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# The Bora (Witoto) Number System

Wesley Thiesen

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0. Introduction
1. Quinary and double decade system
2. First order qualifying suffixes
3. Second order augmentative, diminutive suffixes
4. Third order number suffixes
5. Fourth order intensifying suffix

0. The Bora<sup>1</sup> number system is a descriptive quinary and double decimal system. The first decade is counted on the hands. The second decade is counted on the feet. Numbers one to five are repeated in each succeeding unit of five. Counting is done with the palms of the hands facing away from the speaker. The description begins with the little finger of the right hand and proceeds to the thumb. It continues from the thumb of the left hand to the little finger, then continues on the feet.

The translation of the basic numbers is as follows: 1 = one, 2 = two, 3 = three (or two and one), 4 = half a hand, 5 = one hand, 6 = one from the hand on this side, 7 = two from the hand on this side, 8 = three (or two and one) from the hand on this side, 9 = half a hand from the hand on this side, 10 = two hands, 11 = one from the foot, 12 = two from the foot, 13 = three (or two and one) from the foot, 14 = half a hand from the foot, 15 = one foot, 16 = one from the foot on this side, 17 = two from the foot on this side, 18 = three (or two and one) from the foot on this side, 19 = half a hand from the foot on this side, 20 = two feet.

Counting in the abstract, however, is impossible. Before counting can begin it is necessary to know the class of the object that is to be counted. Furthermore, singular, dual and plural categories are determined not by the number of objects being counted, but by the occurrence of singular, dual or plural digits used in the formation of the numbers. We are using the term 'digit' to refer only to numbers one to five which make up the primary numerical unit. Noun number agreement with the numbers is also in relation to the digits of the numbers rather than to the number of objects.

1. As we have seen, two units of ten are basic to the Bora number system. Within each decade are two primary units of five, hence a quinary system within the double decimal system. Each digit within each unit of five is either singular, dual or plural. Note that dual and plural are marked by suffixes -cu and -va respectively and that singular is marked by the absence of such morphemes.

1.1. The first four digits are included in each unit of five.

1.1.1. The first digit is singular, e.g. 1 = tsawa<sup>2</sup> (tsa one + -wa qualifier), 6 = íñejcúe hójtsìtu tsawa (i- this + nejcúe<sup>3</sup> side + hojtsì hand + -tu from + tsa one + -wa qualifier), 11 = tsawa méjtúhatyu (tsa one + -wa qualifier + me- indefinite first and second person plural possessive + jtu- foot + -ha qualifier + -tu from), 16 = íñejcúe jtúhatyu tsawa (i- this + nejcúe side + jtu- foot + -ha qualifier + -tu from + tsa one + -wa qualifier),

1.1.2. The second digit is dual, e.g. 2 = miwácu (mi two + -wa qualifier + -cu inanimate dual), 7 = íñejcúe hójtsìtu miwácu (i- this + nejcúe side + hojtsì hand + -tu from + mi two + -wa qualifier + -cu dual), 12 = miwácu méjtúhatyu (mi two + -wa qualifier + -cu dual + me- possessive + jtu- foot + -ha qualifier + -tu from), 17 = íñejcúe jtúhatyu miwácu (i- this + nejcúe side

+ jtu- foot + -ha qualifier + -tu from + mi two + -wa qualifier + -cu dual).

1.1.3. The third digit is plural, e.g. 3 = pápichúúwava (pápichúu<sup>4</sup> three + -wa qualifier + -va plural), 8 = íñejcúe hójtsìtu pápichúúwava (i- this + nejcúe side + hojtsì hand + -tu from + pápichúu three + -wa qualifier + -va plural), 13 = pápichúúwava méjtúhatyu (pápichúu three + -wa qualifier + -va plural + me- possessive + jtu- foot + -ha qualifier + -tu from), 18 = íñejcúe jtúhatyu pápichúúwava (i- this + nejcúe side + jtu- foot + -ha qualifier + -tu from + pápichúu three + -wa qualifier + -va plural).

1.1.4. The fourth digit is plural, e.g. 4 = pííne-hojtsíwava (pííne half + hojtsì hand + -wa qualifier + -va plural), 9 = íñejcúe hójtsìtu pííne-hojtsíwava (i- this + nejcúe side + hojtsì hand + -tu from + pííne half + hojtsì hand + -wa qualifier + -va plural), 14 = pííne-hojtsíwava méjtúhatyu (pííne half + hojtsì hand + -wa qualifier + -va plural + me- possessive + jtu- foot + -ha qualifier + -tu from), 19 = íñejcúe jtúhatyu pííne-hojtsíwava (i- this + nejcúe side + jtu- foot + -ha qualifier + -tu from + pííne half + hojtsì hand + -wa qualifier + -va plural).

1.2. The form of the fifth digit varies with each unit of five within each decade. It also is plural, e.g. 5 = tsá-hojtsíwava (tsa one + hojtsì hand + -wa qualifier + -va plural), 10 = tsá-hojtsíwava (tsa one + hojtsì hand + -cu dual + -wa qualifier + -va plural), 15 = tsá-jtuháwava (tsa one + jtu- foot + -ha qualifier + -wa qualifier + -va plural), 20 = tsá-jtuhácyúwava (tsa one + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural).

1.3. Numbers greater than twenty are formed by decimal multiplication and addition. In the description of the higher numbers there may be various combinations of the singular, dual and plural digits occurring in the same number, e.g. <sup>23 =</sup> miwácu wááuníbaallúri pápichúúwava (mi two + -wa qualifier + -cu

dual + wááumíba<sup>5</sup> ten times + -allu top + -ri on + pápichúu three + -wa  
 qualifier + -va plural), 61 = íñejcúe hójtsìtu tsawa wááumíba<sup>5</sup>allúri tsawa (i-  
this + nejcúe side + hojtsì hand + -tu from + tsa one + -wa qualifier +  
 wááumíba ten times + -allu top + -ri on + tsa one + -wa qualifier), 289 =  
 tsá-jtuhácyu wááumíba<sup>5</sup>allúri íñejcúe hójtsìtu pápichúuwawa wááumíba<sup>5</sup>allúri  
 íñejcúe hójtsìtu páíné-hojtsíwawa ( tsa one + jtu- foot + -ha qualifier + -cu  
 dual + wááumíba ten times + -allu top + -ri on + i- this + nejcúe side + hojtsì  
hand + -tu from + pápichúu three + -wa qualifier + -va plural + wááumíba ten  
times + +allu top + -ri on + i- this + nejcúe side + hojtsì hand + -tu from +  
 páíné half + hojtsì hand + -wa qualifier + -va plural).

1.4. Many of the numbers may be described in several ways. These differences correspond largely to different geographic areas.

1.4.1. Digit three, in all of its occurrences, may be replaced by digits two and one, e.g. 3 = miwácu tsawa (mi two + -wa qualifier + -cu dual + tsa one + -wa qualifier), 8 = íñejcúe hójtsìtu miwácu tsawa (i- this + nejcúe side + hojtsì hand + -tu from + mi two + -wa qualifier + -cu dual + tsa one + -wa qualifier).

1.4.2. Numbers 10 and 20, in all of their occurrences, may be described in two ways, e.g. 10 = tsá-hojtsícuwawa (tsa one + hojtsì hand + -cu dual + -wa qualifier + -va plural) or pá-hojtsícuwawa (pa all + hojtsì hand + -cu dual + -wa qualifier + -va plural), 20 = tsá-jtuhácyúwawa (tsa one + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural) or pá-jtuhácyúwawa (pa all + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural).

1.4.3. Numbers 6 to 9 may be described in shorter form, e.g. 6 = íñejcúe hójtsìtu tsawa (i- this + nejcúe side + hojtsì hand + -tu from + tsa one + -wa qualifier) or íhojtsítu tsawa (i- this + hojtsì hand + -tu from + tsa one + -wa qualifier), 9 = íñejcúe hójtsìtu páíné-hojtsì (i- this + nejcúe side + hojtsì

+ -tu from + páine half + hojtsi hand) or íhojtsitu páine-hojtsi (i- this + hojtsi hand + -tu from + páine half + hojtsi hand).

1.4.4. Numbers 11 to 14 may reverse the order of words in their descriptions, e.g. 12 = miwácu méjtúhatyu (mi two + -wa qualifier + -cu dual + me- possessive + jtu- foot + -ha qualifier + -tu from) or méjtúhatyu miwácu (me- possessive + jtu- foot + -ha qualifier + -tu from + mi two + -wa qualifier + -cu dual), 13 = pápichúwawa méjtúhatyu (pápichú three + -wa qualifier + -va plural + me- possessive + jtu- foot + -ha qualifier + -tu from) or méjtúhatyu pápichúwawa (me- possessive + jtu- foot + -ha qualifier + -tu from + pápichú three + -wa qualifier + -va plural).

1.4.5. Numbers greater than 20 and less than 50 are often formed by addition only rather than by decimal multiplication and addition, e.g. 30 = tsá-jtuhácyúwawa tsá-hojtsícúwawa (tsa one + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural + tsa one + hojtsi hand + -cu dual + -wa qualifier + -va plural), 44 = tsá-jtuhácyúwawa tsá-jtuhácyúwawa páine-hojtsiwawa (tsa one + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural + tsa one + jtu- foot + -ha qualifier + -cu dual + -wa qualifier + -va plural + páine half + hojtsi hand + -wa qualifier + -va plural).

1.5. When numbers are used as modifiers of nouns the nouns agree in number with the final digit used in the formation of the numbers, e.g. 8 nights = íñejcúe hójtsitu pápichúu pejcóva (i- this + nejcúe side + hojtsi hand + -tu from + pápichúu three + pejco night + -va plural), 12 nights = mí pejcócu méjtúhatyu (mi two + pejco night + -cu dual + me- possessive + jtu- foot + -ha qualifier + -tu from), 26 drums = tsá-jtuhácyu íñejcúe hójtsitu tsá cúumu (tsa one + jtu- foot + -ha qualifier + -cu dual + i- this + nejcúe side + hojtsi hand + -tu from + tsa one + cúumu drum).

2. Numbers are non-animate substantives (adjectives)<sup>6</sup> formed with one or more of the five primary digits. Each digit takes first order animate or inanimate qualifying suffixes in agreement with the object counted. It is impossible to count without reference to some object. The digits may also be used without qualifying suffixes as modifiers of nouns.

2.1. Digits one and two must always be followed by the name of the object or by the qualifying suffix representing the object, e.g. 1 tree = tsa'úmehe (tsa one + une- tree + -he qualifier) or 1 (tree) = tsahe (tsa one + -he qualifier), 2 trees = mi úmehécu (mi two + une- tree + -he qualifier + -cu dual) or 2 (trees) = mihécu (mi two + -he qualifier + -cu dual).

2.2. Digits three, four and five, however, may be used without reference to an object, e.g. 3 = pápichúu (pápichúu three), 4 = pííné-hojtsí (pííné half + hojtsí hand), 5 = tsá-hojtsí (tsa one + hojtsí hand).

2.3. There are many inanimate qualifying suffixes. The final morphemes of inanimate nouns are qualifiers. Such qualifiers may be used apart from the nouns with adjectives and pronouns in referring to the objects when such objects are not named. Each qualifying suffix refers to a class of similar objects (shape predominates). Thus in order to count without naming an object it is necessary to refer to that object by using the proper qualifying suffix, e.g. 1 = tsane (tsa one + -ne qualifier referring to an intangible object), tsawa (tsa one + -wa qualifier referring to a board, paddle, seed, etc.), tsaco (tsa one + -co qualifier referring to a pole, stick, etc.), tsamí (tsa one + -mí qualifier referring to a canoe, car, ship, truck, airplane, etc.), tsají (tsa one + -jí qualifier referring to a coin, button, dish, etc.), tsáijyu (tsa one + -ijyu qualifier referring to a day), tsáhaámí (tsa one + -haámí qualifier referring to a leaf, book, piece of paper, bill, etc.).

2.4. There are only a few animate qualifying suffixes to cover number

and gender, e.g. 1 = tsaápi (tsa one + -api masculine singular), tsáápille (tsa one + -api masculine singular + -lle feminine singular), 2 = mitétsi (mi two + -tetsi masculine dual), mitépi (mi two + -tepí feminine dual), 3 = pápichúúneva (pápichúu three + -me animate plural + -va plural).

3. Second order diminutive or augmentative suffixes may be added to the digits to signify a small or large object. This is often done when counting money to distinguish the real (10 centavo piece) from the sol (100 centavo piece). E.g. 1 (real) = tsájíwuu (tsa one + -jí qualifier + -wuu diminutive), 1 (sol) = tsájícoba (tsa one + -jí qualifier + -coba augmentative), 2 (reales) = mójíwuu (mi two + -jí qualifier + -wuu diminutive + -cu dual), 3 (big people) = pápichúúmécobáva (pápichúu three + -me animate plural + -coba augmentative + -va plural).

4. Third order number suffixes are added to digits 2, 3, 4 and 5 when used with inanimate qualifying suffixes.

4.1. The inanimate dual number suffix is always used with digit two when referring to inanimates, e.g. 2 = miwácu (mi two + -wa qualifier + -cu dual), 7 = ínejcúe hójtsítu miwácobácu (i- this + nejcúe side + hójtsí hand + -tu from + mi two + -wa qualifier + -coba augmentative + -cu dual).

However, the inanimate dual number suffix is not used when referring to animates since dual is included in the animate dual qualifiers, e.g. 2 = mitétsi (mi two + -tetsi masculine dual), mitépi (mi two + -tepí feminine dual).

When digit two is used as a modifier to an inanimate noun, the noun adds the inanimate dual suffix rather than the digit, e.g. 2 nights = mí pejcócu (mi two + pejco night + -cu dual).

When digit two is used as a modifier to an animate noun the digit retains the animate qualifier and the noun adds the animate dual suffix normally used

with nouns, e.g. 2 men = mitétsi wajpímútsi (mi two + -tetsi masculine dual + wajpi man + -mutsi masculine dual), 2 women = mitépí wallémúpí (mi two + -tepí feminine dual + walle woman + -mupí feminine dual).

4.2. A special plural number suffix is always used with digits 3, 4 and 5 when these are used with qualifying suffixes. It is a plural suffix peculiar to the number system which is used with animate as well as inanimate numbers, e.g. 4 (people) = pííné-hojtsímeva (pííne half + hojtsí hand + -me animate plural qualifier + -va plural), 4 (books) = pííné-hojtsíhaamíva (pííne half + hojtsí hand + -haamí qualifier + -va plural).

5. A fourth order intensifying suffix -re 'only' is often added to the digits, especially to the first digit. Thus it is possible to have four orders of suffixes on the numbers, e.g. 1 (big button) = tsájícobáre (tsa one + -jí qualifier + -coba augmentative + -re only), 4 (big people) = pííné-hojtsímécobávare (pííne half + hojtsí hand + -me qualifier + -coba augmentative + -va plural + -re only).

This article is to be sent in for publication.

## Footnotes

<sup>1</sup> A Witotoan language spoken by the Bora Indians, about 500 of whom live along the Ampayacu and Yaguasyacu Rivers, tributaries of the Amazon in Northern Peru, having migrated from the area of the Putumayo River. Data were gathered during six months of field work in 1953 under the auspices of the Summer Institute of Linguistics.

<sup>2</sup> The consonant phonemes of Bora are: voiceless, aspirated and unaspirated stops p, t, k (written c before a, o, u), b, d, g; voiceless, palatalized, aspirated and unaspirated stops py, ty, ky (written cy before a, o, u), by, dy, gy; voiceless, unaspirated bilabio-velar stop w; glottal stop and palatalized glottal stop h, hy; voiceless, aspirated and unaspirated affricates ts, ch, ds, ll; voiceless velar and voiceless palatalized velar fricatives j, jy; voiced bilabial and voiced palatalized bilabial fricatives v, vy; nasals and palatalized nasals m, n, my, ñ; voiced, flapped vibrant r; voiced palatal y. The vowel phonemes are: i, a, e (mid, open), ɨ (central, open), o, u (open, unrounded). The tone phonemes are high and low, high being written with an acute accent, low left unmarked.

<sup>3</sup> It would appear that palatalization is conditioned following i and a. However, it does not always occur and there are numerous word pairs.

<sup>4</sup> Tone modification in Bora is very extensive. It is often caused by the addition or subtraction of suffixes.

<sup>5</sup> We have been unable to break down the meaning of wááumíba, but it refers to all ten fingers of the hands.

<sup>6</sup> Substantives in Bora are divided into three classes: adjectives, pronouns and nouns. Adjectives are non-animate taking either animate or inanimate qualifying suffixes. Nouns and pronouns are animate or inanimate.