

Invitational Round of the Ninth International Linguistics Olympiad, China

August 1, 2020

Individual Contest Problems

Problem 1 (20 points). Here are some words and word combinations in Bunun and their English translations in arbitrary order:

- | | |
|---------------------------|------------------------------|
| 1. daandanum | A. <i>vegetable knife</i> |
| 2. daanlaak | B. <i>vegetable garden</i> |
| 3. daanlai'lai | C. <i>to watch out</i> |
| 4. hus-ul | D. <i>dryer</i> |
| 5. iskaan-ivut | E. <i>train</i> |
| 6. ispihahaliv | F. <i>traffic light</i> |
| 7. ispilalaak | G. <i>saw (n.)</i> |
| 8. ivutsanglav | H. <i>green light</i> |
| 9. kukulut | I. <i>eel</i> |
| 10. kukulutsanglav | J. <i>to produce smoke</i> |
| 11. lai'laihus-ul | K. <i>to be dry</i> |
| 12. mahaliv | L. <i>aqueduct</i> |
| 13. mahus-ul | M. <i>tunnel</i> |
| 14. mananulu | N. <i>railway</i> |
| 15. patdanuman | O. <i>water tank</i> |
| 16. pat-iskaanan | P. <i>smoke (n.)</i> |
| 17. pissanglavan | Q. <i>fish pond</i> |
| 18. singhalnanulu | R. <i>green bamboo viper</i> |
| 19. singhalsanglav | S. <i>drill (n.)</i> |



eel

- (a) Determine the correct correspondences between them.
- (b) Translate into English:
20. **daan**
21. **sanglav**
- (c) Translate into Bunun:
22. *cave*
23. *to glow*
24. *water snake*

(!) No additional explanation besides the answers is required, nor will be marked.

⚠ Bunun belongs to the Austronesian family. It is spoken by approx. 38,000 people in China.

' and **ng** are consonants. The mark - indicates syllable break. The doubling of a vowel denotes length.

Green bamboo viper is a species of venomous pit viper. It is bright to dark green above and pale green to whitish below. A drill is a tool used for making holes. —Jin Xu

Problem 2 (20 points). Here are some words in Evenki and their English translations:

a:waŋba	<i>hat (acc.)</i>	imitʃtʃiwi	<i>my oil</i>
ahiŋsalthimuŋ	<i>compared with our brothers</i>	ofittaniŋ	<i>his star</i>
do:soŋmuŋ	<i>our salt</i>	əwəŋbə	<i>pie (acc.)</i>
hotonbi	<i>my city</i>	tasudʒala	<i>at the school</i>
hotʃtʃolo	<i>at the market</i>	təggə:ŋniŋ	<i>his car</i>
iggamuŋ	<i>our flower</i>	umuttalo	<i>at the egg</i>
iggiwə	<i>tail (acc.)</i>	ʉkkəhəŋsʉl	<i>boys</i>
ihʉldʉ:rʉwʉ	<i>shovel (acc.)</i>	urthi	<i>compared with the mountain</i>

(a) Translate into English:

1. **iggala**
2. **ofittasolwo**
3. **əwəŋbi**
4. **təggə:ŋsəlwəmuŋ**

(b) Translate into Evenki:

5. *eggs (acc.)*
6. *brother (acc.)*
7. *his flowers (acc.)*
8. *our oil*
9. *compared with my shovels*
10. *at the mountain*

△ Evenki belongs to the Tungusic family. It is spoken by approx. 16,000 people in China, Russia, and Mongolia.

ɟ, **ʃ**, **tʃ**, and **w** are consonants. **ŋ** = *ng* in *hang*. **ə** = *e* in *the*. **ə** and **ʉ** are like **o** and **u**, respectively, but are of **ə**'s backness. The mark **:** indicates that the preceding vowel is long.

acc. = accusative ≈ direct object.

—Jin Xu

Problem 3 (20 points). Here are some arithmetic equalities in Jingpho:

1. **jahku² = matsat shi langai**
2. **hkying mi ÷ latsa e hkun manga = matsat**
3. **hkun matsat + sanit shi mali = latsa e lahkong**
4. **kru shi masum × sanit = mali tsa e mali shi langai**
5. **manga shi masum + nitsa e matsat shi sanit = masum tsa e mali shi**
6. **(htam manga hta na hta lahkong + hta sanit hta na hta lahkong) × sanit shi = mali shi matsat**

All integers in these equalities are no less than 1 and no more than 1,000.

(a) Write these equalities in numerals.

(b) Translate into English:

7. **hkying langai lahkong**
8. **htam shi jahku hta na hta mi**
9. **mali manga tsa**

(c) Write out in Jingpho: 98; 121; 212; 345.

△ Jingpho belongs to the Sal branch of the Sino-Tibetan family. It is spoken by approx. 940,000 people in Myanmar, India, and China.

hk, **hky**, **ht**, **kr**, **ng**, **sh**, and **ts** are consonants.

—Jin Xu

Problem 4 (20 points). Here are some sentences in Navajo and their English translations:

'atsá bikq'ii 'atsá biyáázh 'at'oh baa hayíłdédél

The male eagle threw the eaglet out from the nest.

bííh bikágí naa yistsóós

I am taking the deer hide from you (sg.).

bííhkq' yítí

The buck moved.

ch'osh bikágí ntl'izí 'atoo' yibéézh

The crab soup is boiling.

jool bich'í' yismáás

I am rolling the ball toward him.

łíí'yáázh iimáás

The pony is rolling away.

łíítsa'ii bich'í' nideet

You (sg.) are rushing toward the mare.

naa'ahóóhai 'ayęęzhii anildeet

You (sg.) are throwing the chicken egg away.

naak'a'at'áhi íłtsooz

I moved the cotton cloth away.

naal'eetí bi'áadii shich'í' yiyíłttí

He gave me the female duck.

tl'izí 'abe' shaa yíniltjool

You (sg.) took the goat milk from me.

tó haitjool

He is carrying the water out.

wóláchíí' yildeetí bikágí ntl'izí háámááz

The pangolin rolled out.

(a) Translate into English:

1. **bikágí ntl'izí háníłdédél**
2. **naal'eetí 'ayęęzhii yíłmááz**

(b) Translate into Navajo:

3. *He carried the ant.*
4. *He is boiling the hen soup.*
5. *The doe gave the fawn the deer milk.*

⚠ Navajo belongs to the Na-Dene family. It is spoken by approx. 170,000 people in the USA.

ʼ, **ch**, **ch'**, **k'**, **ł**, **sh**, **t'**, **tl'**, **ts**, **w**, **y**, and **zh** are consonants. The mark ˈ indicates high tone; if there is no such mark, the syllable has low tone. The mark ˙ indicates nasalization. The doubling of a vowel denotes length.

Pangolin is a species of insectivore. Its physical appearance is marked by large, hardened keratin scales.

—Ziji Wang

Problem 5 (20 points). Here are some words, word combinations, and sentence fragments in Tangut and their English translations in arbitrary order:

- | | |
|----------|---|
| 1. 𐞁𐞂 | A. <i>White Tiger</i> |
| 2. 𐞁𐞃 | B. <i>to swing</i> |
| 3. 𐞁 | C. <i>to be immovable like the mountain</i> |
| 4. 𐞁𐞄 | D. <i>jungle</i> |
| 5. 𐞁 | E. <i>to look</i> |
| 6. 𐞁 | F. <i>lotus</i> |
| 7. 𐞁𐞅𐞆𐞇 | G. <i>Loong God</i> |
| 8. 𐞁𐞈 | H. <i>to be gentle like the forest</i> |
| 9. 𐞁 | I. <i>human</i> |
| 10. 𐞁𐞉 | J. <i>saliva</i> |
| 11. 𐞁𐞊 | K. <i>firefly</i> |
| 12. 𐞁𐞋𐞌𐞍 | L. <i>fish</i> |

(a) Determine the correct correspondences between them.

(b) Determine the correct correspondences:

- | | |
|--------|--------------------------|
| 13. 𐞁 | M. <i>White Dew</i> |
| 14. 𐞁𐞎 | N. <i>worm</i> |
| 15. 𐞁𐞏 | O. <i>cliff cloud</i> |
| 16. 𐞁𐞐 | P. <i>clean</i> |
| 17. 𐞁𐞑 | Q. <i>silk thread</i> |
| 18. 𐞁 | R. <i>wood of forest</i> |
| 19. 𐞁 | S. <i>mud and soil</i> |
| 20. 𐞁 | T. <i>a pair of</i> |
| 21. 𐞁𐞒 | U. <i>watergate</i> |
| 22. 𐞁𐞓 | V. <i>eye</i> |
| 23. 𐞁 | W. <i>middle</i> |
| 24. 𐞁 | X. <i>lip</i> |

(c) Determine the correct correspondences:

- | | |
|----------|--|
| 25. 𪚩𪚪𪚫𪚬 | Y. <i>to move like the thunder and lightning</i> |
| 26. 𪚭𪚮𪚯𪚰 | Z. <i>to be hard to know like the overcast</i> |
| 27. 𪚱𪚲𪚳𪚴 | AA. <i>to be rapid like the wind</i> |
| 28. 𪚵𪚶𪚷𪚸 | BB. <i>to raid and plunder like the fire</i> |

(d) Translate into English:

29. 𪚹𪚺
30. 𪚻𪚼
31. 𪚽𪚾
32. 𪚿𪚽

(e) Translate into Tangut:

33. *willow*

The answer to (33) should coincide with one of (1–12).

(!) No additional explanation besides the answers is required, nor will be marked.

⚠ Tangut belongs to the Burmo-Qiangic branch of the Sino-Tibetan family. It was spoken in Western Xia around 800 years ago.

Western Xia was a regime established mainly by the Tangut people during the era of the Northern Song. Its culture was profoundly influenced by Han Confucianism. The Tangut script, which was used for writing Tangut, was designed by Western Xia by imitating Chinese characters. White Dew is one of the twenty-four solar terms. A cliff cloud is a cloud that forms over a mountain cliff. Loong God is a god that takes the form of Chinese dragon. A watergate is a gate built on an ancient Chinese city wall where the river enters or exits. “To be rapid like the wind,” “to be gentle like the forest,” “to raid and plunder like the fire,” “to be immovable like the mountain,” “to be hard to know like the overcast,” and “to move like the thunder and lightning” are all sentence fragments from *Master Sun’s Art of War*. —Yiming Luo

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Good luck!

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Individual Contest Solutions

Problem 1.

- (a)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
L	M	N	P	I	D	S	R	G	A	E	K	J	C	O	Q	B	F	H
- (b) 21. *road*
22. *vegetable, green*
- (c) 23. **laak**
24. **masinghal**
25. **ivutdanum**

- Problem 2.**

stem	S
------	---

 (

plural	-sV ₂ l
--------	--------------------

) (

comparative	-thi
accusative	-WV ₂
locative	-IV ₁

) (

my	-Wi
his	-niŋ
our	-mV ₃ ŋ

)

No central and back vowels together in S.

W =

after a nasal	b
otherwise	w

first non- i vowel in S	DNE	ə	ɵ	ʉ	a	o	u
V ₁	ə		ɵ		a	o	
V ₂	ə		ɵ	ʉ	a	o	u
V ₃	ʉ				u		

- (a) 1. *at the flower*
2. *stars (acc.)*
3. *my pie*
4. *our cars (acc.)*
- (b) 5. **umuttasulwu**
6. **ahiqba**
7. **iggasalwaniŋ**
8. **imitʃtʃiməŋ**
9. **ihəldu:rsulthiwi**
10. **urle**

Problem 3.

	approx.	ones	numerator	thousands	hundreds
1	langai		mi		la-
2	lahkong				ni-

3	masum
4	mali
5	manga
6	kru
7	sanit
8	matsat
9	jahku

$10\alpha (+\beta) =$

$\alpha =$	1	shi
	2	hkun
	3	sum shi
	otherwise	α shi

$(\beta), 100\alpha (+\gamma) = \alpha \text{ tsa (e } \gamma), 1000\alpha = \text{hkying } \alpha$

$\frac{n}{d} = \text{htam } d \text{ hta na htam } n$

$d, n, \alpha, \beta, \gamma \in \mathbb{N}, \alpha, \beta < 10, \gamma < 100$

- (a)

1. $9^2 = 81$

2. $1000 \div 125 = 8$

3. $28 + 74 = 102$

4. $63 \times 7 = 441$

5. $53 + 287 = 340$

6. $(\frac{2}{5} + \frac{2}{7}) \times 70 = 48$
- (b)

7. *one or two thousand*

8. *one nineteenth*

9. *four or five hundred*
- (c)

98 = jahku shi matsat

121 = latsa e hkun langai

212 = nitsa e shi lahkong

345 = masum tsa e mali shi manga

Problem 4. sentence \rightarrow (S) (O) (PP) V, NP \rightarrow NP A, PP \rightarrow (NP) P

P →	1SG	sh-	<table><tr><td>from</td><td>-aa</td></tr><tr><td>toward</td><td>-ich'ǵ'</td></tr></table>	from	-aa	toward	-ich'ǵ'	A →		bird	otherwise	V →
	from	-aa										
	toward	-ich'ǵ'										
2SG	n-		baby	biyáázh	-'yáázh							
3SG	b-		female	bi'áadii	-tsa'ii							
					male	bika'ii	-ka'					

person affix =			otherwise
∅		-ni-	
intr.	tr.	ipfv.	

default	yi-	∅	yi-
away	ii-	a-	
out	haa-	hai-	ha-

S =	1SG	-s-	∅
	2SG	-ni-	
	3SG	∅	-yii-

	ipfv.	pfv.
	intr.	tr.

tr. and person affix ≠ -s-	-l-
otherwise	∅

	ipfv.	pfv.	
	boil	-béézh	-béézh
carry, give, move, take	animal	-teeh	-tǵ
	flat thing	-tsóós	-tsooz
	liquid	-jool	-jool
	roll	-máás	-mááz
	rush, throw	-deel	-déél

(pfv. \Rightarrow high tone on at most two morae that precede the stem)

- (a) 1. *You threw the scale out.*
2. *I rolled the duck egg.*
- (b) 3. *wóláchí' yiyíltí*
4. *naa'ahóóhai bi'áadii 'atoo' yilbéézh*
5. *bííhtsa'ii bííh 'abe' bííh'yáázh bich'í' yiyíltjool*

Problem 5.

- (a)

1	2	3	4	5	6	7	8	9	10	11	12
G	A	I	F	L	E	H	D	B	J	K	C
- (b)

13	14	15	16	17	18	19	20	21	22	23	24
N	S	U	M	R	X	V	P	Q	O	T	W
- (c)

25	26	27	28
AA	Z	BB	Y
- (d) 29. *white cloud*
30. *water and soil*
31. *longan*
32. *immortal*
- (e) 33. 𪛗