

Thirteenth International Olympiad in Linguistics

Blagoevgrad (Bulgaria), 20–24 July 2015

Individual Contest Solutions

Problem 1. Nahuatl:

- 1: *cě*, 2: *öme*, 3: *ëyi*, 4: *nähui*;
- 5: *mäcuilli*, 10: *mahtlactli*, 15: *caxtölli*;

- $\alpha \times 20^\beta, 1 \leq \alpha \leq 5, 1 \leq \beta \leq 3$:

α	
1:	<i>ceM</i>
2:	<i>öm</i>
3:	<i>yë</i>
4:	<i>näuh</i>
5:	<i>mäcuil</i>

20^β	
20:	<i>pöhualli</i>
400:	<i>tzontli</i>
8000:	<i>xiquipilli</i>

}

- 7: *chicöme*;

- $\gamma + \delta, \left\{ \begin{array}{l} \gamma \in \{10, 15\}, 1 \leq \delta \leq 4 \\ \gamma = \alpha \times 20^\beta, 1 \leq \delta < 20^\beta \end{array} \right\}$: γ -oM- δ ,
- $$M = \begin{cases} m & \text{before } m, p, \text{ or a vowel;} \\ n & \text{otherwise.} \end{cases}$$

Arammba:

- 1: *ngámbi*, 2: *yànpa*ro, 3: *yenówe*, 4: *asàr*, 5: *tambaroy*, 6: *nimbo*;
- $\alpha \times 6, 2 \leq \alpha \leq 5$: α *tàxwo*;
- $6^2 = 36$: *fete*, $6^3 = 216$: *tarumba*, $6^4 = 1296$: *ndamno*, $6^5 = 7776$: *weremeke*;
- $\alpha \times 6^\beta, 2 \leq \beta$: α 6^β ;
- $\alpha \times 6^\beta + \delta, 0 < \delta < 6^\beta$: $\alpha \times 6^\beta$ δ .

	$11 \times 10 = 110$	$1 + 1 = 1 \times 2$	
	$20 \times 2 = 40$	$1 + 4 = 5$	
(a)	$67 + 14 = 81$	$12 + 60 = 72$	
	$5 + 2 = 7$	$3 \times 18 = 54$	
	$13 \times 3 = 39$	$6 \times 36 = 216$	
	$5 \times 3 = 15$	$6 + 12 = 18$	

$$\begin{array}{r} 3 \times 400 + 4 \times 20 + (15 + 1) \\ 1296 \end{array} = 1296 \quad (13)$$

$$\begin{array}{r} 1 \times 400 + 1 \times 20 + (10 + 2) \\ 432 \end{array} = \begin{array}{r} 2 \times 216 \\ 432 \end{array} \quad (14)$$

$$\begin{array}{r} 1 \times 400 \\ 400 \end{array} = \begin{array}{r} 216 + 5 \times 36 + 4 \\ 400 \end{array} \quad (15)$$

$$\begin{array}{r} 1 \times 8000 \\ 8000 \end{array} = \begin{array}{r} 7776 + 216 + 6 + 2 \\ 8000 \end{array} \quad (16)$$

- (b) • $42 = 2 \times 20 + 2$: *öm-pöhualli-om-öme*;
• $494 = 1 \times 400 + 4 \times 20 + 10 + 4$: *cen-tzontli-on-nāuh-pöhualli-om-mahtlactli-on-nāhui*.
- (c) • $43 = 36 + 6 + 1$: *fete nimbo ngámbi*;
• $569 = 2 \times 216 + 3 \times 36 + 4 \times 6 + 5$: *yànparo tarumba yenówe fete asàr tàxwo tambaroy*.

Problem 2. Structure of the verb form:

- I. – **me-**: affirmative form, present, indicative mood,
– ROOT,
– **-pe** ‘really’, **-fe** ‘pretend to’, **-f** ‘be able to’, **-n** — infinitive.

In this part of the word:

1. $C + -C > CəC$ (**de** + **-f** + **-n** > **de-f-ə-n**, **me-** + **bəb** + **-pe** > **me-bəb-ə-pe**).
2. The last syllable receives the stress if it is closed, otherwise the penultimate is stressed (**defən** > **defən**, **mešxepe** > **mešxépe**).
3. $CéC(C)e > CáC(C)e$ (**méšxe** > **mášxe**, **mešxépe** > **mešxápe**).

- II. **-xe** — plural, **-t** — past, **-me** — conditional mood, **-qəm** — negative form.

Answers:

- (a) **ʒeǵén** *to bite*
medéf *(he/she) is able to sew*
medáfe *(he/she) is pretending to sew*
səfən *to be able to burn*
meg^wəš'əʔe *(he/she) is speaking*
mebáb *(he/she) is flying*
- (b) **çentɣ^wéfme** *if (he/she) is able to slide*
šxáfexeqəm *(they) aren't pretending to eat*
bəbəft *(he/she) was able to fly*
šxet *(he/she) was eating*
ʔəg^wərəg^wəpeme *if (he/she) really is trembling*

- (c) **mádexe** (they) are sewing
mebəbáfexe (they) are pretending to fly
sópət (he/she) really was burning
šxéfqəm (he/she) isn't able to eat
g^wəš'əʔexeme if (they) are speaking
mezáqexe (they) are biting

Problem 3.

- (a) 1. Leave the first letter in place.
 2. Delete *h* and *w*.
 3. Replace all consonant letters with digits (letters whose most common sounds are similar are grouped together):

<i>bpv</i> (<i>f</i>)	<i>cgjkqs</i> (<i>xz</i>)	<i>dt</i>	<i>l</i>	<i>mn</i>	<i>r</i>
1	2	3	4	5	6

4. Reduce any sequence of two or more identical digits to a single digit.
 5. Delete all vowels (*a, e, i, o, u, y*).
 6. Leave only the first three digits or add zeroes on the right to make the code one letter and three digits long.
- (b) *Allaway: A400, Anderson: A536, Ashcombe: A251, Buckingham: B252, Chapman: C155, Colquhoun: C425, Evans: E152, Fairwright: F623, Kingscott: K523, Lewis: L200, Littlejohns: L342, Stanmore: S356, Stubbs: S312, Tocher: T260, Tonks: T520, Whytehead: W330.*
- (c) *Ferguson: F622, Fitzgerald: F326, Hamnett: H530, Keefe: K100, Maxwell: M240, Razey: R200, Shaw: S000, Upfield: U143.*

Problem 4. Rules:

- Word order: V P (S/O); S/O P V Poss, V P Poss; S Poss.
- V = verb (past → future: *-bi* → *-ba*, \emptyset → *-jba*).
- S = subject (noun). The subject of a transitive verb gets the ending *-ni*.
- O = object (noun).
- P = pronouns (subject + object) + tense:
 - subject:
 - * 1st *ngV-*,
 - * 2nd *nyV-*,
 - * 3rd $\left\{ \begin{array}{l} \text{intransitive verb: } gV- \\ \text{transitive verb: } \left\{ \begin{array}{l} \text{masculine } gVnV- \\ \text{feminine } ngVyV-; \end{array} \right. \end{array} \right.$
 - object: 1st *-ngV*, 2nd *-nyV*, 3rd $-\emptyset$;

– V are vowels (past: i, \dots, i, a ; future: u, \dots, u).

- Poss = possessed: $\left\{ \begin{array}{l} \text{'+' : } -ngu \\ \text{'-' : } -wa \end{array} \right\} \left\{ \begin{array}{l} \text{possessor} \\ \text{masculine: } -ji \\ \text{feminine: } -nya \end{array} \right\}$

- (a)
- | | | |
|----|---|------------------------------------|
| 1. | <i>Alayulujba nguyunyu bungmanyani.</i> | The old woman will find you (sg.). |
| 2. | <i>Yagu gininya.</i> | He left you (sg.). |
| 3. | <i>Janji darrangguwaji.</i> | The dog doesn't have a stick. |
| 4. | <i>Ngirra nya alanga.</i> | You (sg.) stole the girl. |
| 5. | <i>Dagama nyinga.</i> | You (sg.) struck me. |
| 6. | <i>Dirragbi ga balamurrungunya.</i> | She jumped with the spear. |
- (b)
- | | | |
|-----|---|------------------------------------|
| 7. | You (sg.) will leave me. | <i>Yagujba nyungu.</i> |
| 8. | The doctor slept. | <i>Gulugbi ga ngunybulugi.</i> |
| 9. | The man will run (away) with the money. | <i>Juwa gu bardba gijilunguji.</i> |
| 10. | He will steal the dog. | <i>Ngirrajba gunu janji.</i> |
| 11. | The girl saw you (sg.). | <i>Ngajbi ngiyinya alangani.</i> |

Problem 5.

- (a) $(\circ) \frac{\circ\circ}{\omega} \frac{\circ\circ}{\omega} \circ \frac{\circ\circ}{\omega} \frac{\circ\circ}{\omega}$, $\left| \begin{array}{l} \circ = V (a, e, i, o, u) \\ \omega = VV (aa, ee, ii, oo, uu) \end{array} \right.$

(b)	36.	war	is—maa—ciil		daa-	rood	×
	37.	dir mi-	yaad	wa-	daag-	taan	✓
	38.	laba-	daad	ka	duu-	diye	✓
	39.	ka jan-	na-daad		daa-	hiye	×
	40.	adi-	ga i-	yo	deris-	kaa	✓
	41.	diga-	xaar-	ka	mari-	yoo	✓
	42.	ciid i-	yo doo-		lo di-	raac	×
	43.	noo-	ma kee-		neen	darka	×
	44.	ka-	yaa-	yaa mi-		yaan	×
	45.	wu-	kaa	dan-	qaa-	baan	✓