How far can you carry a pig in day? Idu ethno-metrology





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ABSTRACT

The paper describes the metrological system of the Idu, a minority people of Arunachal Pradesh, Northeast India. Measurement systems include time, distance, weight/volume of dry and liquid substances, field size. Some of these seem quite idiosyncratic when compared to more obvious measurement systems. For example, a key measure of a journey is the distance a pig can be carried in a day. The paper tabulates the names and etymologies of different measures used by the Idu and provides images of some physical items, such as baskets and bamboo tubes. Neighbouring peoples, notably the Kman and Tawra, also have a similar system, and they are possibly found in the wider area, since a parallel description of the Aoheng in Borneo bears strong general similarities. However, the contrast with other comparable areas of the world, such as Sub-Saharan Africa and Melanesia is palpable; these areas conspicuously lack such systems. The paper concludes with some possible explanations for the elaboration of metrology in small-scale societies.

Keywords; Idu; measurement; metrology; Arunachal Pradesh

1. Introduction: ethno-metrology

Histories of the science of measurement, metrology, tend to be very Eurocentric, to imagine a series of conventions which begin in the sixteenth and seventeenth centuries, taking in early physics, the French revolution and more recently, atomic physics, along a fairly well-worn path. Porbably the first published consideration of historical metrology is Lucas Paetus (1573) who explored the measures and weights used by the Romans. Even if the net is cast wider, to non-European civilisations, China and India feature, but rarely tribal societies. The thought that precise systems of measurement are correlated with urbanism makes, sense, just as the evolution of practical monetary systems (and clearly the two are in turn related). That small-scale societies should be vague about weights and measures, or time, is familiar terrain to most field anthropologists. Most African and Melanesian markets still operate without systems of weighing products for sale. At the extreme, it has been claimed that some societies do not have any numeral systems (e.g. the Pirahã of the Amazon) or at best counting systems of the 1, 2 many type (Gordon 2004).

Nonetheless, in the SE Asian area, it is quite common for even small-scale societies to have a system of metrology, covering time, weight, volume and possibly other parameters such as the size of agricultural fields. An interesting overview of weights and measures in SE Asia (Le Roux, Sellato & Ivanoff 2004) only describes one 'tribal' society, the Aoheng of Borneo, (Sellato 2004), the remainder being concerned with more familiar systems. Sellato describes systems of time measurement based on the sun and working practice and volume based on traditional containers.

Despite the lack of accounts, these systems appear to be quite widespread. This paper[1] describes the systems of weight, volume and distance measurement among the Idu, a minority population of Arunachal Pradesh, NE India. It begins with an overview of Idu society and a brief sketch of the phonology of Idu, to explain the transcriptions. It presents the measures as identified by Idu informants with a selection of photos of the baskets or vessels referred to. The paper concludes with an assessment of the significance of a system of weights and measures for a small, dispersed and acephalous society.

2. Background to Idu society

2.1 Ethnography

The earliest discussion of Idu social life is the brief section in Dalton (1872) which covers their social organisation, religion and 'warlike propensities'. Two short monographs describe the social and material life of the Idu, Baruah (1960) and Bhattarcharjee (1983) both of which reflect long residence in the Dibang area. Baruah is of particular interest, since although it was researched in the period after the earthquake of 1950, it reflects a period when the Idu still had very little interaction with the outside world. Both describe Idu relations to the world of the spirits in some detail, although there are a number of errors. It may be assumed that the data in this paper has cross-checked against both of these sources and represents the findings of recent fieldwork.

Needless to say, things have moved along since these descriptions; Baruah in particular reflects the situation more than sixty years ago. Idu have increasingly moved to the plains, and have encountered other lifestyles. The proximity of the administrative centres and more recently the Border Roads Organisation workcamps have brought a mixture of Bengalis, Assamese and others to the area. Roing was also chosen for Nepali resettlement and many Idu now speak some Nepali. The recent construction of major bridges, in particular the bridge crossing the Lohit opened in 2017, has allowed Assamese tourists to reach eastern Arunachal Pradesh easily, and they now arrive in considerable numbers leading to a major expansion of hotels and restaurants.

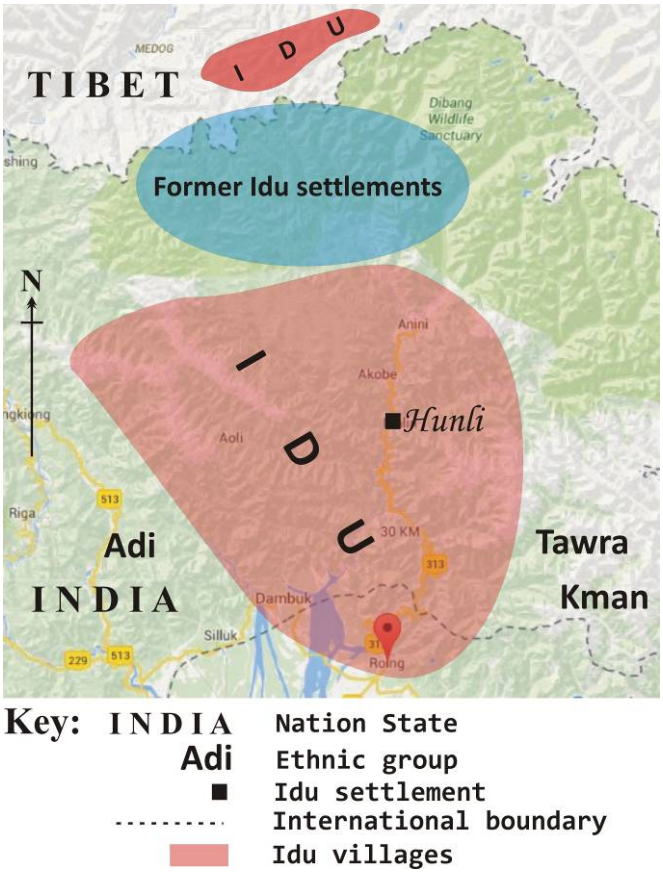
[1] Research for this paper was conducted in 2015-2018, principally in the Roing area of Arunachal Pradesh. I have worked with the Idu Language Development Committee (ILDC) under the auspices of the Idu Cultural and Literary Society. Dr. Mite Lingi, and Hindu Meme assisted in recording the basic data and discussing the ideas put forward in this paper; my thanks to them. The interpretations are my own.

Idu lifestyle has been much affected by these experiences. The longhouses are gradually disappearing in favour of modern cement-block houses, and modern dress has displaced traditional dress except for festivals. Despite this, there is a strong argument that Idu have remained quite conservative in terms of social culture and religious adherence. The aspect of Idu culture which persists and could accurately be described as the social glue which keeps their society coherent, is a strong respect for the practice of shamanistic religion. World religions, typically Christianity and Buddhism, still have few adherents in this area. Both for healing and the performance of the complex rituals involved propitiating *khānyū* spirits, easing the passage of the soul after death and healing the sick, requires the ministrations of the *īgū*, ritual specialists. There is no evidence that the importance of these is dimnishing, or that new individuals are not continuing the tradition.

The Idu are subsistence farmers, and depend on vegetative crops such as taro, bananas and yams, as well as cereals including foxtail and finger millets, sorghum and Job's tears. Rice is now an important part of the diet but this is relatively recent. The richness of the wild environment ensures that a significant proportion of protein still comes from wild resources and large and small mammals and fish are regularly consumed.

A social anthropologist writing in the 1930s would certainly have characterised Idu as a segmentary lineage society. Strongly acephalous, they are divided into paired clans, and these were the basis for residence and warfare far into the colonial era. Marital partners were formerly from preferred clans, although these rules have largely broken down in favour of free choice. Polygyny was common in the past, and was realised in a longhouse system, where wives were provided with individual hearths and family space strung along communal corridors. Cooper (1873: 189-190) described this system quite accurately and it has not changed markedly in the past century and a half. These structures remain widespread in rural areas.

Map 1. Idu territory in India and Tibet



2.2 Language

The Idu language is poorly known. The earliest reference is in Brown (1837). The only significant publications on Idu from the Indian side are the pre-linguistic Talukdar (1962), Jaten Pulu (1978) and Jimi Pulu (2002a,b). Idu has also been described from the Chinese side [under the name Lhoba], notably in Ouyang (1985), Sun et al. (1991), Sun (1999). A new phonology has been prepared in consultation with the Idu language committee project for a practical orthography[2]. In the transcriptions in this paper, phonetic characters have their IPA values, except;

j	is written as	y
h	following any consonant	aspiration
/ə̣/	is retracted schwa	ə̲
long vowels	are written as	doubled vowel

[2] This was presented in Roing on the 27th December, 2015, and was followed by lengthy discussion. Several documents outlining details of the phonology are available on my academia.edu pages.

Idu has three level tones, marked as follows;

High-	ˊ
Mid	¯
Low	`

A macron (¯) over a vowel is thus mid-tone and not length. Nasalisation is common in Idu and marked over the vowel in combination with tone.

3. Weight and volume

The key agricultural product for which measurement is required is cereals, principally rice (*kə*) and millet (*yā*). Since these are very different densities, basketsful do not really correspond more than approximately to absolute weights. Maize and cotton in particular fill baskets at much lower weights than millet and rice. Smaller amounts are measured by ladles, palms and other ad hoc measures. Table 1 shows the typical baskets and other measures used for dry goods and agricultural produce. Photo 1 and Photo 3 are examples of the typical baskets used for measures.

Table 1. Idu dry measurement of weight and volume

Idu	Container	Approximate weight
ànjò	close-woven bamboo basket for rice	10-12 quintals
àwɛ̄	openweave bamboo basket for rice	10-12 quintals
ambo ipigə	bamboo basket for maize cobs	100-150 kg.
àsínōgə, àsónōgə	bamboo basket for rice	30-40 kg.
àtùtūgə	bamboo basket for rice	5-20 kg.
àbrūgə (yàmbà, yà, kə, ènā)	bamboo basket	10-20 kg.
sùjāgə	small basket (<Adi)	quarter of àsínōgə
àpī tōgə	bamboo basket for cotton	10-15 kg.
-gə̄gə	suffix indicating the amount you can can carry on the back e.g. àmbógə̄gə, èkāgə̄gə	20-40 kg.
èpəkāgə	amount of grain that can be winnowed at one time	1-5 kg.
ìkə̄dìgə	bamboo ladle	50-100 gm.
ādrūpràgə	bamboo spoonful	50-100 gm.
sīgə	amount of rice you can thresh with your legs at one time	5-10 kg.
cūmūlà	heap of rice grains	50-100 kg.
àcɛ̃̄gə	big cloth bag (e.g. rice, maize powder)	7-10 kg.
àcɛ̃̄gə	pouch carried by hunters full of maize flour	250-500 gm.
àrhùkūgə	bamboo plate	1-2 kg.
èyàgə	two extended arms full (paddy stacked for threshing)	10-15 kg.
ndràgə	two arms full of cloth bag	4-5 kg.
ìbrùgə	two palms full	200-400 gm.
bùgə	palm full	100-200 gm.
kūshìgə	amount of fish or rat which can be smoked at a time	
nōsìgə	amount you can pound at one time	

Photo 1. àtùtū basket

Photo 2. àcòkà drinking tube

Photo 3. àbrūgə̀ basket

4. Liquid volume

The key Idu drink apart from water is beer, *yu*, usually made from millet. Served on many social occasions it also forms part of the circulation of food and drink at ceremonial gatherings such as Rẽ. The yu was fermented and then passed through a strainer, *ájì*, and served in a bamboo tube (*àcìphrū*, Photo 4), One *àcìphrū* may contain 1 to 4 litres depending on the length and diameter and a strainer 2 to 3 litres. A small type of bamboo tube (*àcòkà*) is about the size of a European mug or a cup (Photo 2).summarises the main measures of liquid capacity recognised by the Idu, together with their approximate equivalents in metric volume.

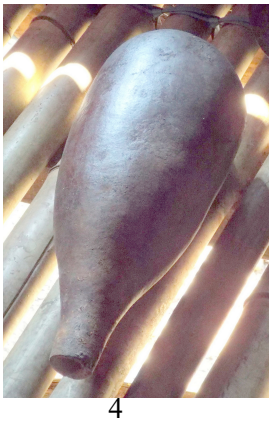
Table 2. Idu liquid volume measurements

Idu	Container	Litres
ècààmbɔ̃	longest bamboo tube	5-10
àwētɔ̃	long thin bamboo tube used as a container	1-2
ìphrū	short bamboo tube	1-2
èphrōkò	short bamboo tube with handle used with strainer	2-4
àcìphrū	short bamboo tube with handle	1-2
àcòkà	short bamboo tube for personal use	0.5-1
ìkə̀tá	short bamboo tube for festival use	0.5-1
phétóthì	very short bamboo tube used for condiments	0.25
éthótì	very short bamboo tube used for condiments	0.25

The bamboo tube measurements all refer to an essentially uniform tube. However, other types of containers are also recognised for standard measures, even including relatively modern items, such as the industrial enamel mug. Table 3 summarises these more various

Photo 4. àcìphrū bamboo container

Photo 5. ēkə̀lā gourd



measures.

Table 3. Idu other measurements of volume

Idu	Container	Litres/ml.	Etymology
àjì	beer strainer	1-2	
èkàpǔ	large gourd	1-5	
ɛ̄kǎlā	small gourd (Photo 5)	1-2	
ìnùpū	gourd ladle	250-500 ml.	
àbrāwə	bamboo ladle	100-200 ml.	
sūdrūprà	iron spoonful	10-100 ml.	< *si adupra*
kòōbə	large industrial mug	500 ml.	? < English 'cup'
pàtīkā	modern imported mug	250 ml.	? < Assamese
jōlōgē	aluminium or steel milk canister	5	? < Assamese
drìsī	kettle	2-5	< English 'dixey'

5. Distance and length

5.1 Short and long distances

Idu also like to measure distance, not really in absolute length but in terms of the time to reach a destination. The nature of the terrain in which they live means that absolute distances do not reflect the difficulties that have to be overcome in crossing rivers or climbing escarpments. Moreover, as the distances in Table 4 suggest, the journeys are often undertaken either transporting animals for sacrifice, gifts or the market. Carrying a protesting pig is not the same as an unencumbered stroll.

Table 4. Idu long distance measurements

Idu	Translation	Indicator	Km.
ètō rhǖ shì	time taken for cock to crow	Distance covered by s.o. carrying a chicken between the periods when it crows	1-2
ètō àyàlōsō pwè khə̄	chicken roost reach time	Place where you can reach by the time fowl go to roost	15-20
ìlì gə̄tò shìgə	pig carry time	Distance covered by s.o. carrying a pig	1
īnjā khə̄	evening until	Place you can reach by sunset	15-20
kú	go and come	Go and come back in the evening without resting at destination (which must be inhabited)	15-20
àmbó mà pwē khə̄	night grope reach time	Distance covered before nightfall	15-20
thrūsìgə nàrù	run one	Distance covered running until you are tired Resting place	Variable

Apart from distance along roads, Idu have short distances, not dissimilar to the traditional English 'hop, step and a jump'. These are shown in Table 5;

Table 5. Idu short distance measurements

Idu	Definition
khrùshīgə	distance covered in one step
dòshīgə	distance covered in one jump

5.2 Short lengths: measurement on fingers

Apart from distance, Idu also have the means to express short lengths. These could apply to the thickness of a cloth, a piece of pork, or a wound. The fingers are the main indicator, with distance to elbow for greater

lengths. The greatest width can be expressed by outspread hands. These type of measurements are not dissimilar to early records of lengths such as the yard in Europe[3].

Table 6. Idu small length measurement

Idu	Indicator	Approximate length
ācù pràyì	width of index finger	10-15 mm
ātā pràyì	width of thumb	20 mm
tīnī pràyì	two fingers	30 mm
tōsó pràyì	three fingers	40-50 mm
lāyá pràyì	four fingers	60-65 mm
lāyá bàŋgà	four spread fingers	70-75 mm
mùbrūjìgə	smallest quantity (smallest type of chicken feather)	5 mm.
mùgə	distance from tip of elbow to fingertips	50 cm.
èthògə	extended index finger to thumb	12 cm
ātūdrāgə	from the tip of the thumb to the bottom side of the hand when fingers are closed	12 cm
àgàgə	from tip of the thumb to the tip of the extended middle finger	14 cm
ètràgə	from the centre of the chest to the tip of middle finger	1 m
èl(~y)àgə	distance between outspread hands	2 m

6. Sizes of agricultural fields

Given the vertiginous terrain of Idu territory, it is rarely practical to establish large agricultural fields on flat land. Fields are thus usually small and often of irregular shape. So field sizes are graded, but their overall area tends to vary a great deal. Table 7 shows the sizes of agricultural field recognised by the Idu.

Table 7. Idu sizes of agricultural fields

Idu	Explanation	Size (ha)
sō mrā, gə mrā	vegetable garden, smallest field	0.1
hə ā	small field	0.2
hə khỗ	medium field	0.5
hə gə	larger field	0.5 - 1.0
grù mrā	largest field	2 - 10

7. Time

The Idu do not conceptualise the day as divided into equal units, nor really as a distinct period. The day is rather conceptualised as the period of waking activity. This begins in the period before dawn and continues through to the time after the evening meal when socialising and eventually the elders sleep. In modern times, the prevalence of electricity in some settlements, and the spread of cheap LED lanterns, as well as the requirement for children to do school homework often means that people stay up significantly later than conventional bedtime.

Table 8 shows the hours of the day as named by the Idu, reflecting both agricultural activities, the movement of the sun and in one case the return of poultry to the coop.

[3] William of Malmesbury's *Deeds of the Kings of England* records that during the reign of Henry I 'the measure of his arm was applied to correct the false ell of the traders and enjoined on all throughout England'.

Table 8. Idu hours of the day

Idu	Translation	Period	Approximate time
àndūnyū yàyì	? + still night	before dawn	3-4 am
ètō rhṹ	cock crow	before dawn	3-4 am
ànjè brè	light through bamboo wall	dawn	4-5 am
ànàyàmā	morning	morning	5-6 am
àrhā chì lṍsō	field walk time	time to go to the fields	6-7 am
dòmbò lōgə	?	before noon	10-11 am
ìnyīmbṍ	sun + trunk	mid-day, noon	12 am
īnyī àhīnyū	sun + that side	early afternoon	1-2 pm
ètò àyà lṍsō	chicken return time	chickens return to the coop	4-5 pm
ìnjā	sunset	sunset, dusk	5 - 6 pm
īnyíndà	after sunset	sunset	6.30 - 7 pm
āhìtì	children + sleep	bedtime for children	6-7 pm
dùā àthálō	in the crowd + wait for feast	socialising time	7-8 pm
hītì	time to sleep	bedtime for all	8-9 pm
tànggrò ēsàjìgə	elders sleep	bedtime for all	8-9 pm

Short times also resemble some informal measurements recognised in English, such as ‘in the blink of an eye’ (Table 9).

Table 9. Idu measurements of short time

Idu	Definition	Approximate time
ìpìshìgə	time taken for a eye to blink	
mūshìgə	time required to burn off the feathers of a chicken	5-10

8. Conclusions

The paper describes the metrological system of the Idu, a minority people of Arunachal Pradesh, Northeast India. Measurement systems include time, distance, weight/volume of dry and liquid substances, field size. The neighbouring peoples also have a similar system, notably the Kman and Tawrã and they are possibly found in the wider area, since the only parallel description I have uncovered, in Borneo, bears strong general similarities. However, the contrast with other comparable areas of the world, such as Sub-Saharan Africa and Melanesia is palpable; these areas conspicuously lack such systems. The presence or absence of metrology is not linked to the complexity of number systems, those in Sub-Saharan Africa are often similar to systems in SE Asia. It is therefore helpful to consider the possible explanation for these systems.

The most important of these is long-distance trade. The Idu and their neighbours have been engaged in trade as far as oral traditions reach, principally to Tibet and Assam. This trade was in agricultural produce, cloth and metalware. Volume of produce, carried in baskets was a key element in planning trade caravans. Walking long distances to trade entrepots was a core element in Idu culture. Intriguingly, the very first mention of the Idu in a historical source, the Tai Ahom pillar of 1675, now in Guwahati Museum (Photo 6). This defines the territory of the Mishmi and enjoins them to pay tribute of four baskets of arrow poison annually, to ensure their lands stay secure. Similarly, the exchange of meat and beer at Rẽ and other ceremonial events is careful calculated as part of long-term exchange cycles; these are not parties where food and drink is handed out casually.

This type of measurement is in turn connected with the cultural importance of prosperity. Wealth is a crucial aspect of wellbeing in Idu thinking and distinctions between rich and poor play a key role in their cultural mapping of their society. The spirit that protects the household, the *bro*, is responsible for maintaining prosperity as well as preventing health crises. Prosperity is above all connected with ownership of mithuns and pigs, and thus the ability to participate in prestigious feasting cycles. Perhaps therefore, an urge towards greater precision in quantifying both trade goods and exchange items has stimulated a broader interest in developing measurement systems.

References

Baruah, Tapan Kumar 1988. *The Idu Mishmis*. Itanagar: Government of Arunachal Pradesh. [reprint of a 1960 publication]

Bhattarcharjee, Tarun 1983. *The Idus of Mathun and Dri Valley*. Shillong: Government of Arunachal Pradesh.

Brown, N. 1837. Comparison of Indo-Chinese Languages. *Journal of the Asiatic Society of Bengal*, 6: 1023-1038.

Brown, N. 1850. Aborigines of the North East Frontier. *Journal of the Asiatic Society of Bengal*, 19: 309-316.

Dalton, E.J.T. 1872. *Descriptive Ethnology of Bengal*. Calcutta: Office of the Superintendent of government printing.

Gordon, P. 2004. Numerical cognition without words: Evidence from Amazonia. *Science*, 306(5695): 496-499.

Griffith, W. 1847. *Journals of Travels in Assam, Burma, etc*. Calcutta.

Le Roux, P. Sellato, B. & J. Ivanoff eds. 2004. *Poids et mesures en Asie du Sud-Est. Systèmes métrologiques et sociétés. Weights and Measures in Southeast Asia. Metrological Systems and Societies*. 2 vols. Paris: EFEO.

Mills, J.P. 1952. The Mishmis of the Lohit Valley, Assam. *The Journal of the Royal Anthropological Institute of Great Britain and Irelan*d, 82(1):1-12.

Nilsson, M.P. 1920. *Primitive Time Reckoning. A Study in the Origins and first Development of the Art of Counting Time among the Primitive and Early Culture Peoples*. Lund: C. W. K. Gleerup.

Ouyang, Jueya 1985. *A brief introduction to the Luoba language*. [in Chinese]. Beijing: Mínzú Chūbǎnshè.

Paetus, Lucas 1573. *De Mensuris et ponderibus Romanis et Graecis.* Venice: Aldo Manuzio.

Pulu, Jatan 1978. *Idu phrase-book*. Shillong: Arunachal Pradesh Directorate of Research.

Pulu, Jimi 2002a. *Idu Mishmi proverbs and sayings*. Itanagar: Arunachal Pradesh Directorate of Research.

Pulu, Jimi 2002b. *A handbook on Idu Mishmi language*. Itanagar: Arunachal Pradesh Directorate of Research.

Robinson, W. 1856. Notes on the languages spoken by the Mi-Shmis. *Journal of the Asiatic Society of Bengal*, 24: 307-324.

Rowlatt, E.A. 1845. Report of an Expedition into the Mishmee Hills to the N.E. of Sudyah. *Journal of the Asiatic Society of Bengal*, 14, 2: 477-493.

Sellato, B., 2004. Grasping the World: Measuring and Counting among the Aoheng of Borneo. In: *Poids et mesures en Asie du Sud-Est. Systèmes métrologiques et sociétés. Weights and Measures in Southeast Asia. Metrological Systems and Societies*. 2 vols. Le Roux, P. Sellato, B. & J. Ivanoff eds. 237-258. Paris: EFEO.

Sun, Hongkai 1983a. *A brief introduction to Idu (Luoba) language*. [In Chinese]. Mínzú Yǔwén 6. Beijing: Mínzú Chūbǎnshè.

Sun, Hongkai 1983b. *The languages of the peoples of the Six River Valley Region and their genetic classification*. [In Chinese]. Mínzú Xuébào. Kunming: Yunnan People's Publishing Company.

Sun, Hongkai 1999. On the Himalayan languages of the eastern Himalayan area in China. *Linguistics of the Tibeto-Burman Area*, 22: 61-72.

Sun, Hongkai et al. 1980. *The languages of the Moba, Luoba and Deng people*. [In Chinese]. Beijing: Zhōngguó Shèhuì Kēxué Chūbǎnshè.

Photo 6. Tai Ahom Pillar, modern copy