia ?	„	Kia wha.
Ko te hia ?	„	Ko te rima.
Toko-hia ?	„	Toko-tahi.

In the answer the number is, of course, regulated by its fact. All of which should be too obvious to require lengthy explanation. *Toko-tahi* is therefore proper to the *toko* table. *Tekau*, however, is not proper to the table, because (a) we are treating of numeral prefixes, and (b) without a prefix *tekau* conveys no particular sense. Mr. Best was confronted with the peculiarity that *toko-tekau* is not used ; it is at that point that *hoko*, a multiple of ten, carries forward this method of numeration. Therefore, *hoko-tahi* = one ten, or ten times one (persons). The following is the regular form of the *toko* (and its allied term, *hoko*) table :—

Toko-tahi	one person	= 1	Hoko-tahi	One ten	= 10
Toko-rua	two persons	2	Hoko-rua	Two tens	20
Toko-toru	three „	3	Hoko-toru	Three tens	30
Toko-wha	four „	4	Hoko-wha	Four tens	40
Toko-rima	five „	5	Hoko-rima	Five tens	50
Toko-ono	six „	6	Hoko-ono	Six tens	60
Toko-whitu	seven „	7	Hoko-whitu	Seven tens	70
Toko-warū	eight „	8	Hoko-warū	Eight tens	80
Toko-iwa	nine „	9	Hoko-iwa	Nine tens	90

Here the method ends, for, as *toko* finishes with the ninth unit, so *hoko* finishes at the ninth ten. But *hoko* proceeds to higher numbers with the aid of a suffix—the suffix *topu*, the literal meaning of which is “to double.” In setting out this table of higher numeration, it serves the purposes of clarity by proceeding from the simple to the complex, thus (prefix as sense requires) :—

Tahi-pu	Twice one	= 2
Rua-pu	two	4
Toru-pu	three	6
Wha-pu	four	8
Rima-pu	five	10
Ono-pu	six	12
Whitu-pu	seven	14
Warū-pu	eight	16
Iwa-pu	nine	18
Tekau topu	ten	20
Rua tekau topu	twenty	40
Toru tekau topu	thirty	60

Wha tekau topu	Twice forty	= 80
Rima tekau topu	„ fifty	100
Ono tekau topu	„ sixty	120
Whitu tekau topu	„ seventy	140
Waru tekau topu	„ eighty	160
Iwa tekau topu	„ ninety	180
Kotahi rau topu	„ one hundred	200
Rua rau topu	„ two hundred	400
Toru rau topu	„ three hundred	600
Wha rau topu	„ four hundred	800
Rima rau topu	„ five hundred	1,000
Kotahi mano topu	„ one thousand	2,000

(Higher numbers as required. When absolute exactness is required, an odd one is referred to as *tai-tahi* or *tau-tahi*.)

Strictly of persons :—

Hoko-tahi topu	Ten ones doubled	= 20
Hoko-rua topu	Ten twos doubled	40
Hoko-toru topu	Ten threes doubled	60
Hoko-wha topu	Ten fours doubled	80
Hoko-rima topu	Ten fives doubled	100
Hoko-ono topu	Ten sixes doubled	120
Hoko-whitu topu	Ten sevens doubled	140
Hoko-waru topu	Ten eights doubled	160
Hoko-iwa topu	Ten nines doubled	180
He rua rau tangata tonu	A number of two hundred men	200
He rua rau me te hoko-tahi	Two hundred and one ten	210
He rua rau me te hoko-rua	Two hundred and two tens	220

So the process may be continued to any known number. Quoting Maunsell's "Maori Grammar," Mr. Best notes, "The Maori mode of counting has always heretofore been by pairs: thus *hoko-rua*, twenty, stands for twenty pair—i.e., forty—and so on. When they wish it to be understood singly they postfix *takitaki* to the numeral adjective—i.e., *hoko-rua takitaki* = twenty." The extraordinary statement that the Maori mode of counting has "always heretofore been by pairs" is absolutely beneath notice. Of a dozen or so distinct modes, one only is by means of doubling, and this mode Mr. Maunsell miscalls "by pairs." A counting by pairs is described as a *tatau-a-takirua*—literally, a counting two by two. The term *topu*, or *pu*, has no use in that connection, but is used for lots, bundles, parcels, and so forth, without reference to the number which each might contain. As to *hokorua takitahi*, such a phrase is proper in a case of misunderstanding. A speaker may be asked, "Are you speaking of twenty doubled (*hoko-rua pu*)?" and he may answer, "Oh, no; I am speaking of twenty singly (*hoko-rua taki-tahi*)."¹ Beyond this the phrase has no peculiar significance.

Taki is a numeral prefix, and as such answers the question, "How were the numbers made up?"—

Taki-tahi	By ones.	Taki-waru	By eights.
Taki-rua	„ twos.	Taki-iwa	„ nines.
Taki-toru	„ threes.	Taki-tekau	„ tens.
Taki-wha	„ fours.	Taki-rua tekau	„ twenties.
Taki-rima	„ fives.	Taki toru tekau	„ thirties.
Taki-ono	„ sixes.	Taki rau	„ hundreds.
Taki-whitu	„ sevens.	Taki mano	„ thousands.

We now reach the final vowel of our series, which is *u*. As we have seen, it occurs in the suffix *pu*. It also occurs in the ordinal prefix *tuā*,

a prefix which answers the question as to the order in which a person or thing stands :—

TABLE E.

Tua-tahi	..	..	First.	Tua-warū	..	..	Eighth.
Tua-rua	..	..	Second.	Tua-iwa	..	..	Ninth.
Tua-toru	..	..	Third.	Tua tekau	..	..	Tenth.
Tua-wha	..	..	Fourth.	Tua rua tekau	..	..	Twentieth.
Tua-rima	..	..	Fifth.	Tua toru tekau	..	..	Thirtieth.
Tua-ono	..	..	Sixth.	Tua rau	..	..	Hundredth.
Tua-whitu	..	..	Seventh.	Tua mano	..	..	Thousandth.

Having thus far, with more or less detail, set out the various numeral prefixes used by the Maori in these original modes of numeration, and having also demonstrated an apparently systematic adoption of the five vowels in the original arrangement of those prefixes, as in Tables A, B, C, D, and E, I now pass on to other considerations. The functions of the various numeral prefixes have been clearly shown, without burdening the tables with minor and, after all, inconsequential detail. In the methods before him, the student is provided with the material on the lines of which he may extend the process, by detail, to its limits.

I have not followed Mr. Best along his many prospecting-by-paths ; to do so would be alike tedious and unprofitable. To give one instance (page 159) : “ It appears to me that at some period of their history the Maori must have used a vigesimal numerical method—a system of counting by scores, or twenties. I shall include in this paper a table showing the method so far as I have been able to ascertain it from my local Native friends. It will be observed that there was a special term (*tekau*) for twenty, but none for thirty ; a special term (*hokorua*) for forty, but none for fifty ; a special term (*hokotoru*) for sixty, but none for seventy ; and so on.” All of which is to say that “ ten ” meant twenty, that “ twenty ” meant forty, and that “ thirty ” meant sixty, without the aid of the necessary word “ to double ” (*topu*), making ten twice ten, and so on. Such a proposition makes for the confounding of the whole of a well-ordered system, and reason refuses to discuss it. If there is a distinct method of counting by scores, or *tatau-a-rua tekau*, other than—

Hoko-tahi pu	..	..	..	..	Ten doubled	= 20
Hoko-rua pu	..	..	..	..	Twenty doubled	40
Hoko-toru pu	..	..	..	..	Thirty doubled	60

by all means let us know of it ; but pray do not attach a double force to terms the values of which are known and fixed. Why not—

Hoko-rua	..	..	..	..	Twenty
Hoko-wha	..	..	..	..	Forty
Hoko-ono	..	..	..	..	Sixty

in which the meanings of the terms are not strained ? But let us pass on.

(b.) THE TERM “ NGAHURU.”

It is not too much to claim that the Maori said what he meant, and meant what he said. To put this in another way, it is a rule that a Maori word, or a term, has a certain well-defined primary meaning. The accepted primary meaning of the term *ngahuru* is “ the fulness, the abundance,” as is more fully set out in the extended form—*nga-huru kai paenga* = the fulness, the abundance of food ; therefore, “ harvest-time, the harvest month.”

The harvest month is the month of March (the Maori year commences in June), which is the tenth month of the Maori year. *Nga-huru*, therefore, has become the name for and commonly indicates the tenth month, and from this fact it apparently derives that secondary meaning of tenth which is commonly used in rituals of thanks-offering to the gods, in religious subjects generally, and especially in matters bearing upon food-crops. The term *nga-huru*, then, is used for the tenth month, for a tenth portion of food, for the tenth heaven, and so on. It is to be found in the rituals to Tane, as lord of the year; to Rongo, as lord of the harvest; also to the divinity Tawhaki. That explanation is intended to illustrate that the term *nga-huru* is semi-religious in its functions, that its use is special and restricted, and that it is not applied to ordinary numeration by those who understand its true mission.

The following original Maori terms for the four seasons of the year—*Ao o te tau*, *Wa o te tau*—show the true place and meaning of *nga-huru* :—

Hotoke or *makariri* = piercing colds—winter.

Ma-huru or *koanga* = returning warmth, digging-time—spring.

Raumati = leaf-crumpler, water-evaporator—summer.

Nga-huru = fulness of abundance, harvest-time—autumn.

Takurua = midwinter.

Rehua = midsummer.

Each separate month (*marama*) has also its characteristic name. I present one set, which is useful to the purposes of this inquiry. The *Tamatea* here (lit., “Bright son”) speaks of the sun itself; the *tu* (lit., “to stand”) speaks of the change of position which the sun monthly takes up in his annual progress :—

Tamatea tu tahi	..	Tamatea presides over the first	(month).
Tamatea tu rua	..	..	second ..
Tamatea tu toru	..	..	third ..
Tamatea tu wha	..	..	fourth ..
Tamatea tu rima	..	..	fifth ..
Tamatea tu ono	..	..	sixth ..
Tamatea tu whitu	..	..	seventh ..
Tamatea tu waru	..	..	eighth ..
Tamatea tu iwa	..	..	ninth ..
Tamatea tu ngahuru	..	..	tenth ..
Tamatea tu ma-tahi	..	..	tenth and one = eleventh (month).
Tamatea tu ma-ruaroa	..	..	tenth and extended two = twelfth (month).

That table shows the true use of *ngahuru* as a factor of numeration. I present another table, which treats of the months by numbers only, in a form which answers the question, “What is the number of this month?”

He tahi ..	..	It is a first.	He waru ..	..	It is an eighth.
He rua ..	..	.. second.	He iwa ..	..	It is a ninth.
He toru ..	..	.. third.	He ngahuru ..	..	tenth.
He wha ..	..	.. fourth.	He ngahuru taitahi ..	..	tenth and an odd one = eleventh.
He rima ..	..	.. fifth.	He ngahuru tairua ..	..	tenth and two odd ones = twelfth.
He ono ..	..	.. sixth.			
He whitu ..	..	.. seventh.			

The following ritual is based on the ancient myth of the ascent of the divinity Tawhaki to the tenth heaven, and, as the heavens are set out numerically, it is of interest to note the process. Its burden is that

Tawhaki ascended the first heaven, then the second, and so on to the tenth :—

Piki ake Tawhaki i te rangi tuatahi	= first heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuarua	= second heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuatoru	= third heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuawha	= fourth heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuarima	= fifth heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuaono	= sixth heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuawhitu	= seventh heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tuawaru	= eighth heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tua-iwa	= ninth heaven.
He rongo te mahaki.	
Piki ake Tawhaki i te rangi tua-ngahuru	= tenth heaven.
He rongo te mahaki.	

Upon his reaching this tenth (*ngahuru*) heaven, the ritual proceeds to recite his doings there. It is to this Tawhaki that a tithe or tenth portion of food is offered up, and the following reference to the practice occurs in White's "Ancient History of the Maori" (vol. i, p. 40): "*E kore e kiia te kai tuku ki a Tawhaki ki te kupu nei 'Tekau,' engari 'Ngahuru'*"; which is to say, (A tenth portion of) food offered up to Tawhaki is not served in the ordinary term 'Tekau,' but (is served in the term) 'Ngahuru.'" That instruction is definite and very much to the point, which is that the term *ngahuru* has a peculiar mission: to use the ordinary term *tekau* in the place of *ngahuru* is a subversion of that mission.

In the light of that explanation of the history of the term *ngahuru*, and in the light of the examples given, which may be multiplied by genuine reference, I have no hesitation whatever to ask students to accept that, to the Maori, *ngahuru* is not a name for ten.

From those examples, which indicate the peculiarity of the meaning of the term *ngahuru*, a peculiarity which restricts its use—in a method of progressive numeration—to the number twelfth, I pass on to consider the misuse of the term by Mr. Best.

In his examples and tables Mr. Best freely uses the term *ngahuru* as representing ten. For the correctness of this (mis)use he cites no acceptable Maori authority, but he does quote authority: "*Ngahuru*.—This is the old Maori word for ten, now replaced by the term *tekau*. This word [presumably *ngahuru*], recognisable under various letter-changes, is in use over a wide area in the Pacific: Rarotongan, *ngauru* = ten; Hawaiian, *anauhi* = ten days; Samoan, *gafulu* = ten. (See Tregear's Dictionary for many other comparatives)"; and so on. So that, failing Maori authority on a subject which he has the assurance to entitle "Maori Numeration," Mr. Best calmly refers the inquirer to those remote sources. Now, while one does not object to Mr. Best going abroad to seek all the information he can, one does object to his introduction of foreign practices (or alleged practices) to show what the Maori really should do; nay, more, what the Maori does, or did. To those who know little or nothing about the matter it is all very well to say, "See Tregear's Dictionary for many other comparatives." Mr. Best might have added, "See also Turner's 'Samoa' for comparatives." Turner gives a list of numerals purporting to be those

used by natives speaking fifty-nine different dialects. In that list he, quite wrongly, shows that the Maori uses the term *ngahuru* for ten. So it is with the rest of such compilers, who continue to copy each other without improvement. Whereas we require particularities, they give us generalities. *Ngahuru* is a term which has a known history. If the compilers of such comparatives as Mr. Best refers to have anything to offer in regard to this, let them do so now. In the meantime, let us speak of "Maori Numeration."

I quote Mr. Best: "The late Mr. A. S. Atkinson mentions, in a pamphlet published by him in 1893, that both Archdeacon Maunsell and Bishop Williams—two excellent Maori scholars—agreed in saying that among some tribes *ngahuru* meant ten, and *tekau* eleven: Bishop Williams saying that they counted by elevens, the eleventh being a tally; and he compares our 'baker's dozen.'" I quite agree as to the "two excellent Maori scholars," for those two men did the bulk of translating into Maori the contents of the Old and New Testaments, a monumental work. As to their agreement on the question of *ngahuru* meaning ten, I find no evidence of it in their great work. I deny most emphatically that the Maori seriously used *tekau* to indicate eleven, the "baker's dozen" notwithstanding. Apart from that, I find the following paragraphs in the Maori Dictionary which bears Bishop Williams's name on the title-page:—

Ngahuru (a.), ten.

Ngahuru (n.), the name of the eleventh and twelfth months, the eleventh being *ngahuru-kai-paenga* and the twelfth simply *ngahuru*, harvest-time. [Here follows an untranslated Maori reference, which renders, "Let us not go there until the *ngahuru* (i.e., harvest-time); until the food-crops are first safely stored away."]

Those erroneous definitions of the term *ngahuru* constitute one of the few blemishes in a work for which I have little else but praise. Though limited in its extent, in the judicious selection of its references, in the masterful and minute treatment of its examples, as in the faithfulness of its definitions, it has been for very many years, and still is, a most reliable standard work of Maori information.

In the definitions under notice, however, Mr. Williams treats of *ngahuru* as a numeral factor signifying ten, eleventh, twelfth. It is at once obvious that we are given here a set of meanings attached to the single term *ngahuru* which could tend to nothing but confusion. To say that *ngahuru* means ten, that *ngahuru* also means eleventh (for the *kai-paenga*, or food-plenty, cannot help him), and that *ngahuru* also means twelfth, is simply nonsense. No form of Maori speech sets up such a contradictory position. As a matter of fact, *ngahuru* has not the force of ten; *ngahuru* has, as I hope I have sufficiently shown, the force of tenth. *Ngahuru-kai-paenga* literally signifies *ngahuru*-food-plenty, or the food-abundance of harvest-time. It is plain that Mr. Williams does not quite understand the true meaning of *ngahuru*. I say "not quite," because when he speaks of it as a name for either the eleventh or twelfth month he is somewhat near the truth, for it is a name for the tenth month. The paragraphs under notice have already done sufficient mischief, and ought to be expunged from a future edition; for compilers such as Turner would feel quite justified in using terms and meanings which occur in such a commendable work as Williams's Dictionary. A paragraph like the following might be substituted:—

Ngahuru (n.), autumn; harvest-time; a name for the harvest—i.e., tenth month. As an adjective, tenth.

Upon the question of the general use by the islanders of the central Pacific of some form of *ngahuru* for ten I have little to offer. I have made some little progress in the study of several leading dialects, but have found nothing which I would care to adapt to Maori with a view to its improvement. I am not inclined to seek from those sources the first principles of the language, any more than I would expect to find from them particular instructions in matters of Maori art, such as carving and tattooing. While dictionary-makers and compilers generally neglect to define, where ascertainable, the derivation and legitimate uses of words, students will continue to remain very much in the dark as to such. The Hawaiian *anahulu* (= ten days) is something to the purpose, but it is not enough. An Easter Island *angahuru* for ten occurs in our table. But, as I have tried to show, that table exhibits peculiarities which are apparently not entirely due to dialect alone, but rather to compilers and to their assistants. On the other hand, it can be readily proved that the Maori has from time immemorial used the term *mahuru* for spring-time, and that the term speaks of returning warmth and spring growth. It is equally clear that for a similar long period the allied term *ngahuru* has been used to indicate harvest-time, the harvest month—incidentally, the tenth month of the year. What, one may ask, is the original and true meaning of their forms of *ngahuru* to the islanders of the central Pacific? With that question I leave it.

(c.) THE TERM "TEKAU."

The question for our consideration is this: Had the Maori an original name for ten? To those who understand something of the past history and language of the Maori the question would appear to be ridiculous. None the less, that is the position which Mr. Best forces upon us; for he urges that *tekau* sometimes meant ten, that it sometimes meant eleven, and that it sometimes meant twenty. So that *tekau* apparently had no fixed meaning. He states this: "I cannot prove that among all the Maori tribes of New Zealand *tekau* represented twenty"; and so on. Of course Mr. Best cannot prove it; but why should he try? Again, he states, "As old Tutaka expressed it, '*Tekau* as a term for ten is a modern usage. It was the white man and his books that made it known to us.'" "The white man and his books!" Save us from such authorities as we have here!

Mr. Best proceeds, "Several old Natives of the Tuhoe and Ngatiawa Tribes confirm the statement that *tekau* was formerly used to denote twenty, and was not used for ten. As *kau* seems to have been a Polynesian word meaning 'collection' or 'assembly,' then the expression would probably have been originally *te kau* = the whole, or the assembling of the ten fingers and ten toes." "Ten fingers and ten toes!" This is put forward as a suggestion that ten did not really mean ten of the fingers, but twenty—the ten fingers and ten toes together—a suggestion without authority. Presumably it is from the same old Native that Mr. Best obtains his names for the "five fire-children," whose names, according to Mr. Best, are "*takonui* (thumb), *takoroa* (forefinger), *manawa*, *mapere*, *toiti*. These are termed the *tokorima a Maui* (the five of Maui)." The "five of Maui" is an euphemism for the five fingers of man, which produce the sacred fire by means of friction. Now, the name of the thumb is *koromatua*; that of the fingers *matikao*, *matikara*. When a Native wishes to enumerate them in their regular order he uses the numeral prefix *toi* (the *tako* of Mr. Best), in this way: *Toi-nui* (great finger, thumb); *toi-roa* (extended, index finger); *toi-*

mapere (centre finger); *toi-manawa* (pulsation, heart finger); and *toi-iti* (little finger), the *toi* of Mr. Best. There is, you will observe, quite a presentable likeness between this set of terms and that given by Mr. Best. The one particular difference is that, whereas Mr. Best gives *manawa* as the term for the middle finger and *mapere* for the next, I show that the reverse is the case, the simple reason for this being that the *toi-manawa* is literally the heart finger, from *manawa*, heart. It is an instance of the Maori meaning exactly what he says; he does not (neither logically could he) call the middle finger the *manawa*, or heart finger. We have very clear evidence here that those from whom Mr. Best draws his information are—well, very careless in matters of nice knowledge.

Mr. Best goes on: "*Tekau*.—This term, as already observed, is now applied to ten, but the old men of the Tuhoe Tribe agree that in pre-European days it was applied to twenty only, never to ten." Here we have one of many similarly rash statements. It strongly implies that the European has left his mark on the system of Maori numeration. It is scarcely necessary to deny that that is so. There is absolutely not a single trace of European innovation in any of the many different modes of Maori numeration—not a single trace. As to pre-European days, a favourite finger-game of the Maori, *karihi-taka*, undoubtedly belongs to pre-European days; it is, so to speak, as old as the hills. It is a game of ten points, and this is how the points were enumerated:—

Karihi-taka tahi	..	.. One.	Karihi-taka ono	.. Six.
Karihi-taka rua	..	.. Two.	Karihi-taka whitu	.. Seven.
Karihi-taka toru	..	.. Three.	Karihi-taka waru	.. Eight.
Karihi-taka wha	..	.. Four.	Karihi-taka iwa	.. Nine.
Karihi-taka rima	..	.. Five.	Karihi-taka kau	.. Ten. (Game.)

(NOTE.—The *te* of *tekau* is omitted, as its use would mar the otherwise perfect rhythm.)

Again as to pre-European days, it will not, I think, be denied that the earlier Maori recitals, legends, &c., published in Grey's "*Polynesian Mythology*" and White's "*Ancient History of the Maori*," bear internal evidences of genuine antiquity. In one of these recitals—that relating to the wanderings of the divinity Tawhaki and his mortal brother Karihi—you will find the following recorded: "This old lady was at the moment employed in counting some taro-roots which she was about to have cooked, and, as she was blind; she was not aware of the strangers who stole quietly and silently up to her. There were ten taro-roots lying in a heap before her. She began to count them—One, two, three, four, five, six, seven, eight, nine. Just at this moment Tawhaki quietly slipped away the tenth. The old lady felt about everywhere for the tenth, but she could not find it. She thought she must have made some mistake, and so began to count her taro-roots over again very carefully—One, two, three, four, five, six, seven, eight. Just then Tawhaki had slipped away the ninth"; and so on. (Grey's "*Mythology*": English version, pp. 42–3; Maori version, p. 51.) This counting incident is a very essential and characteristic feature of the recital, and there we find the old lady using the *ka* prefix in counting, and the *tekau*, or ten, is used no less than three times. Grey, in his translation, uses the equivalent twice only; I have taken the liberty to insert it a third time in the extract, so that it corresponds exactly with the Maori version. How old the Tawhaki-Karihi legend is it is now useless to inquire, but its roots are deeply struck throughout the central Pacific. In the "*Journal of the Polynesian Society*," vol. vii, p. 40, there occurs the best table of

Maori genealogical descent from Karihi, the human brother of Tawhaki, that I know of. That table shows fifty-two generations from Karihi to living descendants. That represents some 1,456 years.* The point is that we have here very first-class evidence of the ancient usage of *tekau* for ten, a usage which Mr. Best has the assurance to deny.

It may be stated as an indisputable fact that by the original usage of *tekau* for ten the Maori has built up—and slowly—the comprehensive system of numeration of which examples are particularly given in our Tables A, B, C, D, and E. It may also be plainly stated that but for that usage of *tekau* for ten we should not now have had those tables to contemplate. Mr. Best and his authorities must alike fail in any attempts to set up a standard other than ten as an equivalent for *tekau*. Even in Williams's Dictionary the legend occurs, "*Tekau* (a.), ten"; nothing more. The early translators of the Prayer-book and of the New and Old Testaments regularly use *tekau* for ten and tenth; and they have not done this as a mere innovation, but because the Maori so understood it.

CONCLUSION.

During the course of this essay I undertook to incidentally show that Mr. Best's observations on (a) the numeral prefix are entirely inadequate, and that those upon (b) the term *ngahuru* and (c) the term *tekau* require considerable modification.

I submit that I have now sufficiently done so, and, further, that I have shown his authorities to be unreliable in the very matters upon which Mr. Best apparently depended for his proofs.

I now conclude by expressing my belief that the authorities and sources to which I myself have referred the subject will be found to be absolutely reliable. And there I now leave it.

* By a printer's error the son of Karihi—namely, Rutapatapaiawha—has been omitted from the table, which is thus a generation short. The generation-measuring rod which I use I have made from materials supplied by Burke's "Peerage." That work shows that William the Conqueror was born A.D. 1025, and his descendant the present Prince of Wales in the year 1865. Between these dates there is a space of 840 years, representing thirty generations from King to Prince. Thirty multiplied by twenty-eight gives us 840, and thus an authentic measuring-rod of twenty-eight years to each generation. There are fifty-two generations from our Karihi, the human brother of Tawhaki, to his living descendants of the year 1865. Measured by our standard rod of twenty-eight years to a generation, we get 1,456 years, or A.D. 453, as the period of Tawhaki and Karihi. I make no apology for using this measuring-rod of my own invention, because—(a) we want facts, and we are very close to them here; and (b) we are utterly without the means to make an adequate measuring-rod of purely Native material. We cannot get back a sufficient distance in time to a date from which to strike a fair average. No local standard can be fixed on grounds other than pure guesswork.