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Abstract

This article examines the foundation myths of Brazil in the last two centuries, paying particular attention to the relationship between these myths and governmental attitudes toward the hybridity of Northern and Southern ethnic and technoscientific entities. Based upon this examination, the article argues that it is important to consider both the wider temporal frames and the shifts and sedimentations that have formed current foundation myths and shaped their relation to science and technology. Postcolonial science technology studies theories illuminate aspects of this trajectory, but our analysis suggests a more complex scenario that involves internal political dynamics and the work of local intellectuals. We argue that the example of Brazilian social scientists should encourage scholars to go beyond the current focus on breaking the myths of technoscience and undertake mythmaking initiatives with wider societal resonances.

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development, epistemology, politics, post-colonial STS, ethnicity, Southern technologies

Introduction

Public attitudes toward technoscience¹ in Europe and North America have changed considerably in the past half-century. The social contract granting scientists nearly limitless autonomy and resources to provide irrefutable answers to societal problems has been called into question by increasingly reflexive societies. Science to some is often seen more as a source of anxiety and environmental catastrophe than as part of a linear path to Utopia (Beck 1992; Guston and Keniston 1994). In this new context, the public has become increasingly skeptical about technoscientific entities ranging from genetically modified food to nuclear energy (Backstrand 2003; Bloomfield and Doolin 2011; Wynne 1996).

But while in the global North² science and technology are coming under increasing public scrutiny, in Brazil and many other Southern countries the link between Northern technoscience and unfettered progress seems to be as strong as ever (Dupas 2006). This can be demonstrated by, for instance, the Brazilian government continuing to invest heavily in satellite-based environmental licensing technologies despite evidence that a system derived from this technology has contributed to the increase in deforestation rather than its reduction (Rajão, Azevedo, and Stabile 2012). In some cases, Northern technoscience also plays a key role in excluding Southern alternatives. This has taken place, for instance, in the creation of a nutritional supplement called “multimixture,” an innovation from rural Brazil that was developed outside established universities and national research institutes. Despite the wide adoption of multimixture by low-income populations all over the country on the basis of its perceived efficacy, its supporters have struggled to obtain official recognition from international donors and national governments (Marques 2012b; Velho and Velho 2002). In sum, imported Northern technoscience is still a fetish or “*feitiço*,” a magical entity able to produce positive effects in deterministic ways (Ellen 1988), while innumerable local technologies and bodies of knowledge are systematically discarded as “primitive” by the post-colonial enterprise (C. Scott 2011).

In line with a growing number of studies in the science, technology, and society (STS) literature, we evaluate how this attitude toward technoscience

can be understood as a consequence of myths that express specific visions about its role and future importance (Bloomfield and Doolin 2011; Lee and Motzkau 2013). We will argue that while these technoscientific myths are clearly influential, their historical origins and the broader societal dynamics that have enabled their emergence are less evident. The issue is especially relevant in assessing the role of technoscientific myths in the global South, since overarching narratives accounting for the emergence of modernity and its consequences (e.g., Giddens 1990; Latour 1993) are not as tangible there as they are in Northern societies.

This article expands upon the postcolonial STS literature by exploring the role of local and foreign intellectuals in the formation of Brazil's foundation myths and emphasizing the intersection of the nation's ethnic (i.e., racial and cultural) and technoscientific (i.e., technical and epistemological) dimensions. Our account of the interaction of ethnicity and technoscience draws upon nuanced depictions of the tensions between hybridity and purity (Haraway 1991; Latour 1993), ethnicity and technoscience (Kontopodis, Niewöhner, and Beck 2011; Medina-Doménech 2009), and their political consequences (Bijker 2003; Jasanoff 1999; Wynne 2007). We then use these ideas to better understand, in historical context, the technoscientific trajectory of Brazil. From this examination, we invite STS scholars to become more aware of their roles not only as observers but also as "myth-makers" able to influence social action.

The next section explains the origins and defines the meaning of "myth" employed in this article. We also review the literature concerning the importance of myths in legitimizing and delegitimizing different forms of technoscience and ethnic identities, and argue that discourse and content analyses are ideal tools to decipher this historical dynamic. The following section outlines the emergence and implications of the founding myths of Brazil across three historical periods: Colony and Monarchy (1500-1889), First Republic (1889-1930), and New State (1930-present). The concluding section discusses the implications of this research for understanding of the role of intellectuals (including STS scholars) in shaping the future of technoscience in Brazil and elsewhere.

Technoscientific Myths and Ethnic Identity

It is well documented that no particular ethnic identity (and related cultural and genetic background) is a self-contained system, or array of symbols, physical traits, and artifacts (Karner 2007; Lemmonier 2002). On the contrary, every human culture has roots that go deep within geo-social history

and extend across any given epoch. These are marked by countless episodes of historical and contemporary migratory flows and cross-pollination of ideas, instruments, and techniques, often through trade and conquest that connect the social histories of Eurasia, Africa, and the New Worlds of America and the South Pacific (Diamond 1997; Harding 2011). And this has led invariably to social change, hybridization, and in some cases fractionalization and reunification, that entangle most present-day societies in a complex genealogical tree of world cultures (Karner 2007).

A similar hybrid picture of science and technology also emerged from the field of STS in the last decades. Starting with Kuhn (1962), various studies have challenged ideas about technological artifacts and scientific theories as self-sufficient entities distinct from each other and from society. STS has successfully debunked the notion of purity, exposing the artificial separations between science and politics (Shapin and Schaffer 1985), scientific knowledge and practical skills (Collins 1985), laymen and scientific experts (Wynne 1996), humans and nonhumans (Callon 1986) and local and global knowledge (Harding 2011). Haraway (1985) suggests that dichotomies distinguishing science from technology or nature from society are being reevaluated along with other socially constructed divisions, such as mind from body, self from other, male from female, human from nonhuman, and even God from man. She argues that the tradition of binary opposition that supports dominant narratives of exclusion and separation are being transformed, replaced by what she calls the *informatics of domination* “a movement from an organic, industrial society to a polymorphous, information system . . . where no objects, spaces, or bodies are sacred in themselves; any component can be interfaced with any other if the proper standard, the proper code, can be constructed for processing signals in a common language” (p. 161-63). And as the fragility of these divisions becomes apparent, it also becomes clear that the modernist project has been incomplete in its attempt to extirpate all mixtures from technoscience. Thus, paraphrasing Latour (1993), it is possible to say that we have never been pure.

Despite such mounting evidence, the idea persists that national ethnicities, on the one hand, and technoscience, on the other, are pure, unitary, static, and coherent objects. Phrases such as “American as apple pie,” substantives such as “Nordic Food,” and adjectives such as “Britishness” suggest a view of national culture as an essence that can be traced back to its pure origins (i.e., Greek, Aryan, or Nordic) and unchanging characteristics over time and space (i.e., white skin or higher intellect; Karner 2007). Similarly, even though the utopian views related to science and technology have come under

attack in recent decades (Beck 1992), the artifacts and bodies of knowledge related to Northern technoscience still have high status, especially in the global South (C. Scott 2011). This is evident, for instance, in the way in which notions of “high-tech” and “scientific” are used in everyday language to mean entities that are inherently superior to others that are “low-tech” and “unscientific.” Therefore, the idea is still very much alive that Northern science and technology, in its pure and unitary forms, can provide infinite benefits in an accountable and authoritative way, based on unfettered research and application (Sarewitz 1996).

The question many have asked is if the empirical evidence is so clear that hybrids are the rule, why is the notion of the purity of technoscientific and ethnic identities so resilient? To answer this question, at first we can consider these views as the outcome of a dominant ideology, that is, a superstructure imposed by the capitalist elite (with the assistance of artist and scientists and other intellectuals) in order to dominate the proletariat and maintain the infrastructure, namely, the material conditions of production (Gramsci [1948] 1979; Marx and Engels [1845] 1970). More recently, however, the notion of ideology has been dissolved and extended to a broader, relativist understanding of the role of social imaginaries in society. While Marx suggests that ideologies, such as commodity fetishism, can be unraveled by exposing the material reality underling the social condition, Castoriadis (1997) argues this may not be a straightforward process. In particular, he inverts the argument and points out that social imaginaries have “meanings which are not ‘dictated’ by real factors since it is instead this meaning that attributes to these real factors a particular importance and a particular place in the universe constituted by a given society” (Castoriadis 1997, 127). A good example of the persistence and importance of these social imaginaries is B. Anderson’s (1983) account of the emergence of nationalism and the related notion of ethnic purity. He explains that the decline of religion as the main source of collective identity gave rise to new ways of self-understanding and social solidarity. In this context, it became important to be considered part of an imagined community, namely, a broad social denomination such as “French” and “British” that went well beyond immediate families and local geographies.

It is in this context that myths emerge as an important carrier of specific social imaginaries. Myths can be defined as normatively laden narratives that are held by adherents, despite the lack of proof or the eventual presence of counterproof (Segal 2004). Thus, as in the case of the social imaginaries, myths do not rely directly on concrete experiences to support their meaning. In contrast, myths often shape both self-understanding of past events and

expectations about the future, making them “a staging ground for action, and not only for escape” (Appadurai 1996, 7). For instance, in order for imagined communities to exist, it is often important to diffuse founding myths that relate their origin to well-defined and heroic events such as the arrival of the Mayflower Pilgrims, in the case of the United States (Sargent 1988), and the superiority of ancient Greek and Roman civilizations, in the case of Europe (Delanty 1995).

Therefore, myths of ethnic identity emerge as instrumental in ensuring national solidarity despite the exposure of inconvenient historical records or internal social divisions (real and perceived). They are created and maintained to keep social order during and after social–environmental disruptions that often threaten political cohesion and national tax surpluses (Sargent 1988; Slotki 1992). Thus, such myths “provide a space to conform [a] *carnivalesque* [population] to a frame with a collective meaning, to a narrative artifact that would subdue it to a greater history, an epic history of the foundation of the nation and its heroes”³ (Cukierman 2007, 354). Similarly, myths of technoscience concerning, for instance, its purity and superiority in some cases, and unruliness and risk in others, play an important role in shaping society since they influence not only understandings of the past but also future expectations and actions (Bloomfield and Doolin 2011; Lee and Motzkau 2013; Macnaghten, Kearnes, and Wynne 2005; Taylor 2002).

The consequences of technoscientific myths have been more strongly marked by exclusion and subjugation in the global South than in other parts of the world. As Southerners have looked abroad for models, they have often been faced with narratives that frame their ethnicities and technosciences as inferior to the North. Exhibiting both Eurocentrism and historical amnesia, a powerful modern myth has depicted a unitary South (i.e. underdeveloped nations of the Third World) that can be observed, analyzed, and documented, and by extension controlled and exploited (Escobar 1995; Said 1979). It is this kind of power/knowledge analysis (control by knowing) that also underlines the historical expansion of cartography as a science, which functionally extended the European colonial powers’ domination of the Far East and the New Worlds (Foucault 1977; J. C. Scott 1998; Turnbull 2000). From this emerges an account of how imposing Northern technoscientific and ethnic myths has contributed significantly to the North’s subjugation of the global South (Adams 2003; Chambers and Gillespie 2000; Harding 2011).

While this perspective clarifies postcolonial power relations, recent studies have challenged its binary and deterministic character. Notions such as “indigenous modernities” (W. Anderson 2002), “appropriate technology”

(Lemmonier 2002), “domestication of technology” (Berker et al. 2006), “monstrous hybrids” (Verran 1998), “lines of flight” (Deleuze and Guattari 1987; Marques 2012a), and “re-agency” (Shrum 2005) propose that negotiations between traditional society, imported new technologies, and ways of knowing quite often result in a plurality of outcomes among and within regions. Thus, rather than replacing Southern technologies and epistemologies with Northern ones, what often emerges are “processes of displacement and reconfiguration, the fragmentation and hybridity of technoscience” (W. Anderson 2002, 651; Verran 1998).

We argue that mythmaking about the diffusion of Northern technoscience should also be understood as deeply linked to the agencies of Southern actors rather than only being imposed from the outside. In the remainder of this article, we show how Brazil’s foundation myths emerged and were renegotiated during different epochs. This historical understanding helps to explain the country’s heterogeneous development, present cohesion, and future self-reflection. We also offer descriptive evidence for how the inception, development, and transformation of Brazil’s foundation myths are expressed through novels, songs, artworks, scientific theories, ideological statements, and official historiographies produced by local and foreign intellectuals. Furthermore, we evaluate the orientation of these foundation myths in relation to ethnic and technoscientific hybridity and purity and their influence on policy making in the areas of immigration, law and civil rights, economic production, and technoscience. In order to accomplish this, our article uses discourse and content analysis to examine textual (including scientific productions) and iconographic narratives and to show how these shape and are shaped over time by cultural and political dynamics (Auerbach and Silverstein 2003; Johnstone 2008). In the following section, we employ these techniques to offer a comparative overview of the transformations of Brazil’s foundation myth over time.

Mythmaking and Unmaking in Brazil

The Edenic Myth

It is possible to identify at the start of Brazil’s colonization a myth that accepted and in some cases even fostered the creation of a hybrid society along technoscientific and ethnic dimensions. Even though Portugal was one of the most technologically advanced nations in Europe in the early sixteenth century, (Bleichmar, De Vos, and Huffine 2008; Law 1987), its people were still deeply influenced by medieval cosmology. One particular

Christian myth that permeated the Iberian Peninsula was the idea that the Garden of Eden was a real physical place located somewhere on Earth. Thus, when the Portuguese arrived on what would become Brazil, they believed they had found this biblical paradise, a land of exotic delights with a luxuriant and benign nature. As a result, the local indigenous population was at first seen as noble savages, not only because they were untarnished by civilization, but also because they were considered as having kinship ties with the Europeans, an interpolation directly from the biblical story of Adam and Eve (Gondim 2007; Holanda [1959] 2000). Likewise, the indigenous population in some cases perceived the Portuguese as benign mythical figures (Amado and Jackson 2000). Within this context, the early miscegenation of European and indigenous people, language and tools was not only permitted within the first Portuguese settlements, but actually seen as desirable and encouraged (Ribeiro 1995).

In contrast to Portugal's Edenic myth-driven hybrid-colonial strategy, its Northern European counterparts that were also exploring the region, the Dutch, pursued a purist approach to colonial settlement (Holanda [1936] 1995, [1959] 2000). During the Dutch colonial presence on Brazil's Northern coast, there was a systematic and detailed attempt to recreate Europe in the tropical New World. The Dutch settlers imported a sizable portion of their food supplies from abroad and constructed houses with European architectural styles (including the steep roofs designed to prevent the accumulation of snow) and used imported building materials. Also to maintain racial/ethnic purity Dutch women were imported to Brazil, many to work as prostitutes in the newly created European-style urban centers. In sum, "for some Dutchmen, everything had to be like in their home country: the house, the food, the woman. With no exoticisms" (Freyre 1998, 78).

The Portuguese settlers, meanwhile, were much more open to developing intimacy with the local indigenous population. As a result, the majority of the growing Brazilian population during the colonial period was composed of *mamelucos*, the sons of Portuguese men and indigenous women. Furthermore, despite differences in status between the white and the mixed offspring, the *mameluco* "was not detached from the social nucleus from which it was born, that is, the large landowner's clan. He continued to receive the necessary teaching and assistance at home like any other family member" (Machado [1929] 2006, 173). Likewise, the Portuguese settlers lived in close contact with their indigenous extended families, and in some cases even abandoned their settlements to live in the Indian villages (Ribeiro 1995). As a consequence of this close contact between settlers and indigenous people, there was an intense exchange not only of genes but also

of technologies and epistemologies. This laid the groundwork for the emergence of hybrid techniques and artifacts, such as the use of medicinal and poison plants, construction of bee hives, indigenous cartography, identification and construction of water wells, house building techniques, warfare strategies, and leadership skills (Freyre [1936] 1987; Holanda 1956; Katinsky 1978; Motoyama 2004; Ribeiro 2000).

The production of cassava-root flour reflects the high degree of technoscientific hybridity achieved during the colonial period. The cassava (also known as *tapioca* or *mandioca*) has been the main source of carbohydrates for the South American indigenous population for millennia. But while the corn consumed in Central and North America is prepared by simply cooking it, the cassava is a poisonous root that needs to be grated, pressed, and dried in order to eliminate the hydrocyanic acid and make it suitable for human consumption (Ribeiro 2000). Despite this complication, the Portuguese settlers (and their *mameluco* descendants) adopted the local diet. They learned how to grow and process the cassava for their own consumption instead of importing food supplies from Europe or insisting on growing only European crops as the Dutch had done. During the second stage of the colonial period, the Portuguese settlers contributed to local production by introducing new techniques. These involved, for instance, the substitution of the indigenous press and grater for more efficient designs that were imagined in the Iberian tradition and constructed using Brazilian materials: a technological artifact from the colonial period that is still in use today across many regions of Brazil (Freyre [1933] 1987; Holanda 1956; Katinsky 1978).

During most of Brazil's colonial history, the Portuguese metropolis and the emerging Brazilian political elite adopted a *laissez faire* stance toward Edenic myth and related hybridization practices. But following independence from Portugal in 1822 and the creation of a constitutional monarchy, the country's elite was faced with the task of developing an official image that distanced it from its former colonial master. At this point, the already widespread Edenic myth was seen as a suitable option as it emphasized Brazil's peculiar flora and fauna, Indigenous populations, and widespread racial and cultural miscegenation—symbolic and material elements that could not be found in Europe. The Edenic myth was rapidly incorporated into a series of national texts and images. These included official historiographies, paintings, novels, operas, coats of arms, and coins that celebrated racial and cultural blending by depicting Europeans, Indian, and (less often) African citizens harmoniously collaborating in the construction of the nation (Schwarcz 2006; Sommer 2003).



Figure 1. Stage painting created for the court theater on the occasion of the coronation of Dom Pedro in 1822 (Debret 1834).

A good example of iconography that embedded and diffused the national Edenic myth is the stage painting by Jean-Baptiste Debret (1834) for the coronation of the king Dom Pedro the first (Schwarcz 2006). Here, black workers/slaves (left), white priests, officials and businessman (right), and native Indian warriors (back) demonstrate their loyalty to the Brazilian Empire, represented here by a female figure in the center holding the Constitution (see Figure 1). The images also prominently feature citizens from hybrid backgrounds, such as the *mamelucos* (mixed white and Indian) woman with three babies (right), two of whom are white and the third is a mulatto. In addition, the presence of bows and arrows alongside crowns, sailboats, and muskets in a tropical beach suggests the national appreciation for both European and local technosciences in the formation of Brazil. This initial Edenic myth would not be everlasting though.

The Bandeirante Myth

The rapid industrialization of Europe in the late nineteenth century and the emergence of a former colony (the United States) as an industrial and military power led to a growing sense of global inferiority among many Brazilians (Moog 1969). Internally, meanwhile, the rise of the new Brazilian urban elite motivated the search for a new political and cultural identity

upon which to build the nation's future (Schwarcz 2006; Sommer 2003). Mounting social pressure resulted in a military overthrow of the Brazilian monarchy in 1889. It also challenged the relatively pro-indigenous hybrid foundation myth implanted during the monarchical period in favor of a set of myths aiming to replicate the United States' success in creating another European-style industrial nation in the New World (Schwarcz 2006; Sommer 2003). Among the imported European ideologies that migrated to Brazil during this transformation, August Comte's *Positivism* was one of the most influential (Carvalho 1990; Dupas 2006). A key message adopted from this intellectual movement was the idea of "progress." This assumed that human history could be mapped as a linear trajectory from a primitive "Theological stage" based upon the belief in supernatural explanations, toward a "Positivistic stage" based upon rational and fact-based scientific methods of inquiry. From this emerged a specific epistemological orientation distinguishing science from nonscience, namely the separation of true knowledge obtained via the rational analysis of observable phenomena, from false statements obtained from metaphysical speculations or theological beliefs (Comte [1848] 1907). In this context, Southern countries faced a binary choice: either they adopted this specific Northern technoscientific perspective and prospered or they would remain "primitive" and "irrational."

The notion of technoscientific purity embedded in Comte's *Positivism* was often also related to the idea of ethnic purity and the notion that some races (and related cultures) are inherently superior to others. One of the pioneering publications in this line was "The Inequality of Human Races" by French nobleman Joseph Arthur de Gobineau, in which he defends the idea that natural selection allowed Europeans to develop stronger and smarter than other races. In this context, racial miscegenation is seen as a source of physical, moral, and intellectual degeneration of the superior races (Gobineau [1849] 1915). In addition to racial miscegenation Gobineau was also concerned about the negative consequences of adopting inferior Southern technosciences. For instance, in one of his passages, he argues that the "inferior races" are unable to match the "arts and professions invented under an advanced civilization," suggesting the inherent inadequacy of their intellect and technologies (Gobineau [1849] 1915, 73). In another, he noted that if European (white) settlers adopted local technologies they would forget their own technologies, leading to degenerate (hybrid) forms of civilization.

The intellectuals of the First Republic were deeply influenced by the Positivist emphasis on ethnic and technoscientific purity. This led to a co-opting and then transformation of the initial founding myth of ethnic and

technological hybridity, into a new Republican foundation myth that promoted purity based on European values and techniques (Alves 2001; Schwarcz 1993). The historical figure of the *Bandeirante Paulista* was one of the key embodiments of this new myth. Similar to the North American Pioneer of the nineteenth century, the South American *Bandeirante* of the seventeenth century was framed as a hero whose main virtue was his Northern purity (Schwarcz 1993; Marins 2007; de Oliveira 2008). Along the ethnic dimension, the *bandeirantes* were depicted by the intellectuals of the day as ideal representatives of the Aryan race and direct “descendants from the old German conquerors [of Portugal]: Goths, Suevis, Normans, Burgundians” (Taunay 1924, 119).

Republican mythmakers also emphasized the Northern technoscientific purity of *Bandeirantes* in different ways. The *bandeirantes* were described as in “possession of the apparatus of discipline and of education [...] able to dominate the shapeless and swarming mass of inferior mestizos and keep them, through a social and juridical understanding, within the Aryan norms” (Viana [1918] 2005, 180). They were also depicted wearing helmets, breastplates, heavy velvet clothes, and high boots, cultivating and eating European food, and using muskets and other Northern artifacts as a way to attest to their preference for technologically superior tools. The painting of the famous *Bandeirante* Domingos Jorge Velho effectively illustrates how Republican intellectuals attempted to diffuse the myth of the *Bandeirante* among the illiterate masses (see Figure 2). In this painting, on display at the Museu Paulista, the illustrious *Bandeirante* appears with his velvet cape and highly sophisticated musket, in a pose similar to the one found in the portraits of the King Louis XIV and other European noblemen (Marins 2007). In sum, these historical narratives and images attempted to construct the myth of a man “that is the missing link between the savage nature requiring domination (which included the native Indians) and the civilization opportunistically codified by the pure Portuguese blood and the Christian faith” (de Oliveira 2008, 66).

The creation and diffusion of the *Bandeirante* myth was not merely an intellectual exercise; it also shaped the way the ruling elite governed the country during the First Republic. On the technoscientific front, even though the Positivist “Scientific State” was not fully realized, its supporters were able to institute the idea that Brazil “would not become a civilized country without the support from science, the new and fundamental instrument for any kind of human progress” (Gomes 2010, 11-12). As a consequence, the new government quickly constructed a quantity of libraries, museums, medical and engineering schools. It also sponsored Brazilian



Figure 2. Domingos Jorge Velho (1641-1705) painted by Benedito Calixto in 1903 and exhibited at the Museu Paulista.

Source: photo by Hélio Nobre.

scholars to study in Europe in order to expose them to the latest scientific findings and technologies, proving to the world that “we [Brazilians] are not monkeys,” as affirmed by the Brazilian scientist Rocha Lima during his stay in Berlin (Alves 2001; Cukierman 2007, 106; Heizer and Viadeira 2010). In addition, the government fostered the substitution of locally built technological artifacts, such as wooden boats and sugar mills, with iron steam-powered contraptions imported mainly from England, marginalizing over time local industries and craftsmen traditions (Motoyama 2004).

On the ethnic front, the First Republic enforced a large-scale prejudicial immigration policy to address the (perceived) negative consequences of racial and cultural miscegenation. Following the abolition of slavery, two million Afro-decedents (almost 20 percent of the Brazilian population) abandoned their serfdom (and shelter) in search of jobs as wageworkers. Instead of absorbing this population into the work force, however, the

government decided to recruit workers from Italy, Germany, Portugal, and Spain. During the decades of Brazil's "whitening policy," the country received almost four million Europeans with the assumption that their ethnic and technoscientific purity would promote "order and progress" in the same way the Bandeirantes did three centuries before them (dos Santos 2002; Schwarcz 1993). As a consequence, according to the official census, the country's ethnic composition changed from 60 percent Afro-decedents and mixed ethnicity in 1872 to almost 65 percent Euro-decedents by 1940 (Instituto Brasileiro de Geografia e Estatística [IBGE] 2000). Even though the social classification and measurement of race is problematic, this shift suggests that the Bandeirante myth substantiated the creation of official policies that systematically excluded nonwhite Brazilians in favor of white Europeans. This indicates that the New Republic's Bandeirante foundation myth was not only a specific way to rethink the past but also a way to reshape the country's ethnic and technoscientific future. Much like the Edenic myth it replaced, the First Republic's myth would also be challenged during another global transformation in the twentieth century. This time the motivation and consequences would partially divert from Northern trends.

The Racial Democracy and Development Myths

It should be noted that the ideas embedded in the Bandeirante myth were not exclusive to Brazil. Since before the turn of the twentieth century, it is possible to trace a growing fixation with ethnic purity across different parts of the world. For example, racial "scientific" theories were employed in the nineteenth century in order to legitimize the economic and military dominance of white Europeans over the rest of the world. In the early twentieth century, new breeding grounds for this white supremacist orientation emerged not only in Nazi Germany but also among influential groups of intellectuals in the United States, England (Barkan 1993), Italy, and France (Turda and Weindling 2007). In many countries, these scientific theories and related myths of purity often translated into exclusionary policies aimed at dominating nonwhites. In the United States, for example, the creation of Indian reservations and of segregationist "Jim Crow" laws were conceived as cost-efficient alternatives to extermination, while circumventing the "corrupting" effect of indigenous and black cultures and ethnicities in diluting American Eurocentric identity (Hannah 2000; Klarman 2004). These ideas also traveled South, since scientific forms of segregation were also implemented in parts of Africa and South America, especially during

the period between the great World Wars (Bowker and Star 1999; Medina-Doménech 2009).

But while racial scientific theories and related segregation policies gained legitimacy around the world, in Brazil it is possible to observe the opposite trajectory. In the end of the first three decades of the twentieth century, it became increasingly clear that the construction of Brazil as a neo-European country was a failed project both economically (since the dream of rapid industrialization did not happen) and culturally (since it did not account for the enduring ethnic diversity of the country). In response, a group of Brazilian intellectuals proposed and executed an artistic, anthropological and historical revolution by revitalizing the hybrid foundation myth of Brazil (de Andrade 1928; Freyre [1933] 1987; Holanda [1936] 1995; Machado [1929] 2006). One of their first steps was to deconstruct the idea of purity embedded in the Bandeirante myth. They pointed out that the original Bandeirantes were far from the pure, sophisticated European nobleman transplanted to the South as mis-depicted during the First Republic period. In contrast, they pointed out that even the richest inhabitants of São Paulo had, in most cases, very few pieces of clothing made of raw cotton. And even though some Paulistas produced their own wine and bread with ingredients grown locally, imported European food items were virtually absent from their everyday lives. Finally, physicians, engineers, and other representatives of European technoscience were extremely rare and as a consequence, European medical treatments and Northern technologies, such as metalwork and gunpowder, were expensive and difficult to find.

In order to further challenge the Bandeirante myth, the historian Sergio Buarque de Holanda's pointed to an excerpt of a letter written by a bishop that met in person Domingos Jorge Velho (the same historical figure from the painting in Figure 2). In contrast to the white nobleman depicted by Republican intellectuals, the bishop described Domingos as a man who could "hardly be differentiated from the most savage Tapuia [native indian], even if he calls himself a Christian" (Holanda [1936] 1995, 126). Holanda's decision to select this specific excerpt was not a coincidence. Since one of the aims of the intellectuals of his generation was to challenge the purity of the nation's foundation myth, the representation of this iconic Bandeirante was a key cultural battleground. From the ashes of the Bandeirante myth, this group of intellectuals proposed a new myth. Recovering some elements of the Edenic myth of Brazil's early monarchical period, they emphasized that the nation was not a neo-European country, purified by the early Portuguese explorers. In contrast, the country was coproduced by indigenous people, Europeans, Africans, and their mixed descendants.

For this reason, they argued that the main characteristic of Brazilian civilization was its anthropophagic nature, namely, its capacity to eat, digest, and transform ethnic and technoscientific entities from different origins into a new indivisible hybrid (de Andrade 1928).

This group of intellectuals took the Brazilian academic establishment by storm, creating a new and influential research agenda around this reified foundation myth. But they also had the ambition to diffuse this hybrid mythology well beyond the university walls. With this in mind, they forged close relations with the art world, the mass media, and the political elite. For instance, Sergio Buarque de Holanda regularly published articles on Brazilian colonial history and contemporary issues in newspapers with broad circulation and joined and supported different left-wing political parties (Candido and Prado 1998). The poet Mario de Andrade organized trips to the historic cities of Minas Gerais in order to reevaluate the artistic heritage of the country and place it on equal footing with Europe (Natal 2007). The anthropologist Gilberto Freyre was not only a prolific contributor to various newspapers, but also embarked on a political career when elected to congress in 1946 (Kosminsky, Lépine, and Peixoto 2003; Palhares-Burke 2005). Therefore, these intellectuals saw themselves not only as privileged observers of Brazilian reality but also as public intellectuals on a mission to transform their country, as expressed by Freyre:

I believe that no Russian scholar, amongst the romantics from the 19th century, has worried more intensely about the destiny of Russia than I worried about the destiny of Brazil [. . .]. It was as if everything relied on how my generation and I would solve centuries-old issues. (Freyre [1933] 1987, 31)

But while the myth proposed by these Brazilian intellectuals had both an ethnic and technoscientific dimensions, the political elite neither embraced nor promoted both dimensions in the same measure. The 1930s were marked by intense political struggles that led to the establishment of the New State in 1937. Given the populist basis of the new regime, the government was very keen to adopt and diffuse myths that celebrated the mixed background of the vast majority of Brazilians. For this reason, the ethnic aspect of the myth proposed by local intellectuals was seized by the government of the time, which in turn transformed the national foundation myth into one of Racial Democracy: a self-image of Brazil in which ethnic differences had harmoniously coexisted and mingled (Souza 2000). In order to diffuse this myth beyond the literate circles, the government fostered hybrid cultural manifestations in different dimensions of the nation's cultural

landscape. This official government support included sponsoring Brazil's football team (a sport with an increasing Afro-Brazilian presence), creating Rio Carnival with samba songs that exalted the hybrid ethnic background of the country, and legalizing both capoeira (a martial art created by the slaves) and Afro-Brazilian religions (Capoeira 2002; Skidmore 1999).

The Racial Democracy myth also influenced different governmental practices. In addition to stopping the "whitening" immigration policy adopted by the First Republic, the new Populist government implemented the country's first social security policies and labor laws, although their effects were only superficial (Levine 1998). While it is still sharply debated whether the *Estado Novo* was a Machiavellian dictatorship or a benevolent regime, it is clear that this new government contributed to an important reversal in the way the political elite conceptualized the country's vast (mostly poor) mixed population.

Along the technoscientific dimension, conversely, the political elite was willing to maintain and even expand the emphasis on the purity myth initiated during the First Republic. It is possible to trace the failure of the local intellectual elite in proposing a hybrid technoscientific myth of the country to both material and cultural factors. Global depression in the 1930s hit primary goods exporters like Brazil especially hard (Thorp 2000). Later on, the industrial elite endeavored to provide local alternatives to imported goods in order to fill the void left by European and later North American industries during the Second World War. In this regard, the country's elite found very attractive the strategy of relying on heavy industries based on Northern technologies in order to produce industrialized goods such as cars and domestic appliances that until then needed to be imported from Europe and the United States (Skidmore 1999).

But in addition to these endogenous economic challenges, an exogenous challenge emerged during the infancy of the Cold War: the imposition of a new "development" myth based upon Western styles. This global policy trend played a key role in further hindering the revitalization of the original hybrid technoscientific myth in Brazil. With the weakening of Europe during the war, the colonial system, rationalized by an underlying notion of Northern racial superiority, came into question. This sparked independence movements throughout Africa, the Middle East, and Southeast Asia. The question then was: would these soon-to-become sovereign nations choose a capitalist or socialist model of political economy? The only remaining super power in the North, the United States, would not allow the global South to succumb to Soviet-style socialism. To avert this threat, the US government reconceptualized North-South relations, in concert with plans to

reconstruct Europe (its most important export market), by creating the modern myth of “development” (Escobar 1995; Rist 2008). The US President Harry S. Truman’s now famous 1949 “Four Point Program” aptly illustrates the key prescriptions of this new myth:

Forth, we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. [...] The United States is pre-eminent among nations in the development of industrial and scientific techniques. The material resources, which we can afford to use for the assistance of other peoples are limited. But our imponderable resources in technical knowledge are constantly growing and are inexhaustible. [...] It must be a worldwide effort for the achievement of peace, plenty, and freedom. (Rist 2008, 71)

Within the logic of the development myth, Southern countries are simply in a transient state of underdevelopment. Thus, it was removed from discussion the idea that Southern ethnicities were inherently inferior and could only be saved via mass migration or other forms of cultural engineering previously legitimized by ethnic purity myths. With all the attention now turned to the technoscientific dimension, Northern “scientific advances and industrial progress” emerged as the prominent *cure*, while Southern technoscience became the *cause* for the illness of underdevelopment (Rist 2008). And since the “Goddess of [Northern] Technology doesn’t speak Spanish” nor Portuguese (Galeano 1997, 243), in order to become “developed” Southern countries needed to uncritically embrace Northern technoscience in exchange for granting Northern nations access to their vulnerable markets and natural resources, generating a spiral of increasing dependency and subordination of the global South (Cardoso and Faletto 1979).

The Brazilian state of the mid-twentieth century adopted wholeheartedly the development myth and inscribed its idea of technoscientific purity in the government’s propaganda machinery. Evidence of this can be found in the illustration on the back of the ten Cruzeiros currency note in circulation during this period (see Figure 3). Here, in place of the Edenic beach and Southern artifacts painted by Debret (1834) during Brazil’s monarchy (see Figure 1), we see a strictly industrial landscape filled with smoking chimneys and clogs from heavy machinery. The currency note features at its center a male figure that represents the “National Unity”: a unity not made out of a common hybrid past, but based on a purely Northern technoscientific future. A future forged with the might of man’s higher “Western”



Figure 3. Note worth ten Cruzeiros that circulated between 1942 and 1967.

intellect (symbolized by the Greek-inspired laurel wreath), the length of the telephone wires (that are tangled in his feet), and the power of the engine piston (that he holds in his hand like a holy scepter). In sum, these symbols mark the government's willingness to exchange Brazil's (relatively) successful hybrid past, for an uncertain, but highly seductive Northern technoscientific future. Against the myth of development, not even the myth-making efforts of the Brazilian intellectuals of the mid-century were enough. Worse still, it is possible to observe the influence of the myth of development in some of their writings. Hence, they often alternated between the view of hybrid technoscience as sophisticated solutions adapted to natural and social context, and as temporary answers to pressing problems awaiting the arrival of a superior and definitive form of Northern technoscience (see, e.g., Holanda 1956, 4).

Going beyond the North–South Divide

Interpreting the historical accounts of the ethnic and technoscientific myths of Brazil and their relation with ethnic and technoscientific policies reveals a discernible chronological pattern described in Table 1. Consistent with a growing body of research in the field of postcolonial STS (W. Anderson 2002; Harding 2011), the case of Brazil demonstrates how different groups have mobilized the myths of Northern ethnic and technoscientific purity in order to extend their dominance over time and space. For example, during the Brazilian Monarchy, a hybrid strategy was employed to frame both ethnic and technoscience diversity in order to distance this young nation from its former colonial master, Portugal (line 1). After this historic period, the

Table 1. Brazil’s History of Ethnic and Technoscience Myths.

	Ethnic Diversity	Technoscience Diversity
1. Monarchy’s Edenic Myth 1500-1889	Hybrid	Hybrid
2. First Republic’s Bandeirante Myth 1889-1930	Pure	Pure
3. The New State’s Racial Democracy/ Development Myths 1930-present	Hybrid	Pure (attempt to create a hybrid myth failed)
4. Possible Futures	Hybrid	Pure or Hybrid?

creation of the Bandeirante Myth by the First Republic can be understood as a strategy imposed by Northern countries and the local (largely Euro-descendant) elite to legitimate new forms of domination and elevate Brazil to the level of other great nations, following the end of slavery and the rise of global industrial age (line 2). When this strategy failed to catch Brazil up, a New State rose from the ashes of the great depression and implemented a dual strategy, leveraging Brazil’s historical ethnic diversity while continuing its reliance on Northern technoscience (line 3).

The connection between ethnic and technoscientific myths during most of Brazil’s history has been no coincidence (Kontopodis, Niewöhner, and Beck 2011; Medina-Doménech 2009). These two elements have been intimately intertwined in the construction and reinterpretation of Brazil’s foundation myths, as the same voices that reaffirmed the inherently superior (white) race also maintained that only Northern technoscience holds the promise for a better future. In this way, these myths have demarcated privileged peoples (white vs. colored), epistemologies (science vs. belief), and regions (Northern vs. Southern). It is from this context that we can better understand why Brazil’s Southern technoscientific contributions, even when pragmatic and reasonable (such as the multimix food supplement mentioned in the introduction to this article [Marques 2012b]), are considered relics from the past: artifacts and knowledge that were once important; but present-day indigenous responses like this seem to have no place in present-day Brazil. Meanwhile, investments in expensive Northern cutting edge geographic information system (GIS) technology is valued and expanded, even though it has failed to produce the expected results. This strongly suggests that these myths are not mere fantasies but rather instruments of domination mobilized to subjugate and exploit the global South.

But Brazil’s historical trajectory was far from a linear process of modernization (and by extension, purification) imposed by the North, as some

postcolonial STS scholars suggest. In contrast, it involved the agency of Southern intellectuals, politicians, and (to a lesser extent) local populations from different origins. In particular, the emergence of a hybrid Edenic myth relied not only on political power plays but also on the preexisting imaginaries and practices of both native Brazilians and Portuguese settlers. In the same way, the replacement of the Edenic myth in favor of the Bandeirante myth reflected not only postcolonial imperialism but also the sentiment of inferiority that the Brazilian elites have felt in relation to their emerging North American neighbors. Finally, and most importantly, the establishment of the myth of racial democracy, with its strong emphasis on ethnic hybridity, would not have happened without the discontent of the majority of the Brazilian population with a purely Northern self-image of the country and the subversive work of historians, anthropologists, artist, and other intellectuals during the New State.

The trajectory of ethnic and technoscientific myths of Brazil also invites us to follow the path laid out by Said (1979) and Escobar (1995) and go beyond an essentialist interpretation of the relation between North and South and, by extension, between technoscience, and ethnicity (Escobar 1995; Said 1979). Many postcolonial interpretations take the North and the South as things-in-themselves, with the former fighting for dominance and the later for survival. But when we consider the work of Brazilian mythmakers (intellectuals, politicians, and artists), we can imagine how these very categories are the outcome of a set of purifying practices which classify some forms of knowledge production and ethnicities as either Northern or Southern and declare any mixtures as either nonexistent or shameful (Latour 1993). In this sense, the accounts of Republican intellectuals that would want to see a purely Northern Brazil are not very different from the accounts provided by some postcolonial scholars that suggest the existence of a pure South that should be protected from any Northern influence. Therefore, the crucial opposition here is not so much between a (pure) North and South, but between purity and hybridity. In this view, the problem is not in the encounter and mutual influence of entities from the North and the South. These hybridization practices are to some extent unavoidable when peoples, artifacts, and epistemologies from different parts of the world travel and meet each other. Multiculturalism and epistemological plurality can only be turned into postcolonial dominance if a myth of purity is in place that privileges asymmetrically one side of the encounter at the expense of the other. If this myth of purity is matched and overcome by a myth of hybridity, then it might be possible to create a society that recognizes and celebrates the existence of blended technosciences and ethnicities.

This article provides further evidence for an evaluation of technoscience in the global South that emphasizes the negotiations, adaptations, absorptions, and domestications that take place when artifacts and ideas from different origins meet (Berker et al. 2006; Lemmonier 2002; Shrum 2005). It also shows that Southern actors are not mere spectators of modernity. Instead, they actively try to find autonomous “lines of flight” despite the restrictions and limitations imposed by stringent power relations (W. Anderson 2002; Marques 2012a; Verran 2002).

Conclusion: From Mythbreakers to Mythmakers

At this point, we can look into the future and ask ourselves: Is it possible to establish in Brazil a foundation myth that accepts not only ethnic but also technoscientific hybridity? How can this trajectory inform STS’s concern with the democratization of science and technology? During the early to mid-twentieth century, a group of intellectuals had initiated this project by emphasizing the role of hybrid technoscience in the country’s past and its “usefulness” to the country’s future. These intellectuals were able to criticize the myth of purity by empirically supporting a hybridity myth; but they did not grasp completely the implications of their position in relation to their own modernist assumptions. Therefore, in some cases, they even contradicted themselves by proposing that Southern and hybrid technoscience are but a temporary solution that should soon give way to purely Northern technoscience.

The ongoing introduction of STS ideas in Brazil could raise the debate concerning technoscientific hybridity to a new level. In relation to its empirical basis, it is possible to argue that STS and the Brazilian intellectual movement that emerged during the New State have a similar starting point as both emphasize the hybrid nature of technoscience. Yet, STS scholars were able to abandon their modernist assumptions and followed their findings through the rabbit hole of constructivism. In this way, STS was able to deconstruct the purity myth in two ways. First, by showing empirically how paradigms, political struggles, practical skills, imaginaries, and the agency of humans and nonhumans are part of the very fabric of what we consider to be the natural reality (Bloomfield and Doolin 2011; Latour 1987; Shapin and Schaffer 1985). Second, and most importantly, by depicting the production of knowledge and the development of technology as the outcome of mundane human and nonhuman actions, questioning hard divisions that have set scientists and engineers apart from the rest of society. While this path has attracted considerable criticism

from various quarters of the natural and social sciences (Jasanoff 1999), it was able to debunk the purity myths that have historically tried to separate culture from nature, and science from politics (Latour 1993).

But breaking myths by deconstructing science will not be sufficient to expunge the current global emphasis that privileges purely Northern technoscience. Nor will abandoning the critical project of STS accomplish this important work, since it would maintain intact the purity myth that excludes Southern voices, lay people and noncertified specialists from technoscience (Rajão 2013; Wynne 2007). Similarly, when we finally consider meaning and matter symmetrically, it becomes clear that we cannot dissolve myths by exposing them to the underlying reality (Castoriadis 1997). Thus, the only way to dismiss the myth of purity is by creating a new hybrid one. It is possible to observe elements of this project in the calls for the need to “democratize technological culture” (Bijker 2003) and for the creation of new forms of “civic science” (Backstrand 2003) in order to deal with post-normal issues that involve high stakes and uncertainty (Funtowicz and Ravetz 1993). But in most cases, the aims of STS scholars have been restricted to the myths that have haunted their own academic disciplines. For instance, when Latour (1999, 183) tells us that “if inventing myths is the only way to get on with the job I shall not hesitate to make up a new one,” he claims so as part of an intellectual struggle to overcome the myths proposed by Hegel, Marx, Bergson, and Heidegger. This is far from the “STS kiss” envisioned by Bijker (2003) a decade ago, in which the intellectuals in this field not only interpret the world in various ways but also try to change it.

When it comes to leveraging the transformative power of ideas, STS could definitely learn from the work of Brazil’s early twentieth-century intellectuals. The case of Brazil highlights an explicit effort to recreate the past and shape the future of the country. Thus, these intellectuals were not only involved in exposing the politics of scientific (racial) theories, but were also engaged in the Politics (with capital P) of technoscience and ethnic identity. It was only as a consequence of this engagement that a few intellectuals were able to establish a hybrid ethnic foundation myth for Brazil amidst a period of growing racism in the Global North. This historical feat should challenge STS scholars to imagine the much broader impacts their scholarship could achieve when consciously aimed at creating meaningful transformative social change.

Following the example set by these Brazilian intellectuals will not be easy. It will require STS scholars to become, like their Brazilian counterparts, authentic public intellectuals, keen to take their ideas outside the

academic circles and engage with the broader society by fostering links with the arts, mass media, and government. This also means leaving STS myths to wander astray, so that others could constructively translate them. On one hand, the translation of STS myths to serve other fora is crucial for the amplification of its impact and for generating actual change. On the other hand, translation is also a form of betrayal and it is likely that many STSers will feel uncomfortable as their ideas are appropriated and sometimes subverted by other groups (Wynne 2007). But this is a risk that the Brazilian intellectuals were willing to take, since for them the persistence of the myth of ethnic purity posed a much greater threat than the political instrumentalization of their ideas. This courageous stance might inspire Northern scholars to begin gazing toward and beyond the equator, not only for empirical data to base research upon but also for intellectual insights and applied strategies that contribute to the construction of a more democratic technoscience as we move further into the twenty-first century.

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Notes

1. By adopting the term technoscience, we emphasize the indivisibility of science and technology without repeating the terms “science and technology.” We also have a broad understanding of technoscience, which includes lay forms of knowledge and techniques.
2. Here, global South and North are understood as analytical categories meant to capture broader differences between two sets of countries without recurring to value-laden distinctions such as develop/developing, First/Third World, Rich/Poor, and Center/Periphery. See also “Going beyond the North-South divide” section.
3. This and other quotes from texts in Portuguese were translated by the authors.

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