
**‘CULTURAL PHOTOSYNTHATES’
NOTIONS RELATED TO BIOCHEMICAL ENERGY IN
GUARANÍ COSMOLOGY AND POSSIBLE
EQUIVALENT CONCEPTS IN CHRISTIAN LITURGY**

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Abstract

Ethnobiology has been defined as the study of the notions and concepts developed by any culture about life and living things. Such concepts and notions are often present in the religious beliefs of human groups, suggesting plausible articulations between Ethnobiology and Theology. As an example of such articulations, in the present paper it is proposed that if from ancient times the human being has been able to perceive the central role of the king star in the growth and diversification of the biosphere, for example observing or even influencing the differential growth of plants under good lighting conditions; then it is possible that notions about the bioenergetic flow are in some way represented in the theological conceptions or in the liturgical practices of the sun worshipping religions.

The practice of ‘Mborayu’ among the Guarani natives of South America involves the communal distribution and consumption of food among all the members of a village, including small game or harvested products. The foods distributed in this practice are understood as portions of the contemplative energy of the solar progenitor (their prime God), who is the first ancestor still alive and therefore the subject with the highest cultural influence. Sunlight is understood as the perception or creative wisdom with which this supreme being recreates daily life on Earth and that wisdom can be transmitted to the members of the community indirectly through the consumption of foods that are the result of his creative contemplation. Hence there is an equivalence between food and liturgical resources, which in turn explains why distributing food is also to distribute knowledge or cultural participation. In a lineage in which the first ancestor is the Sun, such equivalence suggests an evident notion of ‘chemical energy’ stored in the food and its distribution among the members of a community reinforces the social identity through communion with the supreme cultural authority.

Based on these Guarani notions about life and living beings, a new approach is proposed to interpret transubstantiation, one of the most controversial topics of the doctrine of the Eucharist within Christian theology.

Keywords: Eucharist, transubstantiation, solar energy, reciprocity, food

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1. Introduction

The human being is aware that life on Earth develops thanks to sunlight and the flow of biochemical energy between producer and consumer organisms [1]. But, since when do we have knowledge of it? There is intrinsic evidence of this energetic flow in the differential growth of plants under conditions of good illumination, in herbivores and in predation, phenomena in which *Homo sapiens*, from its beginnings, has not been only a passive observer but an active participant in subsistence agriculture, harvesting and hunting.

In recent years, conceptual anthropological guidelines and pragmatic ethnographic experiences related to energy have been developed [2]. However, the greatest emphasis is placed on industrial energy and its influences on societies and the environment [3-7]. Researches on cosmological notions about energy are very scarce, compared to the amount of research on scientific notions. Among the few approaches found, is an investigation that addressed how Australian indigenous students use their vernacular language and formal scientific language to describe the concepts of energy and force. It also documented the cultural resources that students used to learn, produce and share that knowledge [8]. However, such vernacular knowledge consists of pragmatic experience rather than the cosmological foundations of that ethnic group.

With respect to the energy that sustains life on Earth, although only two hundred years ago, the biological sciences demonstrated experimentally the transformation of solar energy into biochemical energy [1, p. 108]. From prehistoric times, humans naturally worshiped the light-giving Sun, since they realized that everything on Earth owed its existence and its life to the influence of its rays [9], proliferating the worship of solar deities in various regions of the world [https://en.wikipedia.org/wiki/List_of_solar_deities; 10]. Although the solar mythology of certain classic works [11, 12] has been criticized, among other things, for giving the solar imprint to too many mythical identities [13]; the cosmological importance of the Sun continues to gain evidence, especially from archaeology [14]. Although it is not the only element of nature that is part of the different belief systems that humanity has established throughout its history, the Sun is undoubtedly one of the most widespread deities in the world. Why? The most likely reason is its role as a source of heat and light energy to endow the world with life [9]. If this is the case, then it is necessary to ask if the different cultures that have established solar deities treasure notions related to energy, and especially to the chemical energy stored in living organisms. In other words, since the Sun is the primordial source of energy for living beings on Earth, then solar religions constitute an interesting thematic framework for inquiring from Ethnobiology about possible cosmological constructions related to energy.

This premise has been inductively explored through extensive ethnographic research in Guarani communities in north-eastern Argentina. We studied Guarani cosmology that accounts in a complex way for the transformation of light energy into chemical energy. The correspondence between sunlight and the consciousness of the supreme authority (the solar

being) establishes a fruitful frame of reference for understanding, among other things, certain Guaraní liturgical practices related to reciprocity [15]. It is proposed in this paper that the same frame of reference may provide a useful perspective from which to interpret one of the practices of the Christian liturgy, the first communion.

2. Disciplinary framework

The ethnography I have developed between 2008 and 2016 in Guaraní communities of Argentina is ethnobiological and has resulted in a doctoral thesis in Social Anthropology [15].

Ethnobiology is the study of the notions and concepts developed by any culture about life and living beings [15, p. 26; 16]. Regarding this definition in a South American regional context, the discipline has been intensely focused on addressing issues related to living things (Ethnotaxonomy, Quantitative ethnobiology, natural resources) and, up to the present, there is no perceptible development in relation to notions about biological processes. To address such notions within the Guaraní cosmology, we collected and studied hundreds of myths and stories in the Guaraní language.

The thematic development would have been impossible without previously having knowledge about the language and culture of the Guaraní people, developed by long experience and much participant observation, sustained for several years within the communities. Only in this way the new meanings learned can be joined with others or, in cases where these are not consistent, they vanish within a metalanguage and help to form an alternative way of thinking that the intercultural researcher must necessarily construct. This knowledge is constructed from notions that belong to a cosmology that is studied, but these notions are often not perceived by believers in the cosmology, but not necessarily researchers of it. An example related to the subject treated here is the Guaraní expression '*ju*' (golden, sharp) that in certain contexts denotes an energetic quality related to the solar deity [15, p. 67]. Ethnobiological sources from the literature [17-19] or direct references by some interviewees, allow the inference that the plant or animal names that are prefixed or suffixed by this expression, apply to organisms consecrated by the solar deity or closely related to it. However, in this case, such etymological regularity is not observed in ethnotaxonomic sources and is not perceived by many of the interlocutors who use these nomenclatural expressions in their everyday language. Consequently, the incorporation of this type of signifiers allows the apprehension and implementation of a metalanguage through which the researcher becomes a receiver of information from a cultural source that exceeds the knowledge of the interlocutors participating in the said source.

To address the relationship of Guaraní society with its deities, Durkheim's concept is considered here "religion constitutes a system of notions by means of which individuals represent the society of which they are members, and relationships, darker and more intimate, that maintain with this" [20]. This

concept of collective representation or collective subject has been retaken by Cardoso de Oliveira to adapt it to a theoretical treatment on ethnicity, “culture is a collective representation, as it transcends the individual being, expresses a higher reality, that of society itself. It is a reality of intellectual and moral order, a social being, irreducible - in its totality - to the individual consciences that, in turn, in their daily practice could not apprehend them but fragmentarily.” [21] If the deities as collective subjects transcend the individual consciousness’s of the participants of a culture, then to apprehend the cosmology of a society, or in other words to establish communication with such deities, the researcher must develop a metalanguage in the context of an alternative gnoseology.

3. Expanding the thesis of the ‘cultural photosynthates’

The abundant notions about energy flows found throughout the ethnography developed among the southern Guarani [15, p. 80] have provided evidence to inductively configure a thesis, which is as inherent in Ethnobiology as it is in Theology. If from remote times the human being has been able to perceive the central role of the king star in the biotic proliferation, for example observing or even favouring the differential growth of the plants under conditions of good illumination; then it is possible that notions about the bioenergetic flow are in some way represented in the theological conceptions or in the liturgical practices of the solar religions.

In the present paper, a substantial part of the ethnographic evidence that has contributed to the thesis formulated above is presented. But in addition to this, here it is also proposed to leave open the possibility of extending the thesis to other religions of solar affiliation. To start this project, I propose to use the thesis to rethink transubstantiation, one of the most controversial topics of the doctrine of the Eucharist within Christian theology. Attending this purpose, it is necessary to enunciate a complementary thesis: *If the energetic attributes of the creator (the cultural archetype) are perceived as subjective qualities, then the nutritive resources that he creates can also be considered as cultural sources (Cultural Photosynthates).*

4. The perception - solar deity in the Guarani cosmology

Among the southern Guarani, the supreme creator is considered their first ancestor, the progenitor of the ‘earthly manifestation of the Sun’. It is interesting the name that it receives in several Tupi Guarani dialects is ‘*Kuaa*’, ‘*Kua*’, ‘*Kuat*’, and in all cases these are idiomatic variants that mean ‘contemplation’, ‘intellectual perception’, ‘understanding’. In fact, sunlight is considered the creative contemplation with which the cultural archetype daily recreates life on Earth. On the misty winter mornings the old women throw ashes in the direction of the dawn exclaiming ‘*ejecha piro-piro che ru!*’ (father, wake your eyes!).

Some metaphorical narratives about the creation of the world conceive creation as a work of basketry in which the first ancestor laid down two crossed trunks of wood that would serve as support for the creation (traditional Guarani baskets are rounded in outline except for their square base resulting from the fabric using two wooden crossbars as a frame). There are variants of these basket bases depending upon which species of wood is used, but it is interesting that such variants correspond to different species used in the making of the old devices to light fires. Fire as a resource for slash and burn agriculture is considered an earthly manifestation of the first ancestor and the combustible materials are endowed with the quality 'ju' (of varied translation in the accessible glossaries: golden, incorruptible, sharpened object). Thus, among Ava Guarani groups the term 'aju'y' (Lauraceae species, tree endowed with *ju*) is applied to foundation woods as well as to certain tree genera used as lighters [22]. It is evident that this expression 'ju', although it has imprecise translation in interethnic communication, alludes in a certain way to the solar energy deposited in terrestrial materials. It provides a good example of a word in the metalanguage mentioned in the previous section.

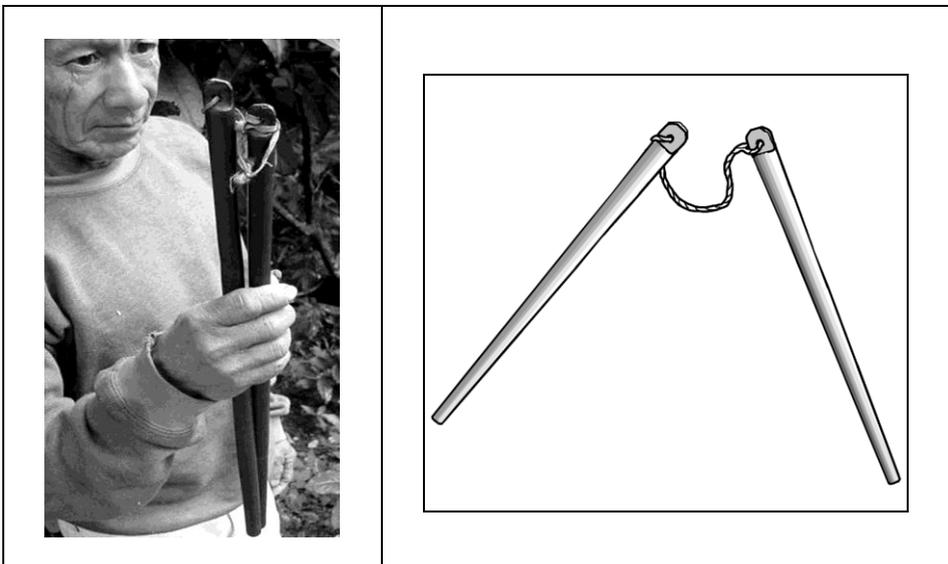


Figure 1. Photography and drawing of the *popygua*, a ceremonial baton of a Guarani religious leader.

An interesting liturgical practice that links solar energy with the awareness of the cultural archetype is displayed in the meetings of Guarani religious leaders. In these meetings, each speaker works as a medium of the cultural archetype, through a special language 'ayvu ñeçhiro' (concatenated language). In this way he reiterates and recreates norms that must be observed by his descendants. While making his speeches, each speaker must carry a baton of the heaviest available wood in the region, or two small batons, linked by a rope (*popygua*), that symbolize the foundational materials of the Earth and are

symbolic repositories of the creative energy of the first ancestor (Figure 1). This liturgical device guarantees that the orations expressed during the speeches are the genuine words of their maximum collective representation. In sum, if the solar energy is regarded as knowledge, then the chemical energy created by the Sun and stored in certain materials make them also sources of knowledge. The role of a single liturgical device thus acquires a meaning that is not understandable by the researcher, unless he puts himself within the reach of a gnoseology coined in the cosmology of native peoples, or their ancestors.

5. A dynamic religion

The Guaraní pantheon, in addition to ‘*Kua*’, has deputy lieutenants who are the archetypes of diverse elements of nature, and whose importance in cosmology is roughly in the following order. ‘*Tupa*’ embodies lightning and rain and plays an important role in agriculture and war. ‘*Karai*’ is the deity of fire and of the peccaries (their main source of protein) and ‘*Jakayra*’ is the owner of the sacred fog, responsible for the fertility of the soil and the medicinal power of the plants; its substance being the means by which sorcerers introduce noxious elements into the body of their victims. While *Tupa* resides on a higher plane next to the solar deity, the other two are on a lower plane closer to the earth, so in mythology they are considered minor deities, capricious and therefore less reliable.

An interesting aspect of the Guaraní religious thought is its plasticity when confronted by the new social scenarios practiced by the surrounding globalized society. Until half a century ago, the traditional Guaraní political leaderships were also religious leaders, often elders or adults with spiritual vocation. Nowadays, political and religious roles have been segregated, with religious leaders dealing only with matters internal to the community or giving a merely ornamental liturgical framework to intercultural meetings. On the other hand, a specifically political leadership category has been established, composed of young people with little experience in the Guaraní spirituality, but with demonstrated language skills and knowledge of the political scene of the national or state societies in which they reside [23]. These new leaders are easily subject to political co-option and susceptible to corruption, so as a result the chiefs of the villages usually do not last for more than a few years.

In the case of the Guaraní, the premise that “religion tends to adapt to the form of the political-economic structure of society” [24] is fulfilled. Recent declarations of the Guaraní religious leaders warn about the advent of eternal darkness due mainly to the fact that the first ancestor disagrees with the actions of his last descendants, and will close the door of his temple to never offer his creative contemplation to the world again [15, p. 459; 25]. These neo-myths suggest that the secondary deity *Tupa* has for some years taken over the government of the world, requesting the solar progenitor not to interrupt his contemplative-creative work. When the new regent is annoyed, he will leave the command to the deities that are closest to the earthly dwelling and this forecasts

a new era where chaos will prevail. This parallelism between processes that occur in the mythic and social planes suggests that deities and political leaders, because they are collective representations of the same society, are equally susceptible to the same events.

6. 'Mborayu' the Guarani reciprocity

The Guarani word for reciprocity is *mborayu* - it is an expression that has been discussed by illustrious ethnographers of the Guaraní language. Clastres [26] questions Cadogan's [27] definition of *mborayu* as 'love of neighbour' since it awakens a Christian echo. He suggests rather it would have its roots more linked to a notion of 'tribal solidarity'.

There are very early references to the practice of distributing, collectively, hunted or gathered pieces of food, however small, between the Tupí Guaraní groups [28]. The almost symbolic attitude of sharing very small pieces of food is still very common in the Guarani communities and among individuals dedicated to hunting, gathering or planting. Such practice is based on a hope of greater future success in their activities, under the observance of the first ancestor or his entourage [15, p. 533]. Fish, rodents and tiny birds that children hunt are fractioned into tiny bites and tasted by children and adults present at the meetings. They are very small bites, not even enough to satisfy the hunger of a single person, which favours the philosophy of reciprocity as its true dimension. It is a practice of communion in which society becomes one with its maximum collective representation transferring among all the guests the energetic quality of these snacks, that is, the wisdom of the cultural archetype, the sunlight, which is synthesized in them.

The lipped peccary is the species that constitutes one of the largest sources of protein due to the abundance of the population and the size of its herds. In Guaraní cosmology, this species of peccary is an animal bred by *Karai*, a deity complementary to the first ancestor. As this animal is one of the preferred foods and widely available (at least in the not too distant past), its hunting involves a more complex liturgy. The sacred name of this animal, *Tataendy rete'i* or 'true flames' reveals that the pieces shared in the institution of 'reciprocity' are not only understood in terms of protein supplies or food inputs. In the case of animals bred and consecrated by archetypal ancestors, the energy that is actually being distributed consists of portions of culture, spiritual energy or social photosynthates. In truth, if sunlight is simply considered the perception and expression of the cultural archetype, the Sun, then it makes no sense to discuss whether sharing the bodies derived from the Sun's creative energy is intended to share portions of culture or to distribute protein rations, because under this custom both gifts are, in effect, the same. This clarifies the etymological significance of *mborayu* as being "to transmit the word or knowledge" or "to give more cultural participation" [15, p. 533], (*mbo*: causative, tend to something happen, transmit an effect, *ayu* word, message).

7. The Christian communion

In the doctrine of the Eucharist, transubstantiation (that is the change of substance or essence by which the bread and wine become in the body and blood of Jesus Christ), has been one of the more fruitful philosophical reflections within Christian theology [29]. While in diverse academic areas, it is debated whether communion represents a transformation of ancient cannibalistic practices [30], different Christian groups understand Christ's presence in communion differently. Consubstantiation is the Lutheran view of the Lord's Supper. Luther rejected the Roman Catholic doctrine of transubstantiation, but he insisted that the phrase "this is my body" needed to be taken literally. That does not mean that the bread actually becomes the physical body of Christ, but that Christ's body is present in, with and under the bread [31].

In opinion of the theologian James Arcadi [29] the fundamental philosophical query associated with the Eucharist, both in traditional and recent literature, is "What is the state of affairs that leads people to say of a piece of bread, 'This is the body of Christ'?" The author examines in detail the spectrum of answers offered throughout the long history of this discussion in Philosophy and Theology. However, among those answers, none develop notions related to some kind of energy-flow.

The solar identity of Christianity was suggested from at least ten arguments that establish equivalence between the Sun and Jesus [32]. If this identity is considered reliable, then transubstantiation can acquire a new meaning and the allusion to the body and blood in the Eucharist can be a metaphor referring to the solar energy contained in these foods in the form of chemical energy. Energy that according to the promise of Jesus can be present very directly among those who ingest these foods. The Eucharist also acquires a different meaning to celebrate the communion of a human group with its cultural archetype or collective representation.

8. Conclusions

Nearly two hundred years ago Science assigned a leading role to sunlight in the process of plant growth, before then it was thought that they simply took their food from the soil [1, p. 108]. But several centuries before the sages enlightened the biological sciences with a reliable knowledge about the importance of sunlight in the synthesis of organic molecules, the Guarani and probably also the Christians already celebrated the 'conscious energy' of their first ancestor contained in food.

As religions are systems of ideas by which members of societies are related to their collective representations, religions cannot be established as inalterable structures. They must necessarily constitute the dynamic platform of a society that is subject to changes, sometimes vertiginous ones. In an era where environmental constraints prevail, religions with greater elements of Biology in their cosmology can acquire more social incumbencies.

Advanced phylogenetic studies reveal that life, in all the forms we know it, is much more likely to have arisen from a single common ancestor rather than several sources. This, among other things, means that the ignition of life took place only once in the 4.543 billion years that make up the long history of our planet. If its origin is an event that has not been repeated in these millions of years in a highly favourable substrate for it to occur, life is by etymological definition a miracle (or object of wonder) that is unlikely to have taken place also on Mars or even in the promising Kepler-452b.

Scientific explanations, by offering seemingly universal and irrevocable conclusions about perceptible phenomena, necessarily trivialize them stripping such phenomena of the mysteries that surround them. Life is a miracle whose origin and meaning is not yet fully apprehended by Science, and therefore it cannot be equally trivialized. If Christianity recovers the solar identity of its cultural archetype, communion could once again claim its possible foundational liturgical mission, that of celebrating the miracle of life.

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