Sources of Ambivalence, Contagion, and Sympathy

Bats and What They Tell Anthropology

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The bat is often portrayed as a vampire, a taxonomic monstrosity, and a source of the worst evils. Whenever pandemics occur, such as the one currently spread by SARS-CoV-2, this animal is quickly identified as a "reservoir of emerging pathogens" and is among the first to be blamed. Yet many human groups live in daily contact with multiple bat species and eat their flesh, which they praise for its medicinal benefits. Such groups see the bat as a "companion species" with which they cohabit and establish cooperative relationships. In this paper, we use recently gathered ethnographic data from Southeast Asia to show how humans imagine bats and enter into relationships with them. By blurring the boundaries between nature and society, this animal has made itself an appropriate subject of study for contemporary anthropology.

Bats account for a fifth of all known mammalian species. These placental mammals are divided into 21 families (Amador et al. 2018). Most are insectivores and have developed a sophisticated echolocation system for flying in the darkness by emitting ultrasonic calls. Others, like fruit bats and three blood-feeding species, use their senses of sight and smell for hunting. Scientists have argued back and forth over their phylogeny, specifically whether they should be divided into microbats (almost all families) and megabats (a single family of flying foxes) or into *Yinpterochiroptera* and *Yangochiroptera*, as suggested by recent molecular studies. Bats have existed since the Pleistocene and, along with primates, are one of the oldest and most widespread mammalian orders.[1] They have long coevolved with hominids. Although very few ancestral forms have been fossilized, bats are believed to have appeared 65 million years ago, as attested by fossils of *Icaronycteris* (Eiting and Gunnell 2009).

Bats were blamed for the COVID-19 pandemic from the outset.[2] Once again, they have been suspected of infecting humans and spreading a fatal disease, this being in fact a long-standing and prolific suspicion. The perception of them as "epidemic villains," to borrow an expression by Christos Lynteris (2019), or as "epidemic rogues" (Fairhead 2018), received a scientific basis with the discovery of their role as virus reservoirs. That discovery represented not only a scientific advance but also the advent of a biopolitical ideology in modern medicine (Lynteris 2019).

Ever since the pandemic began, such fears have been relayed and amplified by social media through, for instance, viral images of "Chinese bat soup"[3] or fake news about patient zero allegedly having sex with bats.[4] The same fears have led to acts of violence. In France, the artist Camille Lellouche composed a hymn to the lockdown under the eloquent title: *Tout ça à cause d'une putain de chauve-souris* ("All that because of a fucking bat").[5] In California, urban residents have wondered whether bats should be eliminated,[6] and in Peru some villagers have tried to burn them alive in their trees.[7] Some refer to a "chiroptophobia" (Low et al. 2021:18).

Such acts stem from a single but widespread blame game: bats are condemned as virus incubators, being worse in that respect than snakes and rodents. Alarmism has grown in recent years with a succession of health crises due to zoonoses—diseases

1. According to Labie and Gilgenkrantz (2006:75), bats are the mammalian order with the largest number of species (over 1,400) after rodents.

2. The closest-known virus to SARS-Cov-2 is the coronavirus RaTG13, which is found in the horseshoe bats of Yunnan (Boni et al. 2020).

3. According to unverifiable sources, patient zero was a laboratory employee who had been bitten by a bat (https://observers.france24.com/fr/20200204-chine-intox-soupe-chauve-souris-chine-video-gros-plan).

4. This fake news may have originated from the fact that the female of some bats (*Cynopterus sphinx*) performs fellatio on the male during the sex act (https://www.livescience.com/9754-surprising-sex-behavior-bats.html).

5. https://www.cinetelerevue.be/videos/coco-corona-camille-lellouche-signe-lhymne-du-confinement.

6. *Independent*, April 19, 2020 (https://www.independent.co.uk/environment/coronavirus-bats-china-pangolin-colony-wildlife-kill-pandemic-covid-19-a9469551.html); *Mercury News*, February 14, 2020 (https://www.mercurynews.com/2020/02/14/should-we-be-worried-about-bats-in-san-jose-making-us-sick/.

7. https://www.ladepeche.fr/2020/03/28/perou-des-paysans-sen-prennent-aux-chauves-souris-en-raison-de-lepidemie-de-coronavirus,8822743.php.

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carried by animals and transmissible to humans. There are now countless scientific papers on the risks posed by bats,[8] and a long list of frightening zoonotic pathogens they may pass on: rabies (RABV) and other types of lyssavirus, respiratory syndromes (SARS-CoV-1, SARS-CoV-2), Hendra virus (HeV), Nipah virus (NiV), Ebola virus (EBOV), Marburg virus (MARV), Type A influenza, a series of paramyxoviruses, and others. Such a record clearly seems to prove that bats are "reservoirs for emerging viruses" (Wang et al. 2015:xv) and a danger to health and society.

Yet several health organizations have been reluctant to make overly hasty accusations. The Pasteur Institute has published this statement on its website: "Even if SARS-CoV-2 is very close to a virus detected in a bat, the animal at the origin of the transmission to humans has not yet been definitely identified."[9] Indeed, the bat virus seems to be only 96% identical to SARS-CoV-2 and cannot bind to human receptors.

What if we seek to blame bats largely because of what our imagination has projected onto them? That hypothesis is a serious one with implications. It was advanced by Merlin Tuttle (2017:46–47) in a paper appropriately titled "Give Bats a Break." This bat specialist attributes part of the problem to preexisting suspicions and to media-driven hysteria during a succession of epidemics. After the outbreak of MERS-CoV, a respiratory virus that caused 600 deaths in the Middle East, the experts immediately blamed bats and only later found out that 85% of dromedary camels in Saudi Arabia were carriers. It turned out that the virus did not come from bats.

Such hasty accusations can be easily explained on closer examination by the way we imagine bats and by the types of relationships we are inclined to have with them. This paper will address how we represent and imagine bats and how this imagined reality can affect our understanding of them and their misdeeds.

Whether in a modern or traditional community, humans develop a special relationship with their environment and take possession of it through their actions and their discourses, which in turn arise from their perceptions. Bats, like other animals, are initially perceived in a shared life environment, and this immediate perception is then transformed by social practices and imagined realities (Charlier et al. 2015). As anthropology has widely shown, people grasp and understand phenomena in ways that vary with their ontological frameworks and, therefore, with their cultural universes and historical contexts (see Descola 2005; Laugrand and Oosten 2014). Those ways evolve and develop over time, but the basic schemas change much more slowly.

Here, the concept of "imagined reality" takes us to the concept of "instituting power," which authors like Bachelard and Castoriadis have used to understand how imagined realities can create and transform institutions and how they become shared within a community that accumulates numerous products of the imagination. As Gregorio (2006) summarizes it: "This instituting power can never be made fully explicit; it is a transcendental in and through which a society creates its institutions" (52). Andrew Lakoff (2017) has studied the power of the imagination to structure reality and guide how people respond to viruses. Imagined realities are partly held in common, hence the consistency of responses by the media and by institutions. One example is the slow response of international aid agencies to the Ebola virus—initially thought to be a localized epidemic (Lakoff 2017:141). In contrast, COVID-19 was considered to be a global pandemic from the outset. It thus immediately awakened memories of other global pandemics, causing governments to assert that the virus would rapidly propagate across social and political boundaries. Because states are supposed to anticipate threats and take responsibility, their citizens will fall prey to fear and uncertainty if the impact is much greater than anticipated. In the case of a pandemic, the high death toll will traumatize the popular imagination, which will then crystallize around the task of identifying a scapegoat. In the specific case of COVID-19, a likely scapegoat seemed to be the bat—already a monstrous figure of imagined reality—although it would eventually lose traction as scientific discourse shifted toward other possible causes. We hypothesize that certain tropes of the imagination, which sometimes lead to prophetic visions (Lynteris 2016), will become dominant during epidemics. During the COVID-19 pandemic, popular imagination became seized by the trope of the disease-ridden bat.

Humans respond to bats in ways that cluster around two poles. On the one hand, bats may be subject to removal from human society (or distancing). This is the leading solution when they are perceived exclusively as pathogenic agents. It has been implemented in different ways, notably in the Western world and South America. On the other hand, bats and humans to cohabit with each other, an option that many societies, especially indigenous ones, have chosen despite the risks to human health and other annoyances, particularly noise and odor. Such societies are more discerning in the way they view a "nature" that we keep at a distance and that we envisage as an outer frame for our social relations. In this regard, Donna Haraway's (2003) concept of "companion species" can help us understand the cohabitation between humans and bats within indigenous groups in many regions of the world. Companion species are animals that cohabit, coevolve, and establish complex relationships with humans (Caeymaex, Despret, and Pieron 2019; Haraway 2018). Haraway (2003:16) argues that such relationships implode the nature-culture dichotomy "in the relentlessly historically specific, joint lives" of humans and their companions. As inseparable partners, animals and humans exchange services and mutual benefits while constraining each other. In her *Companion Species Manifesto*, Haraway (2003) writes, "Inhabitants of technoculture become who we are in the symbiogenetic tissues of naturescultures, in story and in fact . . . We also live with each other in the flesh in ways not exhausted by our ideologies" (16–17).

8. See, among the substantial literature, Hance, Garnotel, and Morillon (2006), Han et al. (2015), O'Shea et al. (2014), Peel et al. (2018), Plowright (2015), Serra-Cobo and Lopez-Roig (2016), Smith and Wang (2013), Wong et al. (2007).

9. https://www.pasteur.fr/en/medical-center/disease-sheets/covid-19-disease-novel-coronavirus.

We will investigate how humans imagine and respond to bats with two aims in mind. First, we wish to see how bats are represented in different historical and sociocultural contexts and how humans relate to them. This brief survey, though not exhaustive, will cover a diverse range of contexts and be, to some extent, disconcerting. It will highlight the often ambivalent connotations that we attach to bats and that span a continuum from the demonic and dangerous vampire to the remarkable and beneficial companion. Second, we will use oral accounts from several indigenous groups that live with bats in the Philippines (Alangan, Blaan, and Ayta) to show that humans can cohabit with them and be their companions. Despite certain dangers, these groups see cohabitation as beneficial. We can then examine the problem of bat-human contact, as well as the problem of the categories that humans use for their relationships with these animals, which deviate from the usual taxonomic categories (Sperber 1975:9–10).

Ambivalence of Bats in Imagined Realities: Sometimes Harmful, Sometimes Beneficial

As shown by the few studies of this animal in the social sciences (Allen 2004; Laird 2018; Strivay 2007; Tupinier 1989), humans imagine bats in ways that vary from one time period to another and from one society to another.

Bats have been observed with ambivalence, independently of the ontological regime of observation (Descola 2005). This has been so in all time periods of the Western world. Though viewed as an evil night spirit during antiquity, a bat could also ward off bad luck, for example, by being nailed to the lintel of a door with its head hanging down. Bat blood was also used to treat snake bites (Pliny the Elder 1855:bk. 29, ch. 26). During the Renaissance, the bat was described as "a fly from hell," being a creature of the devil that offered a stark contrast to the much more virtuous swallow. Nonetheless, it could sometimes incarnate "the good mother"—an exemplary wet nurse who could "transform the blood it steals into the milk it gives" (Strivay 2007:236). This nursing connotation also appears in an origin story from the Pyrenees: when Jesus was challenged to create a featherless bird, he opened his hand to reveal a bat suckling its pups (Albert-Llorca 1991:113). That imagined reality disappeared completely with the advent of modernity, being today possibly validated by recent findings on the quality of bat breast milk (see Peel et al. 2018). During the Enlightenment, the ambivalence felt toward these creatures was reflected in their taxonomy. The French naturalist Buffon saw a tension between the bat as animal and the bat as monstrosity:

> An animal, like the bat, which is half a quadruped and half a bird, and which, upon the whole, is neither the one nor the other, must be a monstrous being; because, by uniting the attributes of two opposite genera, it resembles none of those models presented to us in the great classes of nature. (Buffon 1780–1785 [1760]:318).

During the nineteenth century, bats were believed to suck the blood of sleeping people and, by analogy, eat the lard of live hogs, as shown by Sébillot (2018:17) in the region of Liège, Belgium. Meanwhile, between 1870 and 1890, and despite negative portrayals in popular culture, bats made their entry into the arts, such as the operetta *Die Fledermaus* by Johann Strauss, the collection of poetry by Robert de Montesquiou, and women's clothing and dress.[10]

Much closer to the present are the writings of Gaston Bachelard (1988 [1943]:74) who, in *Air and Dreams*, devotes several pages to the bat, describing it as a damnable creature—a fake bird. Quoting Jules Michelet, Victor Hugo, Alphonse Toussenel, and Buffon, he paints a rather dark and unflattering portrait: "the bat [is] the sign of an ill-fated flight, one that lacks sound, color, or upward movement—the antithesis of the sonorous, transparent, and light flight of Shelley's trilogy" (74).

Such connotations differ not only from one time period to another but also from one geographic area to another. Claude Lévi-Strauss (1966:329) cites the case of the Kogi of Columbia, who give bats contrasting and ambiguous valences by associating them not only with menstrual blood and the female sexual organ—and therefore death—but also with fecundity (see also Karadimas, Delpuech, and Rostain 2017). That association is reversed among the Aztecs, for whom these animals, which they sometimes sacrificed (Brady 2019), originated in Quetzalcoatl's sperm (Lévi-Strauss 1966:329–330). Though feared, bats have been assigned a fundamental role in the fate of humanity through their association with fecundity and with mastery of human-made objects. Down through the ages, they have played key roles in certain creation myths. In *Le cru et le cuit* (*The Raw and the Cooked*) Lévi-Strauss (1969) presents a Kayapo myth that explains the origin of laughter. The story is about a man who is forcefully led into a bat-filled cave and who bursts into laughter when the bats caress him with their wings. Lévi-Strauss observes:

> It is a striking fact that their role, in the two Ge myths where they occur, consists in "opening" the hero or heroes, either by making them "burst out" laughing or by splitting their skulls. Although they have undoubtedly sinister associations, the bats are in all instances the masters of manufactured goods, like the jaguar in the other Ge myths. These achievements take two forms: rock paintings or ceremonial axes (cf. Ryden); in the Tacana myth they perhaps also take the form of musical instruments. (Lévi-Strauss 1969:123)

This wide range of roles, regardless of their ascribed positive or negative values, shows that bats may be assigned all sorts of potential uses and functions (in the sense of "affordance," as defined by Gibson 1979:255). This can be seen cross-culturally. For example, the Wayuu of Colombia have myths that present

10. Some examples of these bat dresses are provided at https://www.laboiteverte.fr/batmans-batwomans-batman/. During the twentieth century, as shown by Restif de la Bretonne in *Pornographe* (1776), the term *chauves-souris* (bat) sometimes meant "prostitute" (https://www.laboiteverte.fr/batmans-batwomans-batman/).

the bat *Püsichi* as one of the primordial negotiators (*pütchipü*) in charge of settling conflicts. It was removed from that position by the demiurge *Maleiwa* because of its unreasonable temperament and tendency to perform its duties only in darkness (Simon 2020*b*:45–46). In some regions of Africa, bats are seen as tricksters with long memories (Cros 2020*b*). They are eaten in soups; appreciated for their medicinal benefits, such as healing of mental illnesses and problems with orientation (Hens 2006; Lelant and Chenaval 2012; Riccucci 2012:251); and used for witchcraft. They are also presented as headstrong representatives of God who have now chosen to go their own way. On this point, Michèle Cros quotes Pooda Iguin from Burkina Faso:

> They cannot speak with God. The bat has palavered with God and says it no longer looks up at heaven and now hangs down. When it urinates, that [the urine] spills onto it; it does not go out during the day. Where there are fetishes, it hangs down there. The bat is the one who decided; it wants to show itself stronger than God, for it knows witchcraft well. (Cros 2020*b*:42)

The bat has a similarly ambivalent status in South Asia and Papua New Guinea. Among the Murik of the Sepik River region, Christian Coiffier (2020:46) reports that the flying fox is associated both with the fetus (life) and with the stillborn baby's placenta.

Bats are also imagined as vectors of disease and harbingers of doom. In general, they have been seen as repulsive and dangerous (notably by preying on humans). Medieval Europeans, for example, associated them with the owl, likening them to a rat-bird and seeing in them the figure of a traitor or demon. They were truly vectors of evil. The Hebrew Scriptures had long ago consigned them to an "unclean" liminal space (Deuteronomy 14:18). When confronted with such taxonomic monstrosities, as with any source of defilement, one had to be wary and seek protection. In the nineteenth century, dictionaries of superstitions described the bat's misdeeds at greater length, detailing its imagined role in the spread of disease and evil. Among other calumnies, its urine supposedly caused baldness and its droppings ringworm.

Again, such connotations do not seem confined to one time period or one geographic area. The tropical zone of the Americas has many bat species, several of which are known as "vampires" because of their blood-feeding behavior. The three known species (*Desmodus rotundus, Diphylla ecaudata*, and *Diaemus youngi*) feed on insects, the blood of small or wounded animals, and, on rare occasions, human blood (Ito, Bernard, and Torres 2016). The last food source has retained more attention than the others.[11] Claude Lévi-Strauss (1973) cites several Amazonian myths to show how these animals incarnate blood-sucking ogres and demons. They evoke predation and cannibalism:

> Generally speaking, however, these animals are chiefly associated in the myths with blood and the orifices of the body. Bats drew the first burst of laughter from an Indian because they did not know about articulated speech and could only communicate with humans by tickling them (Kayapo-Gorotiré, M_{40}). Bats came out of the abdominal cavity of an ogre who devoured young men (Sherenté, M_{315a}; Nim 7, pp. 186–7). The vampires *Desmodus rotundus* sprang from the blood of the family of the demon Aétsasa; this family was massacred by the Indians whom the demon was decapitating in order to shrink their heads (Aguaruna, M_{315b}; Guallart, pp. 71–73). A demon bat was married to a human and was furious because she refused to give him something to drink. So he cut off the Indians' heads and piled them up in the hollow tree where he lived. (Matako, M_{316}, Métraux 3:48; Lévi-Strauss 1973:382)

In the Philippines, negative perceptions of bats lead to physical distancing. Nicole Revel (1990:290) reports that the Palawan consider the flying fox (*kabäg*) to be a bad omen, as shown by these words of advice: "If the *kabäg* comes near your house, it is Maruj, the ancestor of all bats who is coming near. Run away." On the island of Luzon, the Ibaloy, who know only a few bat species, associate the flying fox (*paniki*) with *mandebbas*, a spirit who eats human souls and spreads disease. This spirit is described by Lolo Edward, a *mambonong* (ritual officer):

> What we call *mandebbas* are the flying foxes. The head of the *mandebbas* is like that of a human being but the body is like a dog which can fly. . . . We are performing rituals because of them. . . . The sound is the following, "Ah! Ah! Ah!" If you hear the sound of this *mandebbas*, you will feel *dekab*, meaning your hair will stand from fear. Maybe, these spirits have a power because they came from above. . . . The *mandebbas* sees us as pigs. (quoted in Laugrand et al. 2020:105)

The flying fox is thus seen as preying on humans. Its presence is scarcely appreciated by the Ibaloy, who have a ritual, the *amdag*, where they offer metal objects to protect themselves against its diseases. This animal is likewise viewed negatively by the Tagalog of the Philippine lowlands, who associate its cries with the *aswang*, another vampire-like creature.

Similar examples can be found in Indonesia and Oceania. According to Gregory Forth (2009:145), the Nage believe that old flying foxes can change into palm civets; in general, they associate bats with witchcraft (Forth 2016:127). The same schema holds true for the Ngadha of Sumba Island, the Mandailing Batak of Sumatra, the Trobriand Islanders, and the Nidula of Good-enough Island (Forth 2009:147). According to Valerio Valeri (2000), the Nuaulu of Seram Island view these animals as "the most dangerous dead"; "the stranger dead, the dead who died violently and are full of longing and desire for revenge—the wildest and deadliest of dead, who should remain confined to the forest and the night" (233). In many contexts, however, the emphasis is on the virtues of bats. Sometimes, these animals arouse sympathy and even compassion.

In the Western world of the nineteenth and twentieth centuries, for example, bats were increasingly recognized for their key role in maintaining ecosystems via the balance of nature.

11. Robert Crépeau mentions that the Achuar of Peru consider vampire bats to be "a scourge because they attack people (especially young children, who sleep more deeply than adults) and poultry. They are not considered to be an edible animal." He added, "Incidentally, nowadays, the Kaingang of Brazil use the same word for vampire and bat: *krygféj*" (personal communication, April 11, 2020).

Scientific organizations sought to rehabilitate them[12] to the point of installing safe roosting locations. Today, physical distancing from bats is driven by a desire to protect. Although their negative image returns to cast its shadow in times of crisis, there is now a willingness to humanize them and try to see things from their perspective. In his essay on what it means to be a bat, Thomas Nagel (1983:395) examines the (im)possibility of taking that perspective while a bat is echolocating. Conversely, the neurologist John Pettigrew (1986*a*, 1986*b*, 1991) takes up the question of Linnaeus: "Are flying foxes really primates?" He answers in the affirmative, arguing in a series of papers that flying foxes share several unique neurological characteristics with primates. Even if this debate is now closed with the new discoveries brought by molecular biology, bats evoke human beings. Their anatomy is described by the same terms used for humans: toes, feet, legs, arms, elbows, wrists, fingers, thumbs, and so on. They live in large groups, are sociable, and are often monogamous, like humans. Individual bats can develop bonds of friendship with each other on the basis of preferences that remain to be understood.[13] In some species, the male is a "poet" with such a large repertoire of courtship songs that its vocalizations have not been fully cataloged (Prat et al. 2017).[14] Again, bats blur boundaries and categories but this time in a positive way that inspires sympathy.

It is not only in today's Western world that bats are appreciated for their virtues rather than feared for their dangers. Around the Indian Ocean, in Vietnam, in Thailand, in Indonesia, on Samoa, in Borneo, in the Philippines, on Guam, in New Caledonia, and in China, flying foxes (*Pteropus*) and vampires (*Desmodontinae*) have seldom been viewed by humans as repulsive. On the contrary, they are enjoyed as delicacies (Demeulenaere et al. 2020; Mickleburgh, Waylen, and Racey 2009) and renowned for their medicinal benefits. In some regions of India, flying foxes are believed to cure asthma, respiratory problems, arthritis, and blindness. The Newars of Nepal remember using them for medicinal purposes (Tuladhar-Douglas 2008). In the province of Tamil Nadu, flying foxes are considered as guardians of the forest (Tangavelou, Rani, and Karthikeyan 2013). In China and Japan, eating their droppings is supposed to restore sight, heal rheumatism and abscesses, rectify the position of the fetus, and facilitate breastfeeding. In China, bats also incarnate happiness and longevity. Even today, in the midst of the pandemic, a Chinese inventor has designed a bat-shaped coronavirus shield, which he has named "Be a Bat Man."[15]

On Samoa and Fiji the flying fox has the status of a protective divinity. Gifford (1924:121) refers to Pekatea, a white flying fox adopted by the chief Punga. Coiffier (2020) reports that "in a Samoan tale, the Tongan king's daughter was saved from a fire by a flock of flying foxes that extinguished the fire by urinating on it" (54, n31).

On the basis of observations among the Murik, the Iatmul, and the Sawos, who live next to each other in Papua New Guinea, Christian Coiffier (2020:54) shows the close association that exists between these animals and procreation. Nor have their exceptional sexual characteristics gone unnoticed by the Arapesh, as described by Donald Tuzin (1980:91). Bats also appear in many initiation rites. Among the Kamoro and the Asmat, Jan Pouwer (2010:38–39) describes complete rituals inspired by bats (*tako*). Some of the rituals, which are no longer performed, involved a man and a woman promoting fertility by acting out a copulation between two bats. Other rituals were performed for male initiation ceremonies:

> Accompanied by their bride-receivers, the initiates climb the ladders to the ridgepole and hang on to it with hands and feet. The bat dignitary on top of the roof chants to them: "What are you doing there? You are finishing up the fruit [an enumeration of kinds of fruit follows]." He hits the roof with a stick to chase the "bats" away. They fall down and are intercepted by their bride-receivers, who take care that the initiates do not come to any harm. . . . At the end the initiates lie down on the floor, and talking and laughing are prohibited. The older men stay with them throughout the night. At dawn women, mothers and sisters line up in front of the house. Accompanied by the guild of singers and drummers, the right "bats," followed by the left "bats," leave the house in a procession. (Pouwer 2010:40)

Likewise in Papua New Guinea, Roy Wagner has coined the term "chiroptomorphism" to describe an original primordial state where bats shared the world with humans without the division of gender (see also Lipset 1990):

> Chiroptomorphism, in other words, the representation of the human in bat form, results by short division in a generic realization of the human, that is, without the division of gender or engenderment, an expression of the primordial "own gender." Perhaps this is what the Murik Lakes people of the Sepik River region intend in their notion of the *nabwagngain*, the placental spirit considered as bat that is the "true mother" of every person. (Wagner 2001:136)

The author shows that in the eyes of different peoples of Papua New Guinea, humans and bats imagine each other through their interrelationships and also through a series of systematic inversions:

> What kinds of bats are we, and what kinds of human beings are bats? . . . Whether or not they may be primates, as Linnaeus claimed and the Daribi imply, bats challenge the obvious humanoid morphology and genetic affinities of the apes with a quizzical counterclaim of being more totemically human. (Wagner 2001:136)

Farther south, in Australia, Deborah Bird Rose (2010), who has worked with Aboriginal people from the Victoria River

12. See, in the Philippines, https://www.fondationensemble.org/projet/the-filipinos-for-flying-foxes/.

13. https://www.sciencenews.org/article/vampire-bat-friendships-endure-captivity-wild.

14. https://www.futura-sciences.com/planete/actualites/zoologie-chantant-amour-chauve-souris-fait-poete-27667/.

15. https://globetrender.com/2020/07/29/be-a-bat-man-wearable-coronavirus-shield/.

region, notes the human qualities they give to flying foxes. She describes a scene she witnessed with Daly Pulkara, one of her Aboriginal companions. The two observers saw hundreds of bats leave the tree where they had been roosting. When a few turned back, Daly said: "The old people always said those blokes forgot their axes." For her, that incident explained the entire totemic cosmology of Aboriginal Australians, particularly how they see flying foxes and humans as having a shared kinship going back to the time of creation:

> The personhood of flying foxes is known not only through stories but also through kinship. Flying foxes are matrilineal "totems": they are members of kin groups comprised of both human and flying fox persons. Flying foxes are part of the group by reason of being flying foxes. Humans are part of the group because their mother, and her mother, and her mother, right back to the beginning, were flying fox people. Men belong to the group—they are flying foxes because they are the children of their mother, but their sons and daughters will not be flying foxes because flying fox people don't marry other flying fox people. The matrilineal kin relationship is understood to be corporeal—the flesh of the kin group is shared across the bodies of the people and animals, and is their co-specific embodied being in the world. This is the family: humans and nonhumans. They are in it together, sharing flesh, care, and continuity from generation to generation. (Deborah Bird Rose 2010:178)

Thus, in many parts of the world, bats are imagined in a sympathetic light.

Despite the contrasts, these imagined realities share a common thread running through them: bats have fascinated the human mind regardless of their position on a continuum ranging from demon to cultural hero, from fake to model, and from therapeutic benefit to infectious agent. To understand how they are imagined and represented, we will examine their place in three indigenous Philippine societies where humans carry on regular relationships with them.

Bats in the Philippines: "Companion Species"?

The Philippines is a major reservoir of world biodiversity. According to a survey by Ingle and Heaney (1992), the country has over 70 bat species divided into seven families. Thirty-two percent feed on fruits and nectar and the others on insects (Balete 2010). Of the 60% of bat species native to the Philippines, 35% are flying foxes from the family *Pteropodidae*; this region thus has the world's largest number of flying fox species (Tanalgo and Hughes 2018:46). Recently, Filipino researchers have found that 17 of the world's 26 *Pteropodidae* species are native to their country, which also has 407 *Vespertilionidae* species, 160 *Phyllostomidae* species, and 186 *Pteropodidae* species. The genetic diversity is considerable.[16]

Bats nonetheless remain poorly known in that country. Several species have only just been discovered, and, more importantly, these animals are becoming scarce through deforestation and urban growth, intensive sugarcane farming, guano mining on Negros Island, poaching and overhunting, and other causes (Tanalgo 2017). Relatively few people worry about the fate of these animals, whose image has been further tarnished during the COVID-19 pandemic by descriptions of them as reservoirs of deadly viruses.[17]

Many of the country's indigenous communities have lived near bats for millennia; indeed, they have lived *with* them. Lengthy cohabitation is indicated by linguistic evidence. Within the vast region of the Austronesian language family, which extends from Easter Island to Madagascar and from southern China to Australia, *Pteropus* bats are identified by the same generic term with some variation: *panihi*, *panichi*, *paniki*, *poniki*, *fanihi*, *pani*, *pnik*, *fnik*, and so on. Robert Blust has collected a long list of these variants (https://www.trussel2.com/ACD/acd-s_p.htm#27295). The geographic distribution of the flying fox corresponds closely to that of Austronesian languages, suggesting that this bat maintained close relationships with Austronesian peoples and constituted interspecific communities.

Since 2012 we have been conducting ethnographic research on human-animal relationships in four indigenous groups: the Alangan Mangyan of Mindoro, the Blaan of Mindanao, and the Ayta and Ibaloy of Luzon—all of whom live from hunting, gathering, and slash-and-burn farming. We have learned how they live in very close contact with several bat species and how they manage this cohabitation (Laugrand and Laugrand 2020). This aspect of indigenous life seems largely ignored (see, e.g., Reizl et al. 2012).

The ethnographic data used for this article come from eight workshops we held between 2012 and 2020 on the transfer of knowledge from older to younger generations. Our approach was to bring elders and young people together and get them to dialogue on collectively chosen themes. Each workshop was filmed while being led by anthropologists and indigenous facilitators. The oral accounts were never anonymous; each participant consented to identify him- or herself. A session would cover different subjects, with each participant speaking in turn on the subject and with questions coming from other participants and the facilitators, all of whom could follow the discussions through interpreters. The goal was to promote local knowledge and help pass it on. Despite the unnatural format, the participants had no trouble following the discussion and having their contributions validated, contradicted, or added upon by the other participants. Oral accounts were taken down in the vernacular and then translated and verified by the participants before being published verbatim with an English or French translation in question-and-answer format (Laugrand 2020; see also the collection *Verbatim*, at

16. http://philjournalsci.dost.gov.ph/publication/special-issues/genomics/90-148-special-issue/1086-dna-barcodes-reveal-high-genetic-diversity-in-philippine-fruit-bats.

17. In 1973, the Philippines already had a large reservoir of zoonoses, with nearly 63% of the world's 181 zoonotic diseases (Steele, Arambulo, and Beran 1973). See also Chan et al. (2013), Chung et al. (2015), Satoshi (2011), and Shumpei et al. (2010).

https://pul.uclouvain.be/collection/?collection_id=116). The oral accounts were given in a clearly defined context, and in this postcolonial setting the participants appreciated seeing their local knowledge promoted. In addition to the workshops, Frédéric Laugrand and Antoine Laugrand have conducted 10 and 27 months of fieldwork, respectively, in Luzon, Mindoro, and Mindanao since 2012 and started learning the Blaan and Ibaloy languages.

The Blaan Koronadal live on the coasts and in the mountains of southeastern Mindanao. Most of them hunt and gather in the tropical forest while also engaging in slash-and-burn farming. The Blaan we worked with had established their homes in an extinct volcano, in the Malbulen region (Little Baguio; see figs. 1, 2).

The Blaan live with five species of bats, which they classify as birds (*lmanaf*). The largest are the *kabol*, the flying foxes. The smallest are the *kabäg*, which the Blaan divide into four categories: the *kabäg law* (which eat the fruits of the *law* tree), the *kabäg mehin* (which come from the sea), the *kabäg lmugan* (which resemble the *lmugan* bird, whose vocalizations are said to be the word of Dwata, their divinity), and the *kabäg layen* (which eat rotten fruits, bananas, and coffee bush flowers). All of these species are eaten, except for the *kabäg layen*. The latter are smaller and dwell in caves and in the cavities of some trees, like the banana plant. Their call, *Kwit! Kwit! Kwit!*, imitates the noise of children walking in mud. The *kabäg layen* are inedible, and the Blaan emphasize the stench of their urine. They associate these tiny bats with the *busaw*—evil flying spirits that hunt humans and live underground, in cliff holes, and in caves. As Tony Panulong, a young leader, explained: "A *busaw* is very furry. It can fly and is bald. One of the signs that a *busaw* is in the vicinity is when the bad smell of the bats [*kabäg layen*] spreads around" (2015; quoted in Laugrand and Laugrand 2021*b*:90). The urine of the *kabäg layen* thus betrays the presence of *busaw* spirits, which are believed to possess the bats. To walk across an area that they occupy, one has to make a *damsu* (an offering); otherwise, one cannot go farther without trouble. When no offering is made, "the odor of its urine can drive you crazy," according to Edwin Lumimbong (2018; quoted in Laugrand and Laugrand 2021*a*).

One can gain therapeutic benefits from *busaw* spirits, just as one can from bats, specifically from their teeth. Tony Panulong recounted:

> The *busaw* has big teeth, bigger than those of horses and *carabao*. It is generally found in mountain cliffs. If a *busaw* flies away from its cliff, it leaves its teeth behind. And that's where you can get some for safekeeping. It's also said that a *busaw* can die of old age because of its advancing years. When it dies, it abandons its teeth, and you have a chance of finding some in the cliffs.
>
> If the *busaw* has given you an illness [the *busaw* are considered to be vectors of serious diseases caused by witchcraft], the remedy is to use one of its teeth, which you place in a dish with water, and you use the water to wash the victim as if he

Figure 1. Blaan houses near the forest where bats are hunted, Little Baguio, Mindanao, Philippines. Photo: A. Laugrand, 2017.

Figure 2. Blaan hunter with his bow and arrow, Little Baguio, Mindanao, Philippines. Photo: A. Laugrand, 2018.

> were taking a bath. It's very unusual to find a *busaw* tooth; it's said that in times past the people who healed [*mloos*] had found one. (quoted in Laugrand and Laugrand 2021*b*:90)

An elder, Anacleta, told another story about a *busaw* that lived atop a huge tree. After capturing a man who had acted wrongly, it brought him back to the top of the tree to eat him. The man managed to get away by catching a vine with his teeth. Back on the ground, he gathered some foul-smelling flowers and weeds and rubbed his body with them to counter the *busaw*'s power.

Through its odor, its type of habitat, and its ability to drive people crazy, the *kabäg layen* is associated with the disease-spreading *busaw*. Among the Blaan, as among the Ibaloy, any encounter with such spirits requires offerings and appeasement for safe passage.

In sum, our data show that the Blaan discern different bat species and respond to them differently. They have ambivalent attitudes toward many species, like the flying foxes, which are considered to be either beneficial or malevolent. Only the smallest species is seen as a vector of disease. The Ibaloy show similar discernment: only the largest species, the flying foxes, are associated with harmful flying spirits that bring illness (the *mandebbas*). Thus, both of these human groups have distinct relationships with distinct bat species, rather than a single relationship with bats in general.

A third group, the Alangan of Mindoro, are hunter-gatherers who live in a mountainous forested environment. They distinguish between three types of bats: the *kabeg* (flying foxes), the *kabilaw*, and the *kaliputput* (the least interesting ones, for them). They describe their relationships with these animals in terms of cooperation: bats knock down otherwise inaccessible fruits from trees, like those of the *pautan* (*Mangifera altissima*). They also disseminate the remnants of such fruits, thus helping feed rats, ants, and insects.

According to the Alangan, *kabeg* meat is an exceptionally tasty delicacy. It has a revitalizing effect, regenerating mind and body, stimulating and clarifying thought while ensuring a long life. An elder, Anigo Balbas, cited the case of his father-in-law, who lived to be a hundred by eating such meat. Danilo Basito, one of the village leaders, explained that bats lose their foul odor once they have been skinned. Their meat is also said to purify the body and give strength: "When you begin to get tired and you eat some [of its meat], it gives you back your energy . . . it clears our thoughts" (quoted in Laugrand, Laugrand, and Tremblay 2020:89). It is said that these animals owe their powers to their fruit diet.

The *kabeg* are also described as valuable allies because their posture can be used to predict the weather. Another village leader explained:

> When a storm is brewing, they hang like that, as if they were sad. As if they were shivering. Their wings aren't like that (pointing upward) when they're roosting. When there's rain, their wings are like that (pointing downward). It looks like their arms are folded, whereas when it's the warm season they hang like that (with their arms stretched out); it looks like they're more brave. (Isagani Garong; quoted in Laugrand, Laugrand, and Tremblay 2020:91)

Discourse about the *kabilaw* focuses on their place in cosmology. Oral accounts stress their gregariousness, as seen by the

mass departure of an entire group when the leader flies away, along with the spirit master who protects them. "When the leader sings," explained Isagani Garong, "when he flies away and the entire group follows, the first one to sing is the leader." The following excerpt shows how much the Alangan respect these bats:

> It's forbidden to enter the caves where they dwell. As for people like you, it's really forbidden to enter because they could fall down on you. That's why the *kabilaw* bat is really sacred. . . . Because if you go there, you may get sick, you may no longer be able to go home. Because you don't come from there. It's probably the spirit that watches over them who will cause you this dizzy spell . . . In this place where they live, there's a good spirit and a bad spirit who watch over them. (Danilo Basito; quoted in Laugrand, Laugrand, and Tremblay 2020:93)

Some oral accounts emphasize how organized the *kabilaw* are. They have sentinels:

> They have guards here and there who keep watch. For example, they will tell each other there are hunters coming. They know when one of their own is missing, when one of their own gets caught. It's also for this reason they are considered with much respect and are for us, in a way, sacred. (Anigo Balbas; quoted in Laugrand, Laugrand, and Tremblay 2020:92)

The Alangan express no fear of bats. They have efficacious medicinal plants with which they can treat the few cases of bat bites. They nonetheless think it undesirable to tame them, even considering it a transgression to do so. "That would be to take the place of the god of the bats. We're not God. They're the ones who bring us things; they're the ones who make us stronger" (Danilo Basito; quoted in Laugrand, Laugrand, and Tremblay 2020:93).

Among the Alangan, bats tend to be viewed with sympathy. They help humans. The sympathy is even more explicit among the Ayta.

Indeed, the Ayta of the Subic Bay region see bats as a heritage to be preserved (Caruncho 2005). As one of the oldest human groups in the Philippines, the Ayta Amba, with whom we worked at greater length, recognize at least five sorts of bats. The largest are the *paniki*, "the good ones." They are the flying foxes. Because they have no fat, eating them will not cause blood pressure problems, according to the Ayta. The *ugi*, "the courageous ones," are multicolored; no other bat can approach them while they are eating. The *bulbuan*, "the angry ones," are noisy. The *kulalaba*, a tiny species, live in cavities and in trees. Finally, the *kaangin* live in bamboo groves, in caves, and in the roofs of houses. They are the only bats that eat insects.

The Ayta see bats as having distinct temperaments, emotions, and skills, particularly cognitive and communicative skills. By observing their behavior, a person can predict the future or infer what the bats are seeking or avoiding. If they are flying in the daytime or seeking refuge in small trees, the reason is that they sense an oncoming typhoon or thunderstorm. If they avoid going out on a clear night, the reason is their fear of the moon; this is why they will not feed during a full moon. The Ayta know much about these night-flying animals: the weather conditions that harm them (e.g., violent winds), the landscape features they like, their olfactory capacities ("they detect odors at a great distance"), their nomadic life ("they stay only three months in the same tree"), and their storage techniques (they "place fruits on the 'fingertips' of their wings"). The Ayta also say that bats can communicate with humans and that they know their habits ("they will drink water at sea around 3:30 p.m. before going to feed") and their reproductive cycles.

Like the Alangan, the Ayta emphasize that bats are beneficial to the environment. They help agriculture because their excrement (guano) acts as a natural filter. They are effective pollinators, and their droppings fertilize the soil. The Ayta appreciate having them nearby.

A bat hunter, Abraham, told us that bats can recognize Ayta individuals by their physical appearance and communicate with them. He also said that flying foxes have a spirit master, but he no longer remembered its name. Hunting is a special occasion when the Ayta must show a respectful attitude. Only male individuals are hunted, with a bow and arrows so as not to frighten the other bats. Another technique is to construct *dakta* traps that catch prey with sticky sap from the *antipolo* tree. The trapped bats soon die of hunger and fall to the ground, where their bodies are gathered. The Ayta hunt parsimoniously, as dictated by their asymmetric relationship with the king of the flying foxes, the strongest animal in the group. "When we hunt," explained Abraham, "we have to ask that spirit for permission and offer something in exchange."

Bats are dangerous to the Ayta only to a certain degree. Although some may inflict a venomous bite with their teeth, this risk is said to be almost nonexistent. As for zoonoses, the Ayta say the opposite of what epidemiologists claim, saying in fact that bats are not infectious agents and do not spread diseases. On the contrary, bats are described as paragons of cleanliness because they stay away from the filth on the ground. The Ayta have long been eating them for medicinal purposes. Many affirm that bat meat has prevented them from ever getting sick. They say, in fact, that their bodies are made stronger and more resistant. This is what motivates hunters to collect the blood of their prey in a bamboo container and drink it, as a way to reactivate their alliance with the forest, "the great house." As far back as the Ayta can remember, no one has ever died from eating a bat. Abraham said he had seen his hunting companions file down a bat's teeth to avoid getting bitten, an indication that an individual bat would sometimes be raised as a pet.

The Alangan and the Ayta thus assign the bat a major role in their world. It is an asset to human and forest life. It prolongs existence and strengthens mental acuity; it contributes to pollination, fertilizes the soil, and assists reforestation.

Of course, those views are group specific and do not encompass all of the ways that bats may be imagined by other indigenous groups of the Philippines. We have seen that the Ibaloy link the bat to the vampire-like *mandebbas*, an eater of

souls, and that the Blaan link it to the *busaw*, a witchcraft-related spirit that possesses its victims and makes them succumb to illness. The bat thus appears as a *pharmakon*: it regenerates and heals but can also spread death and disease.

Should We Stay Away from Bats or Make Them Our Companions?

At the very time that some scientists are condemning such consumption, many communities have been consuming the flesh and blood of bats, seeing them as beneficial to mind and body and apparently having long thought so. Although we lack the data and necessary expertise to demonstrate such benefits, we can at least use the above ethnographic data to show that fear of bats is not universal. We can go further and ask this question: to what extent does our imagined reality contribute to the fears that bats arouse in us and that are made worse by pandemics?

The cases of successful cohabitation should make us look for the problem in the types of relationship we have with bats, rather than in bats themselves, and identify the conditions for cohabiting with them. To come back to the COVID-19 pandemic, was it really caused by humans and bats living in close proximity? Could the cause be related not only to that close proximity but also, and more so, to the ways we have been utilizing bats and their habitats? Those habitats have shrunk considerably with intensive logging of primary forests.[18] Although loss of habitat has reduced the numbers of some species, it has caused other species to migrate toward regions inhabited by humans. Meanwhile, population growth has increased the meat requirements of humans and the volumes of livestock to be raised and transported.[19] Large numbers of livestock and wild animals have thus ended up together in crowded markets under conditions of poor sanitation in dense urban environments, as was the case in Wuhan. Viruses thus enjoy an ideal environment for growth and proliferation.

This new environment cannot be blamed solely on bats. In part, it is due to how they and their former habitats have been utilized. More generally, the cause lies in the completely new contexts that humans have created by overharvesting resources and concentrating the transportation, processing, and sale of resources in confined spaces.

Frédéric Keck (2020) notes that the intensification of industrial livestock production has multiplied the risks of infection by placing more and more livestock between humans and "wild reservoirs" of pathogens. Such intermediary animals have included pangolins (which may have received an ancestral form of SARS-CoV-2 from bats and later infected humans) and hogs (which have gotten avian influenza from wild birds). In Queensland, bats infected horses in 1994, thereby spreading the Hendra virus. The Nipah virus has been spread by hogs in contact with bat droppings. By propagating a pathogen to other hosts, such intermediaries can greatly amplify the magnitude of an epidemic and thus create an imbalance between those species and their ecosystem (Morvan 2021*a*).

We now come to another question: are there proven cases of such viruses infecting a human without having first passed through a live intermediary host? If we look at viruses beyond the *Lyssavirus* genus, we see that the question is still open (see Moratelli and Calisher 2015; Racey et al. 2018:281). The Ebola virus is a striking example. It has been detected in Africa since 1976, and experts have concluded that it infected humans via exports of bush meat. Previously, bats had been blamed. James Fairhead (2018; J. Fairhead, personal communication, 2019) and Merlin Tuttle (2017) report the public response in the village where Ebola broke out a second time: the hollow tree where the bats roosted was immediately burned down with the bats inside. Months later, researchers realized that bats had nothing to do with the epidemic, the second outbreak being due to an infected woman (see Tuttle 2017).

Are bats really virus incubators? Was that their role in the current pandemic? Since the time of Girolamo Fracastoro (1476–1553) medicine has focused on the role of infectious agents in disease, and this role has become fantasized and elaborated upon in the imagination (Paillard 1998:10). In this imagined reality, we have sought to keep nature at a distance by pushing blood and microbes beyond the pale, thus ensuring our safety. Yet disease is also due to the drastic changes that we have imposed on the living world and that we fail to recognize as disease inducing. The Alangan and the Ayta imagine reality differently. They view the bat with more sympathy, describing it as living in a parallel society and seeing its flesh as edible. They do not fear it as a source of bacteria, viruses, or harm of any sort. Instead, they praise its ecological and medicinal benefits.

The Alangan and the Ayta are not the only human groups for whom bats are companion species and even partners. The Daribi of Papua New Guinea (Wagner 2001) and the Yarralin of Australia (Bird Rose 2010), like many others, regard them as vital beings. On Siberut Island (Indonesia), bats (*leitua*) are, with hornbills, the only winged creatures whose skulls are kept by hunters (see fig. 3). This privilege shows how respected they are and how they are treated as thinking individuals whose cooperation is sought by the local Mentawai people (Simon 2020*a*, 2021, forthcoming). In the Pacific, the Kanaks of New Caledonia (Haudricourt 1991) and the Maori of New Zealand see bats as sources of inspiration for their tattoos (Galliot 2015), whereas on the Solomons, on Makira Island, they are central to the social landscape, their teeth being used as currency (Lavery and Fasi 2017). In Polynesia, from Samoa to Fiji, flying foxes are

18. According to the Musée de l'Homme, humans destroyed 100 million hectares of tropical rainforest between 1980 and 2000 and have eliminated more than 85% of all wetlands since the Industrial Revolution (https://www.museedelhomme.fr/fr/aller-plus-loin/actualites/covid-19-pandemie-dune-biodiversite-maltraitee-4122). For more about bat conservation and related issues, see Voigt and Kingston (2016).

19. Mickleburgh, Waylen, and Racey (2009) and Mildenstein, Tanshi, and Racey (2016) have listed the countries where bat meat is sold in markets.

Figure 3. Deck made with bamboo sticks used by the Mentawai of Siberut (Indonesia) to hunt frugivorous bats. Placed in front of a fruit tree, this device provides a platform at the same height as the prey that will be captured with a net. Photo: L. Simon, 2018.

sometimes associated with divinities or cultural heroes; they thus occupy a primordial place in oral traditions and myths (Coiffier 2020; Firth 1961; Sinavaiana and Enright 1982). These cases show the positive connotations that may be attached to bats and the inspiration they may provide.

Today, the literature on flying foxes is considerable. Many specialists have found that this animal can be viewed sympathetically in the popular imagination. They agree in their observations on its key role in habitat regeneration (for the case of Indonesia see Whittaker and Jones 1994). There is also consensus on the good it does for ecosystems through pollination and reforestation. Research has shown that woodlands in Taiwan, on the Ryukyu Islands, and on Pacific Islands owe their biodiversity to flying foxes carrying seeds over very long distances (Cox et al. 1991; Lee et al. 2009; McConkey and Drake 2006).

Those examples show the many ways in which the bat is represented and utilized. It meets the criteria of a "companion species" by helping and cohabiting with humans, despite occasional drawbacks (see figs. 4, 5). In many communities, human-bat relationships have been established without domination or subordination (Caeymaex, Despret, and Pieron 2019). Bats are neither domestic nor wild in such relationships: they are partners; they are synanthropic animals (Fairhead in Keck et al. 2021:212). Although they may be suspected of witchcraft, they are still edible and worthy of respect; they are protected in return for their services of pollination and reforestation. Many communities have understood the benefits that accrue from cooperation with them.

We would like to conclude by making two more points. First, humans have much to gain by treating bats as allies. Second, humans should examine what may lie beneath their negative views of bats.

We are only now beginning to understand the ability of bats to contain and fight off infectious agents. In order to find out why they live four times longer than rodents and 10 times longer than similarly sized mammals, DNA was analyzed from nearly 500 specimens belonging to four species. The reason seems to be related to the telomeres at the tips of their chromosomes.[20] In another study, on innate immune response, the common vampire bat (*Desmodus rotundus*) was found to have an exceptional capacity for rapid control of viral infections.[21] Brook et al. (2020) attribute this capacity to production "of interferons" (Periasamy 2019; Sarkis et al. 2018; Subudhi, Noreen, and Misra 2019). Viruses are thus contained, and any inflammatory response is inhibited. For apparently millions of years, bats have outperformed other animals in resisting the viruses they carry.[22] Their mechanisms of resistance are related to their use of "active" flight, which generates a basal metabolic rate up to 15 times higher than the resting metabolic rate (Herzberg 2020).

Other studies also indicate that bats repair their DNA, attenuate oxidative stress, and remain unaffected by carcinogenesis. Such properties may actually reduce the impact of epidemics and cancers in those humans who consume the flesh of these creatures. It is time to rethink the disgust and fear that so many of us feel for them and instead develop a relationship of mutual respect and assistance. These findings may reconcile us with bats, thus giving rise to new narratives and imagined realities. Our current relationship of predation and mercantile production should not, however, be simply transformed into one of medical "utilization." Our future relationship should be one of reciprocal assistance where each party looks out for the other and ensures conditions for the other's peaceful development.

In closing, we wish to highlight a few troubling similarities between bat society and human society. Bats are reservoirs of viruses and parasites for three reasons: their gregariousness (they live in large colonies), their interspecific communities (their colonies harbor individuals from several species), and their mobility and high capacity for dispersion.[23] Let us add a fourth reason: their

20. http://advances.sciencemag.org/content/4/2/eaao0926.full.

21. https://www.pasteur-cayenne.fr/comprendre-comment-les-chauves-souris-vampire-resistent-aux-infections/.

22. See, e.g., Kuzmin et al. (2017).

23. J. F. Julien in https://www.franceculture.fr/emissions/le-journal-des-sciences/le-journal-des-sciences-du-mercredi-12-fevrier-2020.

Figure 4. Flying foxes in Subic Bay, Philippines. Photo: F. Laugrand, 2019.

invasiveness—bats are criticized for moving into urban outskirts and taking over abandoned sites. That lifestyle is what makes them vectors of disease, yet it is also the lifestyle of many humans who, having left the small towns and countryside, are now, in the early twenty-first century, congregating in sprawling suburbs and exurbs. Deborah Bird Rose (2020) comes to similar conclusions when discussing Australian flying foxes: "I can't help but think that something about them reminds us of us—of how we are when we are at our most crowded, noisy, and irritating" (181).

Conclusion

Bats have been viewed with ambivalence, our relations with them being shaped by contrasting perceptions in our minds. In times

Figure 5. Flying foxes in Miagao, Philippines. Photo: F. Laugrand, 2020.

of crisis, the negative perceptions are highlighted, and we find an easy scapegoat. Yet there are also positive perceptions: bats are considered a delicacy in some societies, and their medicinal properties valued. It is thus possible to imagine a society where humans cooperate with bats, cohabit with them, assume their potential risks and benefits, and accept them as co-actants, not only in the possible propagation of viruses but also in environmental management and in strategies for epidemic containment.

Many authors have uncovered promising solutions when studying the relationships that bind humans to each other, to other species (Laugrand and Simon 2020), to the land, to technologies, to the spirit world, and so on. In *Staying with the Trouble: Making Kin in the Chthulucene*, Haraway (2016) asks us to get over human exceptionalism with its irresistible morality of progress. Instead, like Lovecraft's spider, *Pimoa cthuhlu*, we should connect and branch out, this being the only way ahead for our evolutionary future in a ruined world (Haraway 2018). We should come to terms with others, even those we oppose, by "joining in a sort of collective construction," "finding less murderous ways of living with each other," and in sum "becoming kin to each other" (Caeymaex, Despret, and Pieron 2019:70–71, 74). The intention here is not to impose a moral judgment but rather to build a relationship of mutual solicitation and become willing to experience contradictions and "live with incompatible truths," that is, points of view that are true and yet irreconcilable (Caeymaex, Despret, and Pieron 2019:361).

Like Tuttle (2017:50, 2019), we should think about protecting bats and their spaces, limiting mass killings of them, and seeing things more from their point of view. To rehabilitate them as full participants in this world, and to integrate them with the diversity of life forms and spaces they have shaped and influenced, we should relate to them in new ways and rethink some of the ways we relate to the world in its entirety. In this case, a likely solution would be to give bats the protection they need in exchange for improved opportunities for respectful observation. Such an exchange raises the hope of learning how they acquired their strong immune system. We should treat them as allies, not as enemies.

We should also take a hard look at the current pandemic and how it has sparked inflammatory reactions, physical violence, and media-driven hyperbole. We need a more thoughtful response: not only development of vaccines against viruses that bats may pass on to us but also rethinking of a lifestyle that has pushed us to exploit the world's resources without limit and without respect for other life forms.

Hopefully, just as we have learned to respect certain indigenous perspectives, we should learn to treat bats as beings in their own right, with a history and a future, and not just as "epidemic villains" (Lynteris 2019). Because we occupy the apex of the food chain, as predators who can dominate "nature" everywhere, we feel little need to care about all the beings that surround and feed us. To borrow the terminology of Caeymaex and coauthors, "bats are inviting us to learn how to see 'from below,' how to grasp a world in its multiplicity, its polyvocality, and its interconnections, and how to live with disturbance, how to let ourselves be disturbed by the world" (Caeymaex, Despret, and Pieron 2019:189). They also practice mutualism with plants and improve the quality of their environment.

The ethnographic examples we have briefly covered herein are presented not as models but rather as indicators of the many possibilities for cohabitation with other living things. Those examples can show us how to upgrade existing relationships or how to use other compensatory mechanisms to create new ones. By neglecting such relationships, we have only weakened ourselves within the larger web of connections that bind us to others.

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Comments

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Humans and Bats: Senseless Distancing and Impossible Divorce?

One of the main ideas of this text is that the fear of bats is not universal and has its relevance, given that the COVID-19 pandemic has reactivated and exacerbated the negative representations about these animals. The heuristic scope of this article lies first in the thick literature and rich ethnographic data it provides on the variety of qualities attributed to bats. Whether positive or negative, the wide range of qualities raised are biases to nuance the biomedical monolithism that tends to see bats only as pathogens. Indeed, the biomedical approach emanates from modern epistemology, which has made the dichotomy between nature and culture the universal template. However, contemporary debates in social sciences call this dichotomy into question, and a number of authors (Descola 2005; Latour 1997) attempt to demonstrate with supporting ethnographic data that it is particular to Western culture. The article then secondly appears as an original contribution to this debate, lifting the veil on the affordance of an animal that has been put on the list of the animals that threaten human life.

Indeed, from one geographical area to another, the variety of bat species is either flourishing or threatened by human action. To this variety of species also corresponds a vast network of symbols and thoughts around bats, according to different ontologies and indigenous spiritualities. From one people to another, these animals may have a positive valence as "companion species" (Haraway 2016), vectors of happiness, and numinous entities, while others see them as gloomy agents of the invisible world (because of their nocturnal activity) and agents of witch attacks. Still others hardly notice their presence or simply consider them as animals whose meat is delicious.

This wide range of qualities attributed to bats makes them ambivalent. The authors admirably document this ambivalence by reviewing the available data, as well as their own research in Asia, particularly in the Philippines. Africa is particularly representative of this variety of thoughts around bats. I recently conducted fieldwork in Cameroon to understand the place occupied by these animals in indigenous ontologies and nosological systems. The results of these studies have, like this article, highlighted the ambivalence of bats. In the southern part of the country (forest zone), for example, the Beti, the Bassa, the Douala, the Tikar, and some Bamileke groups hunt and eat different species of bats. The children pick up and eat the fruits (especially mangoes) half eaten by the bats. Therefore, presenting bats as a reservoir of microbes then seems incredible. On the contrary, these animals are supposed to have medicinal virtues. Besides, bats are known as having mystical powers, and their entrance into a home can be interpreted as a bad omen.

In the northern region, bats are companion species for the Kapsiki. They consider that these animals cannot live in a village with conflict and witchcraft. Their presence close to humans would be a source of peace and prosperity. The bats also bring fertility, for the farms located near the trees where the bats live produce abundantly. The Kapsiki also consider bats to be humans because of their shape. They can thus represent ancestors and are therefore the subject of many taboos. In exceptional circumstances, only special castes such as craftsmen and blacksmiths, known to have mystical powers, can eat bats. Generally, bats are a protected species for the Kapsiki, and killing them is a reprobate act.

This ambivalence was also noted in Burkina-Faso by Cros and Frérot (2021) in connection with the health measure that prohibits their consumption and handling because of the Ebola epidemic. While the anagram "*chauve-souris*" = "*souche à virus*" ("bat" = "virus strain," by reversing the letters) was widely disseminated in Western countries during the COVID-19 pandemic, people from French-speaking West African countries rather spoke of "*sauve-souris*" (saving-bat), thereby revealing its medicinal qualities. Recalling the diversity of ways of thinking and living with bats, the authors argue that the awareness messages that invite or oblige, depending on the contexts and health emergencies, to break the ecological continuum between humans and animals, with an emphasis on hunting and nutritional habits, ignore indigenous ontologies and spiritualities. These messages are based on a homogeneous definition of both health and bat: "One Health, One Bat." However, these two approaches, according to the authors, can only be ideal types, conceptual tools that, in the vain pursuit of zero risk, imagine scenarios that have no empirical relevance.

The current challenge being to find the solution to the problem of zoonoses and emerging diseases, another original contribution of this article helps to realize that the incrimination of bats only as (pathogenic) animals is not the solution. It should first be admitted that the hegemony of the nature/culture dichotomy that induces a segregative approach between humans and nonhumans is as destructive as what Mbembe (2020) calls "brutalism," that is, the unlimited exploitation of natural and wildlife resources. This brutalism breaks the harmony that indigenous societies have long maintained between human and nonhumans, thus forcing people to live in misery and unsanitary conditions that are pathogens, rather than the animals themselves.

Any search for a solution to what threatens health and well-being should therefore not be confined to biocentric approaches that focus solely on the pathogenic fallout that would result from the proximity between humans and animals (Cros and Frérot 2021). Indigenous ontologies and spiritualities have much to teach us about anthropozoological relationships. The denial of this reality in public health strategies can have counterproductive results. I even hypothesize that the weak adherence of a large majority of African populations to the preventive measures advocated during the COVID-19 crisis, and even after several Ebola epidemics, is partly due to failure to take into account indigenous ontologies and spiritualities. Humans and animals are part of the same world, and it is futile to imagine that anthropozoological distancing will be imposed everywhere for public health reasons. We should seriously consider the conditions from which peoples admit relational continuums with different species that populate their world.

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For a Comparison of the Ways of Living with Bats among the Kasua of Papua New Guinea and the Ni-van of Santo Island, Vanuatu

This contribution aims at extending Frédéric Laugrand et al.'s epistemological will to resituate and valorize bats in the interrelational context in which they are involved with humans in Papua New Guinea and Vanuatu. If, on the one hand, the Kasua, having a seminomadic livelihood, live immersed in the dense tropical forest of the lowlands and low mountains, on the other one, the Ni-van occupy an island covered with a mantle of more sparse greenery, cradled by the fishy waters of the Pacific Ocean. However, their territories both enjoy exceptional karstic regions where bats live in society. Their species, of course, are not identical: we find the *Miniopterus* sp. in Vanuatu and the big

Dobsonia magna in Papua New Guinea. But still, a comparison of Kasua and Ni-van conceptions and practices toward these animals is relevant in order to identify common features and to single out certain ethnographic differences. In order to establish our point, we will not have recourse to the notion of "companion species" identified by Haraway—so useful in the naturalist Western universe—for in the worlds described here, human beings perceive themselves from the outset as living with nonhumans, participating in a cosmological and ecological relational mode, in short, as evolving in a continual and dynamic interspecific companionship at the basis of their existence and society. Their world is thus qualified by a formidable complexity; it is assimilated to a cosmos where, alongside living beings (human and nonhuman), spirits also coevolve. In all the tribes encountered—the Kasua and six Ni-van tribes—all admit the copresence of several categories of spirit whose identity can vary from one tribe to another: spirits of ancestors, spirits of the clan, spirits incumbent to certain spaces or species (animal, floral, marine), spirits of fertility, and so on. However, as diverse as they are, all these spiritual entities have in common is that they can materialize in visible life in the form of living beings and express themselves through natural phenomena. Finally, they all hold the power to harm human life (through disease or death) if humans do not fulfill their reciprocal obligation toward them. Humans are therefore forced to maintain a certain relational and ecological harmony by practicing rituals, sacrifices, or offerings, as well as by observing numerous behavioral taboos with regard to either spirits, living beings, or the spaces of which the latter are the guardians—in this case, karstic cavities. It is in light of this context that we can understand the original relationships that are formed with bats.

The first common feature is undoubtedly bats' habitat. Indeed, whether they are dry or drowned, followed or not by a resurgence, located on the coast or in the mountains, all the identified cavities are the subject of a myth relating their origin, their properties, or remarkable occupants. The mechanisms underlying the morphogenesis of the karstic landscape are almost similar in all the myths recorded. Among the Ni-van, it is mythical humans or rather their subsistence activities—hunting, tuber digging, fishing—that are at the origin of their formation. They will suddenly cause a collapse of the walls, the creation of a well, or the deadly gush of underground water. All these upheavals will lead to their own metamorphosis into animals, snakes, or eels, the new masters of the place. Among the Kasua, this is the work of a giant named Tawalume, whose name refers to the karst region Tawalu. Clumsy and abrupt, he is the master and the landscaper, since it is his gestures—jumping, bumping, pulling his bow out of the wall, undressing, and so on—that cause the sudden depressions, the digging of cavities, the precipices. Beyond the actors, the mythology thus emphasizes the formidable geological instability governing the karstic landscape. As such, it warns human populations of the mortal danger that they would incur if they came to perpetrate there even the most anodyne practices. Subject to unexpected metamorphoses, these places can only be inhabited by exceptional beings, capable of living with the phenomena of erosion: bats.

The second common trait is the attitude required to enter into a cave inhabited by our exceptional beings. It is based on a very rigorous code of conduct, often similar in each tribe. Generally speaking, entering a cave arouses a strong apprehension in these individuals, some of them even refusing to enter. This emotion takes all its meaning in light of the risks incurred. First of all, although the entrance to a cave is not totally forbidden, all humans do not necessarily have the right to enter it, for instance, menstruating women or men whose wives are gardening or giving birth. Violating this rule would lead to the collapse of the cave or a deadly flood: too much fertility kills. In fact, only men from the clan territory where the cave is located have the right to enter it, but only as long as they greet the masters of the place and make offerings to them.

The bat hunt practiced by all the tribes is therefore governed by these requirements. This gives it an exceptional character, which is a third common trait: on the one hand, it is always collective, and on the other, it only takes place twice a year, to conclude funeral rituals, weddings, or initiations. Bats are explicitly the companions of passage of humans but also those that unite humans between them. Their catch can amount to 175 specimens, making it possible to feed and bind several clans simultaneously. It is the abundance, the joy, that comes from the greed of their firm flesh. Only the hunting techniques are different. They can be explained by the configuration and size of the karstic habitats and of the bats, which are smaller and lower in Vanuatu than in Papua New Guinea. In Vanuatu, lit by a bamboo torch, men may use a spear, a stone, or only their hand, taking care to cover their arms and hands with a magical plant anointing to guarantee the capture of prey. Among the Kasua, whose caves are gigantic, another technique is used. While some men enter the cavity with a torch and emit cries and howls to incite the bats to leave the cavity, others, installed in the trees at the exit of the cavity, armed with a long thorny broom made of rattan liana, wait for them to fly away to catch them in their fearsome broom. The fact remains that all these hunters respect the same imperative law: never kill the whole population of animals or the whole of their human community would die.

From these practices, a remarkable ethological knowledge of bats emerges. If their dreaded habitat is a hindrance to the experiences shared in situ, and thus to the knowledge of their behavior in cavities, the ethology of their external behavior is very precise. It concerns the trajectory of their collective flight, whose rubbery sound image is present daily—their cries, too, when they bicker for a fruit. These flights are moreover real announcers. Realized in full daylight, sometimes suddenly, they announce the coming of a cyclone or of a climatic or tectonic disturbance. Ethology is of course about their food, each tribe being able to precisely enumerate the fruits they habitually conquer and in which they participate in the zoochore diffusion. Their company is thus vital to these tribes. Guardians of fragile but unique ecosystems, they are sources of exceptional abundance, a sign of extraordinary fertility necessary for the relational and ecological regeneration of the forest cosmos.

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Chiroptera (bats and flying foxes) have fascinated human minds for thousands of years. This article is a real plea for these flying animals at a time in human history when they are accused of transmitting the most dangerous viruses. It recalls how a "chiroptophobia" then developed, relayed by the media, following various epidemics during recent years.

The authors have carried out for about 10 years ethnographic research within four hunter-gatherer societies and slash-and-burn farmers in the Philippines, on the existing relationships between these Chiroptera and the humans living on their territories. The investigation began with the following question: "What if we seek to blame bats largely because of what our imagination has projected onto them?" This led them to wonder whether these animals were considered "scapegoats" by many peoples of the Earth. Information gathered in the Philippines, as in other parts of Southeast Asia and Oceania, seems to show the opposite.

In the first section of this article, the authors evoke the ambivalence of these animals in the human imagination: sometimes harmful and associated with disease and death, sometimes beneficial and utilized for therapeutic purposes. The authors cite a number of references coming from research conducted by biologists, anthropologists, and other scientists. While they recognize that it is currently scientifically proven that bats are incubators of many viruses, they ask themselves the crucial question: why are these animals very little affected by these viruses as well as the various human communities living for a very long time in contact with them? We asked ourselves the same question during our research on the representations of bats and flying foxes in the Sepik region of northern Papua New Guinea (Coiffier 2020), concerning societies living in conditions quite similar to those studied by the authors in the Philippines.

In the second section, the authors develop Donna Haraway's concept of "companion species" using examples they collected from the field in various regions of the Philippines. They point out that people may behave differently depending on the species of bats they come into contact with, which seems to be the case in New Guinea as well. Some species can be considered companions of humans while others are assimilated with evil spirits.

The third section asks a fundamental question: "Should we stay away from bats or make them our companions?" Fear of bats is not universal. Indeed, the proximity of the Alangan people in Mindoro and the Ayta in Luzon with the chiroptera that the authors noted is common among many peoples of northern New Guinea. The Murik, Boyken, Abelam, Iatmul, and many others consider the colonies of flying foxes hanging in the trees around their villages to have a parallel, but inverted, life in relation to their own community. These animals are then assimilated with ancestral spirits that are, in fact, integrated into their social organization. If these ancestral spirits are mistreated, they can become evil; it is the reason why they are often considered to be responsible for acts of witchcraft. Such findings were also noted by Nicole Revel and the authors in the various communities they studied in the Philippines.

The authors note, as we have suggested, that there is a close correspondence between the geographical distribution of flying foxes and the distribution of Austronesian languages (Coiffier 2020:44). This is an extremely important point that will require many investigations. There are similarities between the names of flying foxes given by people in the Philippine Islands (*kabäg* in Palawan, *kabag* among the Blam in Mindanao, or *kabeg* among the Alangan in Mindoro) and those used in northern New Guinea (*kwumbi* and *kwandje* among the Iatmul and Sawos, *apukibi* and *apokwas* among the Kwoma, *kobis* among the Waxei; Coiffier 2020:49–53). These different peoples consider chiroptera as specific birds that do not lay eggs. The Melanesians' ancestors noticed that the behaviors of these beings differed from those of the marsupials they knew, before the arrival of dogs, pigs, and rats with human migrations. They found that female chiroptera nurse their young in the same way as humans (Coiffier 2020:45). Thus, the peoples of northern New Guinea included flying foxes within their representations of gestation by associating them with the placenta and the environment that controls the proper growth of children, from fetus to adolescence. This is why Roy Wagner (2001) coined the term "chiroptomorphism." A compilation and analysis of myths, featuring bats in all regions of Southeast Asia and Oceania, would provide a better understanding of the complex relationships established between these animals and humans for centuries.

However, the fact that chiroptera are often considered to be associated with witchcraft and death is a real problem. According to recent research from the Bat One Health Institute (Montana), flying foxes may be contagious at only some points in their lives, when they are stressed or when they are pregnant, due to the weakening of their immune system. Research is also being conducted to try to understand their greater longevity compared to that of their mammalian congeners of similar size. The fact that their diet is based exclusively on fruit consumption could be a response.

We agree with the conclusions of this article. The authors hope that further investigation about these chiroptera will help to understand how they have strengthened their immune system, and they express the following wishes: "We should treat them as allies, not as enemies. . . . We should learn to treat bats as beings in their own right, with a history and a future . . . because we occupy the apex of the food chain, as predators."

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Laugrand, Laugrand, and Simon ask a fundamental question for social anthropology: What is the role of imagination in the scientific definition of bats as reservoirs of infectious diseases or as "epidemic villains" (Lynteris 2019)? When there is uncertainty on the transmission of pathogens shared by bats and humans,

such as Ebola or SARS-Cov2, how is this uncertainty compensated by images of bats as dangerous beings, used as techniques of global health to anticipate future pandemics (Lakoff 2017)? And what should global health learn from societies that have developed other relations to bats because they live in close proximity with these animals?

It is quite remarkable that the reservoir animals for two major pandemic viruses, influenza and SARS, are flying animals, birds and bats, by contrast, for instance, with badgers as a reservoir for tuberculosis. The fact that these animals fly over long distances and mix with different species along the way certainly accounts for their capacity to transmit new viruses to humans. They constitute parallel societies for the transmission of pandemic viruses among humans, as if the flight of these animals anticipated the flight of planes through which humans transmit pandemic viruses. Bats and birds have developed metabolisms that allow them to coevolve with different kinds of viruses, which, when they arrive in the human species, cause immune panic and distress. Because it is impossible to identify all the viruses carried by birds and bats over long distances, it is necessary to imagine them as reservoirs. This imaginary is a driving motor of the scientific quest to collect and sequence viruses from these flying species. It sometimes leads virologists to discover clear-cut routes of transmission, as in the direct transmission of the Nipah virus by bats lipping palm trees in Bangladesh in 2011—a case that served as a model for the film *Contagion*. But often the intermediary animal is missing, which makes a strong difference between bats and birds as reservoirs. Avian influenza is transmitted from wild birds to domestic poultry and pigs, and we can imagine how industrial breeding increases the vulnerability of vital infrastructures for humans. But if bats are not domesticated, how can we imagine that they enter human habitats and spread viruses?

Here the lessons that social anthropology can take among hunter-gatherers are precious, for societies such as the Alangan Mangyan of Mindoro, the Blaan of Mindanao, and the Ayta and Ibaloy of Luzon have learned to live with different bat species. They recognize them by their smell, their flight, their teeth; they know which species can be eaten and how their flesh should be cooked to avoid being poisoned. While there have been fantasies about bat soups in China, in southeast Asia and Australia there are actual practices of eating bats, but these are also connected to images. Bats and humans are linked through kinship relations that allow humans to keep at a good distance, which is one of the goals of totemic identifications (Morvan 2021*b*). In West Africa, narratives are made to explain why bats live upside down on trees in such a way that their feces fall on the ground: it is a revenge against God's lack of consideration for them (Cros 2021). By their ambivalent status as flying mammals, bats are resources of images to think about what human societies should or should not do. They are described as vampires sucking blood but also as good nurses feeding milk to their pups and potentially to humans (Strivay 2007). The fear of bats comes from the fact that they can be eaten but they can also eat human beings, and this reversal is problematized in hunting societies through precautionary techniques. When animals are killed in the prophylactic measures of food safety, humans ignore these techniques by which they have learned to cohabit with other species. Images, here, can be used to attenuate the tensions in the identifications with the animals humans have taken as prey.

How, then, can these images from hunting societies transform the techniques of global health? How is the fear of bats transformed when images are carried by the media and not by narratives on how to properly hunt bats? This question opens a wide field of ethnography on how collectors of virus samples in bats play on these global images when they arrive in villages with protection equipment (Roth 2021). The authors give another answer to this question in their ethnography: they suggest that if bats are viewed as sacred by the Balangan, it is not by their intrinsic value or their role in pollination—an argument often made to insist on their ecosystemic services—but rather that they form an organized society, with guards and sentinels warning of the approach of human hunters. Here the reversal of perspective is pushed quite far: not only should we consider bats as sentinels for global health, by collecting viral samples to imagine the diversity of viral mutations, but also we should consider them as sentinels for their own health, protecting themselves against the threats coming from humans such as deforestation and urban expansion. The military vocabulary of global health—soldiers at the front line with viruses—is used here to describe animal behaviors. The imaginary is the site where with this kind of reversal it is possible to think about the challenges of multispecies coexistence.

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Symbolic Practices and Local Biologies Related to the Bat

This paper focuses on the imagined reality/representations, social practices, and systems of biological knowledge about bats held by different ethnic groups around the world. With the world suffering through a COVID-19 pandemic and the World Health Organization pushing the One World, One Health policy, anthropology is presented with an opportunity to rethink symbolic representations, practices, and biological knowledge in connection with relations between humans, animals, and the environment. Laugrand et al. imply that the crux of the problem is greedy human development behavior that causes damage to the global ecosystem, a circumstance to which the bat also falls victim. Their study is rather inspiring.

Laugrand et al. believe that ethnographies showing bats as a source of evil, disease, and fear are not universal. The Aztecs, for example, associated bats with fecundity and with mastery of human-made objects. In addition, many communities think "the bat is an asset to human and forest life"; it not only is eaten and made into medicine but also may be allowed to cohabit with people under the same roof. However, Laugrand et al. do not

explain (or strategically avoid) a question often asked in anthropology: why do different ethnic groups, at various times in history, have polarized perceptions, imagined notions, and social reactions toward the bat? The article mentions differences even among neighboring ethnic groups. How is this difference produced? How do people who hold to those different imaginary worlds communicate with each other? What is the significance of using indigenous ethnographic data in a new global context? Laugrand et al.'s in-depth ethnographies suggest productive developments that can be made in research on symbolic practices related to bats and their biosocial differentiation.

Groups or societies that have different notions around bats live in different real worlds and have different social networks. As underlined by Godelier (1986), symbolic practices are a "means of transmitting ideas from the world of thought to the material world or nature, while at the same time turning them into social relations [such as production, kinship, gender and politics], into social matters [such as discourse, symbolic action and belief]. Symbolic utterances and gestures transform ideas into directly perceptible social and material reality" (229). In their article, Laugrand et al. tell us various imagined associations for bats; however, analysis of the process of transforming these into social reality is somewhat lacking.

Without returning to reflect on these symbolic practices in each society, there is probably no way to remove the bat's connection to stigma. For example, connected prejudices toward the novel coronavirus, bats as scary animals, and the perceived Chinese taste for wild animals early in the pandemic quickly gave rise to the most sensational imagined origins for this disease across social media. Therefore, the symbolic practices of stigma making also need to be examined.

Societies that see the bat as impure and dangerous probably will not reduce their fears because they see that people believe "the bat prolongs existence and strengthens mental acuity," among the Alangan and Ayta of the Philippines. However, ethnographies can be a good tool for challenging our familiar habitus. Reviewing the imagination (or even stigmatization) that takes for granted the link between bats, viruses, and food can provide an opportunity for examining associations between social relations, the imagined reality of the bat, and disease in our own culture. For example, with enhanced contacts globally, which mechanisms, institutions, and symbolic practices (such as mass culture, science publishing, media, education, politics, etc.) might be used to objectivize or neutralize the negative image of the bat and so provide a universal standard for viewing things and action?

Laugrand et al. will probably be criticized (as Lévi-Strauss was criticized) for placing representation, scientific knowledge, and indigenous social practices together on the same level for analysis. We do not oppose treating them as equally valid forms of knowledge. However, if this kind of anthropological idea and research is to be more persuasive and influential, there needs to be deeper study of how biosocial differentiation of bats is developed in various environmental, historical, social, and politico-economic contexts. Margaret Lock's (1995) seminal concept of "local biologies" and the proliferating literature it has generated in medical anthropology have pointed the way for this. A more systematic conceptualization of biosocial process and practice will be a heuristic for both social and scientific reflections as humans continue to face the challenges of the Anthropocene.

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Inspired by Haraway's "companion species" argument, this paper is an original work that examines the concept and substance of companion species through a review of human discourse on bats as wild animals and an analysis of the results of ethnographic research conducted by the authors in the Philippines. Haraway's argument was developed from the coexistence and cooperation between humans and dogs, a species whose relationship is inherently intimate. Conversely, one of the unique aspects of this paper is that it points to the awareness of ambivalence that exists in the human side of the gaze toward other species. The authors seem to see ambivalence toward bats as dichotomous between harmful and beneficial, but I would like to take a slightly different view.

Ambivalence held toward bats is about the diverse relationships between bats and humans that have been established in local contexts, as well as the uniformity of the relationship, which is explained by modern science and empirical knowledge that the animals are a cause of infectious diseases and are negative or harmful. And I recognize that diverse relationships are a product of culture, while uniform relationships are a kind of cul-de-sac caused by civilization.

By the way, given the good opportunity, some supplementary information on the position of bats in Japan should be provided. In China, the bat is sometimes seen as an auspicious bird because of the sound of its name, but one of the widely known qualities of the bat is that it is a "coward" in Japan. Among other things, this is due to their morphological characteristics. The question is whether they are animals (mammals) or birds.

In Japan, Aesop's Fables are often used in children's books and picture books. In fact, Aesop's Fables were introduced to Japan around the seventeenth century. This was one of the Western cultures introduced before the modernization of Japan after the Meiji era (late nineteenth century). A fable in which bats appear is "The Bat, the Birds, and the Beasts." Bats have made an impression on the Japanese as an animal that symbolizes the lesson of "the deceitful have no friends." This period in Japan coincided with a time just after the Warring States period when samurai were fighting for territory and strong rule by the Tokugawa shogunate was being established. Betrayals between warlords often determined the fate of regional states in the Warring States period. Clarity of one's position was also considered one of the samurai virtues of integrity, and the bat's unruffled attitude may have been perceived by the common people as a counterintuitive lesson.

The fact that bat morphology makes humans feel uneasy may recall to me the discussions on category confusion by Mary Douglas, Edmund Leach, and others. The fact that bats behave differently from other birds and are nocturnal may also be disconcerting to humans. The bat will be given recognition as an animal that can demonstrate its abilities at night, being able to see through the dark night when other birds cannot fly. This may be where the discourse that bat droppings improve eyesight, which the authors give as an example from China and Japan, comes from. As a supplement to the medicinal properties of bat feces, an herbal medicine made from dried feces of certain bats is mentioned in medicinal books. This herbal medicine resolves heat in the blood and is therefore effective in treating eye redness. Here, too, the scientific form of explanation works to reduce the discomfort with bats.

Finally, I would like to add a comment on the authors' conclusions from the perspective of the symbiosis between humans and other animals in the context of a pandemic situation of infection by COVID-19. I consider bats to be "thinking" creatures that are very well suited to reviewing the relationship between humans and other animals, in terms of both culture and civilization. In this sense, I respect the depth of the authors' insights. I also agree with the suggestion, "Those examples can show us how to upgrade existing relationships or how to use other compensatory mechanisms to create new ones."

Can we consider that it is not the pathogens that are causing the emerging infectious disease problem but human activities that are disturbing the ecosystems that contain the pathogens? As the natural environment is destroyed and pathogens are transported, they are forced to find new habitats and hosts and undergo host conversion, causing serious damage to ecosystems, including those of humans.

A study by Johnson et al. (2020) also showed that the number of zoonotic virus strains in domestic and pet animals is eight times higher than in wild animals and that in the network of shared relationships between wild and domestic animals and viruses, domestic animals have various viruses. The method of "looking at others from below" is not restricted to wild animals but would be an approach applicable to all living creatures, including domesticated animals.

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"A Web of Connections Binding Us to Others," Bats, Birds, Squirrels, and Guano

Bats are numerous in the world: as of today scientists have identified and classified around 1,400 spp. (Wilson, Mittermeier, and Martínez-Vilalta 2019). Since the COVID-19 pandemic burst, many quests and queries focus on bats as pathogenic agents potentially involved in several zoonoses. The extensively documented article "Sources of Ambivalence, Contagion, and Sympathy: Bats and What They Tell Anthropology" by Professor Frederic Laugrand assisted by Antoine Laugrand, PhD student, and Lionel Simon, postdoctoral fellow, FNRS-IACCHOS-UCL, illustrates the many ways to consider these mammals, ranging from negative to positive perceptions often opposing urban cultures/traditional local groups in Southeast Asia but with a prevailing auspicious value in China, where bat, *Biān fú*, is a mythological symbol between earth and sky. It conveys also the notion of happiness, *Xin fú*. In the verticality of the world, a T-shaped funeral procession banner painted on silk with black ink and colors depicts in three parts the heaven, the human realm in the middle space, and the chaotic infra-world. On the upper part of the middle realm, a bat with its opened wings holds up the heaven. This motif also appears on embroidered imperial robes.[24]

The article aims to help the reader to shift the frame of reference and to learn from other perceptions, attitudes, and uses within many other ontological frames provided by numerous ethnographic examples in the Americas, then in northern Asia and Southeast Asia. By a compilation of many examples worldwide, the authors show how the traditional local conceptions referred to are quite distinct from many doxa.

One of the most striking example is found among aboriginal Australians of Victoria River, where a family is composed of humans and flying foxes. The mothers are thought to be flying foxes since the time of creation, and this has an implication on the social organization, particularly on the affinity rules. The connectionist thinking here provides a rule of prohibition, namely, flying fox people do not marry other flying fox people; the rule of exogamy is stipulated.

This ancestral cosmology reactivates by way of myths and kinship a rather recent debate (1986–1991) referred to in Laugrand's paper about the phylogeny of flying foxes, with some authors suggesting from neurological characters that they were more closely related to primates than to microbats (Pettigrew 1986*b*).

Since molecular biology has discovered DNA, scientists have been able to trace the phylogenetic relationships between groups using genetic information. Based on genetic characteristics, several authors brought clear lines of evidence showing that microbats and flying foxes form a monophyletic group (Nikaido et al. 2000). Flying foxes are not primates! The neurological resemblance between primates and flying foxes results from a convergence and does not derive from a common ancestor.

24. Eliseeff, Danielle. 2003. *Art et archéologie: La Chine du Néolithique à la fin des cinq Dynaties (950 de notre ère)*, École du Louvre, rmn, pp. 199–203, Notice 43: Tomb no. 1 of Mawangdui, Western Han period (206 BC–25 AD). This banner was found in 1972 draped over the coffin in the grave of Lady Dai (c. 168 BC) next to the tomb of her husband and their son, at Mawangdui, near Changsha, Hunan province.

With the authors, I share the proposal of transforming our split view on the components of nature—also related to the split of our disciplines—and emphasize the connectedness between humans and all living things in the phenomenal world they inhabit. This attempt aims to transform our attitude of fear and rejection to a more comprehensive, holistic view of the living.

Thanks to the fieldwork of anthropologists and naturalists, we do start to benefit from local traditional knowledge based on empirical observations, uses, and skills according to the meaning proposed by Tim Ingold (2004:5): skills being properties of the whole system of relations constituted by the presence of the agent in a richly structured environment; I would like to emphasize that the mycological model of continuity among individuals (fungi) is thought to be more suitable than the zoological model of discrete individuals (animals).

In order to do so, I shall add a brief survey on five species of bats, three species of swiftlets, and one squirrel, as they share either the same habitat (caves) or the same food (insects, fruits) and bats and swiftlets are producing guano with their excrement. They are present in caves along the west coast, in the spectacular karstic formations, in El Nido at the northern tip and farther south, in the famous archeological site of Tabon Cave, Lipuun Point, as well as the Ransang area and the Singnapan Valley, while swiftlets nest on cliffs, falling abruptly into the South China Sea.

Being an anthropologist in insular Southeast Asia, and particularly in the Philippines, I shall complement the given documentation, and I propose to add some local uses I was able to gather during many fieldworks conducted from 1970 up to 2018 in collaboration with the Pala'wan living in the southern part of the island by the same name.

My field research is based on a long commitment with faithful returns, a deep attention to microdetails, and a thorough collaboration with the local people (fathers, mothers, and children) in the fluidity of life, following the examples of Georges Condominas and Harold C. Conklin, "*mes Maîtres*," then the work developed in Paris and the precious long collaboration with naturalists and taxonomists at the MNHN in order to know *what is what* and be able to describe, understand, and translate a local traditional knowledge.

* * *

Pala'wan Practical Engagement with the Environment and Traditional Conceptions

Humans-Bats-Birds-Squirrels and Guano

Daily, after sunset, looking toward the south, we were seeing waves of *kabäg* as they were passing high in the sky over our house, on a small island on South China Sea. They were taking off from the Tabon Cave complex, Lipuun Point, toward the north, on their route to the main island where fragrant fruits were attracting them.

Kabäg (Megachiroptera; two very large species are found in Palawan, *Acerodon jubatus* and *Pteropus amplexicaudatus*), a large flying fox eating the fruits of *Binuwaq* (*Magkaranga tamarius*; Euphorbiaceae). /*ngik - ngik - ngik*/ are the "sound-words" emitted. Coming out of caves at dusk and nighttime, the *Taw ät batu* or the Pala'wan living in seasonal variations in rock shelters and the mouth of caves in the Singnapan Valley—far from being frightened—do live in their very presence and consider them a delicious food. After locating them with torches in the depth of caves, they take position on their trajectories out of the cave in order to capture them with rattan thorns (*läwläw*) on top of bamboo poles. Toasted on embers with their fur, they are eaten on the spot: "Their flesh tastes like balud green imperial pigeon [*Ducula aenea palawanensis* Columbidae] and is fatter."

All flying foxes are megachiropters, finding their way by sight and smell. Contrary to microchiropters, they do not rely on echolocation (sonar) to "see" in the night, except the genus *Rousettus*, which uses "primitive" lingual echolocation to move in the complete darkness of caves where it roosts.

Ämämkung (Megachiroptera) cling on rocks and make clicks: /*tsit - tsit - tsit*/. Along the year, they eat the fruit of *tirungän*, a tree bearing fruits without flowering. The same bamboo poles with rattan thorns are used to beat them as they fly and capture them. Their flesh is highly appreciated too.

Ämbalang (megachiropters of small to medium size; three genera are found in Palawan) have a tiny body and live in stones as well. Their sound-word is /*ting - ting - ting*/. They eat the fruits of tirungän and are present all year long. They are captured with the same tool, *läwläw ät ämagas*, in order to be eaten.

Inland. Patukiq (Microchiroptera) is a very tiny bat that eat ants, *säräm*, and *urnäw* and lives in bamboo, *sumbiling* (*Schizostrachyum lumanpao*), like the Palawan black shama, *bilad*. It speaks by way of clicks: /*Ts - Ts - Ts*/, /*Rit - Rit - Rit*/. People consider it a bird, *bägit*, and it is a food too. After being captured by cutting the bamboo internodes that are burned, *patukiq* bats are then boiled to be eaten. This species is probably *Tylonycteris pachypus*, which roosts in the hollowed internodes of bamboos.

Käläläpnit (Microchiroptera) also has a tiny black body, with little rounded eyes like a human child. It has no nest but hangs from the branches of a tree, head down, eating insects (ants, etc). It is captured with the same type of pole with rattan thorns at the distal extremity, *läpsan ät läwläw ät ämagas*. It does not have a specific sound-word.

I like to refer to an "imagined reality," *Maruy*, the bats' ancestor, and complement an F. Laugrand quotation. Enormous, with two teeth longer, it provokes death by sucking and is assimilated with a vampire. *Maruy* hangs from trees, head down like a flying fox, and is part of a long list of malevolents, *Taw Märaqat*, causing many diseases (Revel 1991). This is why when it enters a home, it is an ill-omened sign, *ngasa*.

I notice several similarities with the Alangans' perceptions, imagined realities, and food practices in central Mindoro as well as the Ayta, a Negrito group, referred to by F. Laugrand et al.

In Laos, Vietnam, and Yunnan, *Rhinolophus affinis*, with its horseshoe-shaped nose, is present. This insectivorous species is considered a reservoir of coronaviruses related to SARS-CoV-2, involved in the COVID-19 pandemia.

In Palawan, there are at least seven *Rhinolophus* species (Esselstyn et al. 2004) close to *R. affinis* that are potential reservoirs of coronaviruses. *Tau't Batu Studies* (Peralta 1983:43) lists seven species of bats in the Singnapan Valley but does not give the vernacular terms. Some scientific names are different because of taxonomic changes but are compatible with the names given by Esselstyn et al. (2004).[25]

Apparently, bats are not perceived as such a dangerous disease carrier by the upland people or the Pala'wan living in caves in Singnapan Valley during the rainy season. Both enjoy catching them and eating them. They rather have a friendly relationship and perceive flying foxes and the other bats as good food providers, for they appreciate their flesh and even consider them a food that gives strength. This shows the pragmaticism of forest people as predators in quests for all kinds of food.

With a more holistic view, let us focus now on birds sharing their habitat with bats: *lampitagus* and *lampisayäw* (two swiftlet species belonging to the genus *Collocalia* and/or *Aerodramus*). These swiftlets eat insects, and their nests of mosses and saliva are attached to rocks cavities, caves, and cliffs during the year. In the same way, *ämämänpang ät Duruy* (*Hirundo rustica*) and *ämämämpang ät Buntäl* (*Hirundo tahitica*) are present the whole year, too, but these two swallow species (Hirundinidae) fly only during the Monsoon of the Chick *Duruy* (Gemini), in August, and the Monsoon of the Globe Fish *Buntäl* (Southern Cross), from September to December. They are perceived has having a companionship, *mägiba-iba*, with bats.

The very valuable *sarang* live close to *lampitagus*, either on cliffs by the sea or upland. The golden nests of swiftlets (*salanganes* in French) are perceived as the sap of *Lagundiq* (*Vitex* sp.), an invisible tree, the primeval tree created by *Nägsalad*, the Weaver. When cooked, this nest made of saliva blows and is considered by the people as a remedy, providing long life and good breathing capacity. *Sarang* were not hunted or eaten by the Palawan I met; however, they say their ancestors were trading these nests with rich Chinese merchants. Today this hazardous catch is collected and traded in the area of El Nido, perhaps by the Tagbanuwa.

Let us consider now *Tapilak*, the flying squirrels (*Hylopetes nigripes*; Sciuridae), distinct by shape and fur color. They have quite opposite habits from *kating*, the trees (red squirrel with a long tail; *Callosciurus* sp.; Sciuridae). They make their nests in the trunk of trees, where five or even 10 can live, sleeping in the daytime but flying/gliding at nighttime, thanks to their lateral membranes, *panig*. They eat the same fruits as flying fox bats, on *tägubang, katäl, tirungän, baringin* trees (but also the bark of various trees and vines), and feed young with their milk. They are also perceived by the Pala'wan as "companions" of bats, *mägiba*. This is not an "imagined reality" but an empirical observation of hunters and foragers in the constant process of developing a traditional local knowledge as agents in the living world that is theirs.

Let us focus on both bats and swiftlets, as they share the same habitat and their excrement turns into guano. This valuable product was collected by Indigenous Peruvians on islands offshore and used in Europe as a fertilizer for agriculture during the nineteenth century. We are not aware of this use among the Pala'wan, while the Ayta referred to by F. Laugrand do make use of it. In fact, the process of collecting guano is a delicate action, as fungal spores can be liberated and enter the respiratory tract by inhalation, provoking a lung disease known to scientists as histoplasmosis.

Guano. There are several types of guano in caves: fresh guano and historical guano, which loses its volume and turns compact with time. In the Tabon Cave complex of Lipuun Point on the western coast of Palawan, we could observe that another bird comes in, an incubator bird, *puligi* (*Megapodius freycinet*; Megapodiidae). By laying its eggs in the guano, it disturbs and turns the levels chaotic. For prehistorians, stratigraphy is totally altered. Then the work by a geologist, previous to excavation, has been necessary because there are dissonances between the mineralogical alterations. Then time analysis turns quite complex.

In the famous prehistorical site of Tabon Cave, an investigation similar to a detective's work had to be conducted with a mask to avoid the spores of fungi attacking the lungs. The diggings on ± 50 cm of guano in various parts and dating by ^{14}C allowed for a reach of up to 38,000 years ago (PREHsea Excavations 2012–2016; Choa 2018). When Tabon was discovered in the '60s, we had never heard of local communities or native coworkers taking part in the successive excavations conducted by Dr. Robert Bradford Fox, being aware of this danger.

The concatenation between all living things briefly alluded to in this comment about local traditional peoples' lifeways—exemplified by the Pala'wan—also reveals another way to grasp and bring together the components of the world. Through the years, they transmitted me their knowledge and the intellectual awakening we can all benefit from.

Acknowledgment

I wish to express my gratitude to Dr. Jean-Marc Pons, Institut de Systématique, Évolution, Biodiversité (UMR 7205 CNRS-MNHN SU EPHE UA), Muséum National d'Histoire Naturelle, Paris, for sharing his knowledge on bats and birds with me.

25. If we compare the two listings, according to the International Union for the Conservation of Nature, one specie is not present in Palawan *Eonycteris robusta* (dawn bat).

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Species against the State

Foregrounding bats in their ethnography, Frederic Laugrand et al. challenge categories associated with the order of things. They manifest it through taking rigid categories as a conglomerate "imagined reality." Aware of the potency of such a concept, they push it toward thinking about the pandemic beyond Western science but also accidentally reverberate it throughout the discourse on state making.

Thus, far off from their proposition I sense that their work resonates James Scott's (2009) idea of invented realities among state-evading peoples of Southeast Asia[26] (see also Clastres 1989) and is also one that advances arguments for how imagination-induced categories marginalize nonstate peoples, as in the case of the Meratus Dayak in Anna Tsing (1993) or the highland Lauje in Tania Li (2014), among others. For instance, Laugrand et al.'s discussion of superstitions, traditions, and knowledges associated with bats, including relationships with them as a "companion species" among Indigenous peoples, delineates the boundary where the state space ends. It happens because within the state territory, coexistence with bats is not only a repulsive situation but also detrimental for human survival, especially when bats as nonfood are treated as meat.

Intending to provide a persuasive discussion on bat descriptions, Laugrand et al. grapple between the historical to ethnographic and natural-scientific explanations, sometimes in an oscillating manner, with a specific agenda for reconfiguring the human-bat relationship in the context of the pandemic. But along the lines of their prose, they also unraveled three entangled points. First is the inability of the current scientific paradigm to explain why the relationship between bats and humans seems asymptotic, as well as the failure of the state as an ideal human organization in accommodating heterogeny wherein science is its "reality-making institution." Second, science is rendered as a truth narrative among various "modes of knowing and being" (Fletcher et al. 2021). These are, in Laura Nader's (1996) words, "small sciences" that could equally explain natural phenomena as Western science does, only with a language more intelligible to a community. They are, as Tim Ingold (2018) puts it, like anthropology, "a philosophy with people in" (11). Earlier ethnographic accounts such as Stuart Schlegel's (1999) provide an example of this. Among the Teduray, Schlegel (1999) narrates how a father transmits knowledge to his child on why a colugo (*Cynocephalus volans*), a squirrel-like mammal, is a bird because "it flies through the air" (43), like bats conceived among the Blaan. So, third, as a consequence Laugrand et al. provided a way for articulating reality through "descriptive language." In this context, it is based on orality used for describing active events such as "animals that fly" regardless of their classification. It uses what Donna Haraway (2013) calls "speculative fabulation" for interrogating a homogenous worldview. Thus, their version of Haraway's "companion species" engaged throughout the text is traced through worlding connected to the Indigenous perception of the environment (Surrallés and Garcia Heirro 2005), which collides with the scientific reality, because, for example, not all bats fly at night (see, e.g., Genzel, Yovel, and Yartsev 2018). This ontological collision happens because of the "forms of sociability" ethnic communities establish in the classification of species within their environment against the scientific "comparative description of the morphologies" of species (Chaumeil and Chaumeil 2005; in Surrallés and Garcia Heirro 2005:15). Following this, the way we see bats could reverse from a merely "neither nor" or "either or" species as subject of curiosity to an object of imagination that now "begin[s] to address us" (Severi 2020:125), like how the Teduray's colugo reflects its description back to how it was affirmed in the context of kinship.

Politically, Laugrand et al. transform the bats into a social vessel containing struggle and resistance narratives connected with how ethnic communities they are highly associated with assert Indigenous identity when the state becomes unavoidable, such as in situations like a pandemic. I observed this in my fieldwork among the highland Tau-Buhid (see, e.g., Rosales 2019), who respond to a pandemic through refusal of immunization, glossed over with superstitions of how they reinforce among their communities the need for isolation. They assert isolation as an exercise of autonomy and self-determination and as a means to covertly resist state incorporation through refusal to be inoculated.

In other words, cultural assertions among Indigenous peoples and seen in the description of bats throughout history aid in the fabrication of alterity. Like bats who are feared, such otherness could at times be used as a strategy for state evasion, yet may also be a basis for marginality, or, like the villainous characteristics appendaged to bats, could be a cause for their decimation.

Remarkably, Laugrand et al. open a way for understanding history through showing that categories are malleable, that our relationship with and position in the natural world are politically imagined, and that there is a possibility for reimagining the world as a "pluriworld." One with Marisol de la Cadena and Mario Blaser (2018), Laugrand et al. build a world in "a world of many worlds" wherein bats could regain their position beyond "monstrosity" and "evil" to a species with a right for ontology. I would say, perhaps, they are also turning anthropology's course toward a "multispecies ontology" (Rosales 2021), because, deep in the text, they describe the bats as if they were associated with a specific idea of a world. Their agenda for doing so might be to reorient anthropology away from the province of Enlightenment philosophy (Fletcher et al. 2021), wherein humans are a central subject of inquiry toward a multi-trans-species paradigm with humans a species among many. This way, bats would no longer be a passive subject of human curiosity but rendered as agentic

26. Unless otherwise stated, phrases and ideas similar to James Scott's belong to him. Also note the title is an inspiration from Pierre Clastres.

beings who could thrive in what Eduardo Kohn (2013) calls the "forest of selves"[27] (see also Giraldo, Enrique, and Pálsson 2014:240). According to Laugrand et al. bats are a thinking being among Indigenous peoples. If so, it is imperative to reflect on the agenda bats have in the course of their natural history that some of their species become a reservoir of pathogens. Overall, Laugrand et al. not only brought forward the politics inherent in bat descriptions to conversations on anarchy, ontology, and beyond-human anthropology but also showed how political imaginations could render the pandemic as a state-endemic phenomenon.

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Eat Your Companions

Pangolins are a useful foil to think through the place of bats. Another widely mooted contender of COVID-19's zoonotic origins, the pangolin has enjoyed a remarkably different pandemic trajectory. Its charisma, deliciousness, and medical potency have not been extinguished by its viral potential, and efforts to variously cuddle or consume the pangolin have only been amplified during the pandemic by conservationists and illicit wildlife traders, respectively. In contrast, the bat has been vilified and rejected as unworthy of either preservation or consumption. Yet the time of the bat may have come, and what intrigues me about the essay is that it offers a potential vision for how the fate of both species might converge.

Assessing the literature, the authors correctly note that bats are the subject of considerable cross-cultural elaboration. The Western denotation of the bat as largely a figure of fear or disgust is far from universal. Laugrand and his colleagues describe the marked variation in relational practices that exist between humans and bats, even within the Philippines. Across the groups with whom he has conducted workshops emerges a range of expectations: they are nonhuman allies in environmental management, sources of vitality, and social actors worthy of respect. They hold these up "not as models but rather as indicators of the many possibilities for cohabitation with other living things," entreating that we should "treat them [bats] as allies, not as enemies." This diversity opens a range of intriguing possibilities for making companions if we take our cues from these indigenous communities. The foremost among these, for me, looms implicitly large but remains curiously unconsidered. Should we eat our allies?

The authors' inspiration for companion making, in this case, like many others, is the work of Donna Haraway. In *The Companion Species Manifesto*, Haraway (2003) suggests that "generally, one does not eat one's companion animals" (14). She did not consider serving up her dogs, Cayenne Pepper and Roland, to friends and family. However, if we seek inspiration from indigenous peoples in the Philippines and elsewhere, consumption of our bat companions is common and, in the authors' account, sits alongside the respectful treatment of their virtuous qualities and place as social actors. The notion that eating nonhumans both appropriates their positive attributes (and, as the authors note, indigenous peoples and biophysical scientists identify many of these) and facilitates the creation of cross-species alliances as widespread in the ethnographic literature (see Fausto 2007 and attendant comments). The real provocation that therefore arises here for me is not that bats can be "beings in their own right, with a history and a future" while also eating them but that certain kinds of companion making might demand their consumption. Consuming companions represents perhaps the ultimate practice of becoming-with across human and nonhuman allies. Is it possible to reconcile chirophagy with the argument of Laugrand et al. that our future human-bat relations should be characterized by "reciprocal assistance" and "peaceful development"?

These uncomfortable tensions abound when we seek out environmental hope in indigenous peoples' worldviews, and the Philippines is a rich source of such conundrums (Smith 2020). But providing industrial capitalism's salvation is a heavy burden to place on historically marginalized communities whose lifeways are already subject to intense and sometimes damaging scrutiny, so who else might serve as sources of possibility? Indigenous perspectives in the Philippines indeed provide some vital counterpoints to entrenched Western ideas of bats, but I also point here to the work of other epistemic communities with whom I have worked and who are also worthy of collaborative work and ethnographic investigation: conservationists and scientific researchers in the Philippines for whom bats are similarly complex and intimately encountered subjects and whose views and practices often exist in sometimes uneasy conversation with indigenous practices.

Bats are important, but I want to conclude here with a far broader comment. In the late 1970s, the anthropologist Karl Hutterer (1978) noted that one might expect the colonial acquisition of the Philippines by the United States in the late nineteenth century to have "major repercussions" on the development of American (and perhaps even global) anthropology. This was a sprawling archipelago whose peoples were poorly understood by anthropologists, after all. He concluded, however, that none of these things came to pass. The reasons for the Philippines' surprising and enduringly marginal role in anthropological theory and debates require more attention than can be provided here, but this work by Laugrand and his colleagues offers a less extractive vision for anthropology in and of the Philippines. What is clear is that this potential contribution is based on the nation's tremendous and conjoined human and nonhuman diversity as well as its significance to global debates about environmental degradation and emerging public health issues.

27. Originally, "ecology of selves" or "forest ecology of selves."

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Purity as Danger

I am writing this comment from locked-down Shanghai, where the struggle for social hygiene translates, on the one hand, into a "dynamic zero-COVID" policy and, on the other, into the tracking of any (potentially viral) meme (videos, comments, buzzwords) that would challenge the state-sponsored crusade for cleanliness in body and thought. Needless to say, the willingness to annihilate the virus at its root translates into "an attempt to force experience into logical categories of noncontradiction. But experience is not amenable and those who make the attempt find themselves led into contradiction" (Douglas 1984:163). Pointing out these contradictions produces the generation of memes, to be chased away with the same rigor as the one displayed toward other kinds of viruses.

China's struggle with COVID has not triggered a *direct* focus on bats or bat imagery. For sure, from the early days of the eruption of a new virus around a wet market in Wuhan onward, the link that runs from bats to pangolins, and from pangolins to humans, has nurtured conversations. Still, speculations as to the possible engineering of the virus by external, hostile forces (Kumar and Nayar 2020; Myers 2020; Winter 2020) have soon taken the lead, and these speculations have gained further acceptance with the passage of time. It would be an exaggeration to say that archetypes of lethal defilement have shifted from "batness" to "Americanness." However, the authors' reference to a Chinese inventor whose bat-shaped coronavirus shield was coming with the rallying cry "Be a Bat Man" may be more telling than it seems at first look: created and popularized in the modern urban context, the character of Batman (*bianfuxia* in Chinese) speaks not only of the transfer of the bat into the realm of "imagined reality," as the authors of this contribution justly underline, but also of the continuous ambiguity attached to the bat—a *pharmakon* indeed—even when actual interactions between bats and humans have been drastically reduced. Batman, by the very fear that his costume inspires, translates the uncleanliness of the bat into positive energy. In the current Chinese context, the transfer of the blame from bats and pangolins to the US servicemen who visited Wuhan in October 2019 makes the struggle against the virus a task to be entrusted to *bat-men*.

The imagery attached to bats may illustrate with remarkable precision the dilemma famously underlined by Mary Douglas: the collective struggle against dirt and uncleanliness speaks of the necessary drawing of boundaries (among groups, species, spaces, or things) through which life can be protected and sustained and a common meaning can be attached to the group's existence. However, when enacted too strictly, boundaries that preserve the purity of the self-defining community become death inducing. "Dirty," unclean things are also the ferment that transforms too stable a state of things into new forms of life, even if such a process of renewal is accompanied by pain and danger. (The animal that the Lele, in a case discussed by Douglas, associate with both fertility and filth happens to be the pangolin; see Douglas 1984:169.) Societies shaped by hygienist principles will be intolerant of an animal such as the bat: its apparent characteristics identify it with the uncleanliness that transcategorical otherness connotates in a special way, and such representation is self-expanding. In contrast, societies living in proximity to the animal are prone to translate the ambivalence attached to the fact of cohabitating with a potentially threatening and yet life-inducing Other into a more subtle categorization. Examples of the latter may be found in the contrasts drawn from one species of bat to another (the partitioning of contradictory attributes, so to speak), as discussed by Laugrand et al. with reference to the Blaan and the Alangan.

In fact, the contrast discussed here goes beyond an opposition between contemporary, "hygienist" societies and traditional ones. It is rather about various ways of defining and enforcing boundaries and the strictness of the latter. Thus, the attitude toward bats—or toward any other animal that makes a special impression on the social imaginary—would symbolize the logical and ritual apparatus through which Otherness is both kept at a distance and made a vector of renewal. This would apply to relationships not only with other social groups and animal species but also with the vegetal and supernatural worlds. An example of such continuity is provided by Haudricourt's (1964) analysis of the treatment of the Other in a society based on the cultivation of tubers: (*a*) Melanesian farmers earnestly search for yam or taro clones in the fallow lands, in the bush where the dead are laid, a field that is beneficial when a better-tasting clone is being found, evil when the new clone contains toxic substances; (*b*) ancestors and foreigners escape social constraints, thus being somehow "uncultivated"; (*c*) therefore, once they are "cultivated" on the model of a clone, they become a source of wealth and life. A given mode of cultivation is used as a model for harnessing a potential that is both perilous and promising. Some societies show more skills than others at accommodating the "remains" and the "outcasts" in a way that bears fruit for themselves.

Various modes of action enable groups to unearth forces of renewal from within the "unclean," to thread around boundaries, to tame danger while welcoming new resources. This contribution unfolds some of these strategies, and it makes them a reservoir of inspiration when reflecting on the process through which contemporary societies may attempt to strategically reconcile with forms of life that they had meant to marginalize or destroy.

Reply

We wish to thank the 10 reviewers for their constructive comments and stimulating criticisms. They acknowledge the originality of our study while stressing the need to go further in this interspecific research. We will respond by clarifying our arguments and providing additional details. First of all, we are

surprised that none of the reviewers specializes in Central or South America. This is a pity, since the three hematophagous bat species—out of 1,411 known bat species—live solely in the tropics of the above two regions.

Such bats are often accused of carrying rabies and many other zoonotic pathogens. Transmission does occur sporadically from them to humans and other animals, especially cattle. In 2016, to take an example from South America, hematophagous bats were said to have caused the deaths of 12 children, 8–15 years old, from the Achuar tribe of Amazonia.[28] This tragedy highlights the health risks that such bats may pose through cohabitation with humans.

Hematophagous bats consume 50%–100% of their body weight in blood every night and are highly social animals, being known for their elaborate food-sharing system based on reciprocal altruism (Wilkinson 1984). Their cooperative behavior is not fully understood and needs more study (Carter and Wilkinson 2013). They have long fascinated not only naturalists and biologists but also the Western imagination, which has associated them with mythological "vampires"—a mental association so strong that it has even influenced how Western societies perceive nonhematophagous species. The term "vampire" comes from Serbian and has parallels in virtually all Slavic languages. Initially, it referred to violent spirits of the dead and had a mostly incidental association with blood, but it later came to mean a mythical nocturnal creature that feeds on the vital essence (or blood) of the living. It was then adopted by Western naturalists, like Buffon and others, to describe blood-feeding nocturnal bats and even some fruit-eating species (Cooper 2005:265–266). It should be pointed out that bats have more positive associations in non-Western cultures, like those of Central America. Some of the Mayan deities are bats (Blaffer 2012; Brady 2019; Laughlin and Karasik 1988).

Anthropology Turned upside down and Bats as a Blind Spot

Although bats have remained a marginal topic for Western social scientists, some historians, such as Denise Tupinier (1989), have explored their role in symbolism, while others, such as Marco Riccucci (2012, 2017), have studied their roles in medicine and the arts. Their presence in various folk traditions has interested other academics, such as Glover Allen (2004). They have caught the attention of a few anthropologists who specialize in Papua New Guinea and Oceania, such as Peter Dwyer (1969, 1971) and, more recently, Christian Coiffier (2020). Deborah Rose (2010, 2012, 2014, 2015, 2022) and Arnaud Morvan (2021*a*, 2021*b*) have investigated the relationships between flying foxes and Aboriginal Australians. With respect to Indonesia, some interesting contributions have been made by Gregory Forth (2009, 2021), Jan Pouwer (2010), and others. There has been little from South America, except for a seminal paper by Elizabeth Benson (1987), and almost nothing at all from North America. In Africa, there has been research only since the Ebola outbreak (see Cros 2020*a*; Fairhead 2018, 2021). The lack of interest suggests that chiroptophobia is still common (Low et al. 2021:18). Indeed, it is only in recent years that bats have aroused much interest in anthropology. Particularly welcome is a recent volume, edited by F. Keck and A. Morvan (2021), whose authors show how the bat can tell us a lot about many topics in anthropology: species, symbolism, temporalities, wild versus domestic, and so forth. In her 2018 book, Tessa Laird (2018) discusses the bat's place in the literature, philosophy, and contemporary arts of the Pacific region. She criticizes Thomas Nagel for turning the bat into "an alien form of life" (143) and shows that such a view can be totally inverted or challenged. Like Roy Wagner (2001:137), we believe that anthropology should reverse its perspective: the question is not only what bats mean to us but also what we mean to them. This mutual relationship has been overlooked, particularly in cases where the bat plays a companion role. In Pacific societies, it has been used as a pet or even as a kind of GPS, such as by the Tuamotu (see Laugrand and Laugrand, forthcoming). In his book on costumes, Racinet wrote:

> The New Caledonian flying fox is found in the Solomon Islands. Taken young, it is an animal that is easily tamed. Women like to raise them. The Arossi Island woman lavishes on her bat all the care that a European woman has for her canary or her pug. She carries it on her head, and to take the food that her mistress gives her, the bat clings with its nails to the woolly hair and remains suspended on the forehead or on the cheeks of the lady who is enticing it. (Racinet 1888:28, 60–61)

This companion role is starting to appear in Western societies. Laird (2018) reports that bat-lovers are "immediately identified as quirky, existing outside norms, yet their advocacy for bats emphasizes the characteristics that make bats easier to love: bug-eyed babies, maternity, pair bonding and altruism" (147).

Bat-human relationships assume a wide range of mutually beneficial forms in non-Western cultures. Among Aboriginal Australians, Christian Coiffier states that bats are often associated with ancestral spirits and integrated into human social organizations. While not integrating them to the same extent, the Ayta, the Alangan Mangyan, and the Blaan of the Philippines likewise perceive them as being close partners. Although bats are valuable prey, they have to be respected, and hunters must follow many rules or risk being made ill by the spirits who own them. The last detail may explain an Australian research finding: a bat may release viruses or be less able to resist them under stress (Phelps et al. 2018; Seltmann et al. 2017). This alternation between being immune and being vulnerable is consistent with observations by Nicole Revel and Coiffier: "If these ancestral spirits are mistreated, they can become evil." Often accused of witchcraft, bats are seen as beings who must be treated with respect. The Kapsiki of Cameroon, according to Séraphin Balla, consider it dangerous to disturb them because they may retaliate or spread sickness. Minda de la Cruz, an Ayta

28. See https://www.rtl.be/info/monde/international/dramatique-attaque-de-chauve-souris-vampire-12-enfants-meurent-de-la-rage-793680.aspx.

from Pamulaklakin, stated that a person may catch a flu or some other disease after disturbing a colony or making inappropriate comments to any of them. When treated seriously and approached carefully, with due respect, they benefit humans by supplying guano, by pollinating crops, and by eating insects that often damage crops and trees. Further research is needed into bat-human relationships, which depend on many cultural, economic, and ecological variables. The paucity of existing research says a lot about our prejudices and perceptions, even more so given how close they live to us. In Austronesia, we fully agree with Coiffier's call for further research on the names given to bats, especially because the geographic distribution of flying foxes closely matches that of Austronesian languages.

Revel has worked with G. Condominas and Harold Conklin and is well known for her work on the Palawan in the Philippines. She has documented their wealth of traditional knowledge about the bat and its interactions with other species, such as the swiftlet and the flying squirrel. She notes that guano is dangerous to collect because of fungal spores that can attack one's lungs. Palawans are aware of the danger and never excavate the nearby caves. She further describes how indigenous knowledge works, its focus being not so much on the bat's identity but rather on its interaction with other beings, whether human or nonhuman. Such knowledge complements the Western perspective, which focuses on classification and phylogeny. Deborah Rose (2019:48–49) has described the knowledge systems of Aboriginal Australians in similar terms, stating that connections and entanglements are more important than anything else.

The Bat as a Social and Political Agent: The Problem of Companionship

Our research touched on politics, but we did not explore that topic explicitly. Our reviewers ask us to go further, and rightly so. First, Balla is right to argue, as Achille Mbembe has argued, that "brutalism" characterizes the way Western societies have exploited minerals and wildlife, in contrast to the soft way many non-Western societies have long maintained a close connection with the "environment," which they call their home—their "big house," to quote the Ayta of the Philippines. Yet the people of such societies are also predators. They are not "ecologists"; their way of life goes back long before that term existed. They are instead well-informed users of the "milieu" who form the locus of an interspecific community (see Augustin Berque). The Ayta know they will suffer bad luck, starvation, or sickness if they kill too many animals or waste their meat. If they kill respectfully, they will be not only good hunters but also good providers and good social beings who can share the meat given to them. As Balla puts it, here "humans and animals are part of the same world." They belong to a cosmological order that is ecological, material, and spiritual and that is "evolving in a continual and dynamic interspecific companionship." The last point brings us to Florence Brunois, who writes that the concept of "companion species," borrowed from Donna Haraway, is inappropriate for non-Western (i.e., nonnaturalistic) contexts, where animals and humans are not separated from each other. We agree, although it is difficult to generalize. Nevertheless, we believe that Haraway's concept is appropriate and a heuristic tool. In Western contexts, people need to realize that modernity and urbanization have made them blind to the possibility of living in contact with bats or simply unwilling to contemplate that possibility. Although bats have long been in contact with humans almost everywhere, their synanthropy—their willingness to live close to us—goes unacknowledged. Some sort of chiroptophobia still affects Western people (Low et al. 2021:18). Their societies tend to promote the idea that nocturnal wildlife should be avoided and kept beyond the world of humans. Yes, bat houses are growing in popularity, but one can wonder about the underlying reason. Perhaps the intention is to lure bats away from the rooftops and walls of houses. Because we have long ignored the characteristics of bats and their way of life, we have come to fear them, even those of us from the youngest generation. Our fear of bats is not so different from our fear of snakes (Isbell 2009). In contrast to Western societies, the Ayta and the Alangan Mangyan resemble the Ni-Van tribes of Vanuatu described by Brunois in thinking that a bat can conceal another being within itself and that bat hunting requires rigorous practice of certain taboos and exchanges. Thus, we fully agree when she states that bats can be "companions of passage of humans."

Will Smith raises the apparent contradiction in eating your companion and ally. There is no perceived contradiction in the many situations where an edible companion is not considered humanlike. There may be a contradiction, however, if the edible companion is humanlike and thus considered "too familiar" to eat, like a horse or a dog. Both animals are believed to share certain traits with humans, and both are considered to be "man's best friend." In that situation, an ideal ally is anthropomorphic—one who looks like us and should not be eaten. Among the indigenous peoples of the Philippines, where analogism and animism predominate, the same apparent contradiction may be resolved differently. In the Cordillera, for instance, the Ibaloy eat their dogs, which are nonetheless companion animals that are named, fed, cherished, and kept near their homes or even inside when still puppies. Pigs, horses, and water buffaloes are considered valuable animals throughout the country and are eaten at rituals and in daily life. Isagani Garong, an Alangan Mangyan farmer, told us that his water buffalo was "just like a car" that he could keep his entire life. It helped him farm and travel during the day; it responded only to its owner's voice and was left to wander the rest of the time. Despite being essential to these farmers, who have no machinery to plow their fields, water buffaloes are, at times, eaten when they become sick or too old or, if, as in times of starvation, no other food is available. The same goes for birds that are valued because they foretell future events or even indicate the presence of God and that yet are eaten. For instance, several edible bird species such as the *Phapitreron leucotis* are kept in homes so that their vocalizations may be heard more easily (see Laugrand, Laugrand, and Tremblay 2018). One more example comes from the Mentawaian of Siberut Island (Indonesia), who, before slaughtering their pigs or

chickens, show their attachment to them by evoking the closeness, familiarity, and affection of their relationship to them and by delegating the act of killing (Simon 2021).

Likewise, the bat is eaten and yet sometimes kept as a pet, not for practical uses but rather because it makes a good companion. Furthermore, we argue that it is even more valued as an ally or companion precisely because it can be eaten. By filling the hunter's stomach, it plays a role that is just as important as improving the biodiversity or guarding the sacred caves. Unlike most Westerners, who are reluctant to eat pets or even animals they have seen alive, especially in the case of city dwellers who have contact only with house pets, hunting peoples such as the Ayta, the Blaan, the Mangyan Ibaloy, and the Mentawaian see no contradiction between befriending a species and eating it. Moreover, such friendship is seen as a condition for hunting. Unlike Haraway, who would not consider serving up her own dogs, we argue that a different perspective prevails in societies that view the bat as a "companion species." In such societies, a good ally helps humans by being either a good companion or a good source of food, or both. If we consider our species in its entirety, we see that humans eat their allies more often than their enemies. Among practitioners of cannibalism, the purpose of eating your enemy is to turn him into an ally and ingest his qualities. Allies can be eaten if they are not too close or not considered equivalent to a human. In many non-Western societies, bats are both companions and food. Yet, as Rosman and Rubel put it ("your own pig you may not eat"), a certain distance must be kept between you and your companion. Smith makes a key point: "Consuming companions represents perhaps the ultimate practice of becoming-with across human and nonhuman allies." Nonetheless, we do believe that chirophagy can be reconciled with the idea that future human-bat relationships should be characterized by "reciprocal assistance" and "peaceful development."

Atsushi Nobayashi addresses the ambivalent role of bats and describes Japanese perceptions. In Japan, they are associated with cowardice, and though morphologically similar to humans, they appear disconcerting by hanging downward in the darkness. Nobayashi also points out that "Haraway's argument was developed from the coexistence and cooperation between humans and dogs, a species whose relationship is inherently intimate." We intentionally borrowed her argument in order to question the relationship that humans have with bats, which are treated as pets in some parts of the world. Bats are accused of spreading viruses without adequate proof, and it is quite likely that humans are the ones who have created the conditions for pandemics by disrupting the balance of nature.

Healthy or Unhealthy Bats? COVID-19 as a Revealing Event

As Frédéric Keck sums it up, we wish to show the key role of the human imagination, both that of the public and that of the scientific community, in defining bats as reservoirs of infectious disease. They are always suspected of playing a role in spreading disease, despite the many times that such suspicions are later proven wrong, as was the case during the COVID-19 pandemic. We are arguing that the bat should be seen as a companion rather than as an infectious villain because it is key to promoting biodiversity and fighting deforestation. Unfortunately, as Keck also points out, because discourse on global health so often uses military language, the bat is more easily viewed as an enemy, rather than as a partner.

Pi-chen Liu and Shao-hua Liu ask why different ethnic groups, at various times in history, have such different perceptions, imagined notions, and social reactions toward the bat. Although the answer is complex and goes beyond the scope of our reply, a few points can be made. On the one hand, the bat presents an inverted mirror image of us; on the other, its way of life resembles our own, and it seeks to live near us. We do not accept such behavior, especially in societies dominated by Christianity and, later, by Modernity—both of which view nature as being apart from human society. In other times and places, bats have been viewed as partners or kin. We agree that more research is needed to understand the biosocial differentiation of bats throughout the world. Smith, too, provides part of the answer to the question raised by Liu and Liu. He observes that the pangolin has not suffered from the same stigma, despite similar accusations of being a potential host of COVID-19. Even at the height of the pandemic, the public was very much in favor of protecting it from wildlife hunters and traders. Most surprisingly, its "charisma, deliciousness, and medical potency have not been extinguished by its viral potential," unlike the bat, which nonetheless shares the same attributes in many places, such as China, India, and the Philippines. In state-driven discourse on public health, the bat and the pangolin clearly do not benefit from the same imagined realities. One is viewed with sympathy as an endangered species and the other with fear and hatred as a contagious monster. The latter is likely viewed differently because of a long history of both cohabitation and avoidance.

Christian Rosales links our perspective to that of James Scott through the concept of "invented realities." Indeed, imagination-induced categories have marginalized nonstate peoples, depicting them as ignorant, superstitious, or mistaken. In this case, they are considered to be somehow irrational for choosing to live so close to bats and thus running the risk of being infected by viruses. Such a line of thought is interesting, as Western medicine is certainly not more open-minded than indigenous medicine with respect to wild animals. Biopolitics and biosafety have certainly prevented Western societies from developing interrelationships with other species. The bat is not seen as a "companion species"—a category appropriate only for pets like the dog or the cat. It will be challenging to change our perceptions by acting on Haraway's proposal for "speculative fabulation." The visual arts may already be rising to that challenge through the great figure of Batman. But more is needed. Such inspiration may come from indigenous societies in the Indo-Pacific region. For many in those societies, the COVID-19 pandemic was caused not by bats but rather by the modern way of life—by a world

that has invented a space for humans and a space for nature, while providing no interconnections between the two.

Finally, Benoit Vermander discusses the fascinating case of China where COVID-19 "has not triggered a *direct* focus on bats or bat imagery," but rather "speculations as to the possible engineering of the virus by external, hostile forces." As Vermander rightly suggests, bats are a *pharmakon*, since their substances may heal or kill. His interpretation of the Chinese Batman, *Bianfuxia*, is enlightening, as is the connection he makes with Mary Douglas's perspective. We agree with his description of the dual nature of human relationships with other species and other worlds: "Otherness is both kept at a distance and made a vector of renewal. This would apply to relationships not only with other social groups and animal species but also with the vegetal and supernatural worlds." The bat is viewed with ambivalence even in the realm of gender, as shown by Roy Wagner's chiroptomorphism. In fact, it is everywhere viewed with an ambivalent fascination that results either in fear or in praise, although indifference also occurs.

A way forward would be better cooperation with bats—a policy of living together, assuming the potential risks and benefits, and accepting them as coactors. It must be recognized once and for all that they do not play a major role in spreading the viruses they carry as reservoir hosts. Rather, it is humans who disrupt the ecosystem and weaken it through intensive production of livestock, which then easily become intermediate hosts and thereby open the way for the spread of diseases. Conversely, bats play key roles in maintaining the balance of nature, whether they feed on fruit, blood, nectar, insects, or fish. They thus help prevent the spread of viruses. Finally, their immune strategies may provide new insights into ways to fight disease. All in all, the harm they do seems negligible compared to the benefits they bring.

Reconciliation with all other forms of life is the only promising path for humans if they wish to survive the ecological disaster they have created by separating themselves from nature. Biodiversity loss and ecofragmentation seem difficult to control because of population growth. We must take seriously Haraway's (2015) injunction: "Stop making babies, make kin" (161). She reminds us that we should take care of those who already exist and who sustain us. We should establish kinship ties with them, rather than continuing to reproduce without concern for other humans, whose existence is indispensable.

To that end, we believe that we can enrich our imaginations and practices by drawing inspiration from other communities that have managed, despite colonization and Christianization, to connect with the living world by defining themselves as simple cohabitants and not as a species whose capacities (brain size, etc.) place them above all other species. Let us wager that new initiatives will emerge if we see ourselves as kin to bats.

In conclusion, bats are essential to the well-being of all human and nonhuman communities. By thinking in such terms, we can contribute to the symbiography to which we are now invited by ecologists and philosophers, like Glenn Albrecht, who had the good fortune to meet Aboriginal Australians. It is in our interest to respect "nature." If we exile bats from their territories, the same fate may befall us (Bartholeyns 2021:44). But bats are not the ones who have turned everything upside down.

—Frederic Laugrand, Antoine Laugrand, and Lionel Simon

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