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

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:

aːwaŋba	*hat (acc.)*	**imitʃtʃiwi**	*my oil*
ahiŋsalthimuŋ	*compared with our brothers*	**oʃittaniŋ**	*his star*
doːsoŋmuŋ	*our salt*	**ɵwəŋbə**	*pie (acc.)*
hotonbi	*my city*	**tasudʒala**	*at the school*
hotʃtʃolo	*at the market*	**təggəːŋniŋ**	*his car*
iggamuŋ	*our flower*	**umuttalo**	*at the egg*
iggiwə	*tail (acc.)*	**ʉkkəhəŋsʉl**	*boys*
ihʉldʉːrwʉ	*shovel (acc.)*	**ʉrthi**	*compared with the mountain*

(a) Translate into English:

1. **iggala**
2. **oʃittasolwo**
3. **ɵwəŋbi**
4. **təggəːŋsəlwəmʉŋ**

(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.

dʒ, **ʃ**, **tʃ**, and **w** are consonants. **ŋ** = *ng* in *hang*. **ə** = *e* in *the*. **ɵ** and **ʉ** are like **o** and **u**, respectively, but are of **ə**'s backness. The mark **ː** 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. **jahku**^{2} = **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 htam lahkong** + **htam sanit hta na htam 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 htam 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 biką'ii 'atsá biyáázh 'at'oh baa hayíítdéél
The male eagle threw the eaglet out from the nest.
bįįh bikágí naa yistsóós
I am taking the deer hide from you (sg.).
bįįhką' yítį́
The buck moved.
ch'osh bikágí ntł'izí 'atoo' yibéézh
The crab soup is boiling.
jooł bich'į' yismáás
I am rolling the ball toward him.
łį́į́'yáázh iimáás
The pony is rolling away.
łį́į́tsa'ii bich'į' nideeł
You (sg.) are rushing toward the mare.
naa'ahóóhai 'ayęęzhii aniłdeeł
You (sg.) are throwing the chicken egg away.
naak'a'at'ą́hí íítłtsooz
I moved the cotton cloth away.
naal'eełí bi'áadii shich'į' yiyíítłį́
He gave me the female duck.
tł'ízí 'abe' shaa yíníłjool
You (sg.) took the goat milk from me.
tó haiłjooł
He is carrying the water out.
wóláchíí' yildeełí bikágí ntł'izí háámááz
The pangolin rolled out.

(a) Translate into English:

1. ***bikágí ntł'izí háátdéél***
2. ***naal'eełí 'ayęęzhii yíłmááz***

(b) Translate into Navajo:

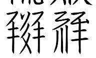
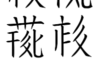
3. *He carried the ant.*
4. *He is boiling the hen soup.*
5. *The doe gave the fawn the deer milk.*

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

', **ch**, **ch'**, **k'**, **ł**, **sh**, **t'**, **tł'**, **ts**, **w**, **y**, and **zh** are consonants. The mark ´ 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*

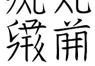
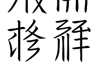
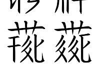
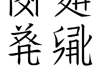
Problem 5 (20 points). Here are some words, word combinations, and sentence fragments in Tangut and their English translations in arbitrary order:

1.
2. 
3.
4.
5.
6.
7.
8. 
9.
10.
11.
12.

A. *White Tiger*
B. *to swing*
C. *to be immovable like the mountain*
D. *jungle*
E. *to look*
F. *lotus*
G. *Loong God*
H. *to be gentle like the forest*
I. *human*
J. *saliva*
K. *firefly*
L. *fish*

(a) Determine the correct correspondences between them.

(b) Determine the correct correspondences:

13.
14.
15. 
16. 
17. 
18.
19.
20.
21.
22. 
23.
24.

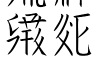
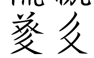
M. *White Dew*
N. *worm*
O. *cliff cloud*
P. *clean*
Q. *silk thread*
R. *wood of forest*
S. *mud and soil*
T. *a pair of*
U. *watergate*
V. *eye*
W. *middle*
X. *lip*

(c) Determine the correct correspondences:

25.
26.
27.
28.

Y. *to move like the thunder and lightning*
Z. *to be hard to know like the overcast*
AA. *to be rapid like the wind*
BB. *to raid and plunder like the fire*

(d) Translate into English:

29.
30. 
31.
32. 

(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	**-lV$_1$**

)(

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. **ahiŋba**
7. **iggasalwaniŋ**
8. **imitʃtʃimʉŋ**
9. **ihʉldʉːrsʉlthiwi**
10. **ʉrlɵ**

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**

(β), $100\alpha\ (+\gamma) = \alpha$ **tsa** (**e** γ), $1000\alpha =$ **hkying** α

$\frac{n}{d} =$ **htam** d **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 → (S) (O) (PP) V, NP → NP A, PP → (NP) P

A →

	bird	otherwise
baby	**biyáázh**	**-'yáázh**
female	**bi'áadii**	**-tsa'ii**
male	**biką'ii**	**-ką'**

, P →

1SG	**sh-**
2SG	**n-**
3SG	**b-**

from	**-aa**
toward	**-ich'į'**

V →

	person affix = ∅		otherwise
	intr.	tr.	
default	**yi-**		
away	**ii-**		**a-**
out	**haa-**	**hai-**	**ha-**

S =

	ipfv.	pfv.	
		intr.	tr.
1SG	**-s-**	∅	
2SG	**-ni-**		
3SG	∅		**-yii-**

tr. and person affix ≠ **-s-**	**-ł-**
otherwise	∅

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

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

(a) 1. *I threw the scale out.*
2. *I rolled the duck egg.*

(b) 3. ***wóláchíí' yiyíítį***
4. ***naa'ahóóhai bi'áadii 'atoo' yiłbéézh***
5. ***bįįhtsa'ii bįįh 'abe' bįįh'yáázh bich'į' yiyíítjool***

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. 莪