

Art and the Senses in Ancient America



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Art and the Senses in Ancient America

Materiality and Meaning

Edited by

Ma. Luisa Vázquez de Ágredos Pascual,
Ana García Barrios and Megan E. O'Neil

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*To our colleague and friend:
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Cover: Front: Santa Maria bronze oval bell Nr. VC 1311 a, b, [Height=24.8 cm; Width= 18.9 cm] from archaeological site Curtiembre, Salta, NW Argentina (*Ethnologisches Museum Berlin*). Photo: Martin Franken. Courtesy *Ethnologisches Museum Berlin*.

Back: X-ray of the Quimbaya longitudinal trumpet MAMF17435 (Height= 30 cm; Width= 5 cm; Weight= 231.81 gr) of *tumbaga* from La Soledad, Finlandia, Colombia (*Museo de América, Madrid*). Photos: Gonzalo Cases Ortega. Courtesy *Museo de América, Madrid*.

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Introduction

Art and the Senses in Ancient America

Ma. Luisa Vázquez de Ágredos Pascual

Universitat de València

Ana García Barrios

Universidad Rey Juan Carlos

Megan E. O'Neil

Emory University

In 1962 Lévi-Strauss referred to the need to develop a science of the concrete (or a science of tangible qualities) that would bring us closer to the classification systems of traditional societies. He did this in his book, *The Savage Mind*, and with it laid the foundations for the first attempt to decipher sensory codes in Amerindian myths, which he addressed in *The Raw and Cooked* two years later, in 1964. These were the first steps of a new science that today is known as the anthropology of the senses, which was not fully defined at that time and did not offer its first results until *the early work of Steven Feld, Sound and Sentiment* (1982), where Feld approached the subject of sounds and auditory perception for the Kaluli people (Papua, New Guinea), as part of a sociocultural framework involving ancestral roots and meanings related to identity in the present. In that same year, 1982, another of the great founders of the anthropology of the senses, *Alain Corbin*, published *The Foul and the Fragrant: Odor and the French Social Imagination*, in which he recounted the social life of smell in 19th-century France. This work was followed by other similar ones by *Corbin*, who in 1990 published *Histoire et anthropologie sensorielle*, with which he announced that sensory studies were of interest to and connected with at least two disciplinary fields, history and anthropology, which soon offered new studies and results on this topic (e.g. Bynum and Porter 1993; Classen 1993, 1997; Classen et al. 1994; Gage et al. 1999; Howes 2005, 2013; Sutton 2001; Taçon 1991).

Since then, the history of the senses and the anthropology of the senses have been accompanied by other disciplinary approaches, such as the geography of the senses (e.g. Howes 2018a, 2018b; Paterson 2009; Rodaway 1994), the archaeology of the senses (e.g. Brück 2005; Gosden 2001; Hamilakis 2013; Houston and Taube 2000; Jones and MacGregor 2002; Joyce 2005; Meskell 1996; Skeates and Day 2020), the sociology of the senses (e.g. Friedman 2011, 2015; Howe 2013, 2018b;

Rhys-Taylor 2015; Synnott 1991, 1993; Vannini, et al. 2012; Waskul and Vaninni 2008), and, more recently, the archaeometry of the senses (e.g. Hurcombe 2007; Vázquez de Ágredos 2018), a total of six disciplinary areas. To this, it should be added that studies of art and architecture from disciplines such as art history and the history of architecture offer approaches and answers regarding sensory perception and experience as a way of knowing and understanding cultures, past and present, as shown by some previous studies (e.g. Bradley 1998; Drobnick 2005; Hosler 1994, 1995; Tilley 2004; Watson and Keating 1999).

It is not surprising that the approach to this universe is of interest to such diverse fields and disciplines, and to which others must be added, such as, for example, psychology (e.g. Heaviland-Jones et al. 2005; Toller and Dodd 1998). Moreover, only from an interdisciplinary and holistic approach is it possible to enter a panorama as seemingly unfathomable as this one, due to its immaterial nature, as well as the ephemerality, volatility and evanescence of some of the most revealing sensory experiences, such as smell and taste, and their close links to memory, which explains the echoes and resonances at the level of cultural identity. This same multifaceted approach to the subject is one Sarah E. Newman advocates in her recent essay, "Sensorial experiences in Mesoamerica: Existing scholarship and possibilities" (2019), in which she expressly alludes to three studies that can be considered pioneers and reference points in this field for the case of Mesoamerica: *Human body and ideology: the conceptions of the ancient Nahuas* (López Austin 1980), *The Natural History of the Soul in Ancient Mexico* (Furst and McKeever 1995), and *The Memory of Bones: Body, Being and Experience Among the Classic Maya* (Houston et al. 2006). Likewise, and with regard to that same interdisciplinary approach, Newman emphasises the need to combine archaeology with ethnohistory and ethnography, due to the wealth of ancestral references

that survive in the traditions of many Mesoamerican peoples today, which can contribute to a greater and better knowledge about sensory experience in pre-Hispanic Mesoamerica (Newman 2019: 489), especially in relation to concrete contexts and experiences, such as that of the funeral rite (Vázquez de Ágredos and Tiesler 2020).

Current research projects also follow this same direction, such as one directed by Vera Tiesler from the Autonomous University of Yucatán, Mexico, titled “Understanding the sensorial experience of ancient and modern Maya: New archaeometric studies of the organic compounds of foods and fragrances” (2019-2021). This project, involving researchers from different universities, research centres and laboratories in America and Europe, tries to approach ancient Maya experience of smell and taste through physicochemical study of organic remains preserved in the archaeological record, and is in close dialogue with other disciplines such as physical anthropology, ethnohistory and ethnography.

This same approach is, moreover, one that other researchers have followed in trying to lay the foundations for studying sensory perception and experience in Pre-Columbian cultures of the Andean area in recent years, with clear precedents in the 1980s and 1990s, through the works of Constance Classen, such as “Sweet Colors, Fragrant Songs: Sensory Models of the Andes and the Amazon”, first published in 1990 in *American Ethnologist*, and subsequent studies, of which we highlight three: *Creation by sound / creation by light: a sensory analysis of two South American cosmologies* (1991); *Inca Cosmology and the Human Body* (1993); and *The Color of Angels: Cosmology, Gender and the Aesthetic Imagination* (1998). Other contemporaneous works, such as those developed by Donald Joralemon (1984), Thomas Turino (1989) or Paul Stoller (1984, 1989), among others, also contributed to the field’s development, such as *Soundscapes in Andean Contexts*, by Claudette Kemper (2004), or the recently published *Andean Foodways: Pre-Columbian, Colonial, and Contemporary Food and Culture*, edited by John E. Staller (2021), in which works such as Gabriel Prieto’s “Grilling Clams and Roasting Tubers: Andean Maritime Foodways in the Second Millennium BC”, address and update themes that had begun to capture the interest of the scientific community long before Classen’s studies, such as “Three Native Tuber Foods of the High Andes”, by William H. Hodge (1951).

In short, the approximately half-century trajectory of the field of sensory perception and sensory experience concerning cultures of the past, including Pre-Columbian ones, is wide and diverse due to the intersections of disciplines that, in one way or another, connect with this field of knowledge and have tried to respond to the challenges posed regarding the senses

that have traditionally been considered, namely sight, hearing, smell, taste and touch, but also to many others that have still been unexplored and that, as research in the field of neurosciences advances, reveal our complexity as human beings and concern our relationship with the environment. In this regard, neuroscience studies indicate that our senses are thirty-three (Howes 2009: 22-25), among which are proprioception (which informs the brain of our position in space) and thermoreception (perception of temperature). This field is increasingly accumulating more research and, in turn, will feed new research in areas such as cultural anthropology.

Regarding the sense of thermoreception, Classen observed in 1993 that there are cultures that organise the world based on thermal sensory experience. As noted again by David Howes (2014: 19), this is applicable for current Tzotzil groups in southern Mexico, since they conceptualise their world (both physical and social) with terms that refer to temperature gradations, such that the east is “the region of emerging heat”, while the west is “the region of waning heat”. Likewise, the sun is “Our Warm Father”, and men get warmer as they get older, whereas women and newborns are cool. On the other hand, as Stephen Houston *et al.* (2006) observed, the term “sight” for the Tzotziles encompasses the processes of hearing, smelling, tasting and touching, going far beyond what we understand as sight and the sensory processes that this term implies. A comparable case occurs among the Hausa of Nigeria, for whom the term *ji* brings together the auditory, olfactory, gustatory and tactile sensory experiences, leaving out only sight, which is referred to as *gani* (Howes 2014: 19). These examples force us to acknowledge that sensory perception and sensory experience are relative; such cultural relativity conditions senses and experience along with many other factors and variables, including, for example, age, gender or functional diversity, which are rarely considered in the field of sensory anthropology, despite their respective involvement in basic sensory processes. In this sense, it must be considered that the heterogeneity of past societies, like those of the present, was not only defined by well-known social, political, cultural and economic aspects, but also by other factors including transgenerational ones, such as those related to genetic predisposition to develop certain types of diseases, or disability in all forms, encompassing the physical, cognitive and sensory, understood not only from the medical perspective but also from that provided by medical sociology.¹

¹ This refers to social restrictions imposed on people who suffer from bodily disabilities. This explains why medical sociology theorises about chronic diseases and disability through the lens of social deviance (Thomas 2007). This approach encompasses both aspects of the impaired body and lived experience, hence the great interest in the field of sensory anthropology and other related fields, such as sensory history.

The results that physical anthropology offers for these three causes of heterogeneity in past societies (age, gender and functional diversity), which completely influence the ways our senses perceive the world around us and our interpretation of it, are more than abundant, as is the explicit evidence that written and visual sources contribute regarding such diversity. And so, for example, interdisciplinary studies conducted to date show that blindness (visual perception), deafness (auditory perception) and lameness (proprioceptive sensory experience) were common in biblical cultures (Gosbell 2015; Raphael 2008). The Hittites, for their part, referred to these in their texts as *dašuwant* (blind), *dudumiyant* (deaf) and *ikniyant* (lame) (Beal 2016: 37). In those same texts, moreover, the Hittite explicitly asked the gods to give him sight, as well as health, vigour and a long life (Beal 2016: 37), without mentioning other senses, suggesting that sight was the sensory baseline for organizing the various dimensions of his world. However, and thanks to those same written sources, we know that hearing and smell were also highly involved in Hittite sensory perception and experience, since, for example, the slave who angered his master could receive two equivalent punishments: dying or suffering the mutilation of the eyes, nose or ears (Beal 2016: 39), from which we may interpret that losing the abilities to perceive through sight, smell or hearing was considered a punishment identical to death.²

This same kind of functional diversity was present in Egypt and Nubia, where highly disabling diseases that compromised one or more of the senses were also frequent. This is demonstrated by several of the studies published in *Palaeopathology in Egypt and Nubia. A century in review*, edited by Ryan Metcalfe *et al.* (2014), where, for example, certain diseases such as temporomandibular ankylosis not only affected the speech and chewing of those who suffered it, but also the sense of taste, closely connected to that of smell. Cerebral palsy, tuberculosis or elephantiasis were also common in ancient Egypt, as indicated by physical anthropology (Buikstra *et al.* 1993), with different implications at the sensory level, and as a common denominator among the three is nociception, that is, the perception of pain through the skin, joints and body organs. On the other hand, pictorial representations of Egyptian art suggest that the lack of some senses invited persons to stimulate other senses in order to perceive, experience and interpret the world differently from other people who

did not experience those same sensory deficiencies. So it was with the blind, who became musicians in the court of the pharaohs. This was the case of the blind harpist from the New Kingdom tomb of Nakht in Thebes, or the blind harpist of the New Kingdom tomb of Patenemheb in Saqqara, who, in Ramesid times, was Chief of Songs of the Temple of Ptah (Dasen 1993). This suggests that the lack of such an important sense as sight for Egyptians, as enshrined through beliefs, mythological stories and associated rites (e.g. myth of the Eye of Horus -Udyat-), was not limiting or socially exclusive, at least not always.

Also, in pre-Hispanic America, archaeological, bioarchaeological and iconographic studies show diseases such as dental diseases (e.g. Tiesler and Cucina 2005) that impacted the sensory sphere (perception and taste experience in this case), as well as bone diseases, such as achondroplasia, a form of dwarfism, that appeared in both Mesoamerica and the Andean area, as seen in iconographic representations, written sources and physical anthropology studies (Rodríguez *et al.* 2012).

It is not the object of this introduction to delve into the reasons why disability should be considered in interdisciplinary studies about sensory perception and sensory experience in cultures of the past. This is due to a larger work in progress that will be the subject of a future publication. However, we record this in order to underline that the relativity of both was conditioned (as it is currently also) by multiple factors that go far beyond those traditionally considered. Transgenerationality, gender diversity or functional diversity played relevant roles in this experience, which, moreover, always had two levels: the individual and the collective, of great importance in community ritual practices, where, for example, another very important variable to consider relates to the consumption of plants and psychoactive substances that altered participants' sensory perception and experience, of which there are countless examples in Mesoamerica and the Andes, and in other ancient cultures as well.

Tobacco (*Nicotiana rustica*), toloache leaves (*Datura estramonio*), angel trumpet leaves (*Brugmansia* spp.), which are extremely fertile in psychoactive alkaloids, ololuhqui seeds (*Turbina corymbosa*), which contain principles such as mescaline, and other plant and fungi, such as *Psilocybe* spp. mushrooms, which are rich in psilocybin, were used in numerous ancient Mesoamerican ceremonies (Carod-Artal 2015). There were identical or equivalent substances used in the Andes and other regions of South America for the same purposes. The intention was to cause alterations and even sensory distortions, especially of a visual type, which, accompanied by other sensory stimuli, such as taste (derived from the intake of the psychoactive

² However, and as this same author also points out, the Hittite texts grant the deaf an exceptional position in religious festivals, such as in the Festival of the Deities of the Underworld, in which a deaf man and a palace servant prepare an aromatic oil, and then the first of them takes the slaughtered ram outside to cook. Deafness, and therefore the inability to perceive and experience the world through the sense of hearing, must have been understood among the Hittites as a condition that favoured the ritual purity that the gods demanded for those who were at their service. This should have applied only to people who were born deaf, and not to those who had their ears mutilated as punishment (Beal 2016: 41).

substance itself, except in the case of ritual enemas, used among the ancient Maya), the auditory (music and chants), the proprioceptive (dance), the olfactory (the burning of copal or other incense that accompanied the rite), and the tactile (the holding of sacred objects and active participation in the ceremony), would have contributed to a unique synaesthetic experience that, as interpreted by ancient people, opened channels of communication with the divine. In many cases, these substances were also used in pre-Hispanic medicine, which suggests, in the case of Mesoamerica and the Andes region, the need for future research that relates sensory perception and experience with the treatment of disease in pre-Hispanic times, considering the interesting results that this line of work has provided in previous studies, and not only concerning the use of toxins rich in psychoactive principles that had great significance in medicine since ancient times (Bynum and Porter 1993).

The topic is very broad and diverse and invites us to delve more deeply, especially now that other senses are being studied in depth by the field of neurosciences and that we know, or intuit, that the senses were highly implicated in ritual contexts. This would be the case, for example, with nociception (the perception of pain through the skin, joints and body organs) and its association with sensory experience, whether altered or not, in autosacrifice ceremonies that included bloodletting, which were frequent in pre-Hispanic cultures. Classic Maya figurines from Jaina Island offer very disparate images of this moment, in which the participants' facial expressions vary from acute suffering to absolute serenity.

It is precisely through pre-Hispanic art that this book will address the theme of perception and sensory experience in ancient pre-Hispanic cultures, and, as the reader will be able to appreciate, many of the aspects that this introduction has discussed regarding the extreme relativity of the phenomenon, and those that are not fully covered, invite future research from one of the diverse methodological approaches that the work of art or its vestiges inspire or allow. One of these is the materiality of art and the possibilities it offers for sensory experience, however relative it may be. To be more specific, the tactile sensation that, for example, is experienced when sliding the hand over a limestone, granite or sandstone stela is completely different, and its respective hardness and textural qualities will favour incisions and reliefs of various profiles and depth, which will cause the light to be reflected in a different way in its entrances and projections (*chiaroscuro*) and affect both visual perception of it and the final sensory experience (whatever it is in each individual).

The same happens with other artistic and cultural subjects and expressions, of which this book offers

examples that link materiality and sensory experience from a wide diversity of media and manifestations that also value the importance of the image in such experience.

The first part of the book explores these themes in ancient Maya art, opening with one of the earliest developing senses, touch. In "Matter, texture, colour and perception of sacred Maya images," García Barrios and Martínez de Velasco affirm not only that the choice of raw materials with which the images of gods were made was conditioned by their function and the context for which they were intended, but also that these materials provoked one sensory experience or an experience in which more than one sense converged. In fact, as the authors point out through examples from the archaeological record, colonial sources and ethnographies, many of these materials guaranteed the activation of multiple sensory receptors in the service of diverse perceptual experiences, as happened, for example, with the images of amaranth, perceived through sight, smell, and taste (Villela 2016: 46-50), expanding the sensory experience and providing more information to the brain and mind, which we must conceive as two differentiated "entities", according to current research in the field of neuroscience.

In the book's second chapter, Mary Miller invites us to continue delving into touch as a way of approaching and understanding ancient Maya art. She does so through Maya figurines, a subject that she knows well (Miller 2019), and that in recent years has been the subject of detailed research (Horcajada 2015). Under the title, "A miniature world of sensory art", Miller proposes that the holistic understanding of these small works is only possible through touch, which forces other senses to be activated as well. They were made "to be held in the hands" and thus initiate a tactile exploration that activates sight, as well as other senses, such as sound, since many were whistles, ocarinas or rattles, or even taste, since "the low temperatures at which some of these pieces were fired allow us to taste them", as Miller notes. This tactile exploration also allows discovering elements on the surface of the figurines, such as fingerprints of the artists, surviving from processes of manufacture, where touch again prevailed and is considered as a dominant sense and way of knowing these works of art.

Eleven miniature clay whistles that were found in the waste midden of the Building J3 of Group IV of the city of Palenque allow Ana García Barrios, Andrés Ciudad Ruíz and Jesús Adánez Pavón to continue delving into this issue, but they focus their attention on auditory perception. Clay was the choice for elaborating pieces that had the purpose of producing music, whose very nature (more invisible than visible, and more intangible

than tangible) illuminates why it has been interpreted on more than one occasion as one of the media used by Maya gods themselves (García and Velásquez 2018: 165; Houston *et al.* 2006: 253). That nature favoured communication with gods in various contexts such as public and private ceremonies involving the interaction of many senses, including sight, smell, taste, touch and, of course, proprioception, given the importance of dance in these celebrations. In these same ceremonies, the sacred aromas that enveloped and intoxicated participants also played an important role in the sphere of the senses and lived experience, since what was perceived through smell was also considered as the matter of gods, and for this reason provided a channel of communication with them and the ancestors (Vázquez de Ágredos and Tiesler 2020); strictly speaking, it was the intangible essence of the sacred.

In the next chapter, Ma. Luisa Vázquez de Ágredos Pascual and Patricia Horcajada Campos address this issue. They first explore the frontiers between sensory experience and sensory perception, and then analyze the close relationship between olfactory experience, culture and ritual in different societies and worldviews. This is confirmed through interdisciplinary studies such as those developed in the Maya area, which are described in this text through two major archaeological findings: incense and perfumed ointments, which may or may not have had cosmetic properties. The results offered by the archaeometry of the senses to characterise the materiality of these ancient fragrances undoubtedly contribute to a greater and better understanding of the sensory universe that served to re-signify and sacralise important spaces and ceremonial practices in the past (Vázquez de Ágredos and Dupey 2018), which continue to be crucial in current Maya communities.

Toward this same direction is Vera Tiesler *et al.*'s contribution to this volume, "Wrapping Maya rulers. An archaeometric study of two funerary contexts in the archaeological site of Calakmul, Campeche, Mexico", which presents us with the physicochemical results and interpretations of raw materials identified in the wrappings that enclosed the deceased bodies of Classic Maya kings at Calakmul. They confirm the importance of colour in these mortuary contexts, as has become customarily understood in recent decades (Pérez 2020; Quintana *et al.* 2008; Tiesler *et al.* 2013; Vázquez de Ágredos *et al.* 2018), and suspect the presence of other materials of a more organic nature that urge us to continue optimizing archaeometric analysis protocols that favour their progressive identification, since they undoubtedly contributed other qualities to these shrouds and, like the aromas, will continue to bring us closer to the funerary customs of the ancient Maya and understandings of the multisensory, immersive and synaesthetic universe that surrounded them, with a strong mnemonic and emotional impact.

That same sensory crucible is multiplied when taste receptors in our taste buds come into play, since taste, like aromas, are not only among the most primitive of the senses and are involved in the very survival of the individual and the species, but precisely because of this, they are directly connected with our limbic system, activating memories and producing diverse emotions. Therefore, sensory immersion and synaesthetic experience are guaranteed when flavours, aromas and textures are set "on the table", and sight and sound are allied to enhance the moment. This is what Lilian Fernández Souza outlines in her contribution to our volume, whose title, "Flavours, aromas and textures: art and everyday life among the ancient Maya", explores a sensory journey that takes place fundamentally through Classic Maya pictorial representations, particularly in the corpus of vessels provided by Justin Kerr, combined with ethnographic data gathered during her field work in different communities of Yucatán over many years (Fernández 2016, 2019).

It is precisely the contribution of María Jesús Novelo-Pérez and Esteban Moisés Herrera-Parra, "Mixtures and textures in Maya culinary art. Evidence from yesterday and today", that most emphasises the need to immerse oneself in contemporary Maya populations to determine the great diversity of flavours, aromas and textures of pre-Hispanic origin that have survived to the present, creating the multisensory universe that flourishes in Maya cuisine, which is in essence feminine, and strengthens cultural identity, and this is what turns the sensory experience of matter (e.g. a tamale) and the intangible that emanates from it (its flavour and aroma) into an inexhaustible source of community strengthening and local development. The palaeobotanical results used in their essay crystallise in a methodological analysis in which archaeology, iconography, epigraphy and ethnography complement each other and point in the same direction in studying matter, perception and sensory experience through food and the sense of the taste, without forgetting others that also come together in the practice of eating that is as mundane as it is sacred (Herrera-Parra 2018), especially on certain dates and celebrations.

Continuing with this crossing of sensory perceptions, but with a greater prominence of sight over others, Marie Charlotte Arnauld invites us into the experience that a visitor would have had "Entering a Maya domestic patio of the Late-Terminal Classic". She does so based on her extensive experience in Group D of Río Bec, in Campeche, Mexico (Arnauld *et al.* 2013a, 2013b), taking us on a journey that enters into each of its spaces, studying the ways they relate to each other, and how sight forces other senses to be activated to achieve a holistic perception of the place, making the visit something programmed and that creates an emotional and mnemonic impact for those who entered

that place for the first time -- they would not forget it. An immersive experience identical to that provided by Maya architecture (and the Maya city itself) was accompanied in the jungle by the numerous sensory stimuli of the surrounding natural environment (visual, aural, and olfactory --smells and stenches-- among others). In addition to these are other aspects of the construction itself, including the limestone, limestone stucco coatings, colour in wall paintings, sculptural reliefs, and graffiti, as well as the beautiful textiles that dressed the interiors of rooms, which we know mainly from Classic period depictions.

In fact, one can use the tools of iconography to address the issue of materiality in Maya art and its close association with images that activated senses that went beyond sight and visual perception. Cristina Vidal Lorenzo does this through the suggestive theme, “The snake in the visual programs of Mayan architecture. Matter and symbolism”, which is still little treated in scholarship, despite its widespread relevance. To do this, she examines various Maya artworks, including recent archaeological finds that enrich her iconographic analysis. These include the stucco frieze of Substructure I of the Acropolis of La Blanca, in the department of Petén, Guatemala, and offers an approximation of the meaning of these representations in Maya architecture (Vidal and Muñoz Cosme 2016; Vidal *et al.* 2017), as well as an interesting final reflection.

In her contribution, “Pre-Hispanic Maya graffiti: perception and representation”, Núria Feliu Beltrán discusses some of the graffiti from this same archaeological site (La Blanca) and others, such as Tikal and Nakum, also located in the Southern Maya Lowlands, which she has widely studied (Feliu 2019). Her text addresses the great challenge that the study of this artistic expression encompasses for different reasons ranging from their materiality, for the most part incised on stucco surfaces covering Maya buildings, and what they represented, which sometimes allows comparisons with Classic Maya pottery scenes. The challenge, above all, concerns who made these creations, who perceived them and how they would have been perceived, which not only involves the sensory universe of sight, but also, and inescapably, that of touch, which frequently increases understanding. It also raises a topic discussed earlier in this introduction: the relativity of sensory experience, which in the case of art (and in this case Maya graffiti) forces us to accept that beyond materiality and the image would exist, as it happens today, a diversity of factors that affect experience, emotions and interpretation. To this point, the author gives the example of the tourist who today approaches these artistic expressions, with respect to the Classic Maya who enjoyed them, concerning cultural, temporal, and spatial relativity, among others, as considered in greater detail in this introduction.

Knowing the materiality of stucco to better understand the effects materials had on the sensory perception of art not only has implications for graffiti, but also for stuccoed ceramics, funerary masks, stucco sculptures and reliefs, and wall paintings, among other artistic media. It also has implications for Maya architecture, since stucco, usually painted, was the second skin that covered it, determining its finish and perception of it (Vázquez de Ágredos and Horcajada 2017). In this sense, knowing its exact composition can help us understand textural, chromatic or light variations that influenced its optical perception, which requires archaeometric analyses such as the one that Núria Guasch-Ferré *et al.* present in the contribution “Archaeometric study of the stuccos in archaeological sites of the Northern Maya Lowlands (Yucatan Peninsula, Mexico): the lime from the mortars of the preparation layers”, which offers comparative results regarding the materiality of these limestone coatings on Maya architecture of the Yucatan Peninsula.

The first part of the book is closed by the essay, “Thrones of the Dresden Codex: The Materiality of Power”, by Merideth Paxton. In it she establishes a relationship between the materiality of these thrones, their function and ancient Maya perceptions of them. Addressing their materials, about which ethnohistoric sources abound, particularly in dictionaries, allows her to delve into the diversity and richness of their colours and textures, which would have activated unique and differential sensory experiences. From “ephemeral celestial matter” to “non-traditional material”, Paxton describes the wide range of materials that gave each of these thrones their own identity, according to their representations in the *Dresden Codex*, which she has widely studied (Paxton 1979, 1980, 1986, 1991), providing a parallel analysis to epigraphic readings and the study of colonial-period dictionaries.

Approaching the materials of art is a common thread in the contribution that opens the book’s second part, but in this case, it is focused on Olmec and Maya works that were manufactured in greenstones of great value, and whose physicochemical characterization has become increasingly frequent (e.g. Manrique-Ortega *et al.* 2020). As with other contributions in the volume, in “Eternity Carved in Stone: Maya and Olmec Greenstone Artifacts Characterized by In Situ Spectroscopic Methods”, Mayra Dafne Manrique-Ortega *et al.* highlight the importance of an archaeometry of the senses in relation to other disciplines and areas of knowledge oriented to the study of sensory perception and experience in Pre-Columbian cultures. At the end of the day, not all greenstones have the same colouration (perceived through sight), texture (touch), temperature (thermoreception), origin or socio-economic consideration or meaning, which influences their respective perception, experience and interpretation. Examples such as Offering 4 from La

Venta bring us closer to this through state-of-the-art results from the analytical protocol that the authors followed for their study of these pieces.

Emiliano Melgar *et al.* also use archaeometry in combination with experimental archaeology in their contribution, “Technological analysis of the obsidian monkey of the Mexica room of the National Museum of Anthropology in Mexico City”, which delves into the materiality and possible origin of one of the most emblematic pieces in the museum’s Mexica gallery. Through exhaustive studies using Scanning Electron Microscopy and experimental archaeology, they reach precise conclusions about the possible origin of the piece and its authenticity, even pointing out that the technological pattern detected in it coincides with that identified at Acolhuacan, in the Basin of Mexico. These results indicate distance from Tenochca productions, and the authors affirm that future comparative studies should test this hypothesis (e.g. Melgar and Solís 2009; Melgar 2011).

On the other hand, the contribution that follows, “Scrolls of smoke and sky: Reevaluating Scent and Sound in the Borgia Group Manuscripts”, by Alanna S. Radlo-Dzur, returns to iconographic study to explore sensorial worlds in the manuscripts of the Borgia Group. In this essay, Radlo-Dzur compiles and exhaustively analyses imagery that she has identified that alludes to invisible emanations related to the sensory universe of the pre-Hispanic Nahuas. Her study shows that the repetition of forms in these codices relates to practices of evaluating characteristics rather than attempting to differentiate sensory categories or subdivisions, such as smell and sound. In other words, and as she herself points out in her interesting conclusion: our “desire to categorise objects into sensorial subdivisions impedes our abilities to see the Mesoamerican focus on distinct qualities and relationships”, which she describes as more holistic and interconnected. Such a conclusion reaffirms the cultural relativity of sensory perception and experience, as well as the way in which the sensory universe was represented in each case.

The codices also are the focus of the book’s next two chapters, by Davide Domenici and Élodie Dupey. In the first, “Studies of the materiality of Mesoamerican codices: I. Notes for a history of scientific analysis”, the authors elaborate a precise state of the field that allows us to travel through the history of the analytical techniques that have been applied for more than a century to identify materials that were used in the elaboration of pre-Hispanic manuscripts. The journey allows us to appreciate how the invasive examinations that were initially used for this purpose, both for the book supports (Schwede 1912, 1916) and the colour palettes (Dark and Plesters 1958), have given way to non-invasive techniques that guarantee better preservation

of the codices (e.g. Domenici *et al.* 2019, 2020). This type of scientific examination applied to the materiality of these books has provided relevant findings related to the symbolic and cultural implications in the history of colour, such as the arsenic pigment known as orpiment (yellow), originally linked to the colonial period, and if it was used in pre-Hispanic times, based on the results gathered in the codices Laud, Fejérváry-Mayer, the Cospì reverso (back) and the Nuttall anverso (front).

The implication of these results in the symbolic and perceptual-sensory sphere is immense, and is in accordance with the horizon to which this book points, in which materiality, meaning and sensory perception of art converge in immersive and unique experiences, which makes it necessary to continually reassess and expand the approaches applied in this interdisciplinary field. Indeed, in “Studies of the materiality of Mesoamerican codices: II. Approaches from history and perspectives for the future”, Domenici and Dupey offer another detailed state of the question, but in this case, they focus on the information provided by historical sources, especially the *Florentine Codex* by Fray Bernardino de Sahagún and the *Treatise on Natural History* by Francisco Hernández, including information about the origins, composition and preparation of colours that were applied to Mesoamerican codices, a subject widely studied by Dupey (e.g. 2017, 2018). The result is a text with an interesting scientific approach to the world of the senses, in which, for example, Domenici and Dupey examine the ancient Mesoamerican relationship between the sprouting of flowers and the emission of words, following the Nahuatl diphthysm *in xochitl in cuicatl*, “the flower, the song”, and colonial texts in Nahuatl known as the *Cantares Mexicanos* and the *Romances of the Lords of New Spain*, studied by Domenici (2016, 2017). This means accepting that in pre-Hispanic times, colours were not only seen, but also perceived in olfactory and auditory ways as well, expanding the sensory experience in synaesthetic terms.

In her contribution to the book, Mónica Gudemos studies auditory perception and its cultural implications through pre-Hispanic instruments from Argentina, Colombia and Ecuador. “Sounds of Copper and Fire. Acoustic Symbolism of Copper Alloys in pre-Hispanic Musical Instruments” is a study in archaeomusicology that highlights certain aspects of these topics, such as the importance of knowing the technology with which these pre-Hispanic instruments were made, due to the influence that their making had in the sound they emitted, which also impacted their symbolism and function in ceremonial contexts involving synaesthetic experience. And thus, among other aspects, Gudemos describes the presence of tin or arsenic in copper alloys, and also discusses the favouring of metallic colours that were highly valued by these and other

pre-Hispanic cultures (visual perception), and the production of alloys with different degrees of hardness, which influenced the final sound production, which is of great interest in the social and ritual spheres of these societies (Gudemos 2016a, 2016b), as other authors have also proposed for Mesoamerica (Simmons *et al.* 2009).

The book is closed by the contribution of Karla Muñoz Acocer *et al.*, “Colours from the past: Mesoamerican pre-Hispanic dyes in Spanish Colonial Architecture in Northern Mexico”, to show that the materiality of art as conceived by the pre-Hispanic peoples of Mesoamerica continued to be present in colonial times, as described in this essay regarding the material, symbolic and sensory world of colour in viceregal architecture in Northern Mexico. The physicochemical results obtained from analysis with non-invasive techniques of the mural paintings of the Jesuit temples of Santa María Cuevas, Cusi and Santa Ana, in Chihuahua, Mexico, show how the processing and use of certain dyes with millenary origin and trajectory in Mesoamerica, such as indigo or cochineal, continued to be crucial for the representation of new images and scenes, distanced from pre-Hispanic gods and beliefs, although the formulations that allowed the use of these organic colours on the walls, after having acquired a hybrid and more stable nature, changed and were reinterpreted, following technical procedures inspired by the Old World. The resulting “mestizaje of materiality” brought to life the images of a new culture and new beliefs and ritual practices, whose sensory perception among the Indigenous populations would have provoked new synaesthetic experiences, as far removed from the original pre-Hispanic ones as was the new political, social, economic and cultural scene that the senses perceived.

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