Ash salts and bodily affects: Witoto environmental knowledge as sexual education

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Received 16 November 2012
Accepted for publication 12 February 2013
Published 13 March 2013
Online at stacks.iop.org/ERL/8/015034

Abstract
This letter addresses the indigenous discourse on a set of plant species used by the Witoto Indians of Northwest Amazonia to extract ash or vegetable salt, obtained from the combustion of the tissues of vegetable species, filtering of the ashes, and desiccation of the resulting brine. It aims to demonstrate how the study of the human condition is carried out through a reading of natural entities. The method employed is the indexical analysis of a discourse uttered by the elder Enokakuiodo in the Witoto language from 1995 to 1998, in a verbal genre called rafue, one of several genres of the ‘language of the yard of coca’. The species used to extract ash salt are conceived of as coming from the body of the Creator and as an image of the human body. The rafue of salt performs, in words and gestures, a narrative of human affects and capacities by reading ecological, biological, cultural and linguistic indices from a set of plant species. This discourse on plant species is a discourse on the control and management of bodily affects and capacities, represented as ash salts, that are lessons about sexual development which the Creator left for humanity as a guide—a ‘sexual education’.

Keywords: Witoto, ash salt, traditional environmental knowledge, Amazonia, biodiversity

Online supplementary data available from stacks.iop.org/ERL/8/015034/mmedia

Introduction
This letter is signed by a Witoto elder, Román-Jitdutjaño, and an anthropologist, Echeverri, who have been working together for many years. Since 1995 our main endeavour has been the study of salt. The Witoto word sallt ‘salt’ refers to the ash or vegetable salts, rich in potassium, obtained from plants, which are an admixture to the tobacco paste used by the People of the Centre (Witoto and other neighbouring groups who lick tobacco paste) of Northwest Amazonia.

Our attempt has been inter-cultural, meaning by this not so much a combination of different approaches—indigenous and scientific—on the same object (ash salt), but the recognition of the same condition (humanity) through the construction of different objects: an object of the positive sciences, salt, and the object of indigenous knowledge: the human body. An inter-cultural project is above all the construction of a social relation between persons with different capacities and knowledge, where an exchange of substances and services is established to attain some common goal. This relationship is precisely the object of indigenous knowledge: those substances and services—food, tobacco, money, tools—are the salt of the issue. This relation is comparable to the sexual relationship between a
married couple, where substances are exchanged and lead to fecundity—the major focus of this knowledge.

From science’s perspective the issue of our common research is salt, from the indigenous perspective what matters is the salt of the issue: the project, seen as a human relationship. This letter is about the latter. We want to show how the study of the human condition is carried out through a reading of the plant species that are used to extract ash salt, which are conceived of as coming from the body of the Creator and as an image of the human body.

Plant species show, in a conspicuous manner, bodily processes that are hidden to perception. This reading of the natural entities is meant to guide moral behaviour and develop a healthy, sociable and fertile human body. Quite unlike the knowledge of the objective and empirical sciences, the indigenous knowledge of biodiversity can be conceived of as a sexual education, understood as ‘knowledge of the body’ (abina onode), that is, the control and management of bodily humours, affects and capacities, in order to attain fecundity.

By ‘body’ we do not mean anatomy and physiology, but a ‘bunch of affects and capacities’, an expression we borrow from Viveiros de Castro (2010) to translate the indigenous concept of iairí ‘salt’. We agree with Viveiros de Castro’s (1998, 2002) perspectivist theory, which posits that the self is a ‘deictic position’—the position of the subject—whose perspective is from the body, not from the spirit. Rather than conceiving of human nature as unique, with multiple human cultures deriving from it—as classic western multiculturalism does—Viveiros asserts that Amerindians would speak of a single (human) culture with multiple bodies and natures—an Amerindian ‘multinaturalism’. Furthermore, we draw key inspiration for our analysis from Lévi-Strauss’s (1962) ground-breaking work on the ‘logic of the concrete’, and from Descola’s (2005) encyclopaedic discussion of the Amerindian modes of identification, relationship and categorization of natural entities.

The expression People of the Centre encompasses seven ethnolinguistic groups of the Witotoan, Boran and Andoque linguistic stocks, which share a number of cultural traits and have a common social and ceremonial organization (Echeverri 1997, Gasché 2009, Griffiths 1998, Karadimas 2005, Londoño 2012). Their ancestral territory spans the area between the Caquetá and Putumayo Rivers in south-eastern Colombia, along the border with Peru (see figure 1), with a total population of about 10,000 people (DNP 2010). What makes all these people form a single society, in spite of their spatial dispersion and linguistic heterogeneity, is their rich ceremonial order, revolving around the consumption of coca and tobacco and the ritual discourses generically called ‘the language of the yard of coca’ (see infra section 1). One key trait of the People of the Centre is their licking of tobacco in the form of a thick decoction mixed with ash salts, which is consumed by men and women in daily life and on ritual occasions. Men lick the tobacco paste, generously admixed with ash salts, together with coca powder (Erythroxylum coca var. ipadu; see Echeverri and Pereira 2005).

The ash salts are obtained by burning plant material from selected vegetable species, filtering the resulting ashes to lixiviate the salts, and dehydrating the resulting brine to obtain the dried salts. Ash, vegetable or potassium salts, as they are variously called in the literature, are known by many peoples from Central Africa, Oceania and America (Godelier 1969, 1986, Lemonnier 1984, Portères 1950, Prinz 1993, Schultes and Raffauf 1990, Weller et al 1996). Detailed accounts of the technical process to prepare ash salts are reported in Lemonnier (1984), for the Anga people of Papua New Guinea, and in our own work (Echeverri et al 2001) for the Witoto in the Colombian Amazon. There are numerous reports of ash salts having been produced all over South and
Central America in the past (see Echeverri et al 2001 for references), but the custom has disappeared in many parts.

Little research has been done on the mineral composition, uses and anthropological relevance of ash salts by the groups that still use it, like the People of the Centre. These people use the same techniques found in other parts of the world to extract vegetable salt. We did our study near the locality of Araracuara in the Caquetá River basin, Colombian Amazon (see figure 1). We collected vegetable material and processed ash salts from 62 species reported as sources of salt by the People of the Centre, using the same materials and techniques employed by the Indians. These 62 indigenous species correspond to 59 species of 19 families, as defined by scientific taxonomy. In most cases an indigenous species corresponds to a single botanical species; in two cases, however, a single botanical species is divided into several indigenous species, and in one case, two different taxonomic species are considered a single indigenous species (see table 1). We gathered botanical samples, identified the species, prepared ash salt from all of them, recorded the whole process of making salt, analysed the chemical composition of the salts (see Echeverri and Roman-Jitdutjañ 2011 for details), and recorded the indigenous discourse on salt in the Witoto language.

We now turn to this discourse, which reveals the profundity of the meaning of salt and the natural world in indigenous thought, and then we move on to the main purpose of this study: the ash salts as a reading of bodily affects—the salt of the issue.

1. Enokakuiedo’s Rafue

The discourse on salt was uttered by the elder Enokakuiedo (Oscar Roman-Jitdutjañ) from July 1995 to March 1998 and tape-recorded in 20 sessions, totalling 22:48 h (see figure 2). These speeches were all recorded at night in the jiibibiri ‘yard of coca’, where men gather to talk, lick tobacco and consume pulverized coca leaves. Enokakuiedo’s speech was in a verbal genre called Rafue, one of several genres of the jiibibiri uai ‘language of the yard of coca’. Rafue, in its more general and public sense, means an ordered sequence of dance rituals performed by a Master of rituals (rafu enaama). In the course of the preparation and celebration of a dance ritual several verbal genres are deployed: from the songs sung in group at the centre of the ceremonial house to several genres of highly formalized ritual dialogues that employ a specialized register of the language. What all these genres have in common and what allows them all to be called Rafue is that they are not discourses about things but discourses that become things—power-discourses (ra ‘thing,’ power,’ -fue ‘spoken word’). Their linguistic function is performative rather than referential.

Enokakuiedo did not deliver his Rafue inside a ceremonial house or in the context of a dance ritual. However, the aim, setting and language of his discourse correspond to those of the ceremonial Rafue. The Rafue of salt, performed by a ritual Master, does not speak about the ash salts, but verbally (not to say ‘spiritually’) processes the filth and illness that are in people. Through his Rafue, the Master is catching the spirits of animals in the form of salt species, which his ceremonial allies will later actually hunt, kill and bring back to the house of the Master, in the form of game and wild fruit. This is called ‘to make the Rafue dawn’; to turn it into real things; through this, the illnesses of people get healed.

Enokakuiedo’s Rafue was delivered in a hut in one of his cultivated plots, deep in the forest. His words, however, followed the protocols of the language of the yard of coca: it took place at night, as the participants sat in a circle on small stools, surrounded by cultivated plants, consumed tobacco paste and coca powder, and women and children listened. Enokakuiedo’s Rafue was addressed to one of his sons and meant for his offspring and people ‘from other yards of coca’, that is, from other cultures and countries. His voice was recorded and he was aware of that. Thus, the Rafue of salt was to be made to dawn by actually searching for the plants and also by text-processing the recordings.

The two of us, plus one of Enokakuiedo’s son (RIP) spent nearly 200 days over a period of 4 years text-processing the entire transcribed corpus (81 837 words in Witoto). This textual corpus is the basis of what we present next. We intend to show what the object and nature of this discourse are, the logic with which it functions, and the characteristics of its verbal and gestural performativity.

Figure 2. Enokakuiedo uttering Rafue. He holds a jar with tobacco paste in his left hand (note the microphone on top of the plastic bin). Photo by Marta Pabon, Araracuara, March 1998.
2. The salt of the issue

‘...all beauty in animals and plants is a silent, enduring form of love and yearning...patiently and willingly uniting and multiplying and growing.... If only human beings could more humbly receive this mystery which the world is filled with, even in its smallest things’. (Rilke Letters to a Young Poet IV)

What is salt? Enokakuiodo’s answer is straightforward: salt is sex; and the Rafue of salt is sexual education—a way of thinking evoked by Rilke’s quotation above. The ash salts originate in the search by the Father Creator for sexual development (komu iya uai, literally ‘word of life’). Enokakuiodo introduces it right at the beginning of the Rafue of salt (excerpt 1 in table A.1):

The Father Creator searches for sexual development, for a ground to cast his semen on. At that time, the semen of the Father Creator is salt.

The Creator searches for sexual development because there is no life, everything is evil and sterile. He attempts to fecundate a ground with his saline essence. He endeavours to heal himself because he is full of salt-semen (excerpt 2 in table A.1).

At that point, the Father Creator is full of salt. He gets ill and he casts out that power. That is the origin of the salt plants. He then speaks: ‘The future generations will have this power of mine, they will drink it, this milk, this brine, and with this they will have children’. On saying this, the Father Creator transformed himself into the salt of this earth (sexual drive). And he adds: ‘Later on, when sexual development arrives to them, they will fecundate, because this is something lovely, this is something they will never forget’.

It is something ‘lovely’ (Enokakuiodo’s translation into Spanish: ‘muy amoroso’) and is also something dangerous. When it is not managed correctly it may ‘corrode’ the person (excerpt 3 in table A.1):

We were all born powerful. That power (salt-sex) is dangerous because we all have it in our bodies. If one abuses it, it drains you, it corrodes you. That is why that salt-sex is kept in the body, because it is like milk from the breast. It is the milk on which the Father Creator fed, and from it men will breast-feed when they need it.

Men will season the blood of women—represented as the tobacco paste—with that salt (excerpt 4 in table A.1):

That salt (semen) is to be seasoned in the tobacco paste (woman’s blood). ‘In the same way, when our words are seasoned, they are endearing’, he (the Creator) then said. On throwing it onto the woman, it was incorporated into her. There it became human, it became a teaching, it is the birth of a weapon; it is a stone of power, a true spirit, a true simulacrum (i.e. offspring).

This is the true processing of salt: offspring. But, again, one has to be careful, because the same processing applies to other entities and not only human beings. The power of salt can be made to form true humanity, but also can bear evil beings and diseases. That is why the Creator establishes an order and a law (excerpt 5 in table A.1):

He thus kept them in careful order, the ash salts. From the part of the soul, with the water that was dripped we became human; but everything is very much alike, the spirits are alike, the diseases are alike, but a human is a human. Thinking of this, he left us this teaching.

That salt is dangerous; it is like an axe that cuts down, even though it appears as ‘fascinating’—in Enokakuiodo’s translation. It is also the power of women: their clitoris, named as an axe (excerpt 6 in table A.1):

This is something fascinating, what you call ‘fascinating’. From it we were born, from it we came about, but it is like an axe (clitoris). It has serious consequences, it may chop you down, it may destroy you.

That is why the Rafue of salt is chiefly about the sexual education of the body, because this salt (sexual drive) may have ‘serious consequences’.

The object of the Rafue of salt is the body. The world and the natural entities are said to be the body of the Father Creator, and that body is the image of the human body. Moreover, the world and body we perceive through the senses are split from the primordial body-world before this world dawned and before we were born. That dawning (of the world) and that birth (of our body) constitute a rupture with the primordial body. We do not guard a memory of our formation in the womb; we were separated from that world when the umbilical cord was severed, and from then on we came to live on this ground. There, ‘in another planet’, as the elders say, we were floating upside down in a salty sea from which we obtained all we needed. We know nothing about that world, although it is the root of our formation and the source of our most fundamental yearning: to return there and feed from that salt. As we cannot, we keep searching for it on this ground, in food, in sexuality, in power, in the possession of objects, in war.... This path leads to life and procreation or to loss and death. To find our way we need to read the signals in our body and in nature, which is the body of the Creator, because the world was formed in the same way as our body. Natural entities exhibit the signs of the formation of the human body and serve as a guide to understanding life and conduct. This is what the Rafue of salt would be ‘about’.

More than talking about, the Rafue of salt performs and re-enacts the history of creation. At the beginning, the Creator had everything in himself. He was full of salt—full of semen—and had nowhere to expel it. He became ill because of that salt. Searching for sexual development he blew his nose and expelled the saline mucus which sickened him. That mucus became the world. In his search, the Creator continued to suffer and cast out the illnesses that sickened him; those potent and polluted substances from the Creator were the proto-substances of a former world that became the

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3 The original Witoto texts of the following excerpts from the Rafue of salt can be found in table A.1.
source of plant and animal species once this world dawns. Each time the Creator expelled a substance from his body, he performed a verbal and a technical gesture. On the one hand, he uttered—in the voice of the elder—a dictum for ‘the future generation of life’, i.e., humanity, and, on the other hand, he processed the illness he threw out by means of fire, leaving an example for future generations, who will imitate that gesture when processing ash salt. That purifying fire is the Mother, who receives many names: Mother of the Processing Fire, Mother of the Humanizing Fire, Mother of the Sweet Fire, Mother of the Delivering Fire, Mother of the Cool Fire. It is by means of these gestures that the Creator signals the path of the future generation of human life. These primordial gestures are called the First-Text (bini).

Once the world dawned, those proto-substances from the Creator took the form of vegetable and animal species and organs and humours of the human body. These entities show traces of their formation in visible signs and in the names they receive. This is responsible for associations between quite dissimilar entities: a tree, insect, herb, mammal, bodily humour or illness. This is called the This-Text (bibe).

2.1. Reading the indices of biodiversity

The This-Text—the world and our body—needs to be read and interpreted. In the rafue of salt, this reading is carried out by means of indices that connect the salt species with other plant and animal species, bodily affects and capacities, and cultural objects and institutions. The ecological conditions; formal and sensory characteristics; and the taxonomic, mythic and lexical bonds of each species act as indices of the species’ connections to other entities, which arise from their common source in the First-Text.

According to Charles Sanders Peirce’s classical definition, indices ‘represent their objects independently of any resemblance to them, only by virtue of real connections with them’ (1998 [1909], 2.460–1, our italics). For Peirce an index is a sign that denotes an object not by resemblance, as icons do, nor by convention, as symbols do, but by virtue of an actual connection. We employ Peirce’s concept of index, although our understanding of what a ‘real connection’ is may differ from his. Our concept of real connection refers not only to those causal or existential connections—in the This-Text—but also to those that derive from a common source in the First-Text.

We distinguish three kinds of indices (loosely following Peirce 2000 [1885] vol. 5): existential, symptomatic and designative. Existential indices establish a connection between two entities based on an ecological or trophic contiguity, cause and effect connection, or instrumental relationship. Symptomatic indices connect species with other entities on the basis of shared formal or sensory characteristics. From the indigenous perspective such resemblance is not an analogical operation, but a symptom, an indication of a common source in the substances of the First-Text. Finally, designative indices connect entities by virtue of their lexical, taxonomic or mythic bonds. An ontological status is attributed to the names of the species comparable to the shape of the leaves or smell of the resin; names as well are indices of a common source in the First-Text.

Existential indices are the least frequent, accounting for only 24 out of the 208 indices we inventoried (see the complete listing in the supplementary material available at stacks.iop.org/ERL/8/015034/mmedia). Some of these indices connect species by virtue of their ecological or trophic contiguity; for example, the connection of the Astrocaryum jauari palm with the black-finned pacu Colossoma macropomum, because the pacu eats the fruits of the palm; or the connection between the jaitakurungo beetle (indet.) and the Oenocarpus bacaba palm because the beetle lives in the palm. Existential indices can also be instrumental, connecting salt species to objects, animals, ritual substances, body parts and human institutions; for example the beehee of Trigona truculentana is connected to sorcery, because when a bewitched person dies, three hairs from the crown of his/her head are inserted into a beehee to cause harm to the witch. Finally, existential indices can connect entities by virtue of cause and effect relationships; for example, the Mauritia flexuosa palm is connected to the calves because stepping on the seeds of the palm causes cramps in the calves.

Symptomatic indices are more frequent (75/208). A fair number of them are based on the sharing of formal or sensory characteristics; for instance: the fruits of the Ecclinusa bullata tree are like the abdomen of the tarantula spider dioki moí (cf Eucratoscelsus sp.); or the shells of the peanut (Arachis hypogaeae) are like the skin of the zeema alligator (Caiman sclerops), which is connected to the zeema raiha tree (Tapura guianensis) by a common lexical root. Symptomatic indices connect plant species to several body organs: brain, belly, salivary gland, intestines, breasts, pubis, vagina, penis; for example, the plant of the pineapple, Ananas comosus, is connected to the brain by the little seeds of its fruit, which are compared to a fleas that impinges on the brain, meaning madness. Symptomatic indices connect salt plants to several objects and institutions of the human world (a tobacco vessel, ceremonial house, drumstick, fishhook, stool, cannibalism, incest) and to several actions expressed as verbs: to get stuck, to deceive, to believe one is mature, to be strong, to gain experience, to fight. For example, to deceive is like the reflection of the Oenocarpus bataua palm, which is deceiving; or fights are compared to the sound of the dry leaves of Astrocaryum chambira when they fall, and to the thorns of the palm, which are as injurious as fights.

Designative indices fall into three classes: lexical, taxonomic and mythic. The lexical indices are the most frequent. Some species establish connections to many other entities by virtue of sharing a common lexical root; for example, the palm ziuniwiri (Geonoma macrostachys) is connected to: ziuniwiri (swallow-tailed kite), ziĩĩo (little bird), zima (little bird), ziĩiko (worm), zio (chameleon), ziĩo (kind of fish), ziĩo (vime), ziĩaĩa (palm), ziĩo (kind of chili pepper), the verb ziĩaĩa (to endure hardships), the ancient fishhook ziĩo, and the verb ziĩuniwaĩi (to weave irregularly). Lexical indices connect plant species to animal
and insect species (67), other plant species (18), the body (22) and the human world (25). Designative connections to the body include several body parts, bodily conditions and bodily verbs. Connections to the human world include several cultural objects, human activities and categories of people.

Taxonomic indices are restricted to connections among plant species. We found six groups of plants bonded in taxons, by virtue of belonging to the same ‘family’ or ‘generation’; for example, the generation of the *Mauritia flexuosa* palm starts with a little herb (*Cyperus* sp.), continues with several palms (*Lepidocaryum tenue*, *Mauritiella armata*, *Mauritiella sp.*, *Mauritia carana*) and concludes with the wild and cultivated varieties of *Mauritia flexuosa*. A remarkable taxon is the group of plants employed to extract ash salt, which is indexed by the tiny little palm *zitora* (*Bactris fissifrons*). Mythic indices connect salt species with animals, insects and mythological characters. A few of them come from a set of conventional associations, between fruits and game animals, which are used to interpret dreams (see Candre 1996) and also in the rituals.

What do all these indices mean?

### 2.2. Bodily affects and capacities

Taken together, the distinctive qualities of species outlined in the existential, symptomatic and designative indices plot a wide range of human affects, as seen in table 1. The two leftmost columns of that table identify the 62 species with their Latin and Witoto names. The two rightmost columns list the natural entities associated with them by virtue of their Latin and Witoto names. The two rightmost columns list the natural entities associated with them by virtue of the indexical logic we just presented, and the corresponding bodily affects and capacities.

We have arranged the species in the following eight groups:

| (1) Searching | Jenode | (5) Molting | Fanide |
| (2) Phlegm | Maraki | (6) Dodging | Zokuade |
| (3) Burning | Jobaide | (7) Roaring | Rukude |
| (4) Filtering | Daibirite | (8) Coalescing | Dujude |

This clustering and order of the salt species is not explicitly stated in the *rafe* of salt, although the labels and the logic that underlies them do derive from it; the labels make reference both to the process of formation of a creature in the womb and to the technical processes of preparing ash salt and tobacco paste.

The *searching* group encompasses several riparian plants that index aquatic fauna associated with difficulties and hindrances in the process of learning: to get stuck (crab), to be immobile (shrimp), to be vain and then become helpless (*Gymnotus*), to be restless (sardine), to become spineless and scared (tadpoles), to talk a lot and accomplish nothing (frog).

The second group refers to the *phlegm* and viscous substances contained in several plant species and the human body (in the stomach and throat), which are particularly strong in some animals (tapir, giant river turtle, worms). When preparing tobacco paste, all the phlegm in these species is caught by adding a vegetable slime to the tobacco decoction. This is symbolized by the vessel where the tobacco paste (without ash salt) is traditionally stored: the shell of *Theobroma bicolour*, which closes the group.

The *burning* group congregates species related to transformation. Two species of this group point to mythological characters that went through experiences of burning and transformation: Kumari Jitoma, a master of preparing bricks of ash salt who was turned into an eel, and the Salt-Man, who experimented with many herbs and ultimately transformed his body into ash salt.

The *filtering* group refers to the human world (25). Designative connections to the human world include several cultural objects, human activities and categories of people. The *searching* group refers to the body include several body parts, bodily conditions and bodily verbs. Connections to the human world include several cultural objects, human activities and categories of people.

The *filtering* group means fecundation. Two trees of the group are connected to evil characters in the mythic indices: *jeedini*, a promiscuous man, who wants to see things done quickly and raped the Mother before she was ready; and Jerovaikono, a devouring woman, symbol of uncontrolled sex. These two salts represent grave errors during the process of formation: sex without procreation, which turns the woman into a devourer, and haste and promiscuity, which do not lead to fecundity.

The *molting* group is like menstruation. This group gathers species associated with blood, rage, fighting and self-importance. Two palms are emblematic of it. *Astrocaryum gymnanthum*, a thorny palm, signals the obstacles that interrupt the way of any endeavour and its thorns connect it with the white-collared peccary *Tayassu pecari*, a ravenous animal. The rage of the peccary represents the power that attempted to cross the Mother of life, but she drained that power away and defeated it; likewise, women periodically wash and drain away that harm, as, when filtering ash salt, water extracts the pure minerals of the salt and separates them from the ashes. *Astrocaryum chambira* is associated with the peccary *Tayassu tajacu*, also a furious animal, and with the power of women and their menstruation.

The group of *dodging* plants indexes illnesses that are difficult to identify. It is made up of three species of epiphytes of the Cyclanthaceae family: one associated with the lizard, which is very fast and not easy to catch; the second associated with the harpy eagle, which attacks from behind; and the third, a strong epiphyte that hugs and clings to the trees, which signals illnesses that develop slowly and are invisible in the body.

In the process of making ash salt, when the brine boils down and thickens, it begins ‘to roar’, proclaiming the charge of minerals in the brew. *Roaring* gathers together species that index states of maturity—although not necessarily wisdom. The species in this group index deceit, madness, the creative and dangerous power of solitary persons (‘orphans’), and suffering and hardships. The two species that close the group evoke the slashing power of the Mother that fells and burns the plots to be cultivated, and the carnivorous power of the Creator.

As the salt brine boils down, it begins to desiccate and solidify; it is the concretion of the whole work, called *coalescing*. This group is the largest. It begins with a small palm that hardly yields any salt; however, its tiny fruit signals the first tobacco vessel where all the wisdom became concentrated. Other species of the group signal the opening of one’s eyes, being alive and well, the construction of the ceremonial houses and the preparation of ceremonial drinks.
Table 1. Salt plants and bodily affects. (Scientific names of plant species agree with the list of accepted names in The Plant List (2013). Identification of the botanical samples was carried out by botanist D Cardenas of the Herbario Amazonico of the Instituto Amazonico de Investigaciones Cientificas SINCHI (Bogota, Colombia), and R Bernal and O L Montenegro of the Instituto de Ciencias Naturales of the Universidad Nacional de Colombia. Specimens are kept at the Herbario Amazonico (SINCHI) and at the Herbario Nacional de Universidad Nacional de Colombia (Bogota). Voucher numbers of the specimens are listed in Echeverri and Roman-Jitdutjaño (2011: 500–501).)

| Species                        | Scientific name | Indexical connections | Bodily affects and capacities                                                                 |
|--------------------------------|-----------------|-----------------------|-------------------------------------------------------------------------------------------------|
| Searching                      |                 |                       |                                                                                                 |
| Cyclanthus bipartitus          | *C. bipartitus*  | Crab *skonga*          | It does not advance and gets blocked                                                            |
| Cyclanthus didymus             | *C. didymus*    | Shrimp *jogol*, hammock | It is lying down                                                                               |
| Cyclanthus halorrhiza          | *C. halorrhiza* | Knifefish *jibua*      | It is conceited and ends up cold and helpless                                                   |
| cf Cyclanthus sp.              |                 | Sediene emaiñada       | It is restless                                                                                  |
| cf Spathiphyllum               | *S. arbuscula*  | Jaguar *jirurungi*     | It looks homeless and scared                                                                    |
| Bactris simplicifrons          | *B. simplicifrons* | Frog *joda*, *bactris gasipua* (*jimena*) | It talks a lot and accomplishes nothing                                                         |
| Cyclanthus bipartitus          | *C. bipartitus*  | Pumf, stone to polish clay *garogi* | It is polished and round; nothing enters into his head or comes out of her womb             |
| Astrocaryum scophilum          | *A. scophilum*  | Body lying down *jimena* | It is lying down with its partner at noon                                                        |
| Eriotheca cf. macrophylla      | *E. macrophylla* | Jaguar*, sifter manioc* | It is weightless and senseless                                                                  |
| Phlegm                         |                 |                       |                                                                                                 |
| Attalea racemosa               | *A. racemosa*   | Armadillo *ulroningo*   | It smells rancid, like milk from the wrong breast                                               |
| Attalea insignis                | *A. insignis*   | Naked-tailed armadillo*, pain on the side | It is rank and feels like a weight on the side                                                   |
| Oenocrypus majora               | *O. majora*     | Tongue                 | It scrubs the filth from its tongue                                                              |
| Oenocrypus harabala            | *O. harabala*   | Beetle, *tambandu irichek* | It is sticky and closes the nostrils                                                            |
| Bactris gasipua                | *B. gasipua*    | Underwater beings, antester, throat | It itches inside the throat                                                                    |
| Astrocaryum jamaari            | *A. jamaari*    | Belly, black fanned pacl | Its belly is full of parasites                                                                  |
| Phenakospermum guayacenes      | *P. guayacenes* | Earthworm, stomach, teeth | It is a remedy for parasites and protection for the teeth                                        |
| Manilkara bidinata             | *M. bidinata*   | Giant river turtle *mento* | It is diarrhoea and itching in the anus                                                          |
| Geonomia maxima var. chelidum  | *G. maxima*     | Pigeon *fikango*, tapir* | It is to season food                                                                           |
| Quassiaquina s. intricata      | *Q. s. intricata* | Tapir, *irm*, to season | It is tender to touch                                                                           |
| Theobroma bicolor              | *T. bicolor*    | Paca *nsi*, ritual tobacco, throat | It encapsulates itching and vomiting                                                             |
| Burning                        |                 |                       |                                                                                                 |
| Eclipta balsata                | *E. balsata*    | Tarentula spider *diok*, black agouti*, manioc, pulling | It is contagious and hard to control, it brings good harvests                                     |
| Eclipta ulii                    | *E. ulii*       | Eclipta balsata         | It sings alone                                                                                  |
| Cherisphyllum sanguinolentum    | *C. sanguinolentum* | Eclipta balsata | Its second toe is the longest                                                                |
| Astrocaryum murumuru           | *A. murumuru*   | Squirrel *kikko*, puma *kekko* | It is fire-like                                                                                 |
| Ischnosiphon leucophaerus       | *I. leucophaerus* | Kumari *jimna*, white deer | It is anaemic and crazy                                                                          |
| Gustavia hesperatula           | *G. hesperatula* | Salt-Marl*, mice *moele*, intestines | It is flatulence; it is insensuous                                                             |
| Gustavia loefisica             | *G. loefisica*  | Pana *nendu*, animals with painings | It hypnizes and deceives                                                                        |
| Filtering                      |                 |                       |                                                                                                 |
| Thauma sphaerocephala          | *T. sphaerocephala* | Anacondal*, smell of fish, cool body | It is desire                                                                                     |
| Sphaenochromum sp.2 (Cyclanthaceae) | *S. sp.2* (Cyclanthaceae) | Beetle, dripping | It is a drop                                                                                     |
| Astrocaryum murumuru           | *A. murumuru*   | Peccary *ermoe*, black agouti *fredo*, big body | It ripens before the time                                                                       |
| Indet. (Ruatanaceae)           | *I. ruatanaceae* | Jeedo rania             | It is a ruddy, promiscuous man                                                                  |
| Leptacha pisonis               | *L. pisonis*    | Jecit*.*, opossum*, penis | It is a devouring woman                                                                          |
| Molting                        |                 |                       |                                                                                                 |
| Inga rubra (Leguminosae)        | *I. rubra*      | Kinkajoe*, clining, snakes | It spreads over and covers the others: big chief’s syndrome                                       |
| Parkia pendula (Leguminosae)    | *P. pendula*    | Bins, kinkajoe         | It is heavy and wants to break down one less                                                    |
| Hieronyma alcornoides          | *H. alcornoides* | Stingy worms, fungi, hervorhage | It is red, blood, a poisonous power                                                             |
| Astrocaryum gynacanthum         | *A. gynacanthum* | White-collared peccary* | It interrupts and stands in the way; it is the defence of women                                   |
| Astrocaryum cambria             | *A. cambria*    | Pecary*.*, veins, placenta, hammock, rubber tree* | It is raging and fighting; it is the power of women                                             |
the stones of power of the animals that the Creator turned into grains of food (corn), the process of learning by shedding the filth accumulated on the body, the life-giving power of women, the fecundating capacity of manhood, and the increase that comes from the adjoining of male and female. The group closes with *Iriartea deltoidea*, a palm that signals the new generation and the canoe in which they will travel.

### Table 1. (Continued.)

| Species                          | Wisto name          | Indexical connections                                | Bodily affects and capacities                                                                 |
|----------------------------------|---------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------|
| *Baccharis listuica*             | *Zokuaide*          |                                                      | It is very fast and hard to catch; its body is beaten. It attacks from above and behind, it is hard to see |
| cf. *Ludovia sp.* (Cyclanthaceae) | *Turao*             | *Listuica*, coca², *kudhi*³, heart                  |                                                                                                 |
| *Emsuyai*                       |                     | *Harpy eagle²*, *bullet arc omoky³*, back of the body emondo |                                                                                                 |
| *Sphardjinnia sp.* 1 (Cyclanthaceae) | *Naranjicolo*, *Jukikoo* | *Jaguar, vessel, guns*               | It is strong and invisible; it develops slowly like a cancer                                      |
| *Rukude*                        |                     |                                                      |                                                                                                 |
| *Gymnocalia bahana* (Areaceae)   | *Koma*              | *Tamarind*, small armadillo⁴, adult person          | It is deceiving                                                                                   |
| *Ananas comosus* (Bromeliaceae)  | *Olojp*             | *Fos, taka*, wild pineapple⁵, pineapple’s beetle rochikongon¹, brain |                                                                                                 |
| *Indel (Phyllanthaceae)*         | *Jaenirai*          | *Solitary wasp jaenirai*, orphanhood                | It is an orphan, a mad creator                                                                    |
| *Philodistachys synantha* (Areaceae) | *Fekori*          | *Worm fekori*, widowed                             | It abandons its work                                                                               |
| *Groenia macrostachys* (Areaceae) | *Zinuijikori*       | *Swallow-tailed kite zinuijikori*, *cannibalism, ancient fishhook, Mauritia uruma* (zokuaide) | It is suffering                                                                                   |
| *Mauritiella uruma* (Areaceae)   | *Ziyapa*            | *Stick to star drinks, Groenia macrostachys (zokuaide) | It endures many hardships                                                                         |
| *Tapura cf. guamaesta* (Dichapetalaceae) | *Zeema sialta*   | *Alligurai⁶, Peana⁷, Fungi on the skin, stool*       | It sheds the impurities of its body                                                                 |
| *Chaunochiton loranthoides* (Oleaceae) | *Viri*            | *Parasite plant virefez⁸, dry season*               | It is the slashing power of the Mother                                                              |
| *Trigona truquenula* (Apidae)    | *Emo*               | *carnivorous ants, wasps and bees*                   | It is the carnivorous power of the Creator                                                         |

*Keelah: Gymnocalia* sp.  
²Jaguar: *irurau: Panthera onca.*  
³Puma: *Felis pardalis.*  
⁴Jaguar: *Panthera onca.*  
⁵Bitter manioc: *Manihot escuflanda.*  
⁶Naked-tailed armadillo: *Cebus apella.*  
⁷Black manioc: *Manihot vernalis.*  
⁸Naked-tailed armadillo: *Cabassous unicinctus.*  
⁹Tamarind: *Tamarindus* tetradactyla.

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3. Sexual education

Those are the names of the salts. These names gather together all the evils in this world and at the same time represent the milk from the mother’s breast. Enokakuido states (excerpt 7 in table A.1):
The (ash) salt is named as an opossum, is named as a snake, and when casting a healing spell on a baby, it is named in the same way.

That is, the child is named in the spell as ‘my snake’, because it was formed with the essence (salt-semen) of all the experience and evil things that the father accumulated in his body, just like the ash salts come from the powerful and polluted powers of the Creator.

The rafue of salt performs a narrative of human affects and capacities through the reading of ecological, biological, cultural and linguistic indices from the set of ash salt plant species. Each one of those species provides an appraisal of the body of the Creator and of the human body. These plants narrate the story of the formation of healthy, engendered and fertile human bodies. What the rafue of salt does discursively is mimicked technically in the actual processing of salt. Rafue is a power-discourse; it is verbal performance and technical processing. This performativity is what turns the primordial affects into food (salts) and knowledge (counsels), which are meant to form human bodies through sexual reproduction. This is sexual education because that biodiversity is the same body of the Father Creator, who in his search for sexual development left the traces of his formation in the formal, sensory and linguistic characteristics of natural species. This is what we have attempted to represent in figure 3.

In the figure, we represent the elements of the This-Text—natural species, bodily parts and cultural object and institutions, on the one hand, and knowledge and food, on the other—overlapping the domain of the First-Text in a reflective, inverted and shadowy fashion. What in the This-Text are vegetal species (upper cell of the figure) may be regarded,
through the indices, as bodily affects and capacities that originate from the salt-illnesses coming from the primordial substances of the Creator. Those primordial affects are verbally performed in the *rafue* as teachings on behaviour and technically processed as food: actual mineral salts obtained from the plants. These pieces of advice feed the spirit and those mineral salts teach the body to become fecund.

Each salt ‘is the spirit of an animal’, say the elders. Ash salts are mixed with tobacco paste; tobacco is the image of the Mother, who defeated the evils of this world with her menstruation (see Molting). The spirits of the animals are captured by the power of tobacco and it is this mixture that gives flavour and voice to the tobacco paste. This combination of substances is explicitly compared to fecundation: ash salt is like semen and the tobacco paste is like menstrual blood. This sexual imagery serves as a model for other types of relationships: marriage, ceremonial partnership, cooperative labours—and may also include inter-cultural research projects like ours.

We stated above that our concept of ‘inter-cultural’ goes beyond the combination of different cultural approaches—the indigenous and scientific—to the same object: salt. In the Western view, ash salt (and its different associations) is the *same object* and its contrasting interpretations a matter of cultural differences. From the indigenous perspective, on the other hand, the fact that each culture is apparently talking about a different object (or objects) is irrelevant, insofar as the objects share a *common condition*: humanity. Indigenous knowledge on plants is a device to understand the perils and dangers (the salt-illnesses) of the relationship entailed by any political or scientific commitment—a sexual education.

Enokakuido’s knowledge is not unique or singular. Experts such as Enokakuido are able to produce highly structured discourses in a specialized register of the language, but their underlying ontology and logic are broadly shared by the men and women of the People of the Centre (see Kronik 2010, for traditional knowledge of palms among Witoto and Muinane; and Griffiths 1998 on the Witoto relationship with cultivated and wild species). This ontology is what we mean when we speak of the ‘real connection’ that enables us to link the resemblance of the anus of the alligator and the flowers of a tree to a substance of the Creator in the *First-Text*. Indexicality involves spatiotemporal location, which depends on a system of co-ordinates—the ‘indexical ground’—conveyed ‘by the on-going practice of the ordinary world of our experience’ (Sonesson 1999).

As Stephens (2012) stated in a recent issue of ERL: ‘There is much to be learnt from the indigenous and local

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**Figure 3.** Biodiversity as sexual education.
communities who depend directly on, value spiritually, and fight for, their biodiverse ecosystems’. As she remarks, such peoples not only value biodiversity for its utility but also and mainly because these natural entities, objects and species are their very same body.

In 1995, at the very beginning of our study of salts, Enokakuido wrote a text in the Witoto language, titled the Nabairiya or ‘Agreement’, in which he stated the aim of our common endeavour. We translate a few lines from it, that may give us a taste of the salt of the issue, to conclude (excerpt 8 in table A.1):

Seeking for fecundity on a dangerous border,
Looking for the coalescing of the fruits,
We protect each other to learn from each other.
Our teaching is great for many to look at,
Our power goes straight into other yards of coca.

Two oceans, two peoples,
Europe and America.
Each one speaks with its own voice,
Each one lives according to its origin.
Sexuality, however, is the same; it is dangerous, you have to know.

The mistress of sexual education (biodiversity) is the one who knows, because she has already experienced everything.

Acknowledgments

This study counted on the financial support of the Instituto Colombiano de Cultura Colcultura (1996); the Earth Love Fund (UK, 1996–97); the Instituto Colombiano de Antropología (1998); the Coama Program for the Consolidation of the Amazon led by The Gaia Foundation (UK, 1998–99); and the Imani Institute of the Universidad Nacional de Colombia (2000–2001, 2011). We would like to thank the biologists Olga L. Montenegro and Dayron Cárdenas, curator of the HerbarioAmazónico of the Instituto Sinchí (Colombia), for the identification of the botanical samples; Jimmy Weiskopf, for revising the English text, and Anna Premauer for designing figure 3. We also want to thank the three anonymous referees of ERL for their helpful comments and observations that contributed greatly to improving this paper.

We dedicate this paper to the memory of Simón Román (1963–2008), Enokakuido’s son, who participated in this study from its start.

Appendix

For the transcription of Witoto words we use the graphic conventions adopted by the Witoto bilingual education schools in the Colombian Amazon, which are a slightly modified version of the one proposed by the Summer Institute of Linguistics (Minor and Minor 1987). Vowel sounds are approximately like those in Spanish or Italian, with the addition of \( \text{ʃ} \), a central high vowel. Consonant sounds are similar to those in Spanish, with the following exceptions: \( f \) is a bilabial approximant, \( z \) is an interdental fricative, \( r \) is a flap in all positions (including word initial), \( ng \) is a nasal velar.

Excerpts from the rafue of salt is given in table A.1.

Table A.1. Excerpts from the rafue of salt.

| 1. | jaae mooma buinaima mei komuiya rafue / bigiñiri jaae e raïnana niï e ñnoga / jaae mooma buinaima niï komuiya monoibi ŋai ñi / |
| 2. | diñori mooma buinaima jaae jaa bigiñiri / niï iai ronoïdena mame ñiien / ronâiona iidi úai jaa jino e faïkana iairína komui ñi / fuui komuïte monifue urukí biidi úaido jagiñiño niï ua jaae kue komuïya / mooma daïñá iidi monoïbi ŋai ñi fuui niï nimánoye niï e kaiõyke ñurue komuï / jaae daïnano ñiï mooma buinaima niï bigiñi nañiñiri ñeñiñiñe ñeñiñïñe ñaïirí i / iidi jaae niï ua monifue urûkíri rafue dükiniadi ñnoga / jaa kloide kaimárena fuui daaïyiñi rafue daïñá ñiñiñe ñeñiñe / |
| 3. | naana meita jakire komuídïkaï / akie ñaire rairuírena kiämo naana ñeza / meita ebëna / jirkaïadí mei dïno kome jaa mei ñaiu / rïnaïte / rite / jirai afeno jaa / abimo jôñëna / niï monoïza / meita fuui bite jitaïde namakí / fuui ña jiroye jaae mooma buinaima niï ña jiroka monoïna mame ñiien / akie ñima jirode / |
| 4. | diñokoni jaa aïyi iidi jaikiñïñgo / jaa aïyi diñïñamo / niïñiñ ezi jaae jaïkiñi ñai kaimáre / jaae mei daïide / faïkana jaa ringomo baï mei nôkaidena mame ñiien / ñiï kaï komena jai ñiñ / yonëñona jai ñaid / niï guamají komuiyano / ña ñiï ña guamado ña ña jorema / ña ñiï jìññiaï / |
5. níi jaae mozinho kanaka atide níi ekákana atide iirí iiaizai / níi uu jaae / ero dibénemo / komeki dibénemo / niíedo jainoibi / jaabe afemo daljide / niíe náiedikaí / kaí mei / aakí dínoma / náiedínama oní dáajena eroide / jóríajája eroide / duiku dáajena eroide / ie jíra kome kome / dainánona idií úái kaimo fiénokaíde / mooma buinaima /

6. dínori jaafarédëna mameide / fadeia waista baa / aiyó kóikana nhíno fíia ebínino kaimáredíño kíóñenano / níínomona koimuídikaí / níínomona bitíkaí / níís iidií / jataná mameide / dánáori / níí baa dááítadíño / tândena mameide / rínátatena mameide / 

7. iiaizai mameki aakí díno jímánakina jaaide / jaiona mameide / jiíra dibene úrue íena mameide / 

8. fíioi raidora junóyena / yízíído dujuna jénúa / daaże i fínóiriya kaí júñidíkaí / afe úái aiyó eroikaí / jákíka máirie jiaí jílibíriídíno / / menade nií iáíroji jiaí naíraí / Moniya nagíma Kámáni nagíma / / fákádoga úái kóiníidíkaí úái / kíona onoga komíni iyano nagíma / jiruí úái níbaide onóñeníia ia yote jiirúñínde / yóneráingo níi yóneraima dááítadíma onoiga /

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