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# The Genetic Relationship between Bugis and Kaili

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## Abstract

This writing aimed to explore Bugis and Kaili's language trace of kinship using a Comparative Linguistics point of view or what is commonly called Comparative Historical Linguistics. In particular, this study aimed to find out how far the footprint of Bugis and Kaili language and when both languages separate from its proto-language. The data were analyzed by implementing lexicostatistics and glottochronology techniques to identify quantitative evidence, and sound correspondence was applied to identify qualitative evidences. The results reveal that in lexicostatistics the cognate percentage of both languages is 27% and by glottochronology calculation of both languages split from their proto-language between 660 – 918 CE (2020). Qualitatively, there are six sets of sound correspondences found in BB and BK are: / ə - a /, / a - ə /, / o - u /, / m - n /, / b - v /, and /? - Ø /, and six types of sound changes found, are: Lenition and fortition, sound loss, apocope, syncope, sound addition, and metathesis.

**Keywords:** Reviews Genetic Relationship, Lexicostatistic, Glottochronology, Sound Correspondence

## Introduction

In Indonesia, there are more than five hundred regional languages that are used as a means of communication between groups that are guarded, protected, and respected. A language is a tool used to communicate with other people (Idris et al., 2020). It means that the language refers to one language relative, namely Austronesian (Yulianti et al., 2022).

Sulawesi is one of the islands that grows and develops various regional languages, both from the native language of Sulawesi and the language of the native tribes of immigrants (Sri et al., 2021). Bugis and Kaili are two of several regional languages that developed in Sulawesi. In terms of location, these two languages are located in: Bugis (South Sulawesi) and Kaili (Central Sulawesi). With this geographical location, the two languages have long been in contact, thus forming a linguistic element between Bugis and Kaili. Geographical locations that are close together experience language contact, but language contacts that influence each other will indeed show similarities. However, according to Hilmi (2017), the comparative linguistic closeness is seen from the same linguistic form because of one family, so there is a possibility that it is geographically close but far in language form and vice versa. It is assumed that the geographical proximity of the two languages will indicate that the two languages are related. Therefore, it is necessary to prove the closeness both quantitatively and qualitatively.

The kinship between two or more languages can be seen from the form of vocabulary and its meaning. In Bugis (abbreviated BB), there are many similarities in vocabulary with Kaili

 

(abbreviated BK). The similarity of the vocabulary is evidence that the Bugis language and Kaili language are related.

The problem raised in this paper is all traces of Bugis and Kaili, and since when did Bugis and Kaili separate from their proton language. Based on the problem formulation, this study aims to find out all traces of Bugis and Kaili languages and since when Bugis and Kaili were separated from their proton languages.

From these descriptions, it is necessary to prove the genetic relationship between Bugis and Kaili in order to determine the extent to which speakers of the two languages can understand each other's speech, both qualitatively and quantitatively. This evidence supports the hypothesis that the two languages are genetically related. Furthermore, these results can prove the migration of Bugis speakers from the Kaili speech area. Based on the previous introduction, three research objectives can be stated: to identify 1) lexicostatistics and glottochronology; 2) voice correspondence; and 3) voice change.

Bugis and Kaili are related to the same language family to the same extent. In revealing the hypothesis, it is necessary to find suitable and adequate theories such as lexicostatistics and glottochronology which are usually combined in terms of lexicostatistical techniques. Lexicostatistics is a technique in language grouping that emphasizes statistical utterances (lexicon), then determines the grouping based on the similarities and differences of two or more languages (Keraf, 1991). According to Crowley & Bowern (2010), lexicostatistics determines the degree of interrelationship between the languages being compared. Glotto-chronology is a technique of grouping languages from one another by prioritizing the depth of time or calculating the age of the language in question (Keraf, 1991). Voice correspondence is a compilation of correspondence sets based on segments that correspond to cognates, regardless of their form and meaning, in the languages being compared with each other (Keraf, 1991). It is known that language change is bound to happen. The sound of a language today is no exception, which undergoes sound changes that come from the sound in its proton language (Crowley & Bowern, 2010).

In this research, the researcher found out several researchers who conducted the same field. In addition, the research on kinship about languages in South Sulawesi and Central Sulawesi has been conducted by several previous researchers, including Fatinah (2017) with the title "Kinship of Kulawi and Kaiili Languages in Central Sulawesi". In her research, she examines the kinship relationship between Kaili and Kulawi both quantitatively and qualitatively. The research data used in this research are 200 basic Swadesh vocabularies and 873 cultural vocabularies. The results showed that the Kulawi language and Kaili language quantitatively had a kinship relationship as a language family with a cognitive proportion of 62%. Qualitatively found several sets of correspondence sounds, such as: l ≈ ɹ / - V #; s ≈ h / - V #; `g ≈` k / - V #; s ≈ x / # -; ɓ ≈ b / # -; ɹ ≈ d / # -; -V #; l ≈ ll / V-V; ɹ ≈ ʧ / -V #; and P ≈ B / # -. Darmawati (2016) with the research title "Traces of Toraja Language in Kaili Language: Segus of Track Records of Austronesian Languages in the Archipelago" In her writing the traces of kinship between Toraja and Kaili languages through the sound law theory of Grimm and Verner. The research data used in this research is 200 basic Swadesh vocabularies. The percentage of kinship obtained was 42.5% from the 85 kinship words (cognate words) between Kaili and Toraja languages. In lexicostatistics, the two languages are thought to have separated in 17 BC. Mayangsari (2020) "Lexicostatistics of Bugis and Toraja Languages". In her research, she found out that Bugis and Toraja languages have a 53% kinship proportion. The lexicostatistics of 200 Swadesh root

words in Bugis and Toraja, found 101 vocabularies of relatives, so it can be denied that Toraja and Buginese belong to the level of the language family

## Methods

Oral data were collected using observations in the field or listening method (Sudaryanto, 1988). This method has a basic technique of tapping, the technique of tapping is a basic in the listening method because in essence listening is manifested by tapping (Mahsun, 1995). The data interview technique used was interviewing the informants, taking notes, and recording using 200 Swadesh vocabulary lists which were invincible with the development of the universality of each language in Austronesian. Informants are native speakers of both languages. The data analysis methods used by the writer in this research are qualitative and quantitative. Quantitatively, lexicostatistics, and glottochronological tactics are applied to calculate the percentage of kinship and time apart of the two languages. Whereas Qualitative is applied to enforce the phonemic correspondence group of both languages and sound changes in the PAN gloss. The lexicostatistic technique not only serves to determine the proportions of kin words and calculates the age of the language but also is used to group the languages of the relatives.

Grouping can be found by connecting the proportions of allied languages and the separate times of both languages according to the level of language classification in table 1 below:

Table 1. Level of Language Classification

| Language level | Time-depth (in centuries) | Cognate percentage % |
|---|---|---|
| Language | 0 – 5 | 100 – 81 |
| Language Level | 5 – 25 | 81 – 36 |
| Stock | 25 – 50 | 36 – 12 |
| Microfilum | 50 – 75 | 12 – 4 |
| Mesophyllum | 75 – 100 | 4 – 1 |
| Macrophilum | 100- and above | 1 - less than 1% |

## Results and Discussion

### Quantitative Studies

In this analysis, the relationship between BB and BK was analyzed using quantitative methods through lexicostatistics and glottochronology.

### Percentage of Cognate

Based on the 200 Swadesh vocabularies recorded for BB and BK, there are 189 complete word pairs or have equivalent words from BB and BK. 11 and 147 glossaries that were not taken into account because they did not have complete word pairs that had no realization between BB and BK.

The following lexicostatistics for BB and BK determine the word relative, namely looking for the percentage of relatives using the formula:

$C = Vt / Vd \times 100\%$

$C = 54/200 \times 100\%$

$C = 27\%$

Description:

C → Relative word

Vt → Total vocabulary of relatives

Vd → The amount of gloss that counts

Based on the results of the above calculations, the kinship of the two languages is 27% or 0.27. In grouping related languages, BB and BK are family categories (source: Keraf, 1991).

### Time-depth (W1)

After the percentage of relatives is known the results, we can calculate the time apart from BB and BK.

C = 27%  log r = 80%

W1 =….?

W1 = (log.C) / (2.log.r)

W1 = (log. 0.27) / (2.log.0.8)

W1 = (- 0.57) / (2 × - 0.097)

W1 = (- 0.57) / (- 0.194)

W1 = 2,938

The split time is multiplied by 1000, so the result becomes 2,938. So the calculation of the initial separation time of BB and BK is 2,938 ago. In other words, the calculation of the initial split time between Bugis and Kaili can be stated as follows; (a) The Buginese and Kaili languages are thought to have been a single language around 2,938 years ago; (b) The Buginese and Kaili languages are thought to have separated from their parent languages around the 918th century AD (calculated 2020).

### Range of Time-depth Error and New Cognate Percentage

Previous calculations are not the exact year of the two languages split. Therefore, certain calculations must be made to avoid mistakes like the one above. So, the next statistical technique is still needed. The next technique is to calculate the error period.

S = √ ((C (1-c)) / n)

S = Standard error in percentage of word relatives

C = Percentage of word relatives

n = number compared, both relatives and non-relatives

note: C = 0.27  n = 200

S =….?

S = √ ((C (1-c)) / n) → S = √ ((0.27 (1-0.27)) / 200)

S = √ ((0.27 × 0.73) / 200)

S = √ (0.1971 / 200)

S = √0.00098

S = 0.301

 

The result of standard error (0.031) is summed by the percentage of the initial relative (C1) to get C2 (C2 = C1 + S). So C2 is 0.27 + 0.031 = 0.301.

### New Time-depth (W2)

With C2, the split time can be recalculated using the same formula.

C2 = 30.1%  log r = 80%

W2 =….?

W2 = (log.C2) / (2.log.r) → W2 = (log. 0.301) /

(2.log.0.8)

W2 = (- 0.52) / (2 × - 0.097)

W2 = (- 0.52) / (- 0.194)

W2 = 2,680

The split time is multiplied by 1000, so the result is 2,680. Thus, the error period = W1 - W2 = 2,938 - 2,680 = 258. So, the ages of Bugis and Kaili can be expressed as follows; (a) Bugis and Kaili are thought to have been a single language 2,938 ± 258 years ago; (b) Bugis and Kaili were single languages 3,196 - 2,680 years ago; (c) Bugis and Kaili languages began to split from a common prototype between 918 and 660 (calculated in 2020).

### Qualitative Assessment

The qualitative study is related to the qualitative evidence of the kinship of the Bugis language (BB) and Kaili language (BK). This evidence can be shown through identical word pairs, word pairs with one different phoneme, and the sound correspondence between BB and BK, described as follows.

### Identical Word Pairs

One of the provisions in determining the word pairs as relatives is that the word pairs have identical similarities. Identical in this case is that the word pairs have the exact same form, sound and meaning. 10 identical word pairs were recorded or as much as 5% of the total data that had word pairs presents in Table 2.

Table 2. Identical Word Pairs

| Gloss | Bugis (BB) | Kaili (BK) |
|---|---|---|
| Dog | [asu] | [asu] |
| Burn | [tunu] | [tunu] |
| New | [baru] | [baru] |
| Dig | [kae?] | [kae?] |
| Mountain | [bulu] | [bulu] |
| Sky | [laŋi?] | [laŋi?] |
| Sea | [tasi] | [tasi] |
| Eye | [mata] | [mata] |
| Die | [matə] | [matə] |
| Breast | [susu] | [susu] |

 

### Word Pairs with One Different Phoneme

The world pairs one phoneme differs between BB and BK, as many as 13-word pairs or 6.5% of the total data having word pairs. The following are word pairs having differences in one phoneme shows in Table 3:

Table 3. Word Pairs with One Different Phoneme

| Gloss | Phoneme Differences | BB | BK |
|---|---|---|---|
| Five | / ø ~ a / | [lima] | [alima] |
| Thin | / m ~ n / | [manipi?] | [nanipi?] |
| Fleas | / ø ~ k / | [utu] | [kutu] |
| Snake | / a ~ e / | [ula?] | [ulə?] |
| Fruit | / b ~ v / | [bua] | [vua] |
| Flower | / ø ~ b / | [uŋa] | [buŋa] |
| Horn | / r ~ d / | [tanru?] | [tandu?] |
| Fur | / h ~ b / | [hulu] | [bulu] |
| Nose | / i ~ o / | [iŋe?] | [oŋe?] |
| Tongue | / l ~ d / | [lila] | [dila] |
| Tooth | / ø ~ ŋ / | [isi] | [ŋisi] |
| Stone | / b ~ v / | [batu] | [vatu] |
| Ash | / w ~ v / | [awu] | [avu] |

### Word Pairs with Phonemic Correspondence

Based on the analysis conducted, there are six pairs of correspondences found in BB and BK, namely: / ə - a /, / a - ə /, / o - u /, / m - n /, / b - v /, and /? - Ø /. Each explanation of the seven pairs of correspondences found in BB and BK is equipped with codifications such as consonants (C) and Vowel (V).

### Sound Correspondences Set / ə - a /

The sound central / ə / in Bugis corresponds phonemically to the sound front vowel / n / in Kaili. This change occurs at the beginning of the word, and at the end of the word. This change occurs before the consonants. The data are presented in table 4 below:

Table 4. Sound Correspondences Set / ə - a /

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Three | [təllu] | [tatalu] | /ə – a/ C - |
| Four | [əppa?] | [ampa?] | /ə – a/ C - |
| Feet | [ajə] | [kada] | /ə – a/ C - |
| Frozen | [mabəkku?] | [nobaku] | /ə – a/ C - |
| Name | [assəŋ] | [saŋa] | /ə – a/ C - |

### Sound Correspondences Set / o - u /

The back-vowel / o / sound in Bugis corresponds phonemically to the back vowel / u / sound in Kaili. This change occurs in the middle of a word, and can also occur at the end, and is preceded by a consonant sound. Table 5 shows pairs of cognates that cover this correspondence set.

 

Table 5. Sound Correspondences Set / o - u /

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Tree | [pohoŋ] | [kayu] | /o – u/ C - |
| Skin | [oli?] | [kuli?] | /o – u/ # - |
| Egg | [tello] | [ntalu] | /o – u/ C - |
| Life | [tuwo] | [natuvu] | /o – u/ C - |

### Sound Correspondences Set / m - n /

The open bilabial sound / m / in Bugis corresponds phonemically to the alveolar phoneme / n / in the Kaili language. This change occurs not only at the beginning of a word, but can occur in the middle and is followed by a vowel sound, as in the words rumpu and unu. Table 6 presents the entire data covered by the correspondence.

Table 6. Sound Correspondences Set / m - n /

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Thin | [manipi?] | [nanipi?] | /m - n/ -V |
| Knowing | [misseŋ] | [nesani] | /m - n/ -V |
| Think | [mappikkiri?] | [nipekiri] | /m - n/ -V |
| Fight | [mangkaga] | [ne:baga] | /m - n/ -V |
| Bad | [maja?] | [naja?a] | /m - n/ -V |

### Sound Correspondences Set / b - v /

The bilabial phoneme / b / in the Bugis language corresponds phonemically to the labiodental phoneme / v / in the Kaili language, or is expressed as / b - v /. This change happens not only at the beginning of a word, but can also occur in the middle and is followed by a vowel sound, as in the word Kabu? and gavu. The exposure is explained by the data in Table 7.

Table 7. Sound Correspondences Set / b - v /

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Fruit | [bua] | [vua] | /b – v/ -V |
| Hair | [belua] | [Vulua] | /b – v/ -V |
| Fall down | [mabuaG] | [nanavu] | /b – v/ -V |
| Stone | [batu] | [vatu] | /b – v/ -V |
| Fog | [kabu?] | [gavu] | /b – v/ -V |
| Rotten | [kebboG] | [navau] | /b – v/ -V |
| Far | [mabela] | [nakava?o] | /b – v/ -V |

### Sound Correspondences Set /? - Ø /

The glottal consonant phoneme in Bugis /? / corresponds phonemically to the phoneme / Ø / in Kaili in final position, or is expressed as /? - Ø /-#. This change occurs in the middle and at the end of the word. Table 8 presents the entire data covered by the correspondence.

Table 8. Sound Correspondences Set /? - Ø /

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Little | [ce?de?] | [sakide?] | /? - Ø/ -# |
| Thick | [maumpe?] | [nakumba] | /? - Ø/ -# |
| Child | [ana?] | [ŋana] | /? - Ø/ -# |

 

| | | | |
|---|---|---|---|
| Blood | [cera?] | [râ] | /? - Ø/ -# |
| Knee | [uttu?] | [taputu] | /? - Ø/ -# |
| Blow | [ma?berruG] | [naberu] | /? - Ø/ -# |
| Because | [nasaba?] | [apa] | /? - Ø/ -# |

Change Beep on Gloss PAN

## Lenition and fortition

Lenition is a sound change that occurs due to weakening the sound of one language into another sound in other languages (Hendrokumoro & Temaja, 2019). Table 9 shows a list of the weak and strong sound status taken from Crowley & Bowern (2010).

Table 9. List of Sound Status

| Stronger Sound | Weaker Sound |
|---|---|
| p | b |
| p | f |
| f | h |
| x | h |
| b | w |
| v | w |
| a | ə |
| d | l |
| s | R |
| k | ? |

Lenition type sound changes in the following table, where the distribution in both languages it has 5 rules, namely * p> b, * b> w, * d> l, * s> r, * a> ə, and * k> ?.

Table 10. Lenitation Sound Change

| Gloss | BB | BK | Rule |
|---|---|---|---|
| Father | */bapa/ | [Ambo’] | - |
| Back | */puŋkur/ | - | [Bengo] |
| Fall down | */tipu(q)/ | [Mabuang] | - |
| Ash | */qabu/ | [Awu] | - |
| Night | */mbəŋi/ | [Wénni] | - |
| Grass | */suku/ | [Ruu’] | - |
| Wring it | */pərəs/ | [Pérra] | - |
| Wet | */basaq/ | [Marica] | - |
| Small | */kə(ciT)ik/ | [Mabiccu?] | - |
| Short | */pandak/ | [Maponco?] | - |
| Child | */anak/ | [Ana?] | - |
| Sit | */dukduk/ | - | [Nokabusu?] |
| Egg | */ad’ak/ | [Tello] | [Ntalu] |
| Tongue | */dilah/ | [Lilla] | - |
| In | */i daləm/ | [Laléng] | - |
| One | */sa/ | [sədi] | - |
| Weight | */bəRat/ | [matanə?] | [nasaə?] |
| Short | */pandak/ | - | [naedə] |

 

| | | | |
|---|---|---|---|
| Male | */ma-rana/ | [uranə] | - |
| Snake | */ular/ | - | [ulə?] |
| Root | */uRat/ | [urə?] | [Kalə] |
| Eat | */ma-kan/ | [manrə] | [naGande] |
| Split | */bəlah/ | - | [nobəso] |
| Lie down | */mature/ | [ləwu] | - |
| Salt | */sira(q)/ | [Pəjje] | - |
| Sand | */pasiR/ | [kəssi] | - |

According to Crowley & Bowern (2010) fortition refers to Strengthening of one sound, the opposite of lenition. The sound changes of the fortition type are shown in the following table, where distribution in both languages has 5 rules, namely * l> d, * r> s * and * ə> a.

Table 11. fortition Sound Change

| Gloss | PAN | BB | BK | Rule |
|---|---|---|---|---|
| Weight | */bəRat/ | - | [nasae?] | *r > s |
| Laughter | */gəlih/ | - | [Ende] | *l > d |
| Not | */korə/ | [Taniya] | - | *ə > a |
| Thick | */təbəl/ | [maumpe?] | [Nakumba] | *ə > a |
| Small | */kə(ciT)ik/ | [mabiccu?] | - | *ə > a |
| Narrow | */sə(m)pit/ | [macipi?] | [napi?] | *ə > a |
| Blood | */gətah/ | - | [râ] | *ə > a |
| Fat | */ləmak/ | [lappe] | - | *ə > a |
| Stomach | */bə(n)təŋ/ | - | [tambuke] | *ə > a |
| Stand up | */kə(d)əŋ/ | - | [noGitaka] | *ə > a |
| Hold on | */kəkət/ | [makkatenni] | [kanGapu] | *ə > a |
| True | */bənər/ | - | [nakana] | *ə > a |
| Right | */təŋən/ | [Kanaŋ] | [Ŋana] | *ə > a |

## Sound Loss

Crowley & Bowern (2010) argued that the type of change through sound loss occurs when one or more sounds are missing in a word. In the data, it was found that there were 2 types of sound offerings in Bugis and Kaili, namely ** h> Ø / -V and * ŋ> Ø / - #.

Table 12. Sound loss

| Gloss | PAN | BB | BK | Rule |
|---|---|---|---|---|
| Tongue | */dilah/ | - | [dila] | *h > Ø/ -V |
| Wind | */haŋin/ | [aŋin] | - | *h > Ø/ -# |
| White | */putih/ | - | [puti] | *h > Ø/ -V |
| Yellow | */kuniŋ/ | - | [kuni] | *ŋ > Ø/ -# |

## Apocope

According to Crowley & Bowern (2010) apocope is a change of the loss of final sound of a word. In this subtype, there are data such as * h sound in the final sound of the Buginese language * h> Ø / - # and * h> Ø / - #, * k> Ø / - #, * m> Ø / - #, / - # in Kaili.

 

Table 13. Apocope

| Gloss | PAN | BB | BK | Rule |
|---|---|---|---|---|
| We | */kitah/ | - | [kiti] | *h > Ø/ -# |
| Fruit | */buah/ | [bua] | [vua] | *h > Ø/ -# |
| Tongue | */dilah/ | [lila] | [dila] | *h > Ø/ -# |
| Wing | */kapak/ | - | [kapi] | *k > Ø/ -# |
| Drink | */innum/ | - | [inu] | *m > Ø/ -# |

## Syncope

Syncope is the omission of medial sound of a word (Crowley & Bowern, 2010). In this subtype, one type of syncope is found in both languages, namely the missing * l sound in both. The data in table 14 shows only one data in both languages found the syncope, i.e., 'dig' *kali with the rule **l > Ø/ V-V.

Table 14. Syncope

| Gloss | PAN | BB | BK | Rule |
|---|---|---|---|---|
| Dig | */kali/ | [kae?] | [kae?] | *l > Ø/ V-V |

## Sound Addition

Crowley & Bowern, (2010) said that sound addition is a phenomenon of adding sounds in certain words derived from the proto-languages. In the data, it was found that there are two types of sound addition in Bugis and Kaili, namely * Ø> y / # -, and * Ø> r / # -. The data in table 15 presents the sound addition Which Bugis has one set of rules, i.e., *Ø>r/ #- and Kaili has only one rule namely * Ø> y / # -.

Table 15. Sound Addition

| Gloss | PAN | BB | BK | Rule |
|---|---|---|---|---|
| I | */aku/ | - | [yaku?] | *Ø>y/ #- |
| Leaf | */rau/ | [raun] | | *Ø>r/ #- |

## Methathesis

Metathesis is a fairly uncommon kind of changes, because it does not involve the loss or addition of sounds, or change in the appearances of a particular sound, but it is a change in the order of the sounds (Crowley & Bowern, 2010). This type of metathesis in the Swadesh basic vocabulary lists of Bugis and Kaili.

Table 16. Methathesis

| Gloss | PAN | BB | BK |
|---|---|---|---|
| Fur | */bulu (gh)/ | [hulu] | - |
| Drink | */innum/ | [minuŋ] | - |
| Burn | */tutuŋ/ | [tunu] | [tunu] |

## Conclusion

Quantitatively, the Bugis and Kaili languages have a kinship rate of 27%, and the two separated around 660-918 AD from the year (2020). From these results, it can be concluded that the Bugis and Kaili languages are language families.

 

Qualitatively found six sets of phonemic correspondences, namely: / ə - a /, / a - ə /, / o - u /, / m - n / , / b - v /, and /? - Ø /. In the Gloss PAN sound change, six subtypes of sound change are found, namely: Lenition and fortition (* p> b, * b> w, * d> l, * s> r, * a> ə, * k> ?, and * l > d, * r> s *, * ə> a), sound loss (* h> Ø / -V), apocope (Buginese * h> Ø / - # and * h> Ø / - #, * k> Ø / - #, * m> Ø / - #, * ŋ> Ø / - # in Kaili), syncope (* l> Ø / VV), sound addition (* Ø> y / # -, * Ø> r / # -), and metathesis

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