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Pan Africa News publishes articles, notes, reviews, forums, news, essays, book reviews, letters to editor, and classified ads (restricted to non-profit organizations) on any aspect of conservation and research regarding chimpanzees (*Pan troglodytes*) and bilitias (*Pan paniscus*). Contributors are requested to write in English and the papers except forums, reviews and essays should usually be 1,500 words or less. Articles, notes and reviews will be peer-reviewed by at least one appropriate expert on request of the PAN editorial staff.

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PAN is published twice a year in June and December. Deadline for manuscripts is one month before publication (*i.e.* the ends of May and November).

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GRASP in Paris 2012

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GRASP, which stands for the Great Apes Survival Partnership, is a joint program of UNESCO and UNEP. The 1st GRASP council meeting was held in Kinshasa, Congo, in 2005. The discussion at the time resulted in the

Kinshasa Declaration on Great Apes. The 2nd meeting of the GRASP council was held in November 6–8th, 2012, in the headquarters of UNESCO, Paris, France. The author is a member to the Scientific Commission (SC) of GRASP. The SC consists of experts on wild great apes and acts to provide scientific advice to GRASP.

The GRASP 2012 council meeting in Paris aimed to define and prioritise actions for the coming years. The new GRASP coordinator, Douglas Cress, took the lead at this international gathering, which included predominantly representatives of range countries, donor countries, NGOs and UN-related organizations. I estimate that about



Figure 1. The 2nd GRASP Council was held 6–8 November 2012 at UNESCO headquarters in Paris.

150 people gathered for this 3-day meeting.

There was a lot of exchange of information about the current situation of great apes and major threats to their survival including habitat loss, poaching and the bushmeat trade, as well as the illegal international trade and the risk of disease transmission. The core of the discussions and output documents are available on the GRASP website. Please visit the website (<http://www.un-grasp.org/>) for an update on GRASP activities. This report simply aims to publicize that the second GRASP council meeting was held in Paris to revitalize conservation efforts for wild great apes across their range.

There are many ongoing activities at different levels aimed at promoting conservation of great apes in the wild. In this context, it might be helpful to mention the different roles of three organizations: the International Primatological Society (IPS), IUCN, and GRASP.

IPS is the international academic society of primatologists. It holds biennial meetings. IPS 2010 was held in Kyoto, Japan, IPS 2012 was just held in Cancun, Mexico, and IPS 2014 will be held in Hanoi in Vietnam. The IPS comprises scientists across various disciplines who study non-human primates (NHPs). The IPS plays a key role in the scientific approach to conservation of NHPs, because the majority is either endangered or threatened. It is very important to acknowledge that there exists a wide variety of primate species, other than just great apes. IPS has a vice-president for conservation.

The IUCN species survival commission (SSC) also unites scientists, taxon experts whose role is, among others, to evaluate the conservation status of species and regularly update the IUCN Red List of threatened species. The IUCN SSC includes a Primate Specialist Group (PSG). The PSG has a Section on Great Apes (SGA). The IUCN-PSG-SGA consequently focuses on the conservation of great apes from a scientific viewpoint.

GRASP differs from IPS and IUCN-SSC in its ability for advocacy. As part of the United Nations organization,

GRASP can, for instance, help to influence policy-makers, to promote green economy strategies, and to improve law enforcement coordination worldwide to the benefit of great apes. This level of effort is essential if we are to resolve conservation challenges lying beyond national borders, producing a real impact on conservation through policy-making whilst balancing conservation and economic development.

I am writing this short note in Bossou, Guinea, West Africa, where the Kyoto University team has been carrying out a longitudinal study of chimpanzees in Bossou and Nimba. Among other tool uses and remarkable behaviors, Bossou chimpanzees are most well-known for their use of a pair of mobile stones to crack open oil palm nuts. However, in recent years, the Bossou chimpanzees have been declining in numbers, with only 12 individuals remaining today. If this community were to become extinct, its unique culture will disappear with it. Mount Nimba, 4 km away from Bossou, is the only natural World Heritage Site (WHS) in Guinea; however, this mountain range, which is rich in high grade iron-ore, continuously faces the threat of mining. We have, for many years now, been taking the initiative to plant trees between Bossou and Nimba to connect the two areas while also encouraging natural regeneration; this project is known as the Green Corridor Project.

Science in the field should accompany in situ conservation efforts, just like science in the laboratory should aim to support welfare of captive animals. In various places, field scientists are making their own grass-roots efforts. I hope that activities at all levels will complement one another to improve the conservation of great apes and ensure their long-term survival in the wild.

<NEWS>

Iyondji Community Bonobo Reserve: A Recently Established Reserve in the Democratic Republic of Congo

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INTRODUCTION

The Iyondji Community Bonobo Reserve (ICBR), established by the Democratic Republic of the Congo (DRC) Ministry of Environment in April 2012, encompasses approximately 1,100 km² of tropical moist forest that harbors bonobos (*bilia*; *Pan paniscus*). The ICBR is adjacent to the southeast border of the Luo Scientific Reserve (481 km²). Wamba, a long-term study site of wild bonobos, is situated in the northern section of the Luo Scientific Reserve¹ (Figure 1). The Kokolopori Bonobo Reserve is east of the ICBR. Creation of the ICBR will benefit the conservation of bonobo habitat because it expands the protected area. The present report describes the history of the area before the ICBR was gazetted, efforts to habituate the bonobos, and current management issues and implications for the future.

BACKGROUND

Most Iyondji villagers live in settlements that extend along established roads in the northern section of the Luo (Maringa) River. Crop fields and secondary forests stretch for 1 to 2 km on both sides of the villages. Primary forest extends along the southern section of the river where temporary hunting, fishing and gathering camps and small hamlets with cassava fields lie² (Figure 1). The local Iyondji communities (Yohala and Yokali villages) wanted to establish a community reserve in the southern section of the Luo River, and in 2007, they requested help from the African Wildlife Foundation, an international non-government organization (NGO), and the Japanese research team that had established the Wamba Committee for Bonobo Research, a long-term research project in and around Wamba. At the time, we conducted preliminary surveys and continued to train and support the community in searching for local bonobo group, and a local NGO, Forêt des Bonobos, took the initiative and carried out the

project with the villagers. Between 2010 and 2011, with support from the United States Fish and Wildlife Service, efforts to gazette a new community reserve were made in earnest.

HABITUATION OF BONOBOS

In July 2010, habituation of the bonobos was begun on a daily basis in preparation for potential tourism or scientific research. The habituation procedure involved identifying unit-groups (or communities) and their ranges by finding footprints and food remnants, making and maintaining observation trails in the ranges, following one or two target groups on a daily basis and identifying individuals in the bonobo groups. We established a research camp at a hamlet along the Bembongo River in the northern part of the proposed protected area (0° 8' 20" N, 22° 44' 37" E; Figure 1). The Bembongo camp was 2–3 h from an Iyondji village (outside of the proposed protected area) travelling in a small boat and on foot.

We found two different groups of bonobos around the camp in the first 2 months. We focused our efforts on the Bembongo Group and followed them on a daily basis. Table 1 shows the number of days the group was observed and the direct observation times during the project. The camp was situated in the northern sector of the Bembongo Group's range. It was possible to follow the bonobos nearly every day when they were near the camp, but this was difficult when they ranged further south because their southern range was 2 h or more from the camp and we had not made observation trails further south.

We identified the Ite Group, a unit-group that ranged in the west adjacent area and the Bohondohondo Group, which ranged in the east adjacent area. Moreover, we found evidence of other bonobo groups in the southern area of the reserve.

The ICBR bonobo population borders the Wamba

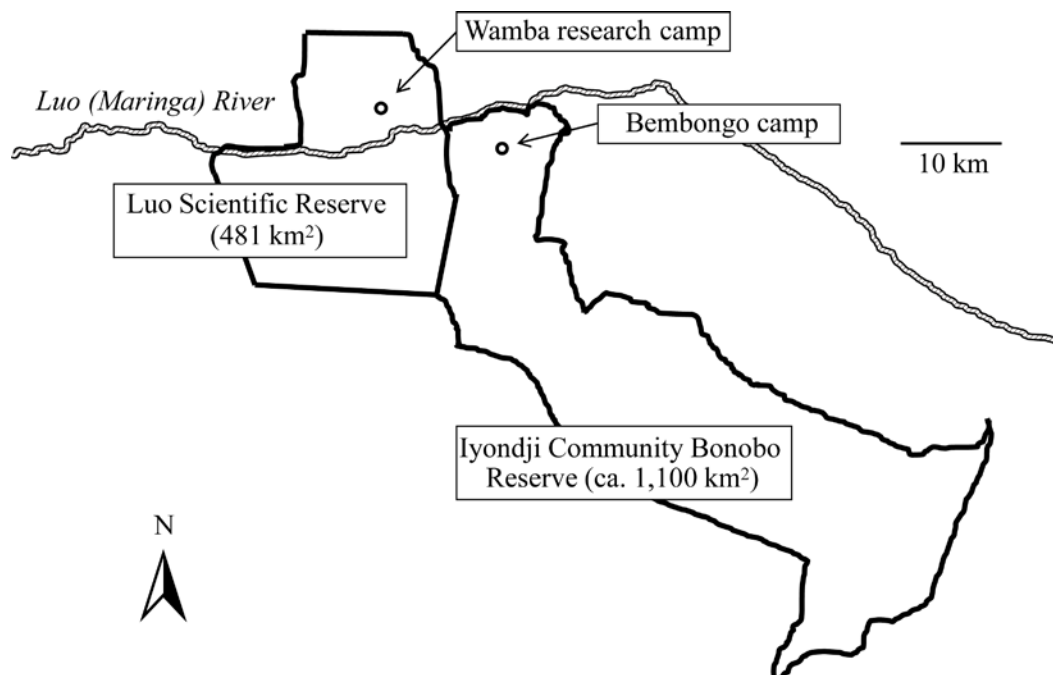


Figure 1. Map of the Iyondji Community Bonobo Reserve and the Luo Scientific Reserve.

Table 1. Number of research days, direct observations and observation time of the Bembongo group.

	Number of research days	Number of observation days	Observation time (h)
2010			
July	17	3	0.3
August	8	0	0
September	12	0	0
October	0	–	–
November	26	4	19.32
December	26	13	33.18
2011			
January	23	12	45.38
February	28	16	62.62
March	31	23	66.9
April	27	11	24.28
May	31	19	84.63
June	30	15	32.13
July	31	12	27.58
August	30	12	27.57
September	27	7	23
October	30	16	30.52
November	25	12	44.63

bonobo population. Behavioural and ecological studies of the Wamba group have been reported previously¹. Given the proximity of the two groups, their habitats are unlikely to differ significantly; however, further surveys are necessary to assess the two environments. Individuals in the ICBR and Wamba groups cannot transfer between groups because they cannot cross the Luo River, which separates the two populations. Thus, the behavioural diversity or “culture” of the ICBR bonobos is an interesting topic for future study³.

CURRENT PROBLEMS AND THE FUTURE

The local Bongando people (a Bantu ethnic group) are closely tied to their natural environment². Although their most important crop is cassava, the Bongando acquire most of their animal protein from the forest where they hunt and gather various species of mammals, birds, reptiles, fish, insects and plants. They keep livestock such as goats, pigs, chicken and ducks, which are consumed in rituals and on ceremonial occasions. Effective and sustainable management of the ICBR requires the development of alternative sustainable livelihoods while controlling the use of resources in the forest.

People living in the forest present additional difficulties. One objective of the 2010–2011 Iyondji project was to establish a biannual monitoring of large mammals and human activity in the proposed protected area. We originally planned to make 10 line transects (each 5 km) in the area for biannual monitoring and regular patrol. However, our monitoring walks were able to cover only four transects in the northern area because the people who lived in scattered hamlets in the middle and southern areas of the proposed protected area were not in favour of a new reserve and obstructed our work. These were not Iyondji people,

but members of other populations in the adjacent administrative districts. Although the southern boundary of the ICBR was within the Iyondji jurisdiction, the Iyondji people only inhabited the forest in the northern sector of the ICBR.

Temporary hunting and gathering camps and small hamlets with cassava fields were present within the ICBR. Approximately 10 people lived in a hamlet (Lingomo *et al.*, unpublished data). According to the villagers, people lived in the forest permanently, and some of their children had never been to the villages along the established roads where there were schools and dispensaries. This situation was, in part, the result of the DRC civil war in the 1990s². Prior to the civil war, villagers hunted primarily for their own consumption. However, during the war the trucking and shipping transportation network collapsed, and the villagers were left with no means of selling cash crops such as coffee beans. As a result, the sale of bush meat became the primary way of earning cash.

Unlike the people from adjacent districts, the local Iyondji communities agreed to manage the ICBR, and they regularly monitor and patrol their forest. It is important to note that the Iyondji people were provided with opportunities for alternative livelihoods that allowed them to decrease the hunting of wild animals and habitat destruction through slash-and-burn agriculture. Continual support for the Iyondji and other adjacent communities may be necessary to resolve conflicts with the ICBR. Furthermore, it is necessary to develop innovative ways to create revenue through the forest and its bonobos, such as tourism and scientific research.

At present, it is not realistic for the local communities to forego the use of resources in the forest. However, local community activities must adhere to regulations of

the reserve, and regular monitoring of animals and human activity is important and necessary. Ideally, the local communities will take the initiative in carrying out regular monitoring and patrolling of their forests. Our ICBR project is a model case of collaboration among local communities, conservation NGOs and scientific researchers. At this stage of the ICBR project, the collaboration is expected to continue to help solve current problems and facilitate development of the management plan.

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<NOTE>

Death of the Oldest Female at Mahale and Some Notes about Longevity of Wild Chimpanzees

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DEATH OF CALLIOPE, THE OLDEST FEMALE AT MAHALE

Calliope (Figure 1), an old, female chimpanzee at Mahale, is assumed to have died this past year (*i.e.*, 2012). Her death is *assumed* because it has not been confirmed, but she has not been witnessed since the final observation

on 5th April 2012. As it is rare to observe the deaths of wild chimpanzees directly, or to find the dead bodies, we usually assume individuals who have not been observed for more than 3 consecutive months in Mahale to be deceased.

Calliope was estimated to be 52 years old in 2012, which is the oldest age at death so far recorded at Mahale. She was first identified in 1973 as a young adult. The starting age of adulthood in females is 13 years old. Therefore, she would have been at least 13 years old at that time. This gave the estimation that she was born in 1960, but her exact birth-year could be even earlier.

According to Nishida¹, Calliope had been very shy to human observers until the 1990s. Although she later became tolerant of observations from a certain distance, she continued to be more timid than the other females. She seemed reluctant to get too close to humans, especially when she had a small baby. Throughout her life, Calliope gave birth to a minimum of 5 offspring (*i.e.*, 3 females and 2 males)². Except for 1 female offspring who died at 3 years old, the other 4 were weaned and reached the age of puberty. Thus, it can be said that she was a successful mother. After she gave birth to her last offspring in 1997, she did not give birth again throughout the last 15 years of her life. Excluding the 5 years during which she was nursing her last baby, she enjoyed her remaining post-reproductive life for 10 years.



Figure 1. Calliope in 2010 (at estimated age of 50 years old). Although her hair was white, she did not look old.

CALLIOPE'S FINAL DAYS OF LIFE

Calliope was often observed traveling with her last daughter, Carmen, until Carmen emigrated from the M group in July 2011. Calliope also groomed often with her two mature sons, Carter and Cadmus, when she met them. After the emigration of Carmen, Calliope often

ranged together with Wakusi, an older female who is estimated to be one year younger than Calliope. As the oldest duet, they usually kept a moderate distance from noisy males, even though they both had mature sons. However, in large, they ranged alongside the other chimpanzees. We sometimes observed that they would feed apart from the others, whose calls could be heard from a distance. Some moments later, they would travel in the direction of the calls in tandem. When they caught up with a group of males, the males would often groom the two older females. The females, however, seldom groomed the males in return, as if they were enjoying respects for the aged. Calliope might have suffered from presbyopia. For instance, when she groomed others, she straightened up her upper body so that her eyes were at a distance from the groomee's body surface.

When MN observed Calliope on 15th December 2011, she was, again, travelling with Wakusi. When these two, and a mother-infant pair, were resting under a bush, there came her fully adult son, Carter. Then, Calliope and Carter started to play with each other. They tickled, slapped, and mouthed each other's body and chased each other in a circle. Both of them showed a play face and play panted. A 51-year-old mother and a 26-year-old adult son were playing like two juveniles! The play lasted for 23 minutes.

HN was the last researcher to see Calliope on 4th March 2012, when he was following an adult male who was in consort with a young estrous female. On this day, again, Calliope and Wakusi were together. The two joined the party that HN was following. Although the observation time for Calliope was short, HN did not notice anything peculiar about her health or physical condition. After that day, she was not observed again for some time. This is not uncommon in March–April, however, as Mahale chimpanzees are usually dispersed in small parties throughout this season. On 5th April 2012, a research assistant observed Calliope with 10 other chimpanzees. This was the last day that she was observed.

LONGEVITY OF WILD CHIMPANZEES

Establishing the longevity, or the maximum lifespan, of wild chimpanzees is difficult to ascertain. Chimpanzees typically have a long lifespan, and their ages are often estimated. Let us compare, here, the 52 years of life of Calliope (the longest documented lifespan at Mahale) with other wild chimpanzee populations. At Gombe, the oldest estimated age at death was 53 years for the famous chimpanzee, Flo³. At Bossou, the oldest female, Kai, died at an estimated 53 years of age⁴. At Tai, a female, Chanel, died when she was 46 years old (calculated from Appendix Table A.1. in ref. 5). These ages are all within the estimated range of the maximal lifespan potential of captive chimpanzees (48 ± 5 years; taken from a literature survey covering over 100 zoos worldwide; cited in ref. 6).

We have to be careful about the specific age at death for chimpanzee individuals in the wild because they are all estimates. For example, Flo's age at death was first estimated to be 43 years old by Goodall⁷, but she was estimated to be 10 years older in the later literature³. This

may be because Flo was already old, in her 30s or 40s, when she was first identified in 1962. Estimating the age of older individuals is particularly difficult because individuals differ in their appearance. Like humans, some chimpanzees look younger and others look older than they really are. Accordingly, we see, with a bit of suspect, that a 55-year-old mother gave birth to a child at Kibale⁸. This means that, if the estimation of age is correct, her longevity will be much longer than that of previously recorded individuals. Research at Kibale was initiated in 1983⁹, which means this female was in her 30s at that time. Thus, there may be the possibility that her age was overestimated.

For the estimated age of Calliope, we expect a small proportion of error because she was estimated to be 13 years old when she was first identified. It is possible that one would estimate a 33-year-old female to be 43 years old, but it is not likely that one estimates a 3-year-old female to be 13 years old. From our experience, estimation error of a 13-year-old female can be within 3 years or so, thus we can more confidently say that Calliope was between 49 and 55 years old at the time of her death.

Finally, we should mention some aged individuals who are still alive. At the time of writing, there were several older chimpanzees at Mahale, such as Wakusi (female, 51), Gwekulo (female, 50), Fatuma (female, 49) and Kalunde (male, 49) (numbers in parentheses are their estimated ages in 2012, which are equally accurate as, or even more accurate than, that of Calliope because these individuals were in their young adulthood or adolescence when identified). Some of these individuals now look old in their appearance and show the typical behavioral characteristics of old age, such as slow traveling speed and a relative decrease in activity. However, at present, they all appear to be in good health. Similarly, at Bossou, 4 females and 1 male older than 50 years were still alive in 2012 (Ohashi G, personal communication). Looking at these figures, although the sample size is still small, it seems that more females experience old age than males at both sites. This assumption concurs with the fact that males, on average, show higher mortality than females¹⁰.

We hope that these older chimpanzees will live longer, well beyond the current records of longevity in wild chimpanzees. Then, our current knowledge about the longevity of wild chimpanzees would be revised.

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<NOTE>

Wild Chimpanzees at Mahale are not Manually Lateralised for Throwing

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INTRODUCTION

The importance of throwing has figured consistently and prominently in scenarios about the evolutionary origins of human behaviour^{1,2}. The utility of imparting force to airborne projectile weapons, launched ballistically, is obvious, whether to deter, punish or subdue predators, prey, or competitors. Other functions of throwing are less obvious but could be equally useful, such as bringing down hanging fruit, gaining others' attention, shattering large objects into fragments, etc. Scenarios have stressed a number of important variables, such as posture (especially bipedality), sensorimotor skill (especially hand-eye coordination), cerebral asymmetry, etc. Calvin¹ linked all of these to the evolutionary origins of language. However, few of these ideas have been tested empirically.

One way to tackle evolutionary aspects of human throwing is to look at throwing performance in our nearest living relations. Although throwing has been known in both wild³ and captive⁴ chimpanzees for almost a century, quantitative studies are few; often they are sub-

sumed in broader studies of manual behaviour, e.g. ref. 5. Furthermore, studies often do not distinguish between aimed (targeted) throwing *versus* unaimed (perhaps better termed hurling) throwing, underarm *versus* overarm delivery, or one-handed *versus* two-handed throwing.

Several studies of manual laterality in throwing by captive chimpanzees have been published, and all have reported population-level, right-sided bias^{6–8}. Others have incorporated these reported findings into comprehensive accounts of the origin of handedness, e.g. ref. 9

We can find no published quantitative data on manual laterality in throwing from *any* non-human primate species in nature, much less from chimpanzees. One obvious reason for this absence is that, unlike in the artificial conditions of captivity, wild primates throw only rarely. Here we report such a dataset, collected ethologically from a population of chimpanzees in nature, over an extended period, in an effort to balance the picture.

METHODS

The subjects were the eastern chimpanzees (*Pan troglodytes schweinfurthii*) of M group in the Mahale Mountains of western Tanzania^{10,11}. This population has been studied since 1965, making it the second-oldest field study of chimpanzees; the apes are fully habituated to close-range behavioural observation. The Mahale ethogram is well-known and described; Nishida *et al.*¹² listed 10 kinds of throwing.

We recorded all observed occurrences of throwing, using *ad lib.* sampling, that is, regardless of whether behaviour was being scan-sampled or focal-subject-sampled¹³. We interrupted normal protocols, in order to note the identity of the thrower, target, etc. Nishida recorded his data from 1999–2004, when he mostly followed males, hence the shortage of data on females. McGrew and Marchant recorded their data in 1996. Here we report data only on unimanual *versus* bimanual data, and on the hand(s) involved. Each throw is considered an independent data-point, as the chimpanzees always repositioned themselves between throws, usually to pick up another object.

RESULTS

We recorded 556 throws by 16 individuals (Table 1); the median number of throws per subject was 33 (range: 9–72). Of these, 63 (11%) were done two-handed, usually in agonistic charging displays; almost half of these were done by two high-ranking adult males (DE, $n = 17$; FN, $n = 13$). These appeared to be unaimed and perforce were done bipedally; they are considered no further here.

One-handed throwing was unlateralized. Only 4 (BB, CT, IV, OR) of the 16 individuals showed statistically significant (Binomial test, two-tailed, $p < 0.05$) laterality; three were biased to the right versus one to the left. The remaining 12 subjects showed ambilateral performance. Overall, nine individuals showed (non-significantly) more right-sided throws, six showed left-sided throws (a non-significant difference, $n = 15$, $x = 6$, $p = 0.60$), and one was tied. Descriptively overall, of one-handed throws, 226 (46%) were done with the left hand versus 267 (54%) with the right hand.

Table 1. Laterality of throwing by wild chimpanzees (n=16) of Mahale's M group.

Name	Year of Birth	Total Throws	Both Hands	Left Hand	Right Hand	R vs. L p<0.05
AL	1982	46	1	21	24	
BB	1981	37	2	26	9	L
CD	1991	34	1	18	15	
CE	1998	11	0	3	8	
CT	1985	32	1	6	25	R
DE	1963	27	17	3	7	
DG	1981	21	3	10	8	
DW	1988	36	2	17	17	
FN	1978	70	13	27	30	
IV	1993	20	1	4	15	R
MC	1996	64	9	28	27	
OR	1991	47	7	10	30	R
OS	1998	14	0	5	9	
PM	1988	16	1	10	5	
PR	1991	72	4	35	33	
XM	1995	9	1	3	5	
TOTAL		556	63	226 (46%)	267 (54%)	

L = stat. sig. left bias; R = stat. sig. right bias; blank = not stat. sig. diff.

All chimpanzees are males, except for IV (bolded).

DISCUSSION

These results clearly contrast with those from the most thorough study done in captivity: Hopkins *et al.*⁷ found that of 89 subjects with six or more data-points, 50 were right-biased, 23 were left-biased, and 16 were unbiased. We have no explanation of this remarkable difference, although it joins a long list of behavioural contrasts between nature and captivity, in which captive chimpanzees are lateralised, while wild chimpanzees are not (see summary in ref. 14). We can find no reports of two-handed throwing by captive chimpanzees; whether this is because such behaviour was not reported, or because it is absent, remains to be seen.

Earlier, McGrew and Marchant¹⁵ hypothesised that captive chimpanzees might be biased toward right-sidedness by their lengthy (sometimes lifetime) association with human caretakers, most of whom will have been right-handed. However, a recent extensive study of four great ape species (see below) found species-level right-sided laterality in captive chimpanzees, at least based on a single bimanual measure¹⁶.

The implications for the evolutionary origins of human handedness are no clearer than the present state of play of contradictory studies of behavioural laterality. Handedness in living *Homo sapiens* could be a derived trait (of uncertain time-depth) or a primitive trait that could date back as far as the last common ancestor of the present African apes and humans (perhaps as long ago as 6–7 million years). Results on manual laterality for the only living Asian great ape, the orang-utan, *Pongo pygmaeus*, are confusing, as according to Hopkins *et al.*¹⁶, they are a left-handed species.

What is clear is that chimpanzees both in captivity and in nature habitually throw, despite being non-linguistic quadrupeds. Thus it is not necessary to invoke bipedal

stance or co-evolved language to explain the evolutionary origins of throwing in the hominin lineage, and if the results from nature are to be believed, neither is it necessary to link throwing to manual lateralisation.

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<NOTE>

Playful Drumming by Immature Wild Chimpanzees at Mahale: Do They Enjoy Making Sounds?

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INTRODUCTION

Before the Mahale Mountains National Park was established in 1985, several villages of Tongwe people lived in the forest. Although many years have passed since the people left, we can still sometimes find the remains of human artifacts on the forest floor while observing chimpanzees. Here, I report the rare cases where immature chimpanzees found and drummed on clay pots discarded by the former villagers and discuss their playful nature in relation to the origin of music.

OBSERVATIONS

(1) Case of an 11-Year-Old Adolescent Male, Cadmus (CD) (25 Nov. 2002)

While CD was playing with a 4-year-old male infant (OS) in a thicket, CD found at 10:13:59 a clay cooking pot (about 40-cm diameter, 30-cm high, with a 14-cm diameter hole at the bottom). He lifted it with his left hand and approached OS with a play-face. OS approached and touched CD, but soon returned to his mother to suckle.

At 10:15:29, an estrous adolescent female (QA) showed leaf-clipping courtship near CD, who did not respond. At 10:15:39, CD lifted the pot with both hands, put it on his head like a helmet, and tapped 31 times on its

side with his right palm. Then he stamped on the ground four times and pounded the pot three times with his left fist. After stamping on the ground twice, he again tapped on the pot's side with his right palm 14 times (Figure 1).



Figure 1. CD puts a pot on his head and taps it with his palm.

At 10:16:42, CD lowered his head, placed the pot on the ground, and kicked its rim twice with his right heel. Then he lowered one side of the rim with his right hand and kicked the rim with his right heel ten times. At 10:17:19, CD stood up, kicked backward, and pushed the pot with his right sole. The pot rolled off, and he left.

In total, CD drummed 60 times: 45 times with his right palm, three times with his left fist, and 12 times with his right heel. He calmly drummed with no pilo-erection. His face was not visible when he put the pot on his head, but he drummed on it on the ground with no facial expression. He generally tapped lightly and did not make loud sounds. Although he might have heard the pot's large resonance from inside it, the sounds did not seem to attract others. No one approached CD during his drumming, even though six chimpanzees rested within 10 m: OS and his mother, a 1-year-old male infant (TD) and his mother, an adult male (DG), and an adolescent female (QA).

(2) Case of a 6-Year-Old Juvenile Male, Michio (MC) (14 Feb. 2003)

At 10:46:56, while MC was walking in a thicket, he found a large clay water pot that was about 50-cm high, with a 45-cm diameter, a narrow neck, and an 18-cm diameter mouth. He slapped the bottom of it three times with his left palm, rolled it, and slapped it once with his right palm. Then he stepped onto it with both feet, soon got off it, lowered the pot's mouth to the ground, and slapped its bottom with his left palm. He then pushed and rolled it, slapped it simultaneously with both palms, and slapped it nine times with both hands in turns. At 10:47:19, he stopped but soon started playing again in various ways (Figure 2, Video 1: available online at [mahale.main.jp/PAN/19_2/19\(2\)_05.html](http://mahale.main.jp/PAN/19_2/19(2)_05.html)): slapping the pot with his palms, pushing and rolling it, stamping on it with his soles, kicking it with his heels, stepping up onto



Figure 2. MC slaps a pot with his palms.

it, dropping his buttock on it, and lying supine on it. He also showed such exploratory behaviors as touching its crack, looking into it, putting his arm into it, etc.

At 10:52:11, MC strongly kicked the pot five times with his right heel, chipping off a small piece. He touched the spot with his right hand and slapped it eight times with both palms in turns. Then he stepped up onto the pot and stamped on it six times with his sole, and the pot finally broke into pieces, and he fell off of it (10:52:57). One-year-old male infant, TD, approached within 5 m of MC and observed the scene. MC lifted one of the broken pieces, but soon went away and approached TD and his mother. After a while, TD came, touched the broken pieces, and stepped on them, but no one paid any attention to the pieces after that.

In total, MC drummed on the pot 199 times: 36 times with his right hand, 112 times with his left hand, four times simultaneously with both hands, 25 times with his right leg, eight times with his left leg, four times with his buttock, and ten times with unidentified body parts. He used his left hand more than his right hand and his right leg more than his left leg. When he drummed with his hands, he usually used his palms (149 times) but he also used his fist (twice) and his wrist (once). When he drummed with his legs, he used his sole (23 times) and his heel (10 times).

MC usually drummed on the side or the bottom of the pot, but he also hit its rim (once) and neck (twice). Since the pot has a round bottom, it was unstable and easy to roll. MC seemed to try to control the pot's orientation and position by pushing or dragging it, lowering or lifting its mouth, and supporting it with his limbs. Supporting behaviors were observed nine times: three times with his right hand, once each with both hands, the right leg, the left leg, both legs, and combinations of right hand/left leg and right hand/right leg. His right hand was used six times, and his left hand was used only once.

MC drummed the pot with no pilo-erection and with a half-open mouth, which is his relaxed face. He drummed relatively strongly, and the sounds were probably audible to others nearby. However, most chimpanzees did not show much interest in his drumming; six others rested within 10 m: MC's mother and her 1-year-old fe-

male infant, TD and his mother, and two adult males (AL, PM). Only TD came to the spot after the pot was finally smashed.

DISCUSSION

CD put the pot on his head like a helmet and tapped it with his palms and kicked it on the ground. He drummed 60 times in about two minutes. MC showed more varied behavioral patterns, including slapping, kicking, stepping up, and rolling. He drummed 199 times in about six minutes. These can be regarded as "object play" in which they experienced various types of object manipulation, and also as "sound play" in which they enjoyed making sounds. During drumming, they sometimes changed the pot's orientation and position and drummed on various spots with different body parts. They seemed to enjoy modifying the sounds and hearing the unexpectedly large and resonant sounds from the pot.

Immature chimpanzees sometimes make sounds during play. They might slap a tree buttress or walk on branches in an exaggerated style to make pitapat sounds. They also make sounds when they play with dry leaves¹. Some immature chimpanzees (including CD and MC) occasionally slap their own bellies with their palms to make spanking sounds as solo play or play solicitation^{2,3}. They may also enjoy making sounds in these cases, but these cases generally last only for a few seconds. The cases observed in this study were exceptionally long. The relatively large and resonant sounds of the pot should have encouraged them to continue drumming.

Adult male chimpanzees often hit or kick a substratum to make banging sounds as an intimidation display, such as slapping the ground or slapping/kicking tree buttresses or metal walls^{4,5}. The clay pot drumming observed in this study featured several differences from such adult drumming. CD and MC were not very excited, unlike adult displays; they did not show pilo-erection or such tense facial expressions as compressed lips. They seemed relaxed and drummed for a much longer duration. They did not pay much attention to other chimpanzees and appeared absorbed in their solo activity. Others did not show much interest in their drumming, either.

An individual difference was found in the laterality. CD usually drummed with his right hand and leg, while MC used his left hand and right leg more often. When supporting the pot, MC mostly used his right hand. Thus, MC showed a tendency of role differentiation in using his hands for drumming and supporting. Individual differences of drumming patterns and laterality were also reported for intimidation drumming by adult males^{4,5}.

In summary, two immature chimpanzees engaged in long and variable solo play, suggesting that they enjoyed producing sounds. In discussion on the origin and evolution of music, much attention has focused on such social aspects as vocal communication and sexual selection⁶. However, the individual capacity to enjoy manipulating sounds also seems essential for the origin of music. This study suggests that chimpanzees have the potential to enjoy making sounds and supports the notion that manual drumming in African great apes is homologous to human instrumental music⁷.

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<NOTE>

Comparison of the Longevity of Chimpanzee Beds between Two Areas in the Mahale Mountains National Park, Tanzania

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INTRODUCTION

Chimpanzee (*Pan troglodytes*) beds have been used as an indicator for the presence of chimpanzees, and the longevity of beds is one of the important variables for estimating chimpanzee population sizes^{1,2}. The longevity of chimpanzee beds can differ due to location, vegetation, and season^{3–6}. For example, beds in forested sites decay faster than those in woodlands⁵, and beds in the dry season decay faster than those in the rainy season^{3,5}.

A previous study⁶ on the longevity of chimpanzee beds was conducted in the Mahale Mountains National Park, Tanzania. Because the study⁶ was conducted only in the forested area in the dry season, we studied chimpanzee beds both in forested and woodland sites during the rainy season.

METHODS

This study was conducted in Mahale Mountains National Park, Tanzania. This site has a rainy season from early October to mid-May⁷. We focused our research in two areas in the park, Kasoje and Miyako (Figure 1). The Kasoje area is composed of gallery forest^{8,9}, and is the center of the range of the M group of chimpanzees. The Miyako area consists of *Brachystegia* woodland with gallery forest along riverside area^{8,9}, and is occupied by chimpanzees of the Y group¹⁰.

Across both sites, we found 102 fresh beds from 3 October 2006 to 16 February 2007, and classified them by their date of construction (Table 1). Of these, we selected 70 beds to estimate bed longevity, and 32 beds to study bed construction. For the longevity study, we classified beds into two categories based on their time of construction. Beds constructed during Period 1 (3 to 10 October) were monitored until 24 May 2007. Beds constructed during Period 2 (11 October to 10 November) were monitored for a minimum of 100 days. Beds constructed after Period 2 were not included in analyses.

Beds were monitored approximately once per week (mean interval = 8.7 days, range = 6–28 days). KZ monitored the beds from 3 October 2006 to 16 February 2007, and MM monitored them from 17 February to 24 May 2007. We defined bed leaves as decayed when all of leaves had fallen from the branches in the bed^{3,5}, and defined beds as decayed when they were no longer clearly discernible as chimpanzee beds^{1,2,4–6}.

We monitored 9 beds in the Kasoje area and 7 beds in the Miyako area during Period 1. During Period 2, we monitored 38 beds in Kasoje area. The minimum distance between bed sites of the two areas was about 2 km (Figure 1).

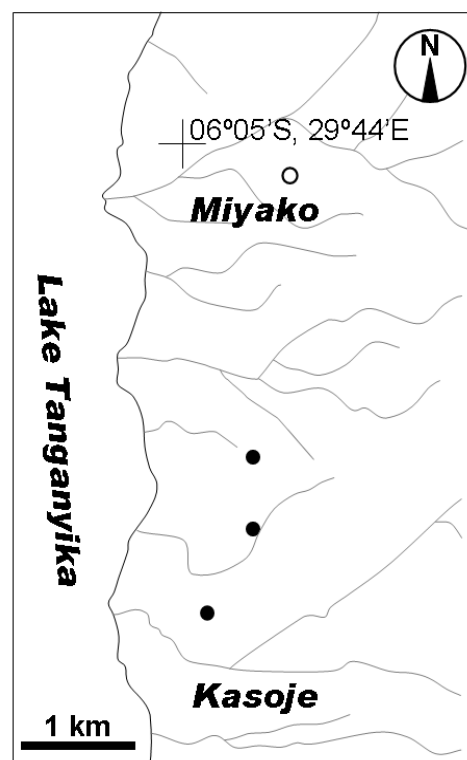


Figure 1. Locations of chimpanzee beds in Kasoje (closed circle) and Miyako (open circle) during period 1.

Table 1. Tree species used for chimpanzee bed.

Area	Local name (Kitongwe)	Scientific name	Family name	Number of beds			
				Total	Period 1	Period 2	After Period 2
Kasoje	Lulumasha*	<i>Pycnanthus angolensis</i> #1	Myristicaceae	19	7	10	
	Mkibu gwesimbwa*	<i>Cordia millenii</i>	Boraginaceae	18		12	3
	Buhono*	<i>Pseudospondias microcarpa</i> #2	Anacardiaceae	13	1	6	
	Mjohoro	<i>Senna spectabilis</i> #3	Fabaceae	6			6
	Ibonobono*	<i>Croton sylvaticus</i>	Euphorbiaceae	5			1
	Msabasaba	<i>Syzygium</i> sp.	Myrtaceae	5		5	
	Mnyoni	<i>Bridelia micrantha</i> #4	Euphorbiaceae	3		3	
	Kafulujege*	<i>Lecaniodiscus fraxinifolius</i>	Sapindaceae	3			2
	Kahwibili	<i>Xylopia parviflora</i> #5	Annonaceae	3			
	Kamilaninga*	<i>Bridelia atroviridis</i>	Euphorbiaceae	2			
	Mjohoro (dead)§	#3		2			2
	Mlama*	<i>Combretum molle</i> #6	Combretaceae	2			1
	Mlyansekesi*	<i>Synsepalum brevipes</i>	Sapotaceae	2	1		
	Bulonje*	<i>Dracaena usambarensis</i> #7	Dracaenaceae	1			
	Ikubila*	<i>Ficus sur</i>	Moraceae	1			
	Mtelele*	<i>Stereospermum kunthianum</i>	Bignoniaceae	1			1
	Muhoko	<i>Aporrhiza paniculata</i>	Sapindaceae	1			
	Buhono* & Kahwibili†	#2 & #5		2		1	
	Buhono* & Lulumasha*†	#2 & #1		1			
	Buhono* & Mlama*†	#2 & #6		1			
Buhono* & Bulonje*†	#2 & #7		1				
Kahwibili & Mnyoni†	#5 & #4		1		1		
Kahwibili & Lulumasha*†	#5 & #1		1				
Kahwibili & Mgongogongo*†	#5 & <i>Anthocleista schweinfurthii</i>	Loganiaceae	1				
Miyako	Mlonje*	<i>Mimusops bagshawei</i>	Sapotaceae	4	4		
	Kashindabilangulube	<i>Blighia unijugata</i>	Sapindaceae	1	1		
	Lisalike	?	?	1	1		
	Mkusi	<i>Croton megalocarpus</i>	Euphorbiaceae	1	1		
Total				102	16	38	16

*: Fruits, leaves, and/or piths of this plant were eaten by chimpanzees.

†: Two species of tree were used to make a bed.

§: Two beds were constructed at the base of dead trees but were built from living vines including *Saba comorensis* (Apocynaceae), *Keetia venosa* (Rubiaceae), and *Tetracera potatoria* (Dilleniaceae).

RESULTS

We recorded 21 tree species that were used for constructing chimpanzee beds (Table 1). The most frequently used species was *Pycnanthus angolensis*, followed by *Cordia millenii* and *Pseudospondias microcarpa*. Many of the trees in which beds were constructed (78/102) are known food trees of Mahale chimpanzees. Eight beds were also found in the invasive tree, *Senna spectabilis*, and two of them were constructed at the base of dead trees.

The mean longevity of chimpanzee beds during Period 1 was 87 days ($n = 9$, range = 21–231) in the Kasoje area and 164 days ($n = 7$, range = 13 to > 233) in the Miyako area (Figure 2). Three beds in the Miyako area were not decayed by the end of the survey period. Bed longevity was significantly longer in Miyako than in Kasoje (Mann-Whitney U test, $n_1 = 9$, $n_2 = 7$, $U = 12$, $p < 0.05$).

During Period 2, we monitored 38 chimpanzee beds in Kasoje. We set a 100 day limit for monitoring these beds and more than half of the beds (22/38) were decayed

by the end of this period (Figure 3). This was not statistically different from the decay rate for Period 1 beds in Kasoje over 100 days (6/9; Fisher's exact test $p = 0.72$), but was significantly greater than the decay rate for beds in Miyako (1/7; Fisher's exact test, $p < 0.05$).

The mean time for leaf decomposition in beds was 76 days in Kasoje ($n = 9$, range = 14–158) and 126 days in Miyako ($n = 7$, range = 13–157). These numbers were not statistically different according to a Mann-Whitney U test (Figure 4, $n_1 = 9$, $n_2 = 7$, $U = 15$, $p = 0.088$).

DISCUSSION

There are two methods for measuring the longevity of chimpanzee beds: the time until leaves decays and the time until the bed structure decays^{1–6}. Bed leaves decayed faster in Kasoje in the dry season (49 days, $n = 41$, range = 18–110)⁶ than in the rainy season (76 days) in this study. In tree species of bed no remarkable differences could be seen between this and previous study, and *Pycnanthus angolensis* was the most frequently used species in both studies. Leaves in the dry season are thought to have

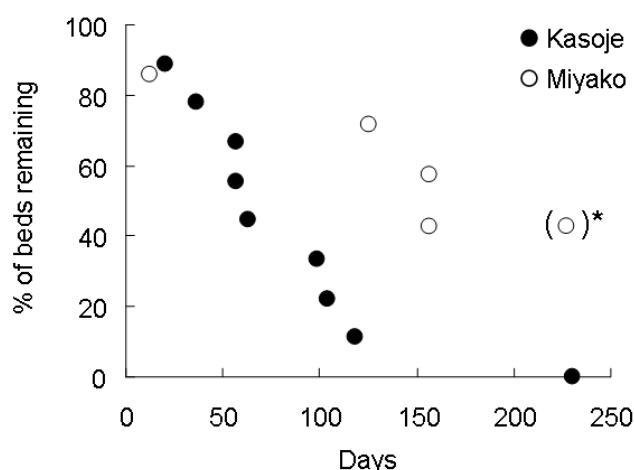


Figure 2. Rate of decay of chimpanzee beds in period 1.
*: Three beds were remained undecayed.

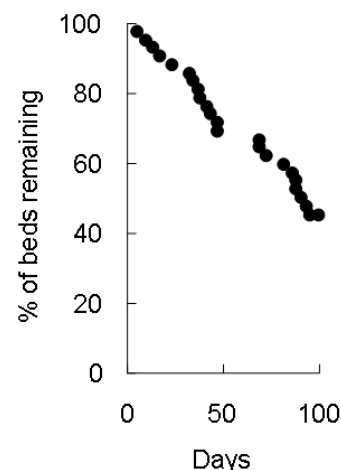


Figure 3. Rate of decay of chimpanzee beds in Kasoje in Period 2.

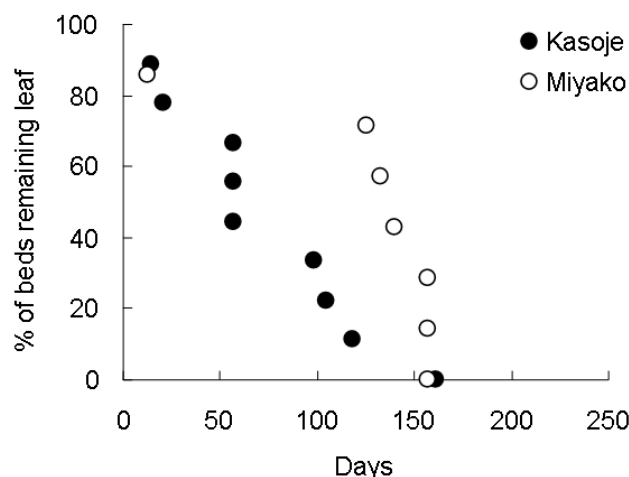


Figure 4. Rate of decay of bed leaves in Period 1.

lower moisture content and, thus, decay faster³. The result in this study is consistent with previous studies^{3,5}.

In contrast, the longevity of bed structures in Kasoje was longer in the dry season (131 days, $n = 41$, range = 30–189)⁶ than in the rainy season (87 days) in this study. This indicates that different mechanisms are relevant for the decay of leaves in beds than for decay of the bed structure. Over the period of this study (3 October 2006–24 May 2007) 1,562 mm of precipitation fell and almost two-thirds of the total precipitation (1,001 mm) fell during the first 3 months (Mahale Mountains Chimpanzee Research Project data). We propose a hypothesis: because dead leaves often remain in branch structure in beds and absorb rainfall during the rainy season, the increased weight of the wet branches may contribute to the deterioration of the bed structure.

The longevity of chimpanzee beds in Miyako was longer than that in Kasoje, but this difference cannot be explained by rainfall because the amount of precipitation did not differ between the two areas¹¹. The longevity of chimpanzee beds in woodlands in the Ugalla area, Tanzania is long (more than 358 days (Yoshikawa M, personal communication); 432 days⁵), and beds in Miyako area also

constructed in woodland. The strength of branches of tree species in woodland may be a key factor contributing to the longevity of chimpanzee beds in these areas.

The present study and previous studies (e.g. ref. 1–6) indicate that the longevity of chimpanzee beds differs according to season and vegetation type. These studies indicate the need for broader range of bed longevity or for appropriate estimates of bed longevity in each site to accurately estimate chimpanzee population sizes.

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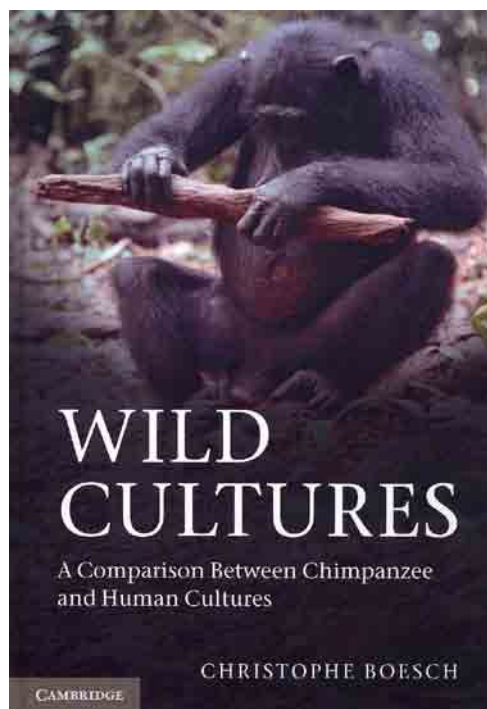
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Wild Cultures: A Comparison between Chimpanzee and Human Cultures

By Christophe Boesch

How do chimpanzees say, “I want to have sex with you?” By clipping a leaf or knocking on a tree trunk? How do they eat live aggressive ants? By using a short stick with one hand or long stick with both? Ivorian and Tanzanian chimpanzees answer these questions differently, as would humans from France and China if asked how they eat rice. Christophe Boesch takes readers into the lives of chimpanzees from different African regions, highlighting the debate about culture. His ethnography reveals how simple techniques have evolved into complex ones, how teaching styles differ, how material culture widens access to new food sources and how youngsters learn culture. This journey reveals many parallels between humans and chimpanzees and points to striking differences. Written in a vivid and accessible style, *Wild Cultures* places the reader in social and ecological contexts that shed light on our twin cultures.



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