

ALAN ALVES BRITO

SECOND EDITION **skyAtlas 2000.0**

Stellar Magnitudes (V)
● 0.5 and brighter ● 0.0 ● 0.5 ● 1.0 ● 1.5 ● 2.0 ● 2.5 ● 3.0 ● 3.5 ● 4.0 ● 4.5 ● 5.0 ● 5.5 ● 6.0 ● 6.5 ● 7.0 ● 7.5 ● 8.0 ● 8.5

Double or Multiple Stars
● Individual numbers are plotted if separation exceeds 200"

Variable Stars
○ Color circle shows maximum brightness, inner dot shows minimum brightness (if magnitude < 8.5)

Open Star Clusters
○ Clusters larger than 10' are to scale

Globular Clusters
⊕ Clusters larger than 10' are to scale

Planetary Nebulae
◇ Nebulae larger than 10' are to scale

Bright and Dark Nebulae
Nebulae larger than 10' are to scale

Galaxies
Shown to scale if major axis is larger than 10'

CHART NUMBER **21**



ASTRO-ANTHROPO-LOGICS

ORIKI OF (IN)VISIBLE MATTERS



ASTRO-ANTHROPO-LOGICS:

ORIKI OF (IN)VISIBLE MATTERS

ALAN ALVES BRITO

THIS BOOK IS DEDICATED TO THE TERRITORIES
BELONGING TO BLACK AND ORIGINAL PEOPLES
WHO RE-EXIST EPISTEMIC RACISM IN BRAZIL

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ABOUT THE COVER PICTURE

The first time I saw the work of art called *Dark Sky*, by the South-African artist Gerhard Marx, I was struck. It deeply affected me for various reasons. There was, through a peculiar poetics, the concrete and symbolic materialization of distinct time scales involving celestial and human objects in a dynamic typical of space-time. When I decided upon writing about the “astro-anthropo-logics,” Marx’s emblematic visual depiction stayed with me. For me, *Dark Sky* elicits different metaphors.

The first and the deepest, in an astronomical scale, whispers in my ears that bodies, human and non-human, are directly connected to the celestial cartography, mainly the stars, since each chemical element composing our body (and visible matter) is linked to the processes of birth, life, and death of stars. The sky is somewhat a great graveyard, in which the processes and rites of life and death, shaped, in different cultures, in resilient stories told by the stars, are experienced in sublime and ongoing ways, communicated

through a nostalgic presence of light. The second metaphor, in an anthropologic scale, makes me think that the “human skull” emerging from the celestial cartography in the work by Marx and cohered by dots of star, galaxies, and nebulas, materializes and tenses the logics of what craniometry meant — which tried to justify, through scientific racism, the biological determinism, stripping Black and indigenous bodies of their humanity. It was, after all, from experiments which aimed to distinguish the races through

the size and the details of cranial formation, that science tried to confirm, obviously without success, the idea that some persons (white) were more human than and, therefore, superior to others (Black and indigenous). *Dark Sky*, in an astro-anthropological perspective, translates and democratizes our sense of humanity at the same time as it resettles, for Brazilian society, the challenge of fighting the existing politics of death, which directly affect Black, quilombola, indigenous, LGBIT+ people, and women.

PRESENTATION

For a work such as the one the reader now holds, it is telling that the French anthropologist Claude Lévi-Strauss (1908-2009), founder of structural anthropology,¹ has said that “the anthropologist is the astronomer of social sciences: it is their duty to discover a meaning for very different configurations, in order and greatness and distance, from those that are immediately close to the observer.”²

As a physicist, astrophysicist, writer, science communicator, teacher, and researcher articulating teaching, research, extension in physics and astronomy, one of my main objectives is

to reflect upon the structural issues of the country and promote racial equality and diversity in basic education and society. I foster and unsettle the debate about the ethnical-racial relations in their multiple and complex intersections with other social markers of difference in Brazil. That is why I often prefer to consider myself an *astropologist*³, mainly in intercultural dialogs with *quilombolas*, indigenous people,⁴ Black people, and other bodies placed in the margin of citizenship in this country formed by multiple cultural matrixes. Astronomy and anthropology are, so to speak, in their respective scales, sciences of other

¹ In this school of anthropology, cultures are understood as systems of signs shared and structured by kinship in search for the modus operandi of the human spirit. Cultural anthropology, on its turn—associated to the German anthropologist Franz Boas (1858-1942) is aimed at studying the diversity of human cultures, be they extinct or contemporary.

² Claude Lévi-Strauss. *Antropologia Estrutural*. Rio de Janeiro: Tempo Brasileiro. 1967. Translated from the Portuguese.

³ Neologism, to remind myself that my head and my heart are connected to the skies and the earthly things, to the life of people and ecosystems.

⁴ Denomination given by colonizers to the original peoples.

worlds possible: structured, cultural, backed by social, linguistic, psychological, political, and economic contexts, constantly articulating and re-creating *social technologies*, translated and trespassed by the poetics (oriki⁵) of (in)visible matters, narrated by the gentle stories of humanity.

Thus, here I present some *racialized cosmologies* that connect us to astrophysical and anthropological regimes in a poetics that reverberates processes of birth, life, and death in the Universe. From different astrophysical environments, in the context of modern scientific cosmology, I hope to trigger reflections about the processes of birth, life, and *carnage* which, associated to COVID-19⁶ (Corona Virus Disease 2019) in Brazil, deepen the historical issues that exclude the experiences of *otherness* (Black and indigenous people, quilombola, LGBT+⁷), marginalized from existence. If Lévi-Strauss is the *astronomer of human constellations*, it is because these Astro-anthropo-LOGICS should return humanity, cul-

ture, poetic beauty, and aesthetics to science, viewing it as a collective creation of humanity, possible only from the stories of all peoples that are eternized in the resilience of the stars in the night sky. In addition, this text debates with (i) the Laws 10,639/2003 and 11,645/2008, which enforce the teaching of African, African-Brazilian, and Indigenous History and Culture in all the levels of Brazilian education; and with (ii) the National Curricular Guidelines for Quilombola School Education, promulgated in 2012, aiming to promote the identities and rights of *differentiated* political subjects.

In the moment of writing this text, Brazil faces one of the most complex global sanitary crises of the present. The Coronavirus, causer of the pandemics, belongs to a family of virus (CoV) that has been circulating in the world since December 2019 and in the country since February 2020, causing from common colds to very harmful diseases, such as the severe

⁵ Yoruba poetic style. See Antônio Risério. *Oriki Orixá*. São Paulo: Perspectiva, 2012.

⁶ Jean Segata et al. The COVID-19 and its pandemics. *Horiz. antropol.*, Porto Alegre, ano 27, n. 59, p. 7-25, Jan./Apr. 2021

⁷ Lesbian, Gay, Bisexual, Transvestites, Transgenders, Non-Binary among other gender identities, orientations, and expressions.

acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the Middle East respiratory syndrome (MERS). Since the beginning of the pandemics — and while I am writing this text (July 2021) — Brazil has registered 19 million cases and 530,000 deaths. More than numbers in a haunting scale, these are people, lives, with faces, feelings, motions, who pulsate; lives cut short, lost amid the deepening of necropolitics⁸ in the country, denounced by many potent voices. Among them, the researcher Jurema Werneck⁹ for decades has focused on the intrinsic issues of institutional racism and the health of the Black population in Brazil¹⁰; and the physician and researcher, specialist in family and community health Andreia Beatriz Silva dos Santos¹¹ denounces the consequences of selectivity of criminal justice and structural racism in the health and life of people within prison communities. In intercultural and poetic dialog (as-

tronomy of cultures), this work was produced and created from reflections and connections in the sphere of plans developed by myself and my collaborators within the Research Project Collaborative Action *Zumbi-Dandara dos Palmares: desafios estruturais e pedagógicos da Educação Escolar Quilombola para a promoção da equidade racial no Brasil no século XXI* (structural and educational challenges in Quilombola School Education for the promotion of racial equity in 21st century Brazil), within the context of the Study Center of Work Relations and Inequality (CEERT); of the Scientific Initiation Program *Ciência na Escola, Ciência na Sociedade* of the Research Dean of the Universidade Federal do Rio Grande do Sul (UFRGS); in the experience accumulated throughout the years directing the Astronomic Observatory at UFRGS as well as part of my hectic activities in teaching (exchanges with the students), research and extension

⁸ A term coined by the Black African writer Achille Mbembe who seeks to account for the management of the politics of death fostered and managed by the States.

⁹ Black Woman, researcher, physician, feminist, Doctor in Communication and Culture by the Universidade Federal do Rio de Janeiro (UFRJ), activist of the Brazilian Black Women Movement and human rights, executive director of Amnesty International-Brazil.

¹⁰ Jurema Werneck. *Racismo institucional e saúde da população negra*. Saúde Soc. São Paulo, v.25, n.3, p.535-549, 2016

¹¹ Black Woman, coordinator of the Work Group in Prison Healthcare of the Brazilian Society of Family and Community Medicine and researcher of the Interdisciplinary Studies Nucleus on Inequalities in Health of the Universidade Estadual de Feira de Santana.

(diverse projects) in the Undergraduate and Graduate Programs in Physics, Graduation Program in the Teaching of Physics and the African-Brazilian Studies Nucleus (NEAB/UFRGS), which I currently lead.

This text — weaved in an educational dialog with the online exposition *racialized cosmologies*¹² — is a nostalgic and realistic narrative of (in)convenient truths. As this material presents *racialized cosmologies* that haunt us, it seeks to materialize the complex relationship between science, technology, art, society, and politics, disclosing the poetics of (in)visible matters, which break open deep social inequalities. As we write this *human* history, the *entropy*¹³ of the Universe follows its course, eloquent and merciless, silently, crossing, without faltering, bodies of Black and indigenous people and others that are historically excluded from the national citizenship and de-

mocratic networks, preferred targets of the many pandemics evidenced by COVID-19. More than a pandemic, we are experiencing a syndemics,¹⁴ a worsening of the health of populations, not only due to COVID-19, but mainly for its combination with unfavorable social factors, generating greater vulnerability and socioeconomic inequality. The syndemics thus represents here coronavirus as a generating factor, but it acts in combination with many other diseases and comorbidities, which are generally evidenced by social inequality and absence of public policies for reducing attenuation factors. Walking with the virus we have factors such as lack of housing and employment, environmental deterioration, poverty, and starvation.

ALAN ALVES BRITO
PORTO ALEGRE, JULY 2021

¹² Instagram: @cosmologiasracializadas.

¹³ Measure of disorder and chaos of a physical system. Second Law of Thermodynamics.

¹⁴ The neologism *syndemics* combines the words *synergy* and *pandemics* was coined by Merrill Singer, American anthropologist and physician, in the 1990's, to enclose the ideas that not necessarily two or more diseases interact to cause greater damages than the mere summation of these two diseases.

PREFACE |

Ago Yê Mojubá, I ask for the blessings of the Council of Yias and Babas — Yalásé Yashodhan Abya Yala, Yabace Mako'ilê, BaOgan Bàbá Kinni, Babalawo Mhelkior and my younger ones so that my asé of writing be one of respect, truthfulness, simplicity, and gratitude. I am Omó Ayo Otunjá, Yakekerê, Yamoro of the Muzunguê Nation — *Morada da Paz Kilombola* Community.

It is in name of this Community that I would like to invite you who are worried by the misgovernment of the States to come together to reflect with this writing that comes to reveal that

Black bodies still tumble due to the color of their skin and the way of being and living in the world. In this senseless struggle, that is, this daily slaughter as people that carries the spirituality of the orishas and, as their ancestral roots that we are, we will not give up on swimming in these turmoiled waters. As our Ancestral Yaba Mãe Preta says: “Oba is on our side.” Thus, we will keep on drumming, letting out our war cry, exchanging knowledge and practices with our indigenous kinsmen and women, since we have the right and the duty to keep on (re)existing in the history of the world.

MAY WE GO FORWARD!

OMÓ AYO OTUNJÁ

Free your Black essence, your consciousness with persistence

I sing to the elders, to my allies, to my orishas

I ask Ago Yê Mojubá to my Iyas to saravá

Singing this I pray fluently

Swimming against the tide

Epa Oh Bàbá

MUSICAL POEM BY THE GROUP SEMENTE DE BAOBÁ,
YOUNG PEOPLE OF THE MORADA DA PAZ KILOMBOLA
COMMUNITY WHO WRITES THEIR LYRICS FROM
THE WAY OF BEING AND LIVING, 2018

PREFACE II

The history of Black populations around the world, mainly those who underwent the process of colonization, account for the great difficulties faced for centuries, given that the marks left by such a process unfold in the multiple colonialities that are laid bare at each and every move of a Black person in sexist, classist, and racialized societies. Therefore, the access of people in certain sectors has proven very difficult; entering as subjects — male and female — of rights and stories told from oneself, by oneself; stories whose meanings can make sense at each piece placed in the mosaic

that makes up the lived life and felt with the heat of emotion of one who builds a text that will serve as a guiding light for others who will come a posteriori. The difficulty is justified insofar as the scientific community itself contributed for its exclusion; arrangements made by a select few who deem themselves owners of humanity. Likewise, the so-called hard sciences have always been seen as impervious to downtrodden populations, namely Blacks, women, LGBTQIA+, and those living in poverty. It is from this standpoint that the book *astro-anthropo-LOGICS: poetics of (in)visible matters* is a proposi-

tion to disrupt the colonialities lingering in the sciences in Brazil, perhaps worldwide, in considering the manifestations of contempt for Black lives, just as the inequalities brought to light by the COVID-19 pandemics. The author masterly strolls through narratives of invisible matters, which draw us closer insofar as these matters constitute parts of our body-matters, of the social-anthro-physical facts that circulate the dyatopic lives, even though they are persistently de-humanized. The book is a dissidence amid the products of similar approach, since all the text brings about dialogs from the Laws 10,639-2003 and

11,645-2008, as well as the National Education Curriculum Parameters Law to include in the approach cultural knowledge and practices of the Black, indigenous, and quilombo-la populations, parts producing the scientific bases that allow analyzing the cosmos. Moreover, the work flirts with Anthropology in order to yield an even more realist view of themes often deemed unreachable by groups at the margins of the production of their own analysis and that should also be produced by them.

JOANICE CONCEIÇÃO¹⁵

¹⁵ Doctor in Anthropology. Professor at the School of Anthropology and the Graduation in Humanities -UNILAB, CE. Head of the A Z Â N I A *Study and Research Group in Culture, Race, Gender, Sexualities, Religion, Performance and Education.*

RACIALIZED COSMOLOGIES¹⁶

ALAN ALVES-BRITO



¹⁶ Text adapted from the paper for the popularization of science produced in 2018 for the *Ciência e Matemática Blog*, at *O Globo*, as well as from two writings produced by the author for the UFRGS newsletter in 2020, in which conditions of race, education, and disclosure and circulation of sciences in this century are portrayed. A significant part of the text was published in English and is available in the collection of articles *Black Holes and Poetry*, published by Patanjali de la Rocha and available at:
Access in 8 July 2021.

The sciences are among the great realizations of human creativity; embedded in technologies, they have variously changed the lives of people. Although there is no consensus in literature about the best way to approach them, convey them or disclose them (either theoretically, technical-experimentally, historically, philosophically, sociologically, anthropologically, artistically, or culturally), the historical experience teaches us that *science* is a dynamic concept and, as such, changes in time and space. There is a consensus, however, concerning the fact that sciences, allied to the arts and other forms of representing, knowing, and understanding the world have a fundamental role in the processes of (re) invention of life and in the building of a *less deadened reality*.¹⁷ Therefore, education, circulation and disclosure of sciences in this century appear as powerful social technologies for the establishment of other configurations of being and existing in the world. However, the world still undergoes the greatest global sanitary crisis of our time, breaking open political, economic, social, ethic, and moral fragi-

lities typical of the 21st century geopolitics. On the one hand, we have the COVID-19, responsible for more than 185 million infections and more than 4 million deaths worldwide. On the other hand, the historical contradictions of the Western order of the colonialist, capitalist, and patriarchal world — which has been an *in vivo* laboratory to rethink processes of death and slaughter of historically excluded bodies — Blacks, poor, women, LGBT+, indigenous, elderly, and handicapped — not only of the social fabric, but also of the material and symbolic developments of science produced in different countries. These two realities — two sides of the same coin — bring us singular challenges and suggest new reflections about the value and the role of science and technology to face social inequalities and, in different context, deepen them. In this sense, the mainstream representations in the world need to be challenged, rethought, and re-dimensioned. The cosmological models developed by astronomy and physics throughout the centuries are deemed essential not only for the historical construction of the modern and

¹⁷ Reference to the classic song “Cálice”, by the singer, songwriter, and writer Chico Buarque de Holanda.

contemporary concept of science but also as foundational elements of the mainstream epistemology and methodology (which are Eurocentric, deterministic, positivistic, experimental, based on the split between subject and object) in the field of education and popularization of science, both mostly white, West-centered (Europe and the United States of America), male, cis-gender, heteronormative and segregationist, focused on the *well-off* people of the global South and North. In Brazil — whose population is mostly Black (56%), yet under-represented in positions of power of the social organization — one of the greatest challenges of public basic education in this century is to foster a new project of education and popularization of sciences, more diverse and inclusive, aimed at strengthening democracy and schooling, here thought of as part of the anti-racist political and educational processes. It should be remembered that, in Brazil, there are engendered systems of physical extermination of Black people (Black genocide), of original peoples (indigenous genocide), women (femicide), and LGBT+ (as

part of the symptomatic LGBT-phobic trait of Brazilian society). Brazil is the country that kills most LGBT+ people around the world for being who they are. In addition, there is the epistemic genocide of Black and original peoples, historically distanced from schools and universities, which are important places of power struggles. The quilombola and indigenous school education in Brazil, as *differentiated* projects of teaching and learning, are challenges and, at the same time, potentialities. Moreover, it should be highlighted that, according to recent data,¹⁸ around 10-15% of the teachers and scientists in Brazilian universities are self-declared Black in a predominantly Black country. The original peoples are absent or under-represented as teachers, scientists, and researchers in universities, museums of sciences, planetaries, and other spheres of power in Brazilian society. In this scenery, anthropology constitutes a fundamental science to dismantle LOGICS of racist narratives naturalized in Brazil and strengthen the ethos of the marginalized populations. The hegemonic representation of the Universe, materialized in physics,

¹⁸ As, for instance, the Census of Higher Education of 2016.

astronomy, and cosmology, is organized and founded on the context of the presuppositions of modern and contemporary science and, therefore, has color, gender, race, class, and geographical origins that are well-defined, being, therefore, a racialized cosmology. Thus, it presents to us and re-formulates some of the most important questionings that follow us throughout the millennia. Who are we? Where do we come from? Where do we go to? Why are we here? How did the Universe shaped itself and how has it evolved?

POETICS (ORIKI) OF MATTERS

Scientists in physics, astrophysics, and cosmology seek to understand what 95% of the Universe is made of—a fraction divided into dark matter (27%) and dark energy (68%), which, although they receive the same predicate (*dark*) have different physical natures. Around merely 5% of the Universe (baryonic matter or luminous matter) corresponds to what can be measured, detected and, from the physical standpoint, described with details. This minute portion is described through the chemical elements of

the periodic table — the basic ingredients of matter and of all things currently observable in Nature. In this sense, the periodic table of the chemical elements is one of the most powerful tools of modern science. But what is actually the origin of these elements and what is their relationship with the *racialized cosmologies*?

In the hegemonic narrative of the origin of the Universe, all that exists begins with the *Big Bang*. After 13.8 billion years, the Universe expands and starts to cool down over time. In the end of the 20th century, we found out that the Universe's expansion is speeding up — which is a *signature* of the so-called *dark energy*, equally unknown to us. In the formation and evolution of the Universe, physical and astrophysical processes happen in different scales of time: The stars, the galaxies, and the planets were formed; life itself as we know it blossomed on Earth. It is estimated that there are more than 200-400 billion galaxies in the Universe (this number may reach trillions) and one of them is crucial to us: the Milky Way; and, among the mor than 200-400 billion

stars that are calculated to exist in our Milky Way, one in particular is essential to life as we know it: the Sun. More than 4 thousand planets have been discovered in the Milky Way, outside the Solar System, but none (up till now) can be our Earth 2.0. That is, we are alone in the Universe, at least for the time being. We are the only beings capable of looking at all of this and ask fundamental questions about the architecture of the Universe and about how we are linked to the Cosmos. This hegemonic narrative invites us to think about our cosmologic responsibilities to preserve life on Earth, not only of our species, but of all living beings. *We should, then, overcome our old ethnocentrism, which places us in a privileged position of power in the organization of these structures to humbly remind us that this same hegemonic narrative has contributed to hierarchize beings and ecosystems, denying humanity to many of them, as occurs with Black, indigenous persons, women and LGBT+ in the history of science.*

This cosmologic, astro-anthropo-LO-

GIC, and poetic dimension of (in) visible matters is important since we need to reinvent life on Earth. We cannot keep on treating our planet as if natural resources were infinite and social inequalities founded on biological constructions. In order to reinvent life, we need to be aware of its rarity and its beauty, but, above all, of its political understanding, observing the poetics that opens up ahead of us. We need to develop the politics of affection and of the open ear. We can no longer naturalize that the knee of a policeman suffocates — stopping the oxygen, product of millions of years of stars much more massive than the Sun — black bodies in the streets of racialized societies in the world, in which the CIS-tems¹⁹ of justice are almost always in favor of white supremacy. We can no longer naturalize that bodies of women, trans-people, transvestites, and indigenous people keep on living in permanent social distancing and isolation with death on their tracks all the time. The poetic of matter should teach us that life is pre-

¹⁹ Leticia Nascimento. *Transfeminismo*. São Paulo: Jandaíra, 2021

cious since we know — even through science’s hegemonic narrative — that we are connected to the stars. Except for oxygen, formed in the first instants (3-5 minutes) of life in the Universe, each chemical element that is part of life as we know it was forged in stars of different masses. This is the ratification of the principle of *Ubuntu*.²⁰ The oxygen that we breathe, the nitrogen of the atmosphere, the iron in our bloodstream, the calcium of our bones, the silicon of our computers, and the fluor of our toothpaste are formed inside the stars or in processes that involve the birth, the life, and the quiet or dramatic death of stars of different masses.

In addition, each chemical element is formed by atoms, which group themselves to form molecules. And these atoms, on their turn, are constituted by sub-atomic particles as protons, neutrons, and electrons, as old as the Universe (13.8 billion of years). We can affirm that life already announced itself pulsating in the first moments of *life* of the Universe, even if we

have waited at least 9.3 billion years until our Solar System was formed so that the conditions for life to blossom on Earth emerged, in quite peculiar circumstances.

Thus, we need to build another dynamic of existence. A cosmology — representation of world, reality, a potent place of the imagination — that favors life and not the stupid and banal death of certain bodies, which prevents, for instance, that Black, indigenous, and LGBT+ children from dreaming. The hegemonic racialized cosmology through its *modus operandi*, based on facts and evidences, leaves no doubt about the need to advance in this debate on how we deal with other racialized cosmologies. This is one of the great challenges of the 21st century, the century that suffocates us, the rivers and other elements that constitute nature.

REMNANTS OF STARS

The theory of stellar evolution tells us that, according to the initial conditions, chemical masses and com-

²⁰ Ubu (ontology) + ntum (epistemology): I am because we are.

positions, and if the stars are isolated or form double systems, these will *live* and *die* in different manners. From the beginning of the Universe to the formation of the Solar System, at least 9.3 billion years have passed. Our Sun formed itself around 4.5 billion years ago, from a gassy nebulae (molecule cloud) composed of hydrogen and helium (98%) and metals²¹ (2%). These metals were not produced in the Sun, which, in the moment, still turn hydrogen into helium in its center,²² in an evolutive phase called main sequence; the 2% of metals found today in the solar atmosphere were formed in stars that *were born, lived, and died* before the Sun was born. Despite the small participation of gassy solar molecule cloud, the *metals* are responsible for the differentiated chemical composition of the planets of the Solar System and, more importantly, for the production of chemical elements and molecules that will give origin and maintain life on Earth. Without the metals, we would not exist.

In astrophysical and cosmological terms, the *poetry* of life, as we know it, occurs mainly due to the CHONPS (carbon, hydrogen, oxygen, nitrogen, phosphorus, and Sulphur) in addition to other elements. The oxygen, formed in stars of high mass,²³ bind hydrogen²⁴ and both give origin to water (H₂O), a fundamental liquid to life since it stands for ~70% of the human body. In addition, life emerged around 1 billion years after the Earth was formed in a long scale of cosmo-geo-logical time.

Therefore, we have many questions and few answers about these varied connections. But, up to now, theory, experimentation, and observation walk together in this journey toward scientific knowledge. Although we have already unconcealed some of the *secrets* about the processes of formation of chemical elements in nature, there are varied questions waiting for answers: What are the details of the physical processes that produce chemical elements and in which astrophysical environments? What is the

²¹ Metals, in astrophysics, are all the stable chemical elements in the periodic table, except for hydrogen and helium.

²² Stars are said to be born when, in their core, high temperatures (minimum of 15 million Celsius degrees) allow nuclear fusion to happen, that is, the thermodynamic conversion of lighter chemical elements in heavier ones, liberating energy, the conversion of hydrogen in helium being the simplest reaction.

²³ Stars with masses higher than 10 times the Sun's mass and which therefore live for millions of years.

²⁴ Hydrogen, helium and a small portion of lithium were formed within the first three minutes after the *Big Bang*.

chemical composition of the Universe and what impact does it have on the formation of stars and planets? Is there any connection between the chemistry of stars and the planets they host? What is the chemical composition of more than 4,000 planets now known as Solar System? What else does the quantum mechanics, that is, the physical part that deals with the atoms and the *very small world*, is hidden in the understanding of chemical elements of the periodic table? What is life? Are we really alone in the Universe? What else is there between sky and earth?

THE NOSTALGIA OF LIGHT

We — the scientists of Brazil and the world — passionately and enthusiastically, but not without difficulties, attempt to answer some of these questions through the main technique we have to measure the quantity of chemical elements in the Universe: spectroscopy, which is steeped on principles of quantum mechanics. Since

the beginnings of the 20th century, although inaugurated earlier, spectroscopy has been used to analyze and interpret the light of the stars. It is the same principle that allows us to understand the separation (decomposition) of light into colors after a soft evening rain — the rainbow, which has so many semantic modulations in the varied indigenous, African, and Afro-Brazilian cultures, representing, in some cultural contexts, the communication between Orun and Aiyé.²⁵

In physics and astronomy, astrophysics studies the interaction between light (radiation, electromagnetic wave) and matter (atoms).²⁶ In this sense, state-of-the-art telescopes and instruments, available in the mountains of Chilean and Hawaiian cities, have changed our ideas about the formation of chemical elements in the Universe. Today, we know and understand better, through the nostalgia of light, why we are cosmologically and poetically *sons and daughters* (remnants²⁷) of stars. The next years foreshadow new *adventures*

²⁵ In Yoruba culture (currently Nigeria), *Orun* is heaven and *Aiyé* is earth. The rainbow is associated to a powerful divinity of the Yoruba pantheon named Oshumare, the owner of the clay jugs, orisha associated to beauty, change, and transformation.

²⁶ The analysis of light to reveal the mysteries of the Universe is actually a similar work to that of the archeologist. Light is, for astrophysics, a fossil, supplying information about the past.

²⁷ With the 1988 Federal Constitution, quilombolas were acknowledged as political subjects of law, and their communities, *remnants of quilombos*, part of the Brazilian cultural heritage.

when telescopes and its new ground instruments, with 25-42-meter diameter mirrors will be fully operative in Chile and in Europe; during that time, smaller telescopes will be launched in space in order to reveal the puzzle of chemical evolution and the formation of the chemical elements of the Universe and life in the cosmic context. In each and every new step, we cannot disregard the ethical commitment we have with the preservation of nature and the well-being of all those who — visibly and/or invisibly/invisibilizedly — make up the Planet Earth, the *pale blue point*²⁸ in its cosmic dance amid the myriad stars of the Universe.

ASTRO-ANTHROPO-LOGICS: THE VOICES OF “SILENCED MAJORITIES”²⁹

Within the context of the first provocations of this work focused on the *racialized cosmologies*, we should ask: Where are the other voices, representations, and narratives of the world? Who has so far had the right to speak about something within the ambit

of the science-subject-Nature-object relationship and to explain these cosmic disconnections? How will the different *racialized cosmologies* (Afro-centered, of ORI-ginary peoples and Western-ORI-ented³⁰) be able to live together free from cosmophobia?³¹ How can we solve ethical and scientific questions involving, for instance, the notion of development offered by astrophysics and cosmology within the context of the installation of one of its most robust projects of *very large telescopes* on a mountain that is sacred to Hawaiian original peoples? Or, alternately, in the case of Brazil, how can we solve the historical dilemma of Black *quilombola* communities that live in territories of the State (in a pathogenic relationship with the United States of America) in the facilities of the Alcântara Space Center in the State of Maranhão? When we think of the odyssey of formation of the chemical elements in the Universe, which elicits our citizenship within the Cosmos, the fundamental question we could ask is: Why do we have to hide this precious and poetic nar-

²⁸ A reference to the well-known picture of Earth taken in February 14th 1990 by the *Voyager 1* space probe at a distance of 6 billion kilometers from the Earth.

²⁹ A term coined by the Black feminist thinker Lélia González (1935-1994).

³⁰ *Ori*, word of Yoruba origin meaning head. A powerful divinity in Yoruba cosmology.

³¹ A concept coined by the quilombola researcher Antônio Nêgo Bispo.

rative from the general public, mainly the students and teacher of basic education? Why are these and other cosmological narratives not accessible to more people? What does the COVID-19 situation, mainly from the cosmo-perception of silenced bodies, have to teach us in the perspective of the establishment of a new order of thinking and organizing the subject-object-Nature relationship?

Many are the questions; few are the answers. But taking into consideration the perverse state of *post-truth* — an ideological virus enhanced by fake news, conspiracy theories, racism, and political interests — which has been the lexicon of our times, the circulation and disclosure of science and technology in Brazil and other places in the world, mainly among those excluded from these processes, become urgent. Scientists and scholars/thinkers must establish new connections with the society concerning the discussion/presentation of the historical, social, and cultural role of science and technology for the construction of *truth*, understood as the relationship with *reality* and, again, limited in space and time, articulating not only new forms of good living, but also of living itself with thinking.

No new culture of scientific circulation and disclosure can be founded in Brazil and other places in the world — in order to fight structural inequalities and reinvent life — without decolonizing thinking, humanizing and de-racializing modern and contemporary science. The dialog between different fields of knowledge and the promotion of intercultural exchanges (undervalued collective knowledges) are fundamental steps to be taken. More and more people need to be part of the project of scientific construction, understood as a *process*. What do physics, astronomy, and anthropology actually yield? *What are their objects of study? How do they develop as sciences?* What is the place of art, aesthetics, and poetry in this dialog? How can we build other narratives and realities through arts and sciences? Will we be able to strengthen the utopias amid the current dystopias, unforetold even by fantasy?

Our current reality breaks open the fragilities of the Brazilian social fabric and reveals the symbiotic relationship between science, technology, and politics. The circulation and communication of the sciences should aim at *scientific truth* and ethics and should be able to help science to (re-)invent life, ena-

bling other *humanities* to take centerstage, activating their affects, aspirations and inspirations. Collectively, we will be able to assess the risks and benefits of science and technology to build another relationship between humanity and Nature and a new culture able to see science as a powerful social technology, crucial for establishing democracy in Brazil?

Lélia González's *pretoguês* (a pun combining the words 'preto' [black] and 'Portuguese' meaning a typically Black variation of Brazilian Portuguese) has to help us in re-writing and recovering Black histories in science, whose blackness, potentialized and re-signified in African and Afro-Brazilian culture, not only warns us about the danger of *single stories*,³² but also bring new onto-epistemological questions involving the subject-object-nature relationship and present us with cosmoperceptions that are non-exclusive, cosmophobic, fearful, and tricky in relation to other existences. Discussing and problematizing blackness/ethnicity in science means, above all, unveiling and situating whiteness, contributing to the subjective, institutional, and structural (de-)construction of our oppressive systems of production of knowledge. Discussing science and blackness/ethnicity allows us to foster diversity, equality, and equity within

the scientific and technological environment to promote anti-racist education as a true hallmark of innovation, synonymous with social transformation and full establishment of democracy in Brazil.

The current reality of Brazil and other countries in the global North and South shows us that the critical, reflexive, affective communication and disclosure in sciences are fundamental for establishing democracy, bringing people near the scientific community. The forms of scientific education and communication should have the main target of coming closer to people, understanding their beliefs, values, and attitudes, making them see that science, as hegemonic narrative, is not neutral, pure, naïve, but, on the contrary, raced, colored, gendered, classed, and geographically situated. More people need to understand the impacts (either beneficial or perilous) of science and technology in their daily lives and, more than ever, be prepared to make critical decisions. Thinking about *racialized cosmologies* allows us to deepen the creation of another *ethos* (interaction), *logos* (reason), and *pathos* (subjectivity) of these new networks of conflicting knowledges in this century, mainly within the *post-pandemic* context, which will most likely demand of us the building of new civilizational standards.

³² Debating with the inspiring ideas of the Nigerian writer Chimamanda Ngozi Adichie.

ASTRO-ANTHROPO-LOGICS I: THE FOREST AND THE DIASPORA

“The forest is alive. It will die only if the whites insist on destroying it. If they succeed, the rivers will vanish under the earth, the ground will crumble, the trees will fade, and the rocks will break in the heat. The dry earth will be empty and silent. The xapiri spirits, which descend from the mountains to frisk in the woods in their mirrors, will flee far away. Their parents, the shamans, will no longer be able to call them and make them dance to protect us. They will not be able to ward off the smokes of epidemics that devour us. They will no longer be able to keep the evil beings at bay, and they will turn the forest into chaos. So, we will die, one after the other, both the whites and us. All the shamans will eventually die. When none of them is left alive to hold the sky, it will collapse.”³³

DAVI KOPENAWA, YANOMAMI SHAMAN AND POLITICAL LEADER

³³ Davi Kopenawa; Albert Bruce. *A Queda do Céu: palavras de um xamã Yanomami*. São Paulo: Companhia das Letras, 2015.



From the beginning of the world, the sky is the place of storytelling. The night sky connects all the peoples that have lived on Earth and leaves us with ancestral questions — Who are we? Where do we come from? Where are we going to? Why are we here? What is the meaning of it all? Are we alone in the Universe? Assorted peoples in different cultures/ethnicities looked at constellations, stars, planets, and galaxies — at first sight static objects, but dynamic in their hurry to *re-exist* —, listened, and

registered stories. The Constellation of the Old Man, historical for the original peoples of Brazil, was long ago recognized by the Tupi peoples, native of South-American regions. Directly related to modern and contemporary astronomy, the Old Man has, on its head, the young stellar cluster named Hyades (millions of years; associated with the coming of rain), whereas the Pleiades, which form another young stellar cluster of significance in several cultures (associated to the coming of the New Year

in the Tupi-Guarani culture) give meaning to the feather seen on the old man's head. The Orion Belt — a group of stars known in Brazil as the Three Marias — part of Orion nebula, which is, in modern astronomy, a region of star formation, materializes part of one leg of the Old Man. The Three Marias represent the sunrise and sunset in the Spring and in Autumn to some cultural traditions. The young clusters, known as open clusters, draw the spiral arms of the Milky Way and fundamental astrophysical laboratories to understand the *Family Picture*³⁴ of the stars.

The mythological narratives, understood here as potencies of *re-existence*, posit that the other leg of the Old Man was cut by his wife and, therefore, the image shows that the right leg ends in the supergiant star Betelgeuse, another

important milestone in the sky and in the cosmology of many indigenous peoples in Brazil and in Africa. Bit by bit, the sky is a territory of alterities and identities, which characterizes it as a historical, cultural, and natural inheritance of humanity. Amid localities and universalities, the narratives of the sky express a potency and an intelligence that the epistemic racism — based on scientific racism — will never erase.

In 1500, when the Europeans arrived at Brazil, the indigenous population numbered around one thousand peoples. Currently, according to statistical data, there are only 256 indigenous peoples in our country, accounting for a population of 817 thousand people. This number has been decreasing every year.

³⁴ Here used in its figurative and poetic sense to point that the stellar clusters are ideal places for studying the stages of the astrophysical processes associated to birth, life (evolution), and death of stars.

To Caetano Veloso, in his wonderful song *Um Índio* (An Indian),

[...]

An Indian preserved in full physical body
In every solid, every gas, and every liquid
In atoms, words, soul, color
In gesture, in smell, in shadow, in light, in magnificent sound
In an equidistant point between the Atlantic and the Pacific
Of the yes-object fulgurating the Indian will descend
And the things that I know that he will say, do
I cannot say in such an explicit manner

[...]

And that that, at this moment, will be revealed to the peoples
Will surprise all not for being exotic
But for having always being able to be concealed
When it will have been obvious

“The virus does not kill birds, bears, no other being, only humans. Those who are in panic are the human peoples and their artificial world, their way of functioning that is in crisis... This package called humanity is being absolutely excised from this organism that is the Earth, living in a civilizational abstraction that suppresses diversity, denies the plurality of the forms of life, existence, and habit.”³⁵

AILTON ALVES LACERDA KRENAK, WRITER, JOURNALIST, PHILOSOPHER AND INDIGENOUS LEADER

³⁵ Ailton Krenak. *O amanhã não está à venda*. São Paulo: Companhia das Letras, 2020. Ebook.



ΟΚΕΟΚΕΟΚΕΟΚΕ

Nassimata

Abdias do Nascimento (1914-2011), one of the greatest Black thinkers and scholars, activists, and politicians (ex-Senator) in Brazil, coined and popularized concepts such as “Black genocide” and proposed the creation of a Quilombista Republic. Writer, playwright, and visual artist, he presents an artistic and creative sensibility that dialogs and connects the African continent with the Black peoples of the Diaspora. In his emblematic work, he provides us with an Afro-Brazilian cosmoperception aligned with astro-anthropological elements that reveal sublime poetics of (in)visible matters. In his painting *Okê Oxóssi*, art historians find such as Raphael Fonseca find the recreation of a deep association between Brazil and the orisha Oxóssi, the *single-arrow hunter*,³⁶ the African deity who, in the Diaspora, has a central role in Black and Indigenous territories. In Yoruba Africa or in the Black Atlantic Diaspora,³⁷ Oxóssi is

the very Forest. Yoruba culture is one of the main African matrixes — next to the Bantu and the Ewe-Fon — for the historical and cultural formation of Brazil. In the work presented here, Abdias associates the Brazilian flag (its sense of national identity) to Oxóssi himself. The genuine narratives are materialized in the potencies of the stories told through geometry, symbology, and abstraction that seem to weave the social fabric of Brazil. With mastery and an Afro-centered outlook, Abdias recreates the Brazilian flag from the lines of the French artist Jean-Baptiste Debret (1768-1848), the author of many of the Brazilian anthropo-LOGICS and for the first academy of arts in Brazil. The green, the yellow, and the blue of the flag are reinterpreted by Abdias and associated to the orisha, so referred in the Afro-religious communities of Brazil. The green (the forests) and the blue (the sky) are the liturgical colors of Oxóssi—who is connected to hun-

³⁶ Mythological designation of Oxóssi in Yoruba culture and cosmology.

³⁷ Reference to Paul Gilroy’s book *The Black Atlantic: modernity and double consciousness*.

ting, to plentiful life, to intelligence, and courage. Oxóssi represents (is) the peoples of the woods, the caboclos. The bow and the arrow highlighted in the painting, known as *ofa* in Yoruba, are his sacred weapon, which control the time arrow of the Universe. From the very flag, Abdias creates the *ofa*, emblematically verticalizing the structure of the national symbol. In a possible interpretation, the *ofa* points upwards, to the African and Afro-Brazilian ancestry. In the gorgeous painting, the stars of the flag are repositioned, one in the green region, two in the blue region in the center, and one in the border. In the arrow, we read four times the ritual greeting of Oxóssi, the king of the Yoruba reign of Ketu³⁸: Oke, Oke, Oke, Oke.³⁹ The cosmologies materialized in this enigmatic painting debate with religious and cultural traditions of several peoples in the world, such as the Egyptian hieroglyphs, the Haitian Voodoo *vèvè*, and the adinkras of the

West-African Akan. The *single-arrow hunter* is cunning and mysterious, one of the most symbolic deities of the Afro-Brazilian sacred and cosmological pantheon and imagination. The Afro-religious peoples have been persecuted in Brazil; their spirituality and religiousness has been demonized, satanized, and attacked by the colonial, patriarchal, capitalistic, and biologizing anthropology of the black bodies and knowledge-practices. The native peoples have been mistreated since the caravels of colonization, guided by the stars, arrived at these latitudes. The laws 10,639/2003 and 11,645/2008, that enforce the teaching of African, Afro-Brazilian, and indigenous history and culture in every level of Brazilian education, still pose serious challenges to the education and disclosure in science, art and other (anti-)racist narrative expressions in Brazil.

³⁸ One of the most studied nations among the African religions in Brazil.

³⁹ From Òke Arolé: "Hail the Great Hunter" in Yoruba.

YAYA MASSEMBA

BY: CAPINAM (POET) AND
ROBERTO MENDES (MUSICIAN AND TEACHER).

What a deep night calunga
In the basement of a slave ship
What a long trip candonga
Hearing the drumming of the waves
The pace of a bird's heart
In the depth of servitude
It is the semba of the world calunga
Beating samba in my chest
Kawo Kabiecile Kawo
Okê arô okê

It was the belly of a boat who gave me birth
It was the wind of the void who paid me heed
From the dark belly of a basement
I will come down to your terreiro
Epa lightning, axe, thunder
Epa justice of a warrior
Eh semba eh
Samba ah
The Drumming of the waves
In the longest nights
Taught me to sing

Eh semba eh

Samba ah

Pain is the deepest place

It is the navel of the world

It is the depth of the sea

Eh semba eh

Samba ah

In the swinging waves

Oke aro

Taught me to beat my drum

Eh semba eh

Samba ah

In the depth of the basement I saw the flare

Of the whirl of the world

What a deep night calunga

In the basement of the slave ship

What a long trip candonga

Hearing the drumming of the waves

The pace of a bird's heart

In the depth of servitude

It is the semba of the world calunga

Beating samba in my chest

Kawo Kabiecile Kawo

Okê arô okê

It was the belly of a boat who gave me birth
It was the wind of the void who paid me heed
From the dark belly of a basement
I will come down to your terreiro
Epa lightning, axe, thunder
Epa justice of a warrior

Eh semba eh
Samba ah
The sky it was that in the cold nights blanketed my solitude

Eh semba eh
Samba ah
It is the endless ocean, without love, without brethren
It is kao I want to be your drum

Eh semba eh
Samba ah
I make the moon shine the splendor and the flare
Luanda Moon in my heart
Navel of color
Shelter from pain
First umbigada Massemba Yáyá
Yáyá Massemba is samba that goes

I will learn to read
To teach my fellows
I will learn to read
To teach my fellows
I will learn to read
To teach my fellows
I will learn to read
To teach my fellows
I will learn to read

Earth and Moon

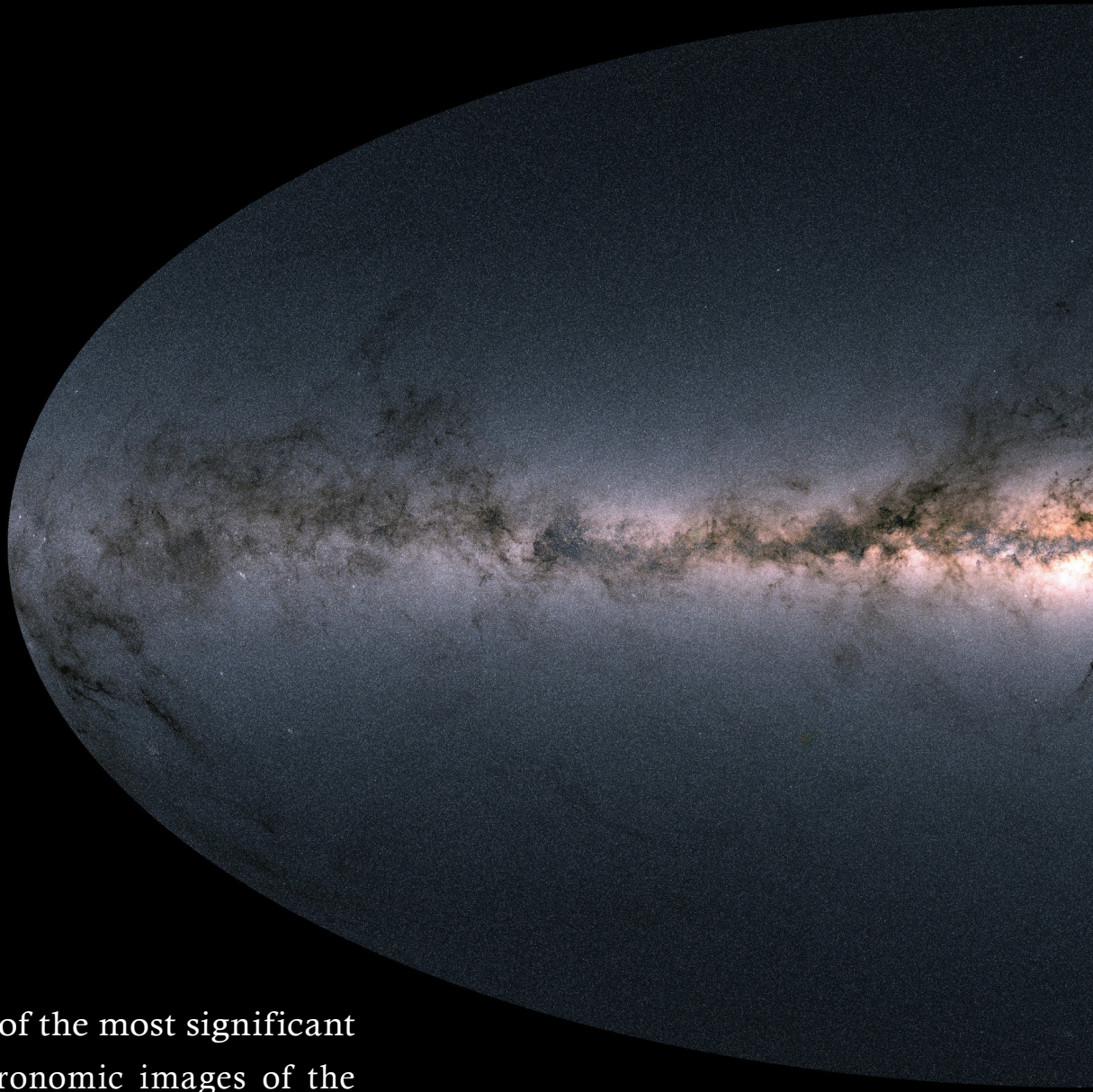
View from Saturn (Cassini)
900 million miles away

View from Mercury (MESSENGER)
61 million miles away

In the ruling astro-anthropo-logics, in a world filled with dystopic scenes, the Earth, indicated by an arrow in the figure in the left and the brightest point in the image in the right, is shot from far-away, from Saturn (a gassy and icy planet, lord of the rings; on the left) and Mercury (the most indrawn planet of the orbit of the Sun; on the right). The poetics hiding behind these two planets is expressed in the fact that Mercury, very close to the Sun, is rarely observable from the Earth, and Saturn, very distanced, is not very bright. The light, nostalgic, finds its destiny in registering a snapshot of the *pale blue dot*. The Cassini and the MESSENGER are robotic *toys* of modern

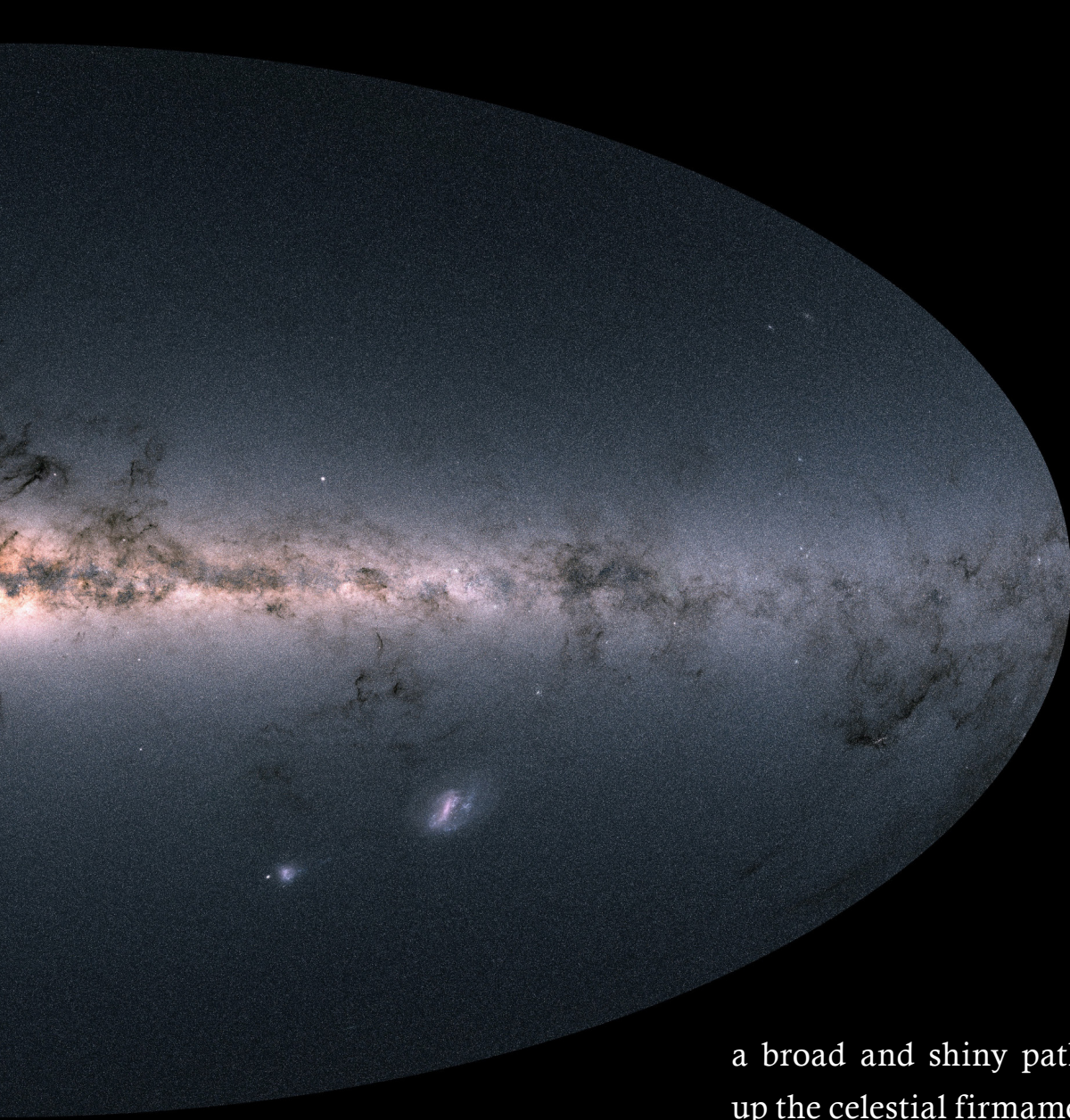
and contemporary Astrophysics and Astronautics. They registered these iconic pictures in July 19th 2013 and, after that, they will never be able to return to their original planet.

These two images allow for our flimsiness within the structures of the Universe. At the same time, they depict the grandiosity of the beauty of being able to look at the world around us looking for emotions hidden within us, of looking for gateways from our problems and the pettiest daily challenges, understanding that the Earth has been, in the last 4.5 billion years, or favorite place in the Solar System and, up to now, in the Universe. The preservation of life on Earth is an unpostponable ethical commitment.



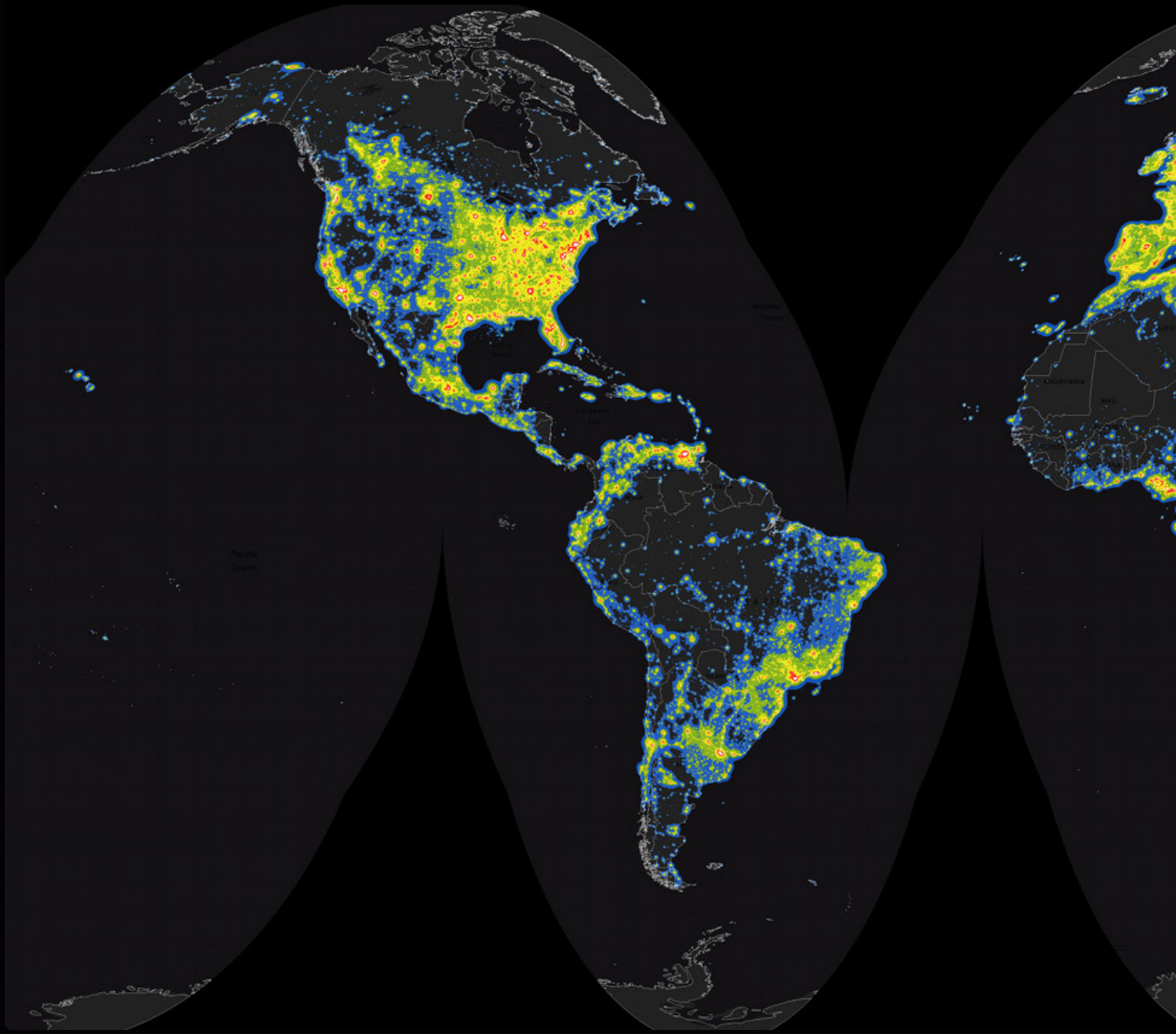
One of the most significant astronomical images of the 21st century, this image of the Milky Way was made by the Gaia Space Telescope, controlled by the European Space Agency (ESA) from a set of data including highly accurate measurements of angle positions, distances and intrinsic movements of more than one billion stars of our galaxy. In this lovely image, two satellite-galaxies are visible in the south: the Large Magellanic Cloud and the Small Magellanic Cloud. These are irregular galaxies *dancing* with us in the cosmic symphony.

The galactic center — as the Milky Way's central region is known — is spheroidal and shiny, although darkened by clouds of dust. As a spiral galaxy, it is composed by the disk (arms) and the halo (spheroidal region, from the center to the most outer portions). The narratives about the Milky Way are found in many cultures, mainly



those that had (or have) a privileged access to the sky of the Southern Celestial Hemisphere and could (or can) look directly into its central regions, with its thick peopling of stars. To certain African peoples, the Milky Way sprung from the play of a girl who danced around a fire and who suddenly threw gleaming embers in the night sky. These embers stood as

a broad and shiny pathway, lighting up the celestial firmament. The palish *milky way* was created, which we can see from afar the shiny pollution. Native peoples of Brazil and Australia link the Milky Way to birds typical of their habitat, both connected to phenomena of the rise and set of celestial bodies. Ancient peoples saw the Milky Way as the privileged dwelling of the gods. Indigenous peoples have always valued the Milky Way deeply, naming it Tapi'I Rape, where the main indigenous constellations are found. To the Tupi-Guarani, the Milky Way represents the Path of the Tapir.

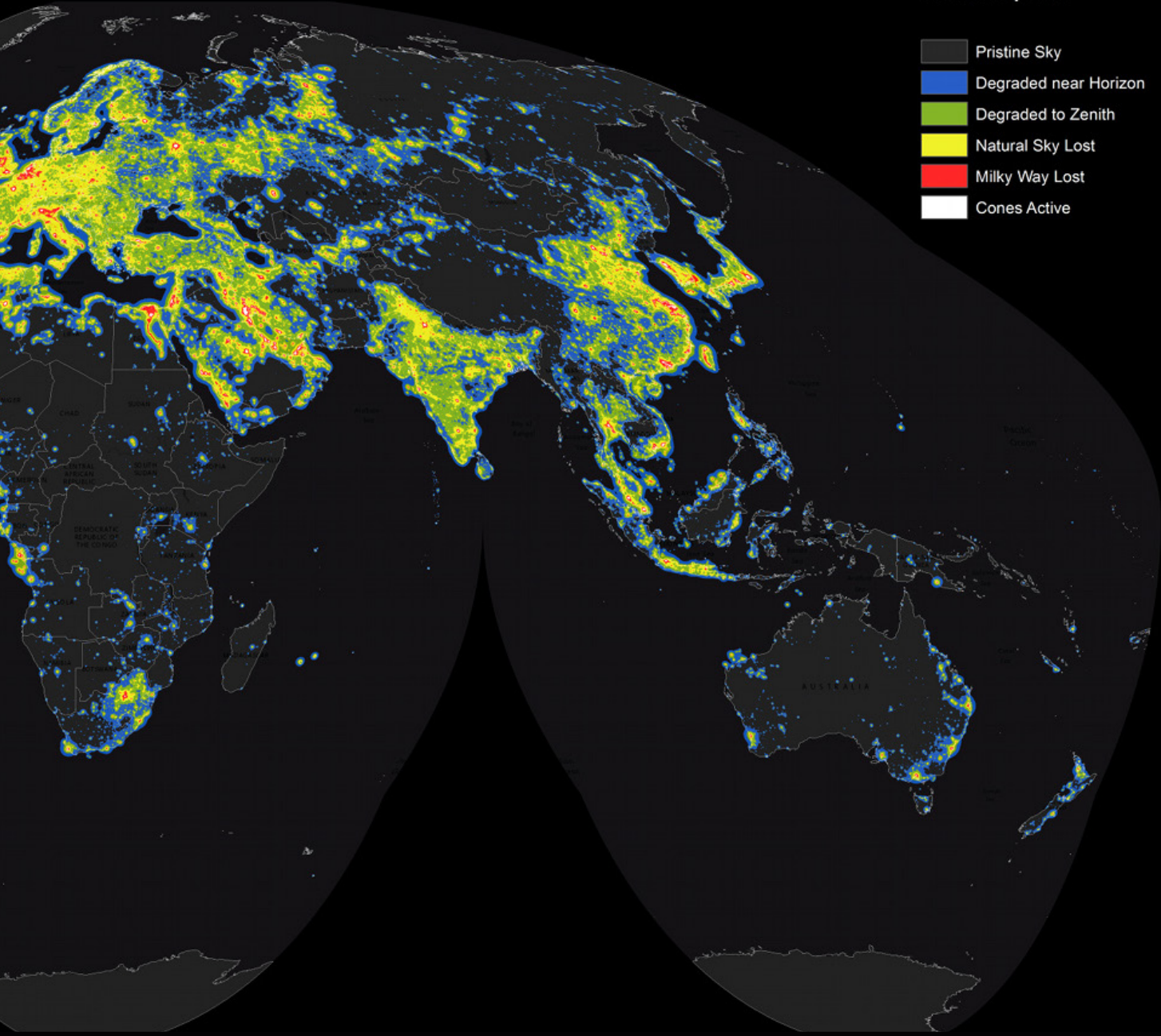


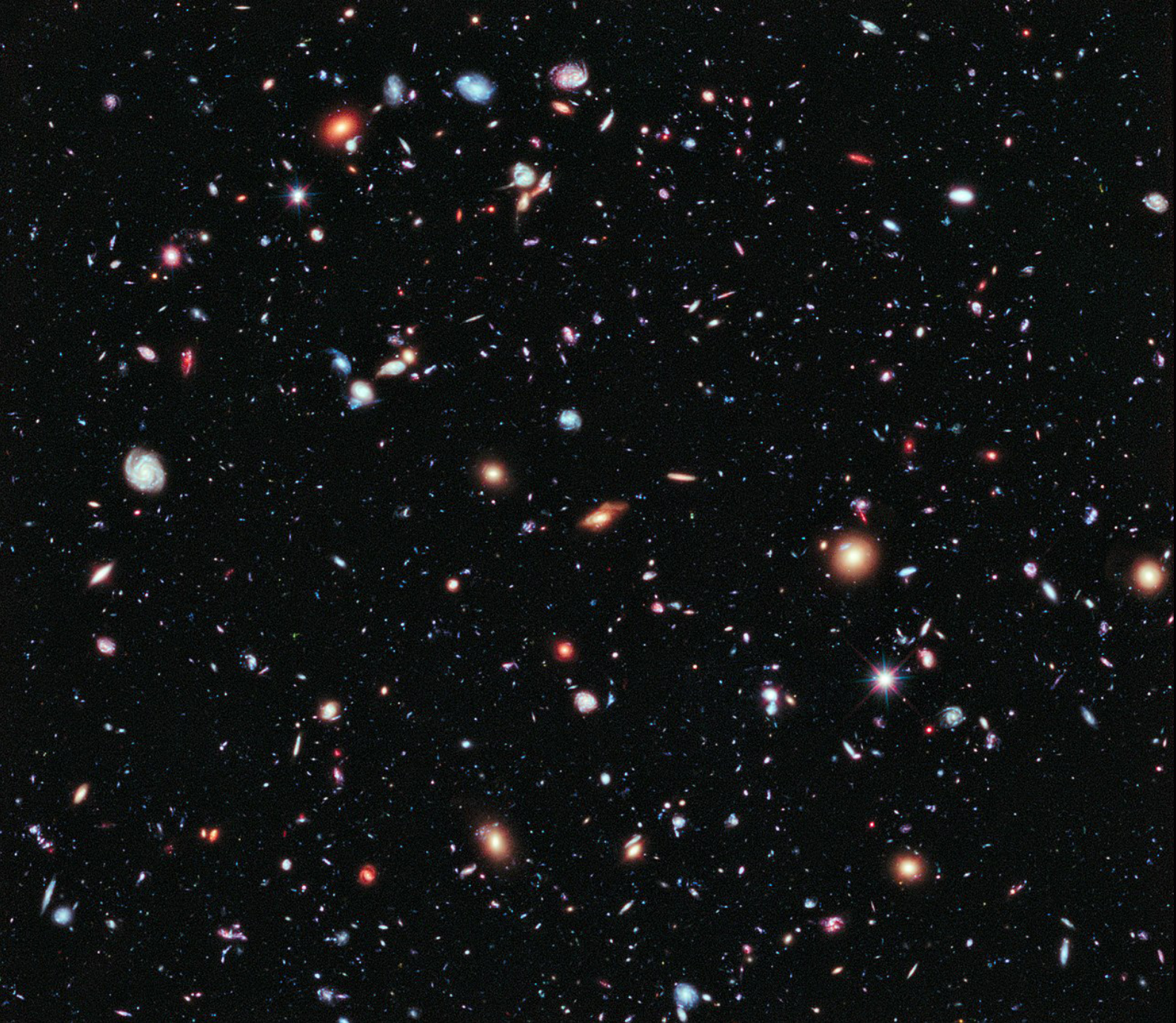
Unfortunately, the contemporary anthropo-LOGICS have already elided the common historical view of our nightly Galaxy to more than a third of humanity; among them, 60% of Europeans and almost 80% of North-Americans. As a symptom of the progress of

Modernity, the sky is ever more polluted by artificial lighting, altering biological routes of beings on our planet. Historical, cultural, and natural patrimony, the reference to the night sky fosters oneiric utopias that potentialize human *being*.

Visual Impacts

-  Pristine Sky
-  Degraded near Horizon
-  Degraded to Zenith
-  Natural Sky Lost
-  Milky Way Lost
-  Cones Active





The astro-anthropo-LOGICS narrate, on the one hand, how the *macro-worlds*, connected to the beautiful astronomic images, poetically link us to the physical processes of birth, life, and death in the Universe. Science. Art. Poetry. But, on the other hand, they point to how the *micro-worlds* and the worlds of the tangible things of our daily life in their *microphysics of power*, foster the

multiple pandemics contained in the COVID-19 pandemics. Meanwhile, baffled and grieved, the *Universe's temporal arrow* follows unhinged, and the deep and complex inequalities keep their progressive work of utter elimination of subdued bodies in Brazil, in a logic of *bio-power*.⁴⁰ Between sky and earth, amid struggles and feuds, *racialized cosmologies* offer new connections with the world-system.

In this symbolic image, we present a small piece of the sky in the Fornax constellation, produced by the Hubble Space Telescope. This register, called *Hubble eXtreme Deep Field*, is one of the most beautiful and impacting astronomical images available in contemporary times. It reveals that the Universe is complex, with varied objects that stand out for its distinct characteristics (color, temperature, morphology etc.). Diversity is revealed as an intrinsic state of the Universe. Wherever we look at, isotropically, the Universe seems to cherish diversity.

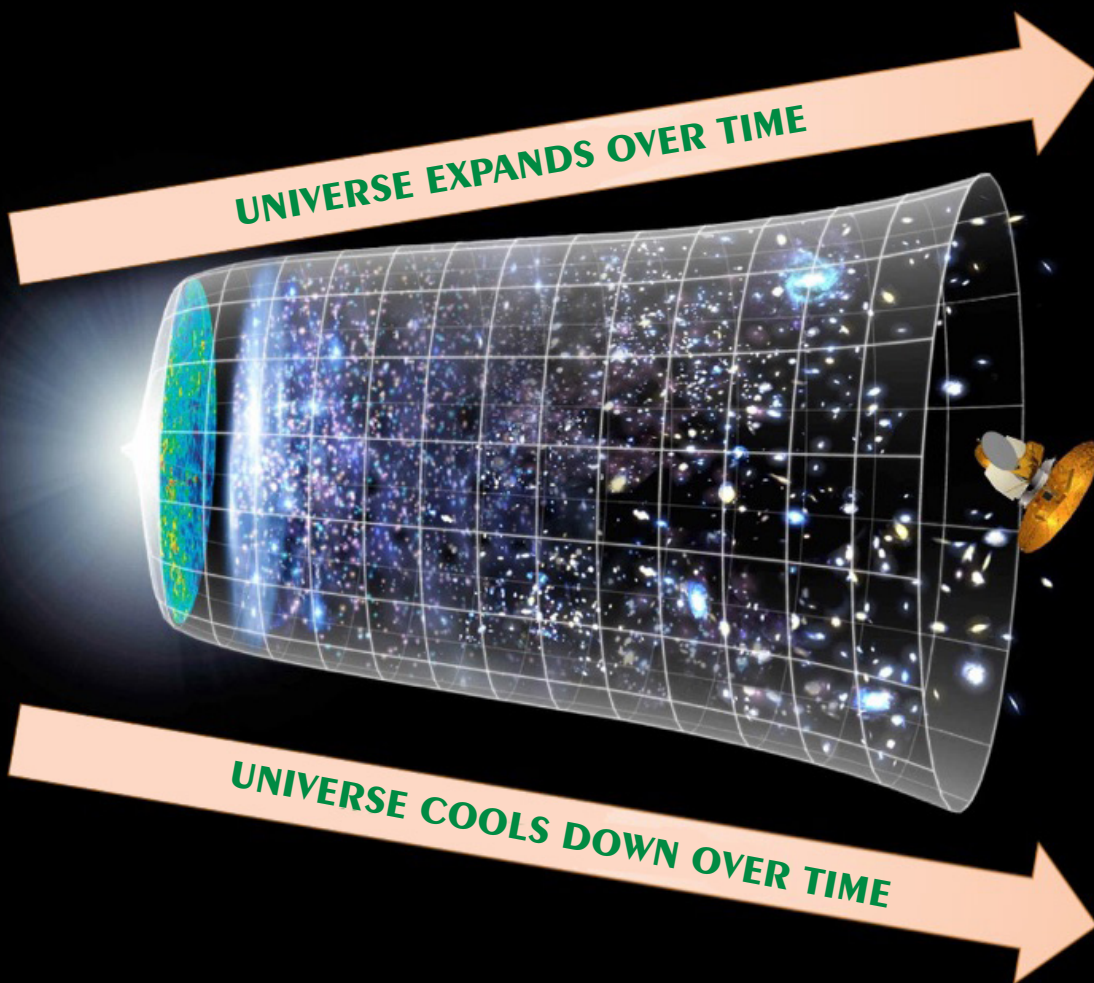
With more than 2 million seconds of exposition, the image covers a smaller area than one tenth of the width of the full Moon, the same permeating our thoughts and hearts throughout history, music, literature, and poetry. The same Moon regulating farming, harvest, earthly aspirations and ins-

pirations for millennia, of peoples in different cultures where poetics are born impossible to daily narratives.

In a simple count of objects, around 5,500 galaxies are estimated in this small yet deeply meaningful field image — some of them so distant that we see them when the Universe had less than 5% of its current age. In this image, the object count, staggered for estimated physical/theoretical size of the Universe, allows us to know, for instance, that there are billions of galaxies in the Cosmos. This image returns to us our humanity and humility and reminds us that all that we want in this life is to look for *logical* explanations about the origin and evolution of structures — afar as much as near — that are capable of offering, in random trajectories, a liberating existential perspective.

⁴⁰ The microphysics of power and the biopower, here cited, refer to the key concepts in the ideas of the French philosopher Michel Foucault (1926-1984), important to understand the necropolitics and the physical and epistemological genocide of the Black and indigenous populations in Brazil.

**MEANING. LOGICAL AND CHRONOLOGICAL
FORM. NOTIONS OF SYMBOLIC ORDER.**



As the Universe expands and cools down within time and space, the light, the stars, the galaxies, the planets follow their course, and life blossoms on Earth. Living and living together — experiencing and co-experiencing. Entropy gives material and symbolic meaning to existence and resistances. The temporal logic of science is different from circular temporal logics of indigenous and quilombola communities. There is, in all cosmology, a representation of truth and a longing for symbolic order that gives meaning to all existing

things within it. Everything seems to say that the logics of the Universe is to follow its course into infinity, even though limited within time and space. Galaxies keep on distancing from one another and, at some point in time, no light will be captured. Sky and Earth will be pitch dark. Thermal death on sight. From the time *there was light*, that is, Big Bang, 13.8 billion years have passed—much history to be told and shared. But who, up to now, has had the right tell? To speak of science? To say what one feels? To see and be seen? To be felt in one's potentialities?

Oxotocanxoxo ⁴¹
(NEO-ORIKI OF OXÓSSI)

WRITTEN BY:

ROBERTO MENDES (MUSICIAN AND TEACHER)

ANTONIO RISÉRIO (WRITER AND RESEARCHER)

Oke Aro Alakoro

Alakoro Oxotocansoso

When he closes, he opens no path

Fresh-skinned Orisha

Alakoro Otocanxoxo

In the mud house

In the tile house Alakoro

Alakoro Otocanxoxo

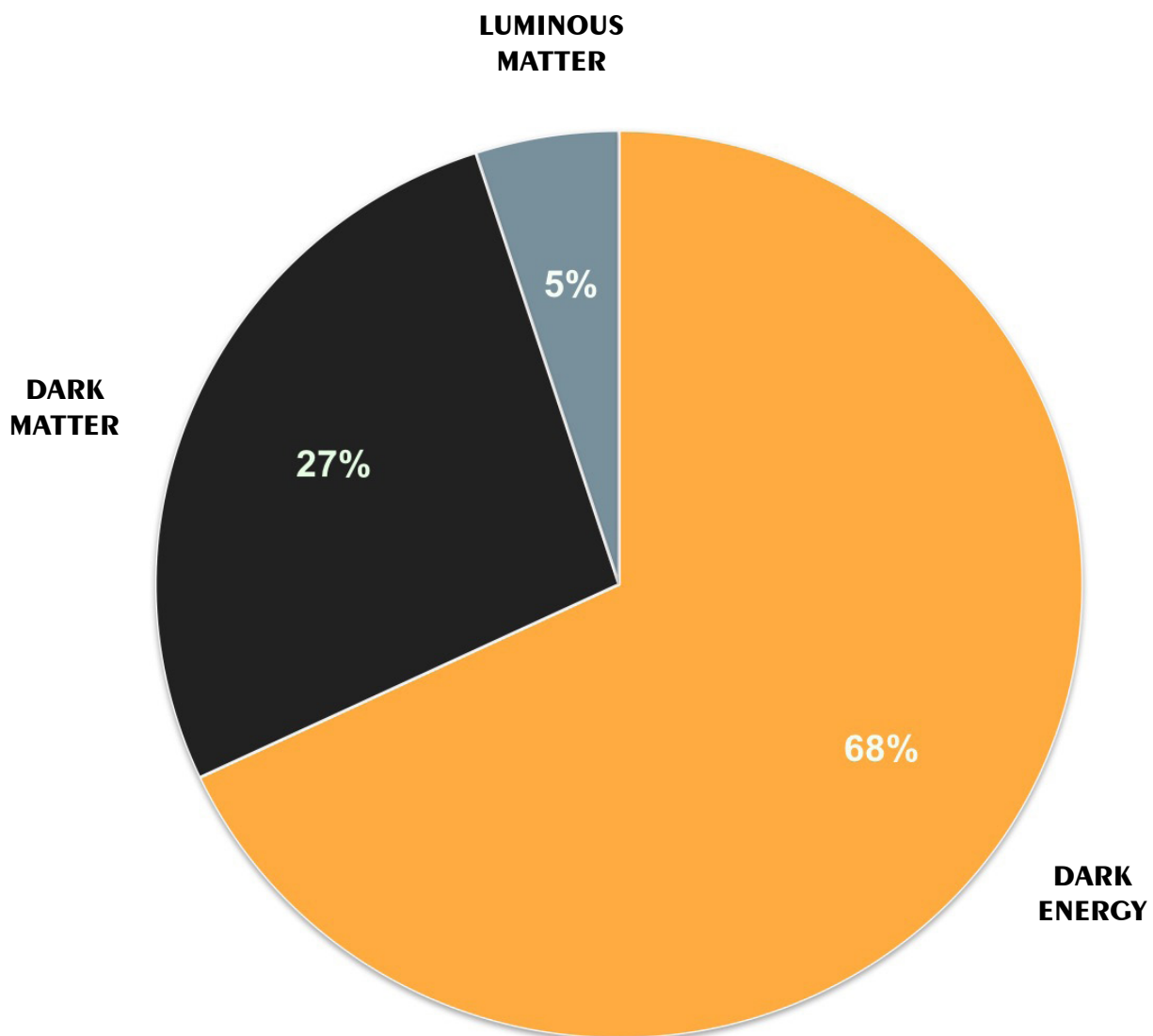
⁴¹ In Yoruba, Oxotocanxoxo means “The one-arrow hunter.”

When he comes into the woods
The woods rustle Alakoro
Alakoro Otocanxoxo

Ofa his shotgun
An arrow amid the fire
The fire was quenched
Ofa his shotgun
An arrow in the sun's eye
The sun has gone
Alakoro Otocanxoxo
In the longer nights
He taught me to sing

ASTRO-ANTHROPO-LOGICS II: INTERGALACTIC AQUILOMBAMENTO

The calabash of existence



Marked by universality (?) and timelessness (?), the sky constitutes a founding element in myths, philosophy, science, religion, and poetry. It lays the grounds for the varied cosmologies. In the modern scientific cosmology, 95% of the Universe is unknown to us, constituted by dark energy and matter. In a semantic pun, with its signs, meanings and lexica — like stars in the sky in the constellation of possible words — we can think and say, poetically and politically, that *Dark Matters*, that is, *Black (life) matter matters*. Without understanding Black/Dark Matter, there is no description of the Universe's formation and evolution possible. Without facing the anthropo-LOGICS that insist in exter-

minating Black and indigenous bodies and epistemes, there will be no way of promoting social justice and strengthening democracy in Brazil.

Light and shadow, as important as they are in the arts, seem to tell a story beginning 13.8 billion years ago. Light, composed of all the colors of the electromagnetic specter, interacts with atoms and reveals us ideas and realities never thought of before. It is the same light that, in the first moments of the *Big Bang*, originates the fundamental particles that will form the atoms and that, on their turn, fuse themselves into molecules such as water (H₂O), an indispensable fuel for life as we know it. Biopower, biopolitics, and necropolitics: *Dark Matters!*

THERE IS A STORY⁴²

WRITTEN BY: BEATRIZ NASCIMENTO

Today I am free as if I had air in my veins

Today I am ready as if I had exorcized

All my phantoms and waiting for other far greater

Today I love no one waiting for love to happen

Today I turn to all sides and the landscape is the same

No passion

Today I am not sad since I cried all my guts out and they are remade

Today I wait for the arrow that will hit me first: love or hatred

Today I am not gleeful since nothing was announced

Today I am attentive as I have a dream left

Today I am brief as a terrible nightmare

Yes, I feel blame

As resentment

What could be bad about a kiss?

⁴² Poem written by Beatriz Nascimento, one of the greatest Brazilian intellectuals. A Black woman, unique thinker, she had her life shortened due to the structural feminicide in the country. She was responsible for the re-semantization of the quilombos in the 20th century, understood as slums and other Black territories marginalized from citizenship.

In the contact of bodies, what can be good?
Let it be where it stayed.
From my part, it was a magical act
That did not change the essence of nothing
That did not take Venus out of its orbit
That did not change its trajectory
Of this intimate pain that I do not extract

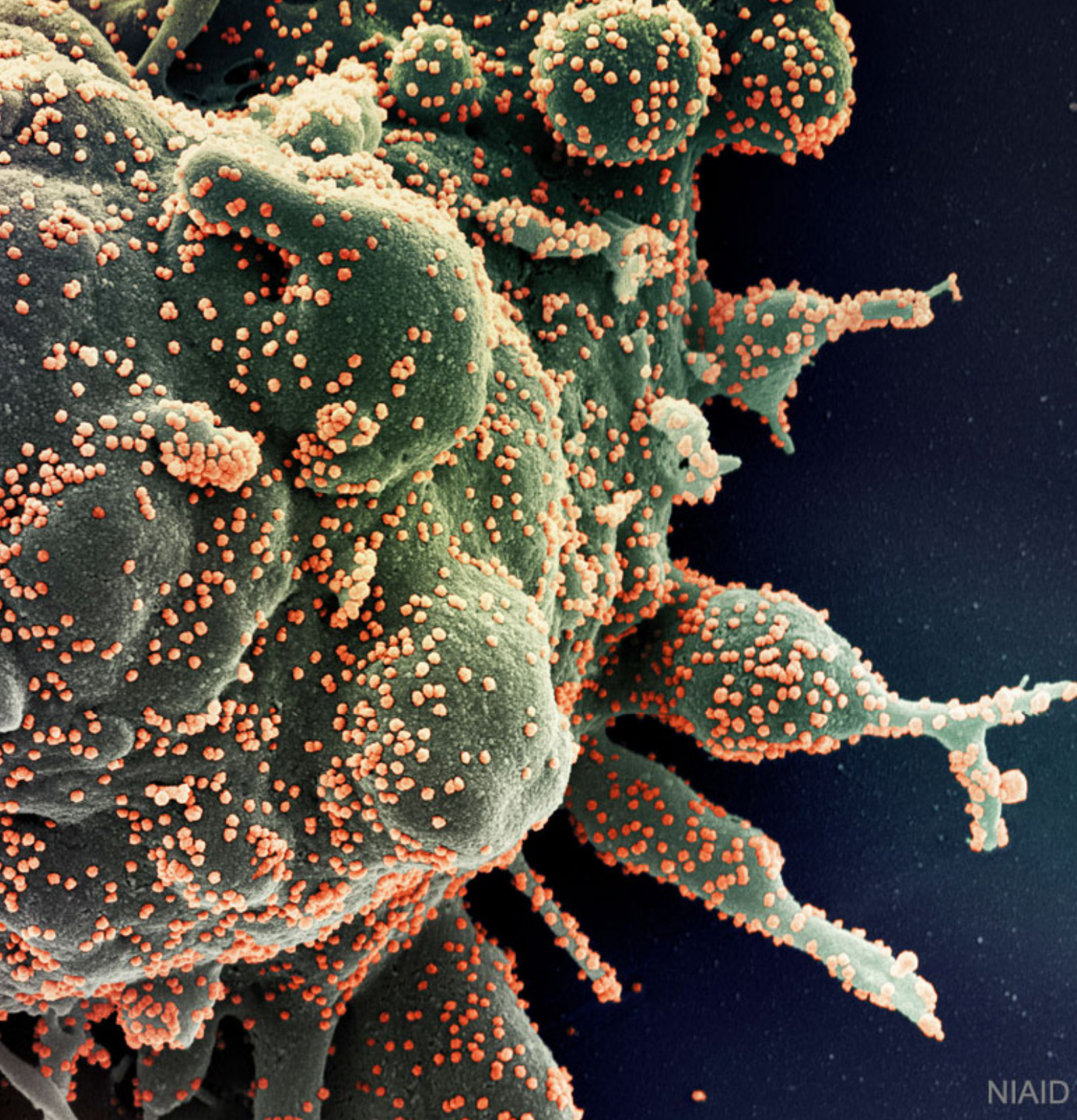
Yes, I feel blame
No swamp territory of consciousness
Since a kiss may modify the
Universe
And make Venus friendlier to Earth
Make the Milky Way more visible
And transport myself to that original
Unfulfillable dream, unsurpassable orgasm

Ah, who will make me Beatriz
Happy to be Beatriz
No angles, no swampy marks
Only a sound with substantive musicality
Rhythm of galactic paths
With tormented tempests
Alpha Omega and I Beta

Neither principle nor ending
In the fringe of happening
Concealed among all
Where nothing is hidden.
Emerging as a snapshot.
That may become a negative
Since it was positive in being at.
Instant of the act that is always beautiful
Since done in reaction to the act that comes next
Intercourse with no ecstasy
Static in its own existing
Improper amid the Universe

Instant of death...
Since Venus did not shift its orbit
No one paid attention if she gave love to Earth
And she made no convulsive movement
Only I was filled with light
Focusing in its abstract intensity of world.
As if I could be Beatriz...
Pure substance aflame!

No, I no longer feel blame
I no longer bear recalls
Only the absorption of the happened
Comingled in body and mind.
Unconscious feeling of being past and
Leaving a falling flap,
As a tumbled star,
As gas balloon...
Invisible facing utter visibility
Dotted blackness and motionless
Unmodulated cry.
Venus's frightened look
Facing Earth moving
In the primordial blue
Of where Love fecundates



Invisible worlds (left): the virus (in orange) causer of the pandemics that circulates in the country since February 2020, belongs to the family of the coronaviruses. In the artistic depiction, it is destroying a cell. In a few months, hundreds

of millions of people were dead and other millions infected because of it. Recent data reveal that more than 530 thousand people died in Brazil, most belonging to the Black population. The Tarantula Nebula (on the right): one of the largest regions (radius of ~



930 light-years) of star formation of our galactic neighborhood. One light-year is a measure of distance, around 9.5 trillion km. The colors, in astronomy, are indicative of temperature. The Sun, which is yellowish, has a surface temperature of 5770 Kelvin (1

Celsius degree = 273 Kelvin). More reddish and bluish colors indicate, respectively, colder and warmer regions than the surface of the Sun. To the Bororo Indians,⁴³ who inhabit the state of Mato Grosso, the origin of the stars is associated to the punishment

of fiendish women in the village. The eyes of these women's children, turned into stars, shine in the night sky. Unlike bacteria, which are living organisms, the viruses are infectious particles. On the other hand, the molecular nebulas are cradles of stars. The images, beautiful in their colors, united in their (in)visible material poetics, reveal the micro and the macroworlds linked by processes of birth, life, and deathliness, in the Earth and the Universe. These are different scales that mix in the essence of what we defined as the Universe. The cell, attacked in the image on the left, is much larger than the virus. While bacteria have only one cell (unicellular), we humans have 10 trillion cells, as numerous as the galaxies in the Universe. While the cells in our body present the typical sizes of $10\mu\text{m}$ to $50\mu\text{m}$,⁴⁴ the

(super)clusters of galaxies, among the largest structures linked by gravity known in the Universe, present scales of 1-50 *megaparsec*.⁴⁵ Violent *anthropological* scales occur in the seas of the Earth. The writer Laurentino Gomes speaks about the crossings of the time of slavery: "12.5 million human beings left Africa. 10.7 million arrived. In the crossing, 1.8 million people died. Divide that per number of days, and you get an average of 14 corpses thrown into the sea every day for 350 years. A number so high that, according to reports of the time, this changed the behavior of shark shoals in the Atlantic Ocean, who started to follow slave ships."⁴⁶ The forced immigration of our times also inflicts Black bodies, drowned in the material and symbolic oceans. What, after all, is science without imagination and art without facts?

⁴³ In their native tongue, "*Bororo*" means "village patio."

⁴⁴ 1 micrometer stands for 1 centimeter divided into 10,000 parts

⁴⁵ 1 million parsec, 1 parsec standing for 3.085678×10^{13} km.

⁴⁶ In an interview for the TV program *Conversas com Bial*, in November 11th 2020.

ASTRO-ANTHROPO-LOGICS III: BIRTH, LIFE AND DEATH

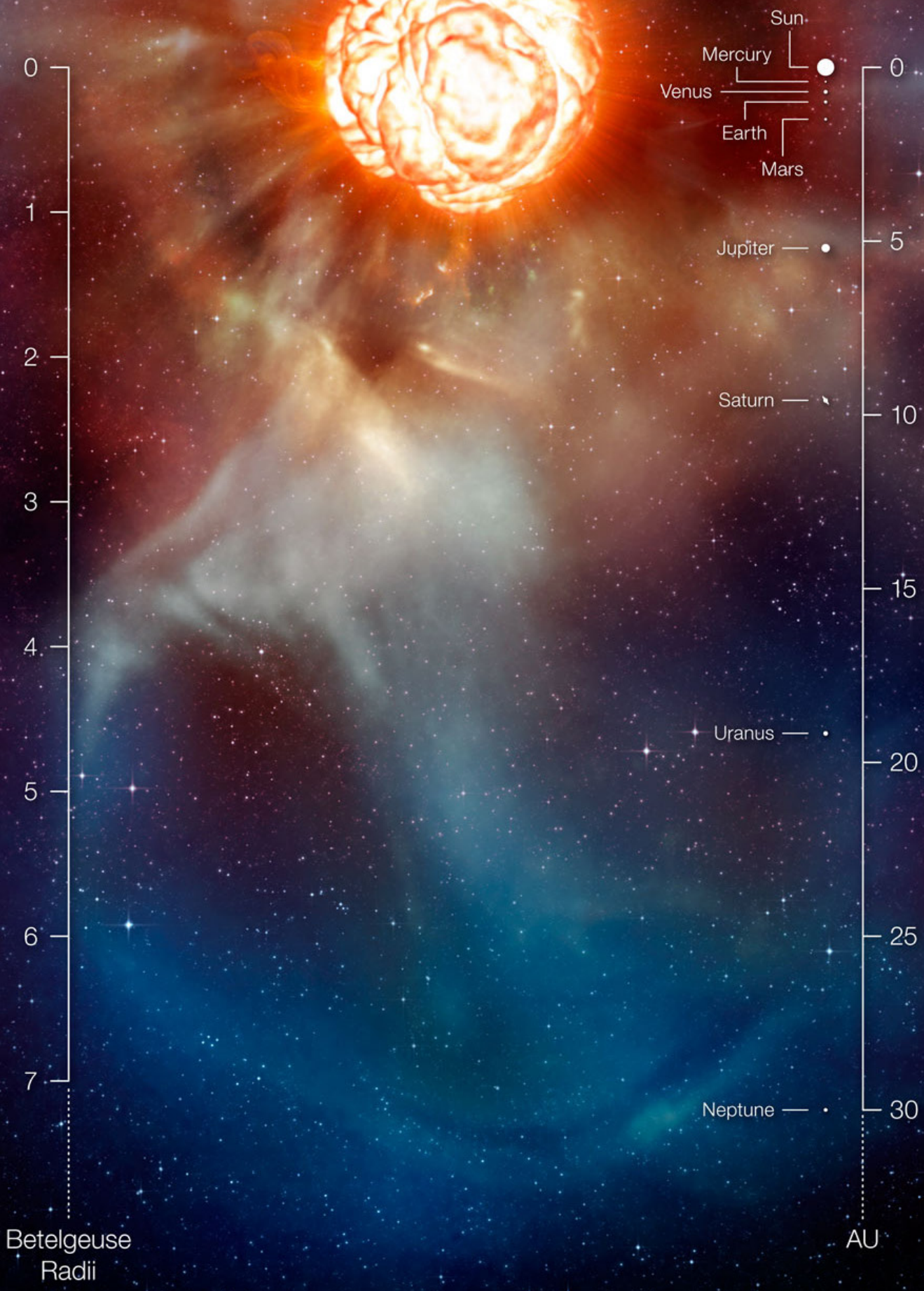
In many indigenous, African, and diasporic cultures, death demands an intense time of mourning through a diversified set of cosmological groundings and sociopolitical organizations. The *reahu* death rites⁴⁷ of the Yanomami and the *axexé* of the Yoruba esta-

blish deep political and etiological relationships⁴⁸ between the visible (living) and invisible (dead) worlds in processes of carnage.⁴⁹ These are difficult questions to process amid a pandemic that suffocates and is based on a policy programmed to kill [the territory bodies].

⁴⁷ Marcelo Moura Silva; Carlos Estelita-Lins. A xawara e os mortos: os Yanomami, luto e luta na pandemia da Covid-19. *Horiz. antropol.*, Porto Alegre, year 27, n. 59, p. 267-285, Jan./Apr. 2021.

⁴⁸ Term related to the discovery of the agents that cause a certain infirmity.

⁴⁹ Joalice Conceição. *A Irmandade da Boa Morte e Culto de Babá Egum: Masculinidades, Feminilidades e Performances Negras*. Jundiaí: Paco Editorial, 2017.



Artistic rendering of Betelgeuse, an orange supergiant star of the Orion constellation. One of the shiniest stars in the sky, it is found in many afro-indigenous cosmological narratives in several places around the globe. The supergiant stars die dramatically in explosive events known as type II Supernovas. Important elements in the periodic table such as oxygen, magnesium, silicon, calcium, and titanium are produced in the Universe from these explosive events that are begotten by massive stars, that is, those having 10 times the mass of the Sun ($M_{\text{sun}} = 1.989 \times 10^{30}$ kg). The Betelgeuse is

about 44,000,000 astronomical units (AU) from the Earth (1 UA equals 150 mi km approximately). In the image, the star's radius and some objects of the Solar System are indicated in astronomical units. The explosion of the Betelgeuse may happen at any time within the next 100,000 years.

On January 1st 2020, the *Huanan Seafood Market*, possible origin of the COVID-19 pandemics, was closed. Hundreds of people were already infected in China. In 7 months on the Earth, the COVID-19 had already left more than 800 thousand dead in its wake.



On January 3rd 2020, on the first days of a striking year for humanity, the yearly meteor shower, the Quadrantids was visible in the sky above the Wall of China.

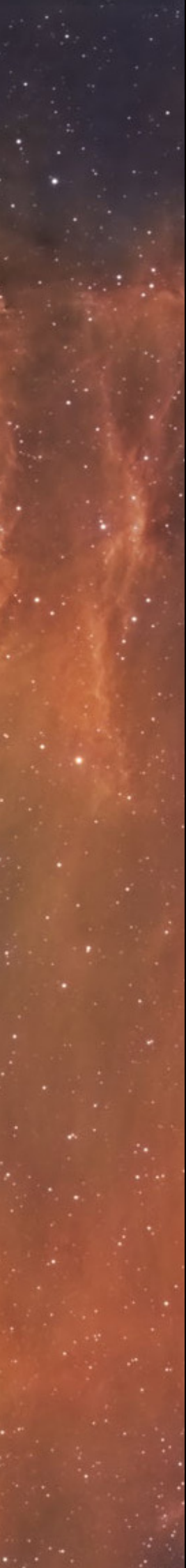
Meteoroid. Meteor. Meteorite. Asteroid. Comet. Language and meaning in science are sometimes complex. The *falling star* (meteor) that is not a star. The *morning star* that is a planet (Venus). The *planetary nebula* that has nothing to



do with planet. In different cultures, proper and common names may be crossed by meanings that escape the logics that homogenize thought. The name is of extreme relevance. There is a burden to naming intangible things.

In the anthropologies, *social names* are being disputed. So easy it is to call people by their nicknames, not so to accept the social names of the *bodies-territories* that live in constant social *distancing* in Brazil.





The Flaming Star Nebula, 1,500 light-years (1 light-year equals ~9.5 trillion km) with a length of around 5 light-years, seems to be aflame. The colors are accounted for by the interstellar gas and the dust grains rich in carbon found in the nebula that may group according to gravity, begetting new stars.

It was in January 7th 2020 that scientists in China announced the discovery of a new coronavirus. On the same day, Chinese authorities censored the *hashtag* #WuhanSARS. Wuhan is the capital and the largest city of the province of Hubei, China. The virus's outbreak elicited xenophobia and racism, the latter pulsating subjectively, institutionally and structurally within Brazilian society for centuries. Could a virus have nationality, after all?





Small galaxies are absorbed by larger galaxies in a kind of galactic *cannibalism*. The physical processes of galactic fusion are common in our Universe. The Milky Way gravitationally captures smaller galaxies. In the image, we see a pair of galaxies located 50 million light-years: NGC 1532, a spiral galaxy that will be absorbed by the larger galaxy. In the modern scientific cosmology, it is thought that galaxies are formed in the Universe from phenomena of fusion in a process of hierarchic formation of structures, that is, from the smaller to the larger.

On our planet, on January 9th 2020 the first death due to the Coronavirus was registered. The pandemic is complex, based on hierarchical logics of racialization. On January 11th 2020, the Chinese government disclosed the COVID-19's genome. In Brazil, the first death, of a Black maid, contaminated by her bosses after they arrived from their vacations abroad, reveals the undeniable intersections between social, racial, class, and gender markers.





500 light-years from here to the northern limit of the Corona Australis, dust clouds block the light of background stars that are farther from the Milky Way and a complex of reflection nebulas is photographed. In the sky, this field of vision stretches over around 1° , accounting for almost 9 light-years as estimated by the region of formation of the nearest star.

On January 12th 2020, the World Health Organization (WHO) published a group of documents with guidelines for countries around the world about how to manage a COVID-19 outbreak. Meanwhile, there were 41 cases of confirmed patients with the disease in China and more than 700 people were being monitored, including more than 400 healthcare professionals. Little was known about the virus. Among the first cases confirmed in China, in December 2019, up to the pandemic declaration by the WHO in March 11th 2020, there was a heap of confusing bits of information and a feeling of panic, unrest, and uncertainty in Brazil.



There are billions of galaxies in the Universe, of varied morphologies. The Milky Way, NGC 247, is a spiral galaxy with around 700,000 light-years of diameter and relatively close to us, only 11 million light-years. In this picture, in addition to the beautiful NGC 247, many background galaxies are perceived, with the four

galaxies down to the left, known as the Burbidge Chain,⁵⁰ standing out. Among the billions of galaxies, our Milky Way is special since it shelters us. Could some humans be more *human* than others? The anthropo-LOGICS have, for centuries, defined that some people (white) are more human than others (Black, indigenous, LGBT+) in a male CIS-tem of the (western) world.

⁵⁰ To pay homage to the British-American astrophysicist Eleanor Margaret Burbidge (1919-2020) for the discovery of the chain. E. M. Burbidge is one of the authors of one of the most important articles (B2FH: Margaret Burbidge, Geoffrey Burbidge, William A. Fowler, and Fred Hoyle) of the 20th century, in which she and her colleagues describe the origin of the chemical elements.



Jose Mitanos

Like us, stars are sociable. They love to be together. The Hyades open cluster is the star cluster that is closer to the Sun, important to the establishment of a ruler (scale/escalator) for measuring distances in the Universe.

The image shows the living colors of stars and the slight nebulas present. Aldebaran, the yellowish star of the Taurus constellation, is the brightest within the field, not belonging, however, to the Hyades cluster, which was formed around 625 million years ago. Just as the Pleiades and the Three Sisters, the Hyades are emblematic asterisms due to being close to the

equator and the ecliptic, quite recognizable by the naked eye. They are present in many Amerindian narratives. The Hyades agglomerate makes up a spectacular group of stars, used as a ruler to indicate distances, which helps us to shorten the distances in the cosmic scale.

But what, after all, do *social isolation* and *distancing* mean? Trans, indigenous, and quilombola people have been living for many years in permanent and continuous *CIS*-tems of *social isolation and distancing*, furthered from the public policies of inclusion, equity, and social justice.

MYTHOLOGICS (M131A)⁵¹

MATACO: ORIGIN OF THE PLEIADES

In ancient times, indigenous people used to climb to the sky through a large tree. There, they found honey and fish in profusion. One day, descending back to Earth, they found, at the foot of the tree, an old woman who asked them a bit of each delicacy, which they denied. To avenge herself, she set the tree on fire. The Indians who had remained in the sky became stars and made up the constellation of the Pleiades.

⁵¹ Lévi-Strauss. O cru e o cozido (Mitológica I). Rio de Janeiro: Zahar, 2021.



The Milky Way has little more than 150 globular agglomerates, which are relics of its formation process. The NGC 6752, an elder of more than 10 billion years, around 13,000 light-years toward the southern constellation of the Peacock, stands out.

After its two other brothers, Omega Centauri (halo) and 47 Tucanae (bulge/inner halo), the NGC 6752, is the third brightest *bee swarm* of the Earthly night sky. It has over 100 light-years of diameter. From the point of view of its stellar constitution, the globular agglomerates are revealing themselves to be more and more

complex each day. Thought of since forever as the best example of *simple star population* (same age and metallic content), they actually behave individually as prototypes of multiple episodes of star formation and generation (*multiple star populations*), describable as *minigalaxies*.

The stars, in isolation or in groups or in associations or agglomerates, tell us stories. Unfortunately, the stories of how African, Afro-Brazilian, and Indigenous populations have looked to the sky have been made invisible. The knowledge and practices of these peoples need to be decolonized. Art. Poetry. Science and movements.





A surprising image made by the Hubble Space Telescope. Highlighted is the giant spiral galaxy UGC 2885, around 232 million light-years from us, with around 800,000 light-years of diameter. The diameter of the Milky Way is 100,000 light-years. The UGC 2885 is a factory of stars with around 10 times more stars than the Milky Way, it has at least a trillion *suns*. Some galaxies grow a lot. The way the galaxies have formed and evolve is still one of the most intriguing questions of this century and, in order to answer it, it is paramount to unveil the role of dark matter in the formation of galaxies.

On Planet Earth, young Black people, between 15 and 29 years old, are being systematically exterminated in Brazil for a long time, in addition to the hear-trending femicide. During the pandemics, unfortunately, domestic and family violence against women increased, according to the Ministry of Women, Family and Human Rights. Since the beginning of the pandemics of the new coronavirus, some women started to spend 24 hours at home, often with their aggressors.



Image Credit: WISE, IRSA, NASA;
Processing & Copyright : Francesco Antonucci

Scientists in astronomy like to see the Universe in multiple windows of the electromagnetic spectrum. The light, in its cosmic dance and journey, reveals us multiple aspects of one same object. The image presented here resulted from the treatment of the infrared light captured by the *Wide Field Infrared Survey Explorer* NASA satellite. The

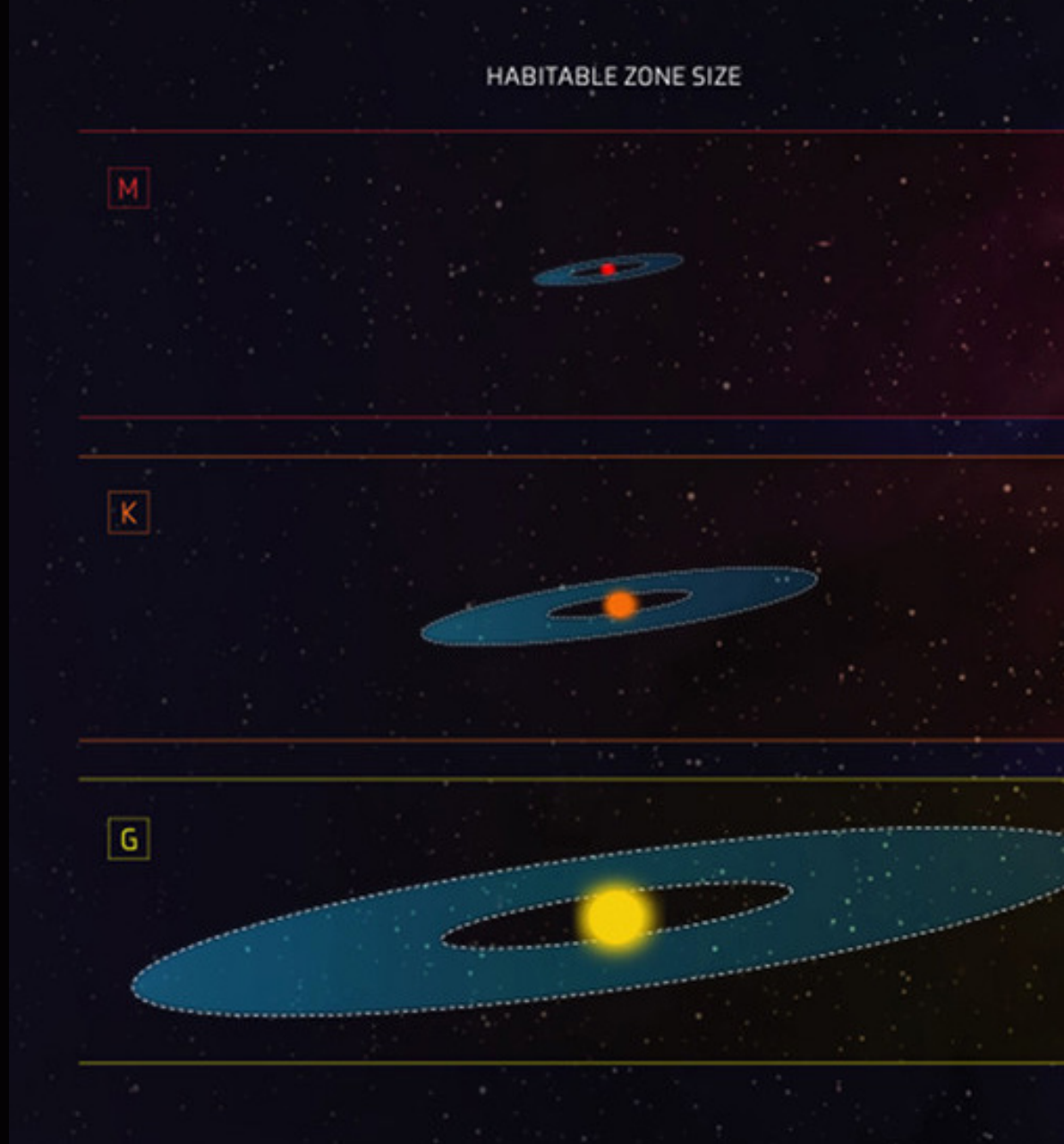
dust emission in the tadpole nebula, IC 410, 1,200 light-years from us in the Auriga constellation. It is a cradle of stars. The cosmic shapes of tadpoles are about 10 light-years in length. The processes of life and death on Earth are marked by complex relationships of power. Body. Power. Life. Death. Politics of bodies. Life management. The last sigh of hope.

ASTRO-ANTHROPO-LOGICS IV:

PERVERSE ETHNOCENTRISM, OPERATING COSMICIDE

Omama has been, since the beginning, the center of the words that the whites call ecology. It is true! Way before these words existed among them and start being repeated so often, they were already among us, even if we did not call them that way. They were, since ever, for the shamans, words coming from the spirits to protect the forest. If we had books, the whites would understand how old they are among us! In the forest, ecology is we, humans. But also, as much as we, the xapiri, the animals, the trees, the rivers, the fish, the sky, the rain, the wind and the sun! it is everything that came into being in the forest, away from the whites; all that is not yet fenced. The words of ecology are our ancient words, the ones Omama gave our ancestors. The xapiri protect the forest since it exists. They were always on the side of our ancestors, who thus never devastated it. It is still very much alive, right? The whites, who of old ignored these things, are now beginning to understand. That is why some of them invented new words to protect the forest. Now they say they are agents of the ecology since they are worried, for their forest is growing hotter.⁵²

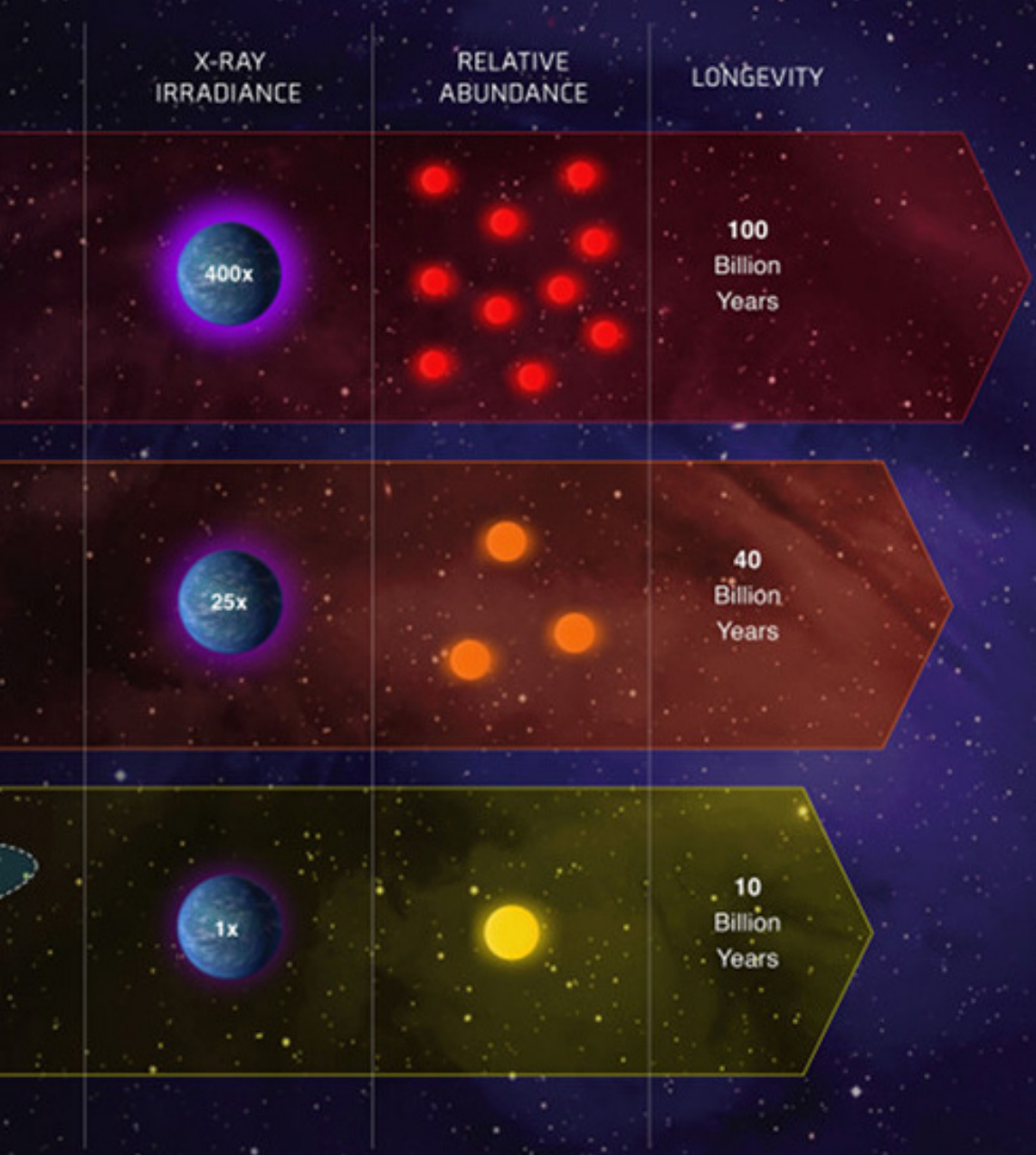
⁵² Davi Kopenawa; Albert Bruce. *A Queda do Céu: palavras de um xamã Yanomami*. São Paulo: Companhia das Letras, 2015.



For there to be life, as we know it, liquid water is crucial. The so-called *inhabitable zone* is the region around a star where the climate is neither too hot nor too cold so as to compromise the existence of liquid water on the surface of the orbiting planets. In the infographic, the *inhabitable zones* around G-spectral type dwarf stars (yellow as the Sun), K (orange),

and M (reddish)—the latter two colder and weaker than the Sun.

The M stars, of masses lower than the Sun, have a long life⁵³ and are very numerous, accounting for around 73% of stars of the Milky Way. They also have very active magnetic fields, which may produce radiation hazardous to life, with an X-ray radiance of 400 times that of the Sun.




The G stars, similar to the Sun, are relatively *tranquil*, with low portions of hazardous radiation, but they account for only 6% of the stars in the Milky Way and have a much shorter life.

In the search for inhabitable planets, the K dwarf stars are of interest. They are 40 billion years old — much older than the Sun — and account for around 13% of the stars in the Milky Way,

producing but small quantities of hazardous radiation.

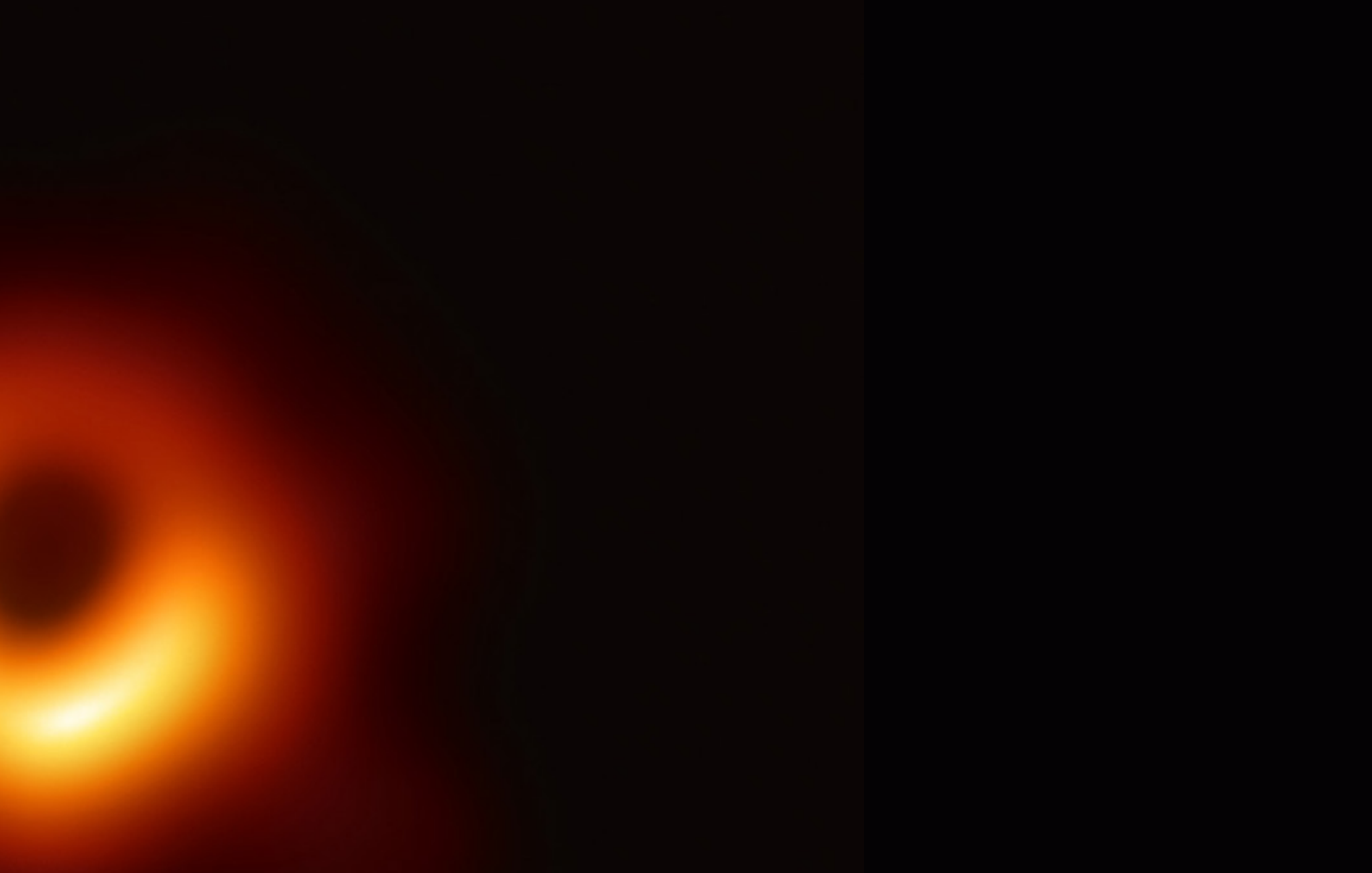
In the process of racialization going on on the planet Earth, some zones are prohibited, other are inhabitable for *bodies-territories*. Some bodies cannot circulate freely in certain zones. Bullets were never *strayed* in Brazil. The Black body has been its main target.

⁵³ 100 billion Years or more. The lower the mass of a star, the longer it lives. The Sun, in its average life, shines for 4.5 billion years.



The *Event Horizon Telescope* (EHT), constituted of eight terrestrial radio telescopes as part of a large international consortium, was projected to capture images of a black hole, which, from the point of view of the birth and death of stars, stands for the remains, the corpse, of a star that is born with a mass 25 times that of the Sun. This iconic image reveals a shadow, the first *direct* visual evidence of the supermassive black hole in the core of the Messier87 galaxy in the Virgo constellation. The black holes, as stellar *remains*, are dense; not even light can escape them. The horizon of events, that is, the border region of the black hole where all can arrive without being captured by the

intense gravitational field, is around 2.5 times lower than the shadow that it projects and its diameter is less than 40 billion km. As a comparison, the ring show in the *picture* has a diameter of no more than 40 microseconds, which is similar to measuring the length of a credit card on the surface of the Moon. In order to obtain this historical image, around 350 *terabytes* of information were collected per day, stored in high perfor-



mance hard disks and processed by highly specialized supercomputers. The *shadow* seen in the images stans for the data transformed into signals. In the racialized cosmologies, the quilombola *remains* resist and re-semanticize the word “quilombo” in our days. As political subjects of rights, they fight for material and symbolic territories and for the right to *differentiated* education and identities, tensed in the modern project.

The Atlas of Violence 2020 indicates that the homicide rates within Black persons increased in 11.5% between 2008 and 2018 whereas that of non-Black persons decreased in 12%. Within this period, Blacks accounted for 75.9% of the homicides. To each non-Black person, 2.7 Black persons are killed. In 2020, the murder of Beto, a Black man, inside the Carrefour hypermarket in the Brazilian city of Porto Alegre shocked the country. Thousands of people took to the streets to protest that *Black Lives Matter (Dark Matters)*. How many more Black persons will have to die so that society may understand the meaning of this sentence?



Image of the Helix Nebula (NGC 7293), created from the composition of registers obtained with the *Wide Field Imager* (WFI), an astronomical camera coupled to the *Max-Planck Society* telescope of the *European Southern Observer*, of 2.2 meters, in the La Silla observatory, in Chile. The greenish blue shine in the center of the Helix is associated to the presence of oxygen atoms that shine due to the effects of the intense ultraviolet radiation of the central star of 120,000 Celsius degrees and the hot gas. The peripheric regions of the image show the reddish color from the hydrogen and nitrogen present there. In the

central region, the knots and galaxies diffused in the gas stand out.

The poetry lurking behind this image calls to mind Toni Morrison's (1931-2019) classical *The Bluest Eye*. Morrison is an internationally acclaimed author, the first Black female writer to be awarded the Nobel Prize in Literature, in 1993. This image reminds me that racism in Brazil is physically marked and, therefore, the phenotypical traits are an important part of the ethnic-racial construction in the country. The scientific racism, as pseudoscience, operates within our anthropoLOGICS.

DEMBWA - AUGUST 10

MUSIC: TIGANÁ SANTANA

(TEACHER, RESEARCHER, SINGER AND SOUNGWRITER FROM BAHIA)

VOICE: TIGANÁ SANTANA E VIRGÍNIA RODRIGUES

Dembwa is the stick of Lemba

Dembwa is nkindu ia geemba

Dembwa is the king of the feet of the malembe

White corn and embroidered skirt

A boy walks to dream

Miss Terezinha is the crying

Mister Zezinho of Aninha is the arrival

August 10 is a day for changing

Dembwa is the task of opening one's arms

Even when there is no one to embrace

Dembwa is the fisherman forgetting the ropes

In the waters that go beyond the sea

Dembwa is much earth for few steps

And much forgiveness to take

Dembwa is Zambi having to wait

The Time has asked the leaf to dance
The leaf to dance and never stop
And always heal the day

The Time has asked the leaf to dance
The leaf to dance and never stop
And always heal the day

The Time is the whole world
And it is the blood of the woman
Up there my people
And above them Candomblé
Will rise, will rise
Will rise, will rise
Will rise until
The one who dies soon
Due to living in one's faith
Will drop, will drop
Will drop, will drop
Will drop until
The most colored life
And the argument of anyone who wants

Dembwa is the stick of Lemba
Dembwa is nkindu ia geemba
Dembwa is the king of the feet of the malembe
White corn and embroidered skirt

A boy walks to dream
Miss Terezinha is the crying
Mister Zezinho of Aninha is the arrival
August 10 is a day for changing

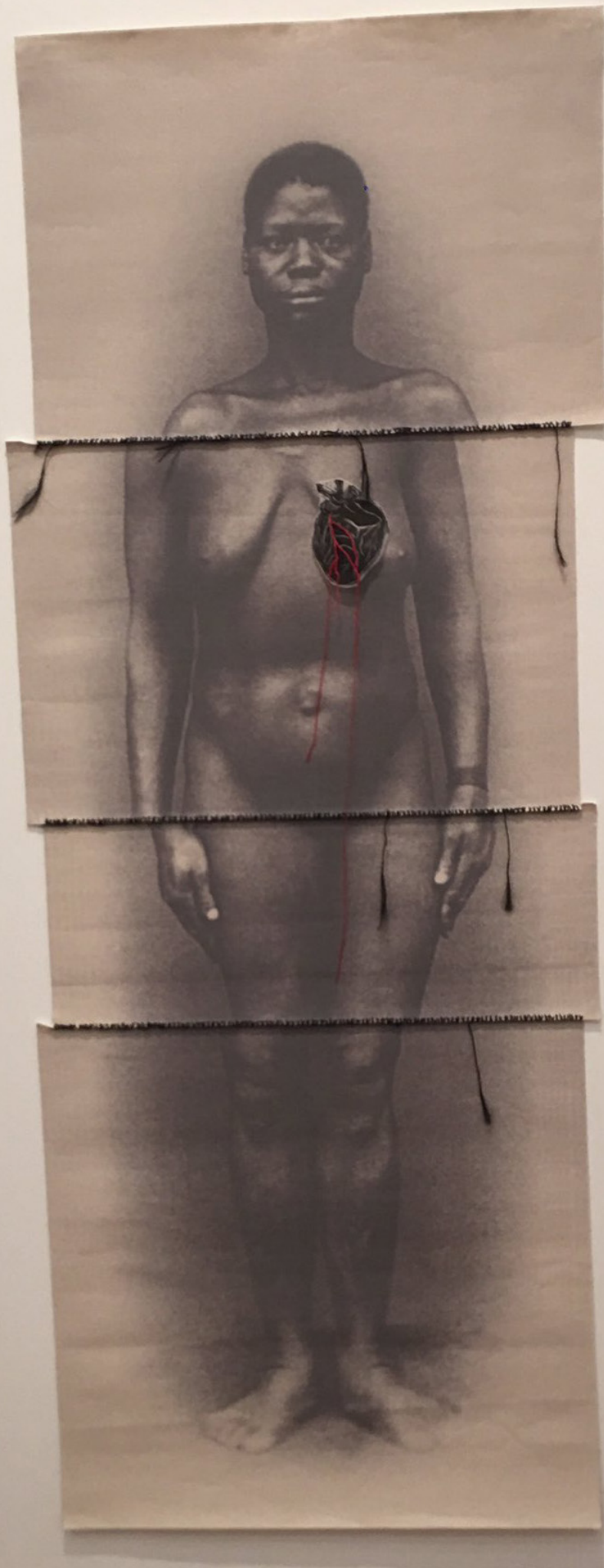
Dembwa is the task of opening one's arms
Even when there is no one to embrace

Dembwa is the fisherman forgetting the ropes
In the waters that go beyond the sea

Dembwa is much earth for few steps
And much forgiveness to take
Dembwa is Zambézia having to wait

The Time has asked the leaf to dance
The leaf to dance and never stop
And always heal the day

For the act of hunting
Dembwa needs to sing
Wind that pierces us
Dembwa needs to sing
River that scars
Dembwa needs to sing
For the warrior to guard us
Dembwa is the place to guard
(Iá)
Iá-iá-iá-iá



Rosana Paulino, Black visual artist, researcher, and educator, one of my favorites, joins photography, embroidery, carving, and installation to explore the discourse of scientific racism that places the subjectivity of Black people in a place of non-intelligence. The artist, in her poetics of the matter, helps us to rethink the African roots and the violence of the slave system, mainly against the bodies of Black women. Her work makes me think about where, when, and how astronomy develops a fundamental role in the project of colonization of the so-called Americas. Her art makes me feel that the basic sciences (mainly the natural sciences, as passionate as they are) urgently need to help us in understanding the role of the sciences not only in repositioning the world, but mainly to help us

to recognize the places of whiteness and blackness.

In science, women, mainly Black and LGBT women, are placed in the margin, as background, rarely having the main role. Due to that, many persons think that women have no contribution in science. However, even in the face of the lack of support and the prejudice, important discoveries have been made by women, such as the base technology to invent the *Wi-Fi* that we use today or the hand-made calculi for us to reach the Moon. Unfortunately, we do not live in an egalitarian and/or equanimous society. For a woman to have the same recognition as a man, she needs to work thrice as much. Black, indigenious, LGBT+ persons are underrated in their epistemic and creative potentialities.

ASTRO-ANTHROPO-LOGICS V: THE WATERS THAT NOURISH LIFE

OSUN⁵⁴
[OXUM]

Obinrin gbadamu gbadamu

To o see gba legbee mu

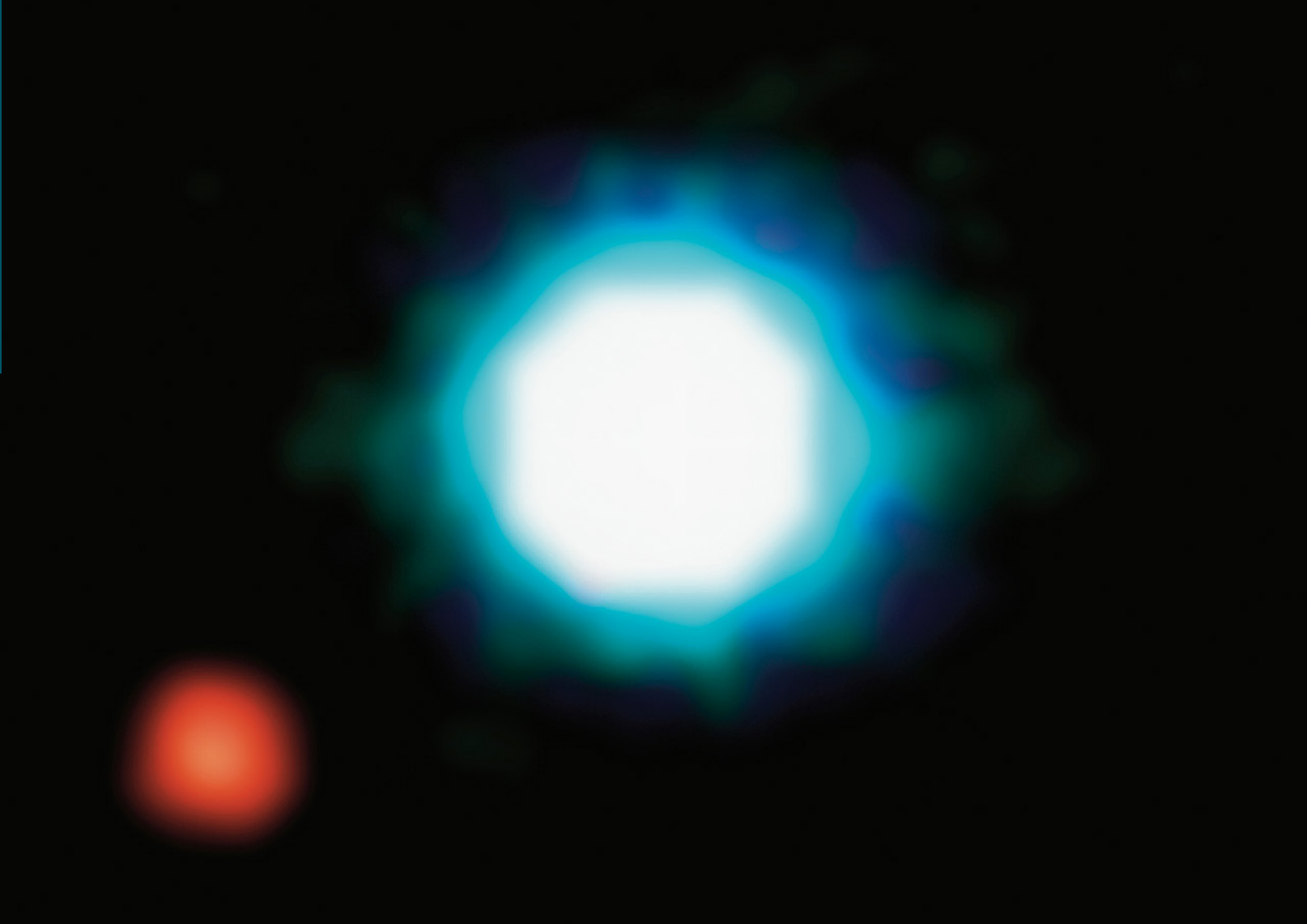
Obinrin gbona, okunrin n sa.

[A strong and powerful woman with a heart of steel

One who is indefatigable (cannot be captured)

A woman whose rage makes men to run in panic.]

⁵⁴ Oriki of Oshun, in Yoruba, as sung by the Black lyrical singer Irma Ferreira.



We live within a logic diverse from the one of the Copernican Revolution. In the above image we have the first *direct* register of an exoplanet. The 2M1207b, represented by the red spot in the lower left side, is one of the more than 4,000 planets catalogued outside of the Solar System up till now. This exoplanet circles around a brown dwarf star, 2M1207, a multicolored spot located in the center of the image. Similar to Jupiter, but 5 times more massive, its host star orbits at a distance 55 times greater than that between the Earth

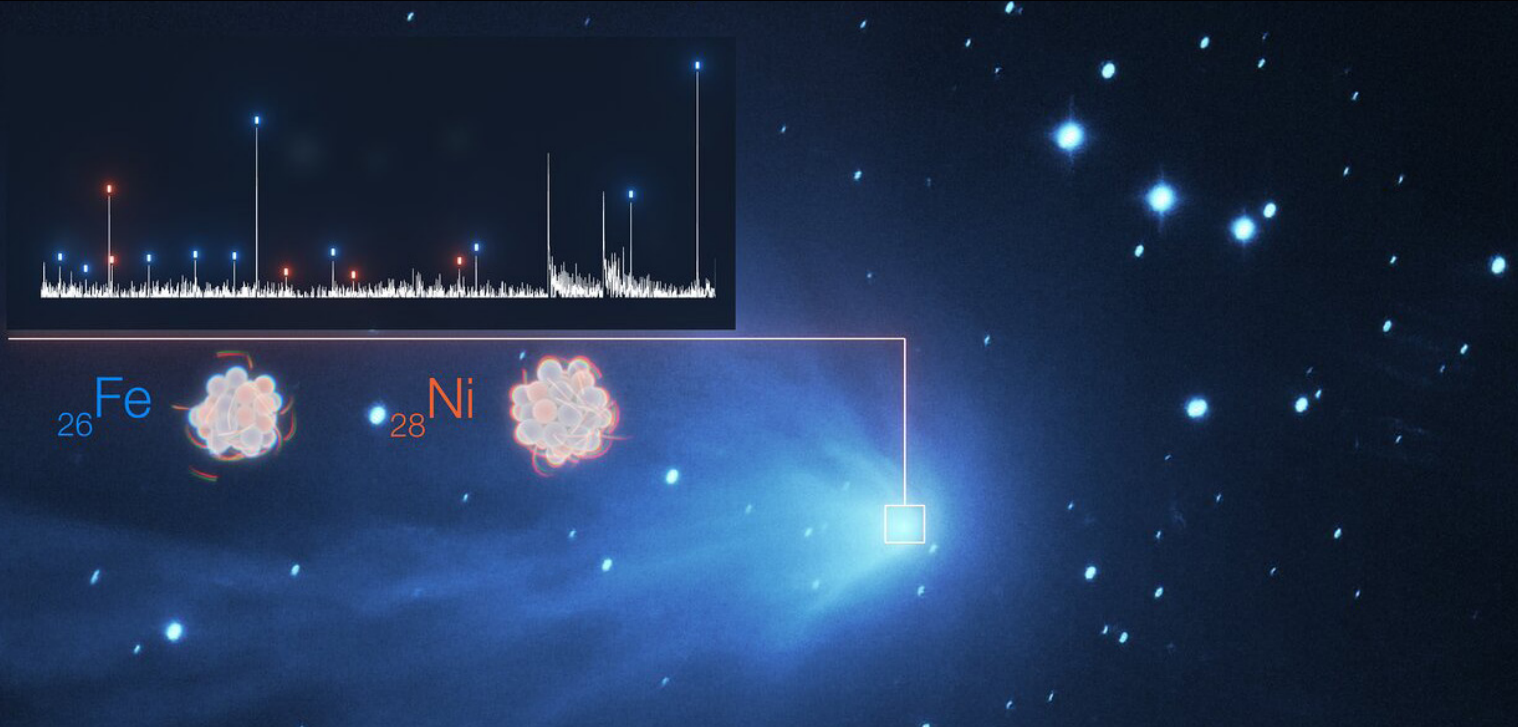
and the Sun (1 Astronomic Unit, distance Earth-Sun: 150 million km), almost twice more distant from the Sun than Neptune. The image is obtained from the composition of three expositions made in near-infrared, one of the ranges of light expression. The discovery of new planets and the consequences of the Anthropocene⁵⁵ or the Planet Earth places us in this century in another logic to that of the Copernican Revolution. It is not enough to discover other planets, dream with the colonization of Mars or ask oneself, out of sheer curiosity, whether we are alone in the Universe.

There is a growing tension between the agenda of science and the needs of people. It is important to rescue the planetary dimension of co-habiting, re-inventing life and creating humanitarian micro-devices, in which biodiversity is protected. Science needs to be integrated within the essence of the planet. Another civilizational covenant, based on ethics, is needed. This is our next great challenge. In the words of Donna Haraway,⁵⁶ biologist, philosopher, writer, and Professor Emeritus of the University

of California, Santa Cruz, one of the best-known feminist theoreticians, “The Anthropocene marks severe discontinuities; what will come after will not be as what came before. I think that our work is to make the Anthropocene as short and tenuous as possible and cultivate, one with each other, in all the imaginable senses, ages to come that may rebuild refuges. At this moment, the earth is filled with refugees, human and non-human, and no refuges.”

⁵⁵ Concept formulated by Paulo Crutzen, Nobel Prize in Chemistry in 1995, which translates the idea that we live in a geological era in which biodiversity has been systematically reduced due to human action. Again, it is important to highlight that the word “human,” employed here, should be contextualized. Who are actually the humans that play the most important part in the Anthropocene?

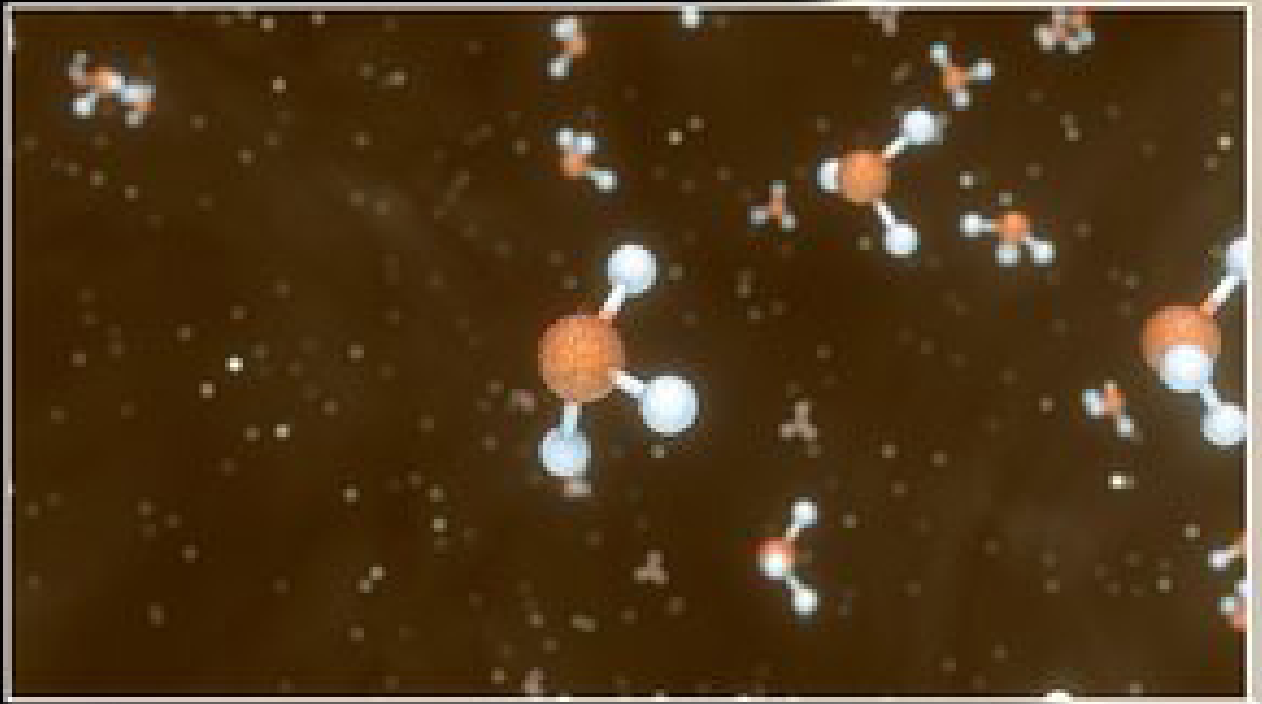
⁵⁶ Donna Haraway. Antropoceno, Capitaloceno, Pantationceno, Chthuluceno: fazendo parentes. *Clima Com Cultura Científica – pesquisa, jornalismo e arte* I Year 3 – N. 5 / April 2016 / I.



Known as space wanderers, the comets are associated, in the popular imagination, to many events, either good or bad. However, from the astrophysical point of view, they are interesting objects to help us understand how the Solar System was formed, since they are fossils of the primordial processes that originated it. Studies made with one of the largest terrestrial telescopes, the *Very Large Telescope* (VLT: 8.4 meters of diameter), of the *European Southern Observatory* (ESO), in Chile, revealed that there are heavy elements, such as iron and nickel, in the atmospheres of comets of the Solar System, even

those visitors more distant from the Sun, which is not so common. In the image, we have the frozen interstellar comet 2I/Borisov. The production of iron in the Universe involves, in a larger proportion, processes of stellar evolution that last at least billions of years since the stars were born until the day they will die. As each chemical element presents a signature, the dispersion of light (via spectroscopy) allows us to reveal the chemical composition of the celestial objects.⁵⁷ The specter of light of the objects such as comets and asteroids helps us to understand the extra-terrestrial origin of the water.

⁵⁷ In the case of comets, for each 100 kg of water in the atmospheres only 1g of iron/nickel exists.



Despite the similarities between the planets Venus and Earth, the atmosphere of Venus is complex, with a great amount of sulfuric acid. In this sense, it is one of the most probably inhospitable planets for life as we know it, although for a long time there was the supposition of life in the highest clouds of its atmosphere. The beautiful image is an artistic rendering of Venus, having as detail molecules of

phosphine.⁵⁸ The observations were possible through the *James Clerk Maxwell* and the *Atacama Large Millimeter/submillimeter Array* telescopes — sophisticated devices. The probable detection of phosphine in Venus caused a great stir and, more importantly, the fact that the quantity found did not discard the possibility that the origin of phosphine was biological, implying *extraterrestrial aerial life*. However, new calculi and measure-



ments have placed such possibilities under doubt. In any way, this event demonstrates that the detection/confirmation of life outside Earth is still one of the great questions of humanity. At the same time as our curiosity makes us look up to the sky, as scientists and poets, often (un)believing, in

a human exercise to perceive the *other*, we have to listen closely, retell stories and preserve life on Earth. The COVID-19 demands from us other logics and dialogs with ethical principles of valuing life and humanizing the bodies excluded from all the cosmopolitical ecosystems.

⁵⁸ Phosphorated Hydrogen (PH₃): an atom of phosphorus and three of hydrogen. On Earth, phosphine is associated to microbes that live in the insides of other animals, in swamps (with low oxygen) etc. Therefore, it may configure, among other possibilities, the signature of life.

ASTRO-ANTHROPO-LOGICS VI: (DE)-VELOPMENT

DRIVE

COMPOSITION: CAETANO VELOSO

VOICE: MARIA BETHÂNIA

DOWN UNDER, THE EARTH, ABOVE

THE MALE SKY

AND BETWEEN THE TWO THE IDEA OF A SIGN

TRACED IN LIGHT

AND IN ALL THE VOICE OF MY MOTHER

AND MY VOICE IN HERS

AND THE AFTERNOON HURTS

OF SUCH EQUALITY

WHAT AN AFTERNOON THAT CROSSES THE HALLWAY

WHAT PEACE

WHAT LIGHT IT MAKES

WHAT A VOICE, WHAT PAIN

WHAT BITTER SWEET

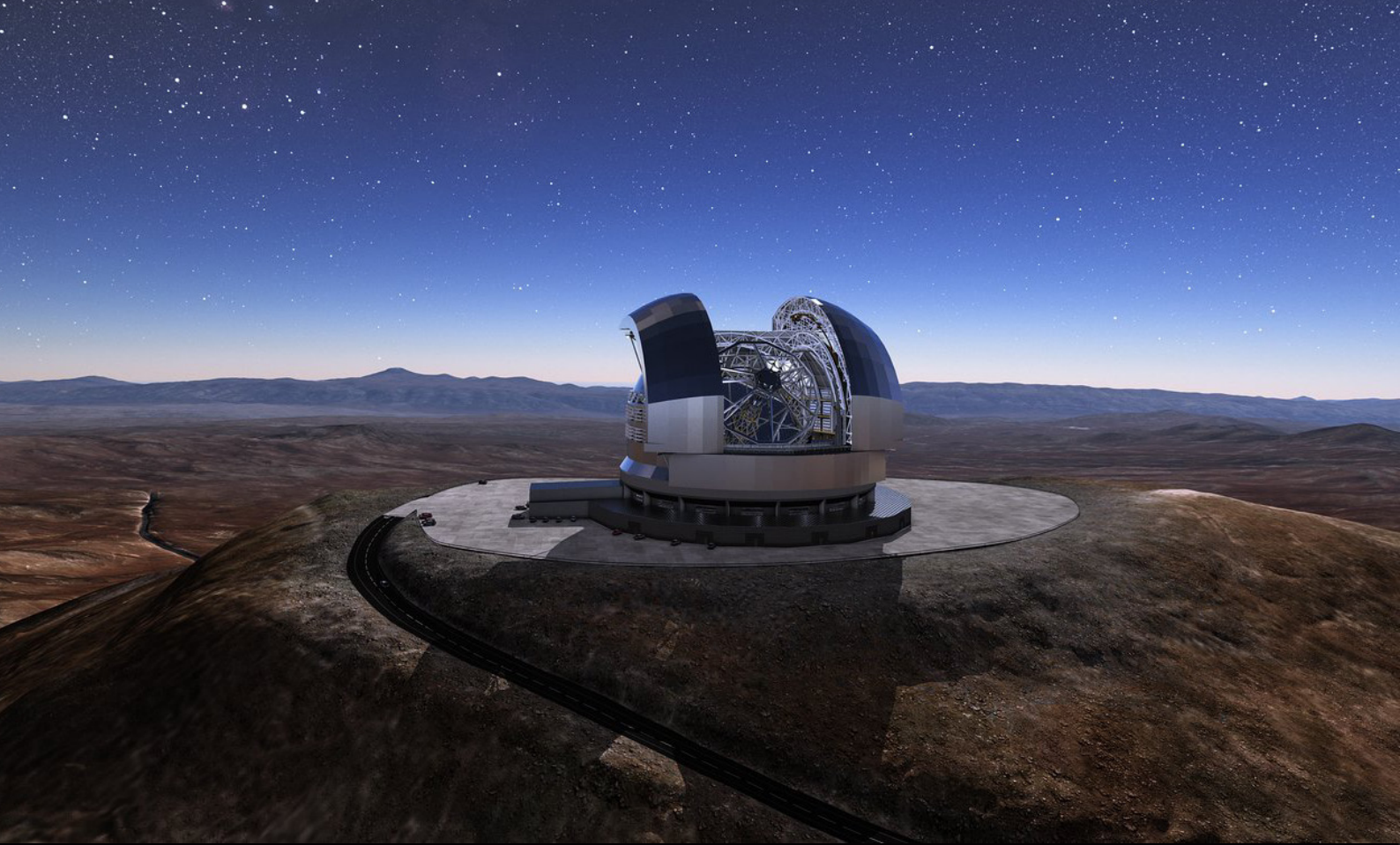
EACH TIME

THE WIND BRINGS

OUR VOICE

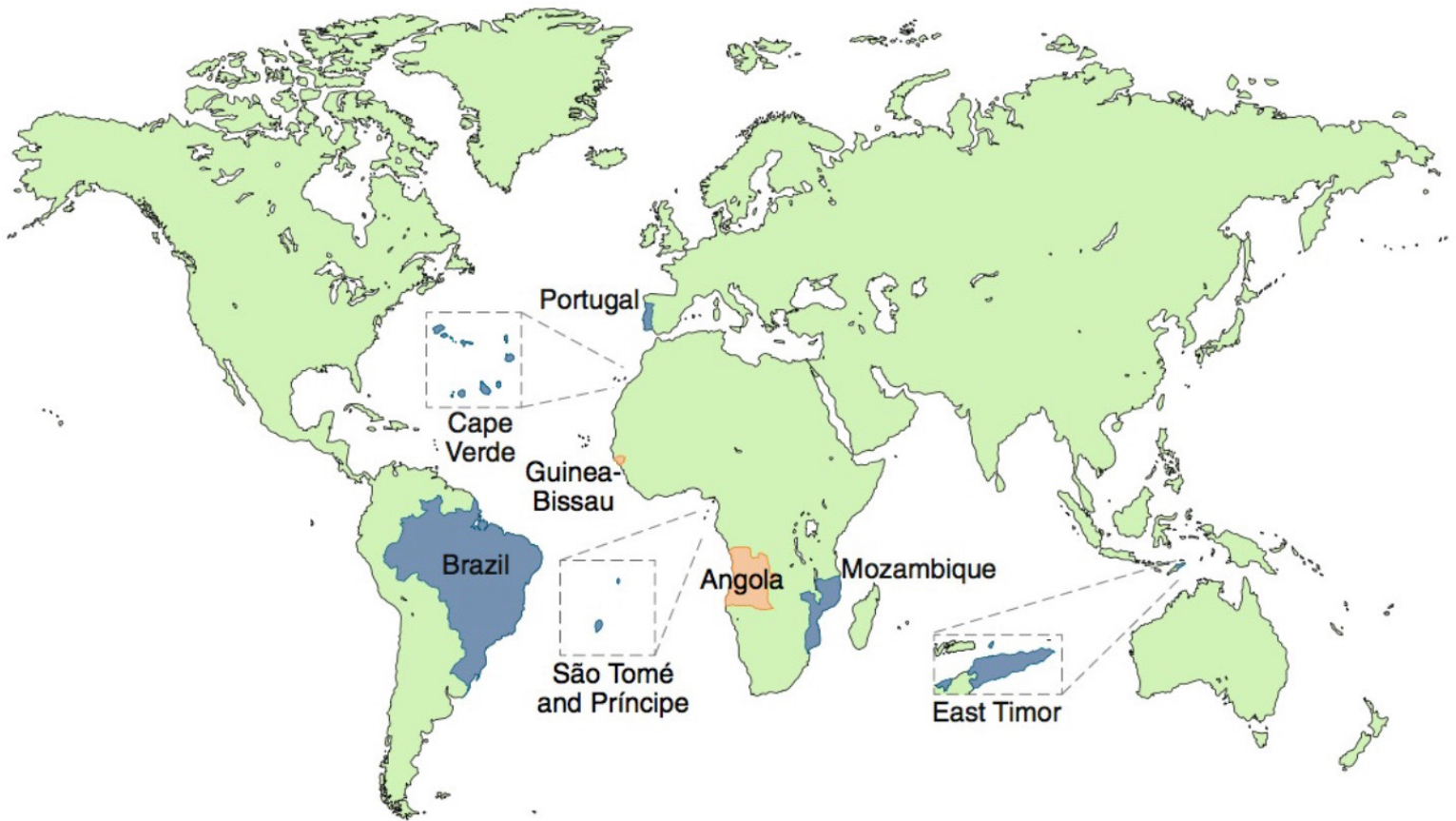
WHAT GREEN FLAME OF THE

CANEBRAKE
CANEBRAKE
AND WE, MOTHER
CANDEIAS, DRIVE
THAT WHICH I HAVE NOT DONE
AND WANTED SO MUCH
IT IS ALL THAT I KNOW NOT
BUT THE VOICE SAYS
AND WHICH MAKES ME
BRINGS ME, CAPABLE
OF BEING HAPPY
THROUGH THE SKY, THROUGH THE EARTH
AND THE EQUAL AFTERNOON
BY THE SIGN
BY THE SIGN
AND WE, MOTHER
AND PENHA, MATRIZ
DRIVE
DRIVE
DRIVE



For centuries, astronomy and astrology were one and the same. In the 17th Century, they split. The former became a science, and the latter became a pseudoscience. The relationship between the former with the State and technology has been since then encouraged. The project of modern and contemporary science involves very high investments, such as shown in this artistic rendering in which, in the Cerro Armazones, in the Chilean desert of the Atacama, near the ESO Paranal Observatory, the largest telescope on earth will be placed (with its 42-meter diameter mirror) named *Extremely*

Large Telescope (ELT). These are gigantic eyes pointed to the sky. Its 30-meter cousin, which would be placed on the mountains of Hawaii, a sacred place for native peoples of this American state, faces lengthy discussions, in which the necessity of deepening the astro-anthropological relations. What is development, after all? Progress? Innovation? How to establish dialogs between the technologies and modern and contemporary scientific knowledge, on the one hand and, on the other, the ancestral knowledges and practices of peoples placed on the margins of the modern and contemporary history of science?



SOME COUNTRIES THAT INTEGRATE THE PORTUGUESE LANGUAGE OFFICE OF ASTRONOMY FOR DEVELOPMENT⁵⁹ OF THE INTERNATIONAL ASTRONOMIC UNION

Within the context of so-called Lusophony, it is not only the beauty and the poetry of the Portuguese language that connect Brazilian astronomy to that produced in African, Asian, and European countries, but, above all, the astro-anthropOLOGICS generated within colonialism and coloniality that need to be deepened and reflected upon. The relationships in

sciences are not pure, naïve, neutral. There are historical and cultural context in an interweaving of complex relationships of power that need to be discussed. The lenses of decoloniality are a possible pathway. The pretagogies and the other ways of thinking the world are as well. These are the tongues and languages that need to encourage freedoms.

⁵⁹ Alan Alves Brito; Patricia Spinelli; Valente Cuambe; Ivanilda Cabral; Joana Latas; Rosa Doran. Astronomy for Development in Portuguese-speaking Countries. *Nature Astronomy*, 3, 366, 2019.



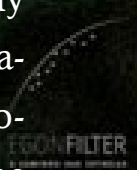
In this beautiful image of the night sky of the south of Brazil, which caused a lot of stir since many frightened people did not know what the parallel tracks in the horizon were, one can see the Starlink communication satellites launched by SpaceX, a private company. The satellites shine

due to reflecting the light of the Sun. If this practice becomes widespread, more and more artificial satellites as these will be produced, and these shiny events in the sky will become ever more common. There is a strong



debate within the international scientific community about how these satellites may, in the future, progressively affect the observations of the space. How can we, in the speedy modernity of the urban context, reconnect to

the stories of the sky? What are the limits and the borders of space exploration? How can we collectively create norms for exploring the space? Who can speak about these programs? What will we do with the great amount of space garbage already produced since mid-20th Century?





Babak Tafreshi

In this poetic image, the city of São Sebastião do Rio de Janeiro is seen, one of the most photogenic cities in the world. In the background, as the Sun rose, the beauty of the nearly full Moon setting at seaside. The reddish hue announces the spread of light, nostalgic, illuminating the beginning of morning in one of the stretches of the coast of the Southern *Black Atlantic*. To the west, the slums of Vidigal, under the eyes and the shadow of the twin peaks of the Morro Dois Irmãos. To enchant the harmony of the beautiful natural landscape, the birds follow their morning pathways to remind us of freedom as unnegotiable.

Rio de Janeiro, with its stories and geographies linked to the *Black Atlantic*, is one of the most racialized cities of the country. The slums are the modern day quilombos in the thought of Beatriz Nascimento. It is in Rio de Janeiro that the samba of Tia Ciata becomes an orison and a black oriki. In the beauty of Rio de Janeiro are

the black smiles, the fights, the griefs, the cries, and the uprising intelligence of a melaninated people crossed by structural racism.

In March 14th 2018, the carioca councilwoman Marielle Franco, a Black, lesbian woman, researcher, human rights activist, was brutally assassinated in Rio de Janeiro. The driver of the car in which she was, Anderson Gomes, was also victimized. Marielle is a star that became an international symbol of the anti-racist fight.

In many indigenous and African cultures, the Moon is linked to the Sun, often as its sister, wife and foe. In these cultures, the Moon may translate the potency of femininity. Its phases are often associated to the cycles of life, to frailty and corruption. In eclipsing the Sun, the Moon reverberates an unimaginable power. The stories about it in the many Amerindian and African narratives are many. All of them posit a connection between sky and earth that the modern worldview cannot grasp, let alone feel.



Babak Tafreshi

The Iguazu Falls are among the Seven Wonders of the World. In this beautiful image, the Milky Way can be seen. To compose the photograph, the splendorous tropical forest can be seen, near the Falls, in the National Park, in the border between Brazil and Argentina. From left to right, in the sky, the Alpha and Beta stars of Centaur can be spotted, the Coalsack nebula, the Southern Cross and the Carina Nebula. Sirius, the shiniest star in the night, is highlighted, almost at the center. Irregular galaxies are also noticed as well as our most endeared neighbors, the Large and Small Magellanic Clouds. The positive sign (more to the left) points to the South Celestial Pole, around which the sun moves in its daily route.

These stars and galaxies permeate the sky narratives of indigenous and African peoples throughout history. These celestial objects translate the resilience of downtrodden bodies, such as the one of Caroline Herschel (1750-1848), first woman astronomer to receive a salary and one of the first to be accepted in scientific organizations.

Currently, women are still the minority in many scientific organizations, reflecting latent inequalities in society. In the Brazilian Physics Society, for instance, 68% of the members are men, 61% are white, 88% are heterosexual, and 59% live in the Southeastern Region, according to data published in 2020.⁶⁰ Black men and women are under-represented in the (exact) sciences.

⁶⁰ Célia Anteneodo; Carolina Brito; Alan Alves-Brito; Simone Alexandre; Beatriz D'ávila; Débora Menezes. Brazilian Physicists Community Diversity, Equity, And Inclusion: A First Diagnostic, *Phys. Rev. Phys. Educ. Res.* 16, 010136, 2020.



Babak Tafreshi

This image of the night sky, with many of its elements identified, was made in the city of Campos, northeast of Rio de Janeiro. Contrasting with it, we see the cane-brake of a local farm in the historical region of the state. The stories of the stars of the African peoples in diaspora are connected to the *plantation* memories,⁶¹

one of the most atrocious economic models of our history, which used enslaved work as its most valuable currency. Toward the center of our Galaxy, we see a splendorous sky. From left to right, the Galactic Center in the Sagittarius Constellation. Shiny stars stand out in the tail of the Scorpio; the South Celestial Pole is above; on the right



of the gap, in the sugarcane, we see the Coalsack Nebula, dark region, understood as *constellation* by American native peoples, and we also see the Southern Cross, paradigmatic for the peoples who live under the sky of the Southern Hemisphere. The closest stellar system, Alfa Centauri, and the most complex globular cluster of stars, Ome-

ga Centauri, shine in the starry night. Just as stars, human beings are born, grow, and die (infancy, childhood, adult age, and old age). However, a black person born in Brazil have greater changes of having his or her life interrupted until their teenage. In 2019, 4,971 children died violently in our Country, 75% of them Black.



⁶¹ A reference to Grada Kilomba's book *Memória da plantação: episódios de racismo no cotidiano*. Rio de Janeiro: Cobogó, 2019.

⁶² Danilo da Conceição Serejo Lopes. *A atemporalidade do colonialismo: contribuições para entender a luta das comunidades quilombolas de Alcântara e a base espacial*. Editora UEMA/PPGCSPA/PNCSA: São Luís, 2020.

⁶³ See https://www.youtube.com/watch?v=7n6slSF_iYI



The Alcântara Space Center, north of the state of Maranhão, was built in 1983. This region, due to being near the equator of the Earth, is known as a strategic site for launching rockets around the world, since it reduces in up to 30% the fuel needed to perform a space flight. There is, since then, social-anthropological and cosmopolitical tension in the region, which is a quilombola territory⁶² (star remnants, in the poetics of matter). If, in the past, the sky helped Black men and women to trace their escape routes toward the quilombos,⁶³ today the politics behind space conquest still oppresses Black experiences. In this case, we have another painful example of the way the stars cross with anthropoLOGICS in their visible and sensible poetics in the invisibilization of certain bodies-territories.

Where are the scientific and technological results yielded in the African continent within the Modernity Project? Which are the robust astrophysical and astronomical projects developed in African countries? Which are the scientists of the African continent working in physical sciences? Where are the indigenous people contributing to the field? How are they moving and organizing? Who are they? Where do they live?



This image reminds us of the Atacama Desert in Chile, a small country located between the Pacific Ocean and the Andes Mountains, where bodies of men and women who thought for social justice and freedom of speech and thought were buried⁶⁴ during the Pinochet dictatorship (1915-2006), one of the bloodiest in history. In Chile, the Mapuche cosmologies, original peoples, are stereotyped and silenced.

However, the image was not made in Chile. In April 6th 2021, the *Perseverance* robotic jeep stretched one of its arms to shoot its first selfie on the planet Mars. In this historical gesture, it

registered from a very short distance, Martian rocks and details of the surface of the red planet. These missions are only possible due to the robust programs of computational thinking and artificial intelligence existing behind them. *Artificial intelligence*, as well as the *internet of things*, are some of the most revolutionary strategies of our times. They have been more and more developed and used within the context of space exploration and astronomic studies, in all the phases of the processes of collection and treatment of the great volume of information obtained day after day in the many centers and observatories around the world.

At the same time, the artificial intelligence algorithms are sexist and racist, representing and associating women, LGBT+, Black, and indigenous people to low intelligence, violence, and general inability. Machines reproduce the segregationist and racist anthropoLOGICS that have placed Black and indigenous bodies (thoughts) as *pseudo-truths*⁶⁵ in the history of modern and contemporary science.

In addition, Black and indigenous territories in Brazil (villages, neighborhoods, slums, schools etc.) lack access to technology and, even less, digital culture. There is, for instance,

a marked residue of illiteracy among quilombola populations. According to data of the National Research by Household Sample of 2019, the global illiteracy rate in Brazil was 6.6%. This means that around 11 million people cannot read or write a simple note. Illiteracy is, in modern and contemporary anthropoLOGICS, a technology of physical and epistemic death of Black bodies. The building of the ethos of the modern and contemporary subject follows in continuous tension with the r[existence] of the ethos of the quilombola-African-indigenous-Black subject.

⁶⁴ A historical context poetically, astrophysically, and politically depicted in the movie-documentary *Nostalgia de la Luz*, 2010, directed and written by the filmmaker Patricio Guzmán.

⁶⁵ Katemari Rosa; Alan Alves-Brito; Bárbara Carine Soares Pinheiro. Pós-verdade para quem? Fatos produzidos por uma ciência racista. *Caderno Brasileiro de Ensino de Física*, v. 37, n. 3, 1440-1468, 2020

ASTRO-ANTHROPO-LOGICS VII: FIRE, JUSTICE, WIND AND STORM

NEO-ORIKI OF YANSAN

COMPOSITION: CAETANO VELOSO / GILBERTO GIL
(SINGERS AND SONGWRITERS FROM BAHIA)

Lady of the leaden clouds

Lady of the world

Within me

Queen of the rays

Queen of the rays

Queen of the rays

good weather – bad weather

Lady of the June showers

Lady of everything

Within me

Queen of the rays

Queen of the rays

good weather – bad weather

I am the sky

For your storms

A sky broken in two

In middle afternoon

I am a sky

For your storms

Pagan goddess of lightnings

Of the showers of the whole year

Within me

Queen of the rays

Queen of the rays

Queen of the rays

good weather – bad weather



Francisco Sajual

In this image, registered in Guatemala, Jupiter and Saturn are seen on the right soon after the Sunset, just above a tree, bathed by the dim shining of the zodiac light. For many native and African peoples, in their *ubuntu* communitarian stands, all the people within the community make up a sociological universe, in which their territories of existence are part of a whole, they themselves a set with other animate

(or not) beings, the celestial bodies and the meteorological phenomena. In this sense, Shango, one of the most puzzling divinities of Yoruba cosmology, is the volcano itself, which, in its rage, sputters lava and shakes the sky (*Orun*) and the earth (*Àiyé*), controlling (being) justice, rays, and thunder. In these dialogues, we need to build the collective subject proposed to us by Ailton Krenak.

MITHOLOGICALS (M93)⁶⁶

XERENTE: THE PLANET JUPITER

One day, Star (Jupiter) came down from the sky to marry a young bachelor who was in love with her. He hides the miniature woman inside a calabash, where his brothers find her. Annoyed, Star takes her husband to the sky; everything is different there. Wherever he looks, the boy only sees smoked or charred human flesh; the water where he bathes is littered with mutilated corpses and eviscerated carcasses. He escapes sliding down the stem of the bacaba tree that allowed his ascension and, going back to his kinsmen, narrates his adventure. But he would not survive for too long. When he died, his soul returned to the sky, where he became a star.

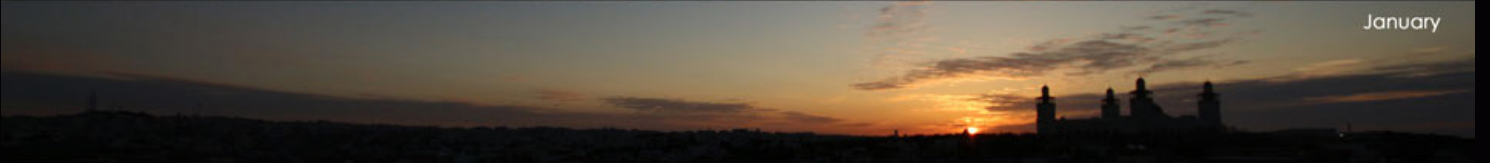
⁶⁶ Lévi-Strauss. *O cru e o cozido (Mitológica I)*. Rio de Janeiro: Zahar, 2021.



December Solstice



January



February



March Equinox



April



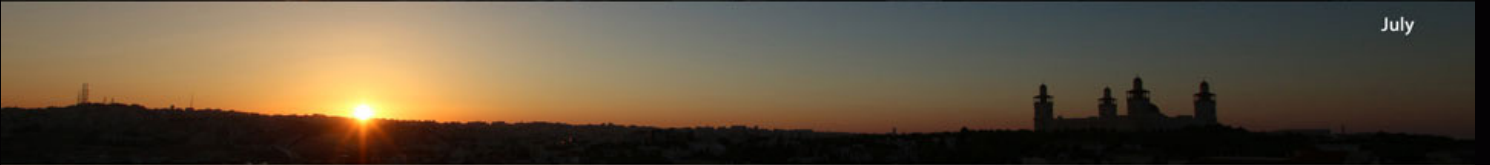
May



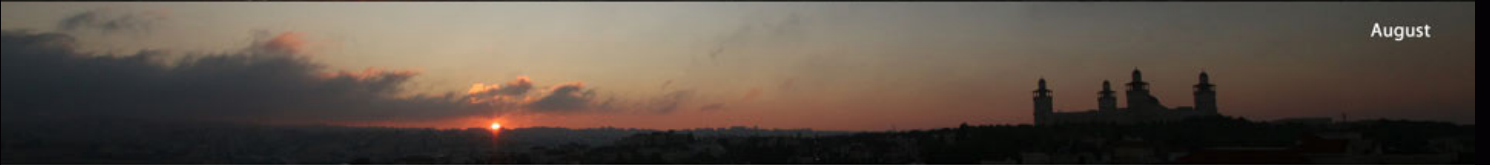
June Solstice



July



August



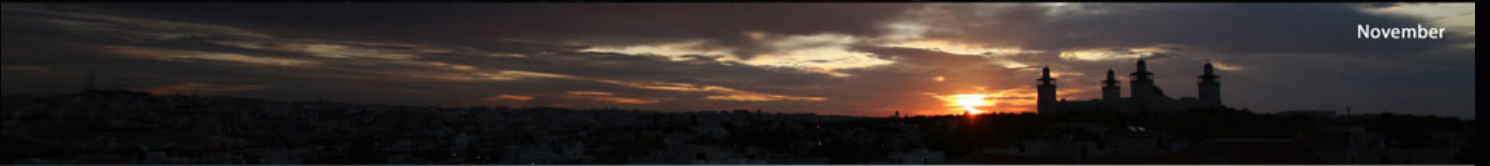
September Equinox



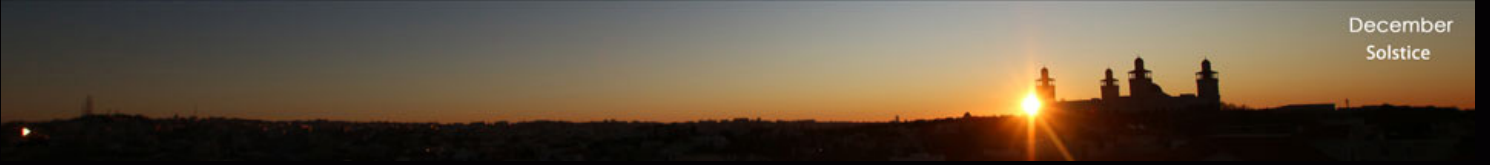
October



November



December Solstice



One of my favorite astronomic images, made up of pictures taken during all the months of 2019, from the city of Amman, in Jordan. This sensitive image captures the Sunrise in the horizon and leaves no doubt about the fact that our star does not rise (or set) always in the same place throughout the year. Although the Sun always rises in the eastern side, it rises more to the south of the East in the December solstice (summer⁶⁷ in the Southern Hemisphere) and more to the north of the East in the June solstice (winter in the Southern Hemisphere).

The main visible movements in the sky are due to the motions of *rotation*⁶⁸ and *revolution*⁶⁹ of the Earth. The visible motions of the sky occur, then, around the celestial poles,⁷⁰ perpendicular to the celestial equator⁷¹; and around the poles of the ecliptic,

situated in a perpendicular axis to the ecliptic going through the center of the Earth. The Sun, in its daily and yearly visible pathway, appears in the sky narratives of many cultures, associated to different philosophical, scientific, religious, sacred, and mythological manifestations. The solstices (June and December) and equinoxes (March and September), which establish well defined locations of the Sun in their visible pathway by the ecliptic, are temporal markers associated to the formulation of calendars. Much before science, they define technique. Indigenous, African, and African-Brazilian peoples still use the sky to count the time, to sow, gather, and, in many of their sacred rites, in which the sky and the earth are not separated in the sense of modern anthropo-LOGICS.

⁶⁷ Lower quantity of sunlight in the Northern Hemisphere and greater quantity of sunlight in the Southern Hemisphere. The seasons of the year are not related to the distance between Sun and Earth as many people imagine.

⁶⁸ Around the axis of the celestial poles, in a 24-hour scale, one day.

⁶⁹ In the plane of the ecliptic, defined as the geometrical site of the Sun itself, in a time scale of 365.5 days, that is, one year.

⁷⁰ Extensions of the rotation axis of the Earth in the sky (celestial sphere).

⁷¹ Projection of the terrestrial equator in the sky (celestial sphere).





Beautiful image of the Starburst⁷² galaxy M82, situated around 12 million light-years from us, in the constellation of the Ursa Major. The colors are created from the composition of pictures taken in varied ranges/windows of the light, that is, the electromagnetic specter, from spatial missions: The X-ray data were registered by the Chandra space telescope and appear in blue; the infrared light, registered by the Spitzer, appears in red; the observations of the Hubble telescope appear in orange (in the hydrogen emission) and more bluish and green-yellow (region of the visible light, in the optic). The composition of colors reminds us of the rainbow, which, in the modern anthropological relations, stands for diversity. Although it is considered that a person born in Brazil has a life expectancy of 76.6 years, this estimation is not the same for trans people/transvestites. Today, in our country, these people have an average life expectancy of 35 years. Brazil is the country that kills the largest number of LGBT+ people for being who they are.

⁷² A class of galaxies that present intense surges of stellar formation.

MYTHOLOGICS (M127)⁷³

BORORO: THE ORIGIN OF LIGHT RAIN

Ill-treated by the mothers and sisters, the men of the Bokodori Encerar clan became *xinadatáu* birds (“galinha do bugre”) and vanished in the air. The women could hold only one boy. The birds told this little brother that, if he were thirsty or too hot, he could imitate their cry: *toká, toká, toká, ká, ká*. Thus, they would know that he needed water and cause a light and quiet rain cloud to appear. This type of rain is associated to the Butaudogue spirits, whereas storms, followed by winds and thunders, are associated to the Badogebague spirits.

⁷³ Lévi-Strauss. *O cru e o cozido* (Mitológica I). Rio de Janeiro: Zahar, 2021..



Each star in this image of the NGC 1898 globular cluster, located in the heart of the Large Magellanic Cloud, our neighboring galaxy, stands for a Black, indigenous, LGBT+ person and a woman, victimized by racism, LGBTphobia, and femicide in Brazil. Each star in this image stands for a victim of the many pandemics within the COVID-19 pandemic, which has caused more than half a million people to disappear in Brazil until now. This image is itself an oriki of diver-

sity and leaves us the message that we need to build, in the sky and in the Earth, other astro-anthropo-logical narratives able to return to us the poetics of (in)visible matters that violence and brutality try to rip from us every day. Only then can we change, project, live together, inhabit together and communicate the cosmological and communitarian ethical sense shaped, for millions of years, in the ashes of the stars and in the words of affection. It is necessary to hear and feel the other universes, in the sky and in the Earth.

ASTRO-ANTHROPO-LOGICS VIII: FEUDS AND DISPUTES

*My last prayer:
Oh, body of mine.
Make me always a questioning man!*⁷⁴

⁷⁴Frantz Fanon (1925-1961). *Pele Negra, máscaras brancas*. Salvador: EdUfba, p. 191, 2008. Psychiatrist and philosopher, born in the French colony of Martinica. One of the greatest Black thinkers and intellectuals of the 20th century.

**The Black bodies and the zones of the not-being-being.
The (in)visible Black bodies.
The Black bodies in motions: (cosmo)politics and onto-epistemologies.**

The narcissistic pact of whiteness, a concept proposed by the thinker and researcher Cida Bento, should always be problematized and questioned in Brazilian society. The experiential writings (*escrevivências*) by Conceição Evaristo and Daniel Munduruku and the political strength of Sônia Guajajara are sparks of stars that shape the orality that touches us, changes us, and communicates new words to us within a circle in a round in which ancestral time is circular and invites us to the *aquilombamento* that we chose to follow: for us and for our kin, in the building of collective subjects, bravely rejecting the places of subalternity and the silencing into which we are constantly pushed. We, the bodies-territories.

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PROJECTS

ZUMBI-DANDARA DOS PALMARES

Project promoted by Itaú Social, Study Center about Labor Relations and Inequalities (CEERT), by UNICEG, by Instituto Unibanco and the Tide Setubal Foundation, is managed within the ambit of the Afro-Brazilian, Indigenous, and African Study Center at UFRGS, coordinated by the author alongside a research team on the exact and human sciences, of schools and social movements. Our main objective is to promote a thorough radiography of the main structural and educational challenges in Quilombola School Education (EEQ) for the promotion of racial equity in Brazil in the 20th century, focused on Rio Grande do Sul. It had its onset in November of 2020 (18 months).

AKOTIRENE KILOMBO CIÊNCIA

Project created by the author and the Morada da Paz Quilombola Community (COMPaz), Território de Mãe Preta. It focuses on the promotion of racial equity in the EEQ and in public basic education, deepening the ethnic-racial and gender relations in their intersections and establishing an intercultural dialog among the nature sciences and the indigenous and quilombola knowledge and practices. It had its onset in May of 2018. It has been sponsored by the Instituto Unibanco, Itaú Social, and Fundação Carlos Chagas in 2018-19 and, in 2021, (8 months), has the sponsorship of the Museu do Amanhã and the British Consulate. Since 2019, it has been receiving funds from UFRGS within the ambit of the Programa Ciência na Escola, Ciência na Sociedade, at UFRGS.

THE AUTHOR



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THE SKY IS SOMEWHAT A GREAT GRAVEYARD, IN WHICH THE PROCESSES AND RITES OF LIFE AND DEATH, SHAPED, IN DIFFERENT CULTURES, IN RESILIENT STORIES TOLD BY THE STARS, ARE EXPERIENCED IN SUBLIME AND ONGOING WAYS, COMMUNICATED THROUGH A NOSTALGIC PRESENCE OF LIGHT.

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