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Writing history in the present: The implications of localized forms of science in Latin America for a postcolonial world²

I write this essay as a gringa-neoyorquina-chilanga-tica-nicaraguese-paceña-inglesa – an identity given to me in parts by many friends from many different places around the world over the years. It is also an identity that I am coming to accept within myself, in a way that is neither deserved nor undeserved, but simply for me is a growing truth both affective and embodied. Through doing so I lay claim to a process of metamorphosis, one that began in the mind of a teenager from a New York City suburb, to undergo years of significant, often uncomfortable, transformation through lived experiences in various parts of Latin America, including most recently the 18 months of doctoral research in Bolivia on which the empirics of this essay are based.

This essay is about the makings of localized forms of technoscientific theory and practice in Latin America, specifically taking the case of Bolivia, and the implications of such for researchers coming from the Global North. Until recently, little notice has been taken of localized adaptations of scientific practice in non-western settings (i.e. Bolivian science), especially in terms of how they shift scientific trends and debates on a global scale (Harding 1994; Powell 2007). To echo Anderson's notion of the postcolonial study of science and technology, this essay is thus an attempt to

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write a ‘history of the present’, in order to come to terms with “the turbulence and uncertainty of contemporary global flows of knowledge and practice” (2002, 644). To this aim, I bring myself into the equation as a kind of living evidence for a process of ‘reverse transculturation’, in which the experiences I have had in various parts of Latin America have deeply shaped my understandings of knowledge production and use. Mary Louise Pratt used the concept of transculturation to describe the way in which groups subjugated to colonialism determined to varying extents the use of and meaning ascribed to materials and symbols imposed on them from dominating cultures (1992, 7). In a ‘reverse’ process, the absorption of culture and meaning also travels in the opposite direction, admitting and accepting the kind of power inherent in encounter (ibid.). This kind of exploration can help to challenge unidirectional understandings of postcolonial relations, and to make visible the ways in which the so-called ‘peripheries’ of the world can disrupt and change cultures of knowledge held in the northern and western ‘cores’ (Sundberg 2006; Harding 2006; Conductor 2004; Rodriguez 2013). The overall aim of this essay is to show how localized forms of science are not only influencing practice in the so-called ‘peripheral’ regions of the world, but are shifting debates on the production and use of knowledge in new directions globally.

A ‘Bolivian Science’

In Bolivia, the rationale for a given scientific project generally emphasizes integrating indigenous knowledge and materials into scientific practice... ‘Science’ does not reference an alternative epistemology emergent from local traditions and prioritized to contest Western models of knowledge production, though scientific practice here actively integrates indigenous perspectives and concerns. Instead, science is understood as an extraordinarily powerful tool that is modified and deployed to meet national ends (Centellas 2010, 161-162).

In her paper, *The Localism of Bolivian Science: Tradition, Policy, and Projects*, Katherine Centellas describes a unique, localized embedding of scientific practice in

Bolivia, which she refers to as Bolivian Science. She uses this notion to challenge what she refers to as a false dichotomy between the indigenous/traditional and modern/developed as often portrayed in international media accounts of Bolivian society, and depicts the practice of science in Bolivia as something carried out by women, indigenous people, and for the good of society. More than an 'indigenous science' or a universalised 'Science in Bolivia', she distinguishes Bolivian Science as unique in its commitment that the ends of its practice be focused on the local, rather than the global.

What is different is the focus on rooting scientific practice, knowledge, and objects of study exclusively in 'our problems' and 'our conditions.' The criteria for understanding Bolivian science as science overlap with standard measures such as repeatability and transparency of method, but additional categories—among them local applicability, implementation, and technique—matter in Bolivia to a degree that marks its scientific practice as unique. This is innovative because it forges a new model of the relationship between scientific knowledge, peoples, and locations (Centellas 2010, 162).

There is much evidence in Bolivia today for this 'new model' that Centellas mentions. In December of 2013, Bolivia's first communications satellite, named Tupac Katari for the indigenous leader who organized an anti-colonial rebellion in 1781, was launched into space, promising both the modernization and nationalization of communications technologies in the country. The launching of the satellite was preceded by a ritualistic ceremony giving thanks to the 'Pachamama', and accompanied by words from Bolivia's president Evo Morales, "This will be our light, after living for so many years in the obscurity, the suffering and the domination of the empires," (21 December 2013, BBC).

As Centellas points out, since Evo's rise to power in 2006, there has been renewed interest in and emphasis on science and technology, particularly with regards to projects that emphasize the revalorization of indigenous knowledges for the sustainable management of the nation's natural resources (Viceministerio de Ciencia

y Tecnología 2012). For example, both private and public academic and research institutions in Bolivia are taking up the Andean concept of ‘Suma qamaña’ (‘Living Well’ in English), which is being promoted as an alternative to western capitalist forms of development through the revaluing of indigenous livelihoods and belief systems (Farah and Vasapollo 2011). While there have been relevant critiques with regard to the potential of political bodies to exploit such concepts for their own ends (Guydnas 2014), Suma qamaña has had great relevance for academic discussions around “knowledge integration”. Increasingly, and despite questions regarding the practical or theoretical validity of such an approach, researchers in the biological and conservation sciences are seeking to find common ground between scientific and indigenous knowledge systems. An interview with the director of the postgraduate centre for the Institute of Ecology of the Universidad Mayor de San Andres also sheds light on the new importance of this way of thinking:

In the postgraduate centre one of the important components, aside from research, is in the Masters course called ‘Ecology and Conservation’. We have an entire module around ‘Living Well’, indigenous ways of thinking and alternative politics. We are very critical of so-called ‘sustainable development’ and the Green Economy, and we promote alternative ways of thinking.³

These alternative ways of thinking are based in the concept of ‘endogenous science’, which Haverkork et al. define as a practice of knowledge production that ‘has emerged from within’, and often refers to something that has arisen in a given society or system, but that has been modified and improved through dialogue and co-production with other systems” (2013, 17). Thus, endogenous science is not something that has developed in complete isolation from exogenous factors, but can be understood as a product of many different ways of thinking about the world.

³ Patricia Roncal, October 2013.

Creole science – a forgotten legacy...

We have met the ‘other’ and they
are us.⁴

In some ways, it may be tempting to see the emergence of such forms of localized science as an inevitable product of the recent emphasis on indigenous knowledge systems in both national and international spheres. Indeed, in policy making in Bolivia, as in global institutions such as the United Nations, the insertion of indigenous knowledge into debates on education, the use of natural resources, and economic development, is the general order of the day. At the international level, this is reflected in global forums and agreements on intellectual property rights, such as the International Declaration of Indigenous Rights and the Supplement to the Nagoya Protocol to the Convention on Biological Diversity. Among academics, this appearance of indigenous knowledge has been called a “long overdue move,” and much has been written over the last three decades both about the real or false dichotomies between Western and traditional knowledge systems, and the necessary or impossible goal of integration (Agrawal 1995, 2002; Berkes 1999, 2004; Bohensky and Maru 2011; Born and Boreux 2009; Bradshaw and Bekoff 2001; Drew and Henne 2006; Moller et al. 2004; Nasasdy 2003).

However, often what is less talked about in these debates is that they are not as new as they may appear. Discussions and activities that emphasized the co-production of knowledge have existed since European science first encountered other ways of knowing as held by native cultures in places of colonialism. So-called ‘Creole’⁵ scientists in North and South America were among the first endeavouring to think

⁴ Susanna Hecht, writing of Euclides da Cunha’s vision for the development of Brazil (2013, 430).

⁵ Cushman proposes narrowing usage of the term ‘Creole science’ to “refer to a specific geopolitical context in which systematic knowledge of the natural world provided a basis for Americans of European and mixed ethnicity to assert their own authority and dominance over regional environments and their residents while living under colonial rule. This distinguishes it historically from systematic forms of knowledge primarily intended to legitimate imperial rule or to strengthen the controllers of centralized postcolonial states—phenomena better referred to as imperial science or national science, respectively” (2011, 23).

of using science as a means to achieving the development of a modern culture in the colonies that had its roots in the traditions native to the new lands (Lafuente 2000). In some cases, this included the valuation of indigenous knowledge alongside European scientific knowledge⁶ (Pastrana 1993; Lafuente 2000), but mainly the emphasis was on the ‘nationalization’ of the practice of science in their own lands, which was viewed by both colonizer and colonized as providing a “mechanism for increased colonial autonomy and self-sufficiency” (Chambers and Gillespie 2000, 226).

Although science developed itself differently on different soils, there are several elements in common in the various manifestations of ‘Creole science’. One was that it was understood by both the Empire and the colony that the growth of science promoted autonomy and self-sufficiency (ibid.). Secondly, there was a kind of pride in and ownership of the biological riches that their birthlands offered to the Creole scientists. And finally, science was very much seen as a force for the good of society and independence – not something to be shipped back to Europe. All of these elements together resulted in the creation of unique forms of scientific practice – not simply mirrored distortions of a single, universalised ‘Science’ – but rather localized evolutions of the same.

Alongside this historical discussion of Creole science, postcolonial and science studies scholars have frequently referred to the notion of ‘cultural hybridity’, which I argue emerges from a mixture of two juxtaposing components of any process of transculturation: mimicry and independence. Bhabha (1984) writes of the ‘mimic man’ as a kind of subversive being whose very existence can challenge and undermine the authenticity and originality of the colonizer. This is similar to the concept of transculturation explained earlier, which can be seen as an act of discerning between that which is desirable and that which can be rejected. When combined with ‘independent’, native ways of knowing the world, this ‘mimic’ can transform into

⁶ Tsing also notes that early interactions between botany naturalists and indigenous knowledge often led the former to publish respectful accounts of the latter, which was seen by European scholars as “hostile” to European systems of ordering - “discussions among Europeans refused to acknowledge this global sharing of knowledge. Instead, they focused on the formation of a universal system of classification” (2005, 93).

something less recognizable by the colonizer, perhaps something that is ‘not quite’ right:

In any process of globalization of science the receiver, far from being merely passive, selects fragments of the transmitter's broadcast and adapts them to its own circumstances. From the point of view of the transmitter, the reception is an incomplete and/or mediocre copy of what was broadcast. But seen from the point of view of the receiver, the phenomenon is much more complex: a preexisting cultural base has been enriched (and deformed) by something different and external. This means that a tradition must be ‘invented’ in such a way that it can interface with a new element. Only through this interactive model of mutual renewal can novelty be accepted and – most of all – used to advantage (Lafuente 2000, 156-157).

The existence of these alternative models directly challenges the western epistemological ideal of the ‘universal’, of which the west has been accused of ‘confiscating’ to further promote its own superiority over the rest of the world (Garaudi 1987; Prasad 1997). In this western-dominated universal model of science, first promoted by George Basalla, the research subject was always Europe, while elsewhere remained the object, and the flow of knowledge was one-directional – from north to south, west to east, with the latter regions simply serving to provide the data that would support theories already constructed by ‘more advanced’ civilizations (and minds) (Chakrabarty 1992).

There have been many challenges to this linear model of technoscientific diffusion, and scholars such as Arturo Escobar and Gilbert Joseph have come up with different forms of modernity that draw the eye to specific spaces of contact and encounter. These run alongside critical narratives from Latin American, Asian and African intellectuals, who present evidence while coloniality is largely responsible for modernization and development as we know it today, it also planted the seed of decoloniality (Mignolo 2011). As such, Anderson (2002) writes that there is a need to redraw the old map of technoscience in order to discern new categories. However, in

practice, ‘core-periphery’ patterns appear to hold strong even today (also see Driver 2004 and Rodríguez 2013). As the Aymaran scholar Rivera Cusicanqui writes:

Ideas flow, like rivers, from south to north, and become affluents of great currents of thought. But as in the world market for material goods, ideas also leave the country turned into raw material, which becomes regurgitated and turns into great hodgepodge under the guise of a finished product. This forms the canon of a new area of social scientific discourse: "postcolonial thinking". This canon brings certain themes and sources into the light, but leaves others in the shadow (2010, 68).

In this sense, and others, "core-periphery" patterns seem to maintain their dominance. The highest-rated science institutions and scientific journals with the most impact are generally found in Europe and North America⁷, and the so-called universal language of science is English (Kaplan 1993; Strevens 1992; Sunderland 2009; Stocks et al. 2008)⁸. Funding for scientific research in former colonial nations tends to flow from north to south, while specimens collected in those nations travel in the opposite direction for genetic analysis and taxonomic allocating (Latour 1987; Neimark 2012; Parry 2000, 2004; Waterton et al. 2013). So it remains necessary not only to theorize about alternative technoscientific cultures and movements, but also to study and attempt to understand how by through the doing of science in different localized contexts it can be possible to decolonize it.

In this sense, contemporary localized models of scientific practice in Latin America, like the forgotten manifestations of Creole science that came before, challenge traditional models of modernity in new ways. This calls for a new way of seeking knowledge, “from a praxis that is committed to the people... This done, truth will not have to be a simple reflection of data, but can become a task at hand: not an account of what has been done, but of what needs to be done” (Martín-Baró 1994,

⁷ See university ranking websites, such as <http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking>; see also journal rating websites, such as <http://thomsonreuters.com/journal-citation-reports/>

⁸ For example, it is virtually impossible to publish a peer-reviewed article, such as this piece, under the auspices of a conventional academic journal in two languages, which is one of the main motivations for publishing it here. See also a previous Alternautas blog post for an analysis of how this plays out in the social sciences: <http://www.alternautas.net/blog/2015/5/3/academic-dependency-1>

23). To understand this further, it is first necessary to explore how these forms have emerged out of a long history of colonial science and resource exploitation, and how this history has come to see not only what has been and what is, but to lay the foundation for what could be. In Part Two of this piece, we will do this by turning to Bolivia, one of the last of the South American countries whose biological and botanical mysteries were explored by Europeans.

Histories of biological science in Bolivia

Nowhere do nature and the savage combine to make exploration work so difficult and so risky as in the remote corners of this continent. (Percy Fawcett, presenting to the Royal Geographical Society in 1911 the results of an expedition along the Heath River, Bolivia.)

Located in the interior of South America, with much of its geography set at a forbidding altitude and its lower regions heavily populated by indigenous tribes resistant to outsiders, scientific exploration in Bolivia by Europeans began after independence from Spain, in 1825. This was after the lifting of the so-called ‘Green Curtain’ that the Spanish Empire had draped across South America, in an attempt to hide its riches from the rest of Europe. It was also during the time of the Enlightenment, which encouraged educated young men from Europe – among them, Darwin, Bates, and Wallace – to follow in the footsteps of von Humboldt and others to seek out the answers to the mysteries of the natural world in the Americas (Safier 2008; Von Hagen 1951).⁹

As noted in previous works, this activity was very much one of extraction (Latour

⁹ There is a very interesting history here that begins with the famous expedition to Ecuador by the Academie des Sciences in 1735, which had the aim of testing Newtonian theories on the shape and size of the earth. This expedition was a key event in the history of the Enlightenment, and was also said to mark the beginning of the history of scientific research in South America (Ferreiro 2013; VonHagen 1951). See also Anker (2001) for a historical account of ecology, who argues that “the history of ecology is best understood as a product of north-south relations, which took local research as models for an emerging global reasoning” (4).

1987; Parry 2000, 2004). Collectors gathered interesting specimens of flora and fauna, often with the paid or volunteer assistance of local people, to be shipped back to the collector's homeland, or to the country of those financing the expedition. In Bolivia, this pattern continued well into the latter part of the 20th century; even as late as the 1990s more than 90% of 37,000 zoological specimens from Bolivia were in collections around the world (Anderson 1997; Tarifa 2005).

However, alongside this more extractivist form of biological research as carried out by Europeans, new traditions of botanical and biological exploration were developing from within Bolivia, producing institutions and naturalists of national, if not international, renown.¹⁰ Held in common amongst these was a sense of deep pride in, as well as a unique form of sovereignty over the natural delights that Bolivia could provide.

The best prize I have received for my scientific work does not constitute the medals I've received but rather my position, indisputable and unenvied, of being a naturalist that is the absolute owner of all the wild nature in one of the most inaccessible and desired countries for its geobotanical exoticism.¹¹

One of the most esteemed of the early Bolivian botanists, Agustín Aspiazu (1826-1897), wrote poetry that underscored the connection between the natural wonders of his homeland and political autonomy. One of his poems, eulogizes Bolivian independence from Spain as follows: "The bird makes another nest as soon as it flies; The fish passes from the river to the fathomless sea; The soft flower drags its pollen across the land; There, where the winds wish to drag it."¹²

However, foreigners continued to play an important role in the development of the biosciences within Bolivia, where most institutions supporting such studies were created in the second half of the 20th century. The Institute of Ecology at the UMSA,

¹⁰ Bolivia is home to one of the oldest universities in the world: the Universidad San Francisco Xavier de Chuquisaca, which was established in 1624.

¹¹ Martin Cardenas, the 'lone Bolivian botanist', as quoted in Rodriguez (2005, p. 26).

¹² From the poem "Un Día Grande".

for example, got its start in 1978 by three German biologists and was funded initially by the German government. As recalled by one of the founders, Dr. Stefan Beck,

Back then there was no biology. For example, among the professors in the department, one was a dentist. There was nothing in the collections. I remember very well arriving the first time to the main building and asking, “where are the plants?” And they pointed to a corner where there were a bunch of plant collections in a pile. That was how it was.¹³

For the first ten years of ecology in Bolivia, the work was primarily focused on discovery and the development of a national inventory of flora and fauna, which was still much driven by foreign researchers. This was at the time when, at the international level, the discourse of humanity’s “shared heritage” with regard to culturally and biologically rich parts of the world was gaining traction (see Smith and Akagawa 2008 for a critical read on this subject). But even in the early days, the so-called ‘new pioneers’ of biological science in Bolivia developed their methods and skills largely in isolation from their foreign counterparts (Ibisch et al. 2003). Tarifa (2005) writes that the first wave of Bolivian pioneers in mastozoology was in the 1960s and 70s, but the focus was more on using biological research to better understand epidemiological problems, rather than an interest on flora and fauna for its own sake. This suggests that the interests that drove national biologists – such as human-wildlife conflicts and diseases in domesticated camelid species (llamas and alpacas) – were different than those of foreign researchers, who were more concerned with the conservation needs of charismatic species like primates and felines (ibid.). “Few of these new pioneers were adopted as disciples by foreign researchers; the majority trained themselves, eventually becoming the ‘big brothers’ of the third generation of national researchers that emerged in the mid-1990s” (Tarifa 2005, 126). Thus, from the beginning, there was a divide in priorities and concerns between those who came to Bolivia to do research, and those who did research on their own soil.

¹³ Interview with Stefan Beck, October 2013.

A 'Bolivian Science'

So we must oppose whatever is foreign because it is colonial, and instead revalue what is ours... But what is ours? (Lozada 2011, 22)

In 2009, a new Political Constitution of the State was put into effect, giving more rights (in theory) to indigenous communities respecting their control over their land and natural resources, specifically through the development of laws that guarantee that these resources are controlled by Bolivians and not by foreigners. Science and technology were given their own section in the new constitution, and of note is the creation of a state system of science and technology. This explicit politicizing of science – especially in the biological sciences – has provided support and funding for certain types of research Bolivia, while at the same time it has made other types infeasible. One example is the International Barcode of Life project, which was rejected by the Bolivian Vice-Ministry of the Environment's Biodiversity Department in 2013. This project has the explicit intention of identifying the micro-genome for every species on the planet in order to be able to identify and classify it into a global library of 'DNA barcodes', guided by a technoscientific vision that Paul Herbert, the initial 'inventor' of the project describe as *one gene = all species = all life* (Waterton et al. 2013, 2). This means that the creators of the project have been inspired by, and seek to inspire others, with the idea that through the mapping of all of the unique genetic codes of life on earth, humanity will learn to more greatly appreciate nature in all of its vast yet connected diversity.

In the specific case of Bolivia, due to the lack of genetic laboratories, the International Barcode of Life project required sending thousands of samples of materials of Bolivian flora and fauna out of the country to be 'coded' in better-equipped labs across North and South America. Although the project was initially approved, there were increasing concerns among the scientific staff at the Vice-Ministry of Biodiversity regarding the "leakage of national heritage" that the project appeared to be authorizing, and in 2013 the decision was taken to revoke the permission to export genetic samples under the project. With regards to the decision, one scientist involved

in the process said:

I wouldn't call it a rejection of imperialism but rather 'love of our own', and this is my interpretation of the few who had the power of decision in this case. The reality is that other countries are much more (scientifically) advanced as compared to Bolivia, but we Bolivians have our own rhythm, perhaps slower, but we will get there, making use of the tools that external research institutions and international collaborations can provide us with. Sometimes there is a great deal of pressure from these external entities but in the end the decision is a local one.¹⁴

The rejection of the project demonstrates the still keenly-felt link between such modern-day attempts to classify and organize nature through foreign-led projects, and the long history of taxonomic extractivism that classified much of Bolivia's biological and botanical history, as described earlier. This points to the increasing determination of various public and private academic institutions in Bolivia to question the arguments of science for the global good, and to rewrite the mantra as science for the national good. As the quote above points out, as the project objective should be local, so should the decision. It also points towards a critical glance of the supposed inherent value in the western drive to classify and organize with a newly expressed scepticism that says, simply, "this isn't for us." Thus, this begs the question implied at the beginning of this section – what is Bolivian Science?

Bolivian science as cacophony

In short, on the relationship between academic and indigenous sciences, whether situated within an idealized imaginary of knowledge exchange, or juxtaposed – placed side by side – on the scene of the current Bolivian context, there is only one clear answer: the integration of knowledges is possible, but only within the context of specific proposals that address specific problems or challenges. Bolivian science is not "one" indigenous science, but a pluralized repertoire of more than 30 cultures, reenacted as many times by the logic of science and academia.¹⁵

As the quote above points out, perhaps what is most important to understand about this process of 'remaking' science in the Bolivian context is that it does not manifest

¹⁴ From personal communication received via email in March, 2015 with anonymous scientist.

¹⁵ From personal communication in December, 2015 with Igor Patzi Sanjinés, anthropologist.

in a single unified ‘nationalized’ science. This is essential to understand, because otherwise there is a danger in giving the impression of Bolivian science to represent one shared discourse, moving forward towards an indigenous-modern future, with Bolivian Science as the driving force behind a ‘Suma qamaña’-oriented progress. But to do this would be to mask the existence of many ‘faces’ of Bolivian science, faces that have emerged out of tensions, frictions and synergies between different worlds in Bolivia.

These faces represent a complex multisided battle of rhetoric among perceptions of western science as a double-edged sword, yet one that is necessary in order to subdue its capitalist creations, and discussions about a new way forward through the promise of Suma qamaña. They bring up the question of who can more quickly throw off the yoke of imperialism – those who have the ability to free their minds from ‘internal colonialism’ rife in Latin American political structures. They are at the encounter between Bhabha’s mimic man and an Aymaran revolutionary and all of society that lies in-between. And here it is key to understanding the importance of the fuzzy line between dependence and independence, the space where concepts such as ‘science’ can be re-examined not to be simply tossed out, but to be questioned and eventually remade. This calls for more than just a rethinking of the role of science in society, suggesting a need for the kind of ‘ethno-education’ that Walsh and García have written about as a ‘casa adentro’ (or ‘in-house’) process of learning that is based on questioning, self-reflection and belonging: “The struggle is to return *this* form of knowledge, and in this way understand life, understand our own knowledges and insert in the educational process *our* vision of history and *our* vision of knowledge” (Walsh and García 2002, 323).

The idea is not to decolonize science by rejecting it outright, but rather by finding a multiplicity of forums through which to reimagine it through the very process of carrying it out. Across Bolivia such projects are increasingly common, and additional seemingly small gestures can point to other ways in which science in Bolivia is emerging. For example, a report written in 2007 by botanists at the National Herbarium for its international partner, the Missouri Botanical Garden, starts out with a description of an indigenous ritual they carried out with their driver at the top

of a mountain chain:

We stopped in the highest pass called “Paso Sanchez” (4800 m above sea level), the pass is considered a sacred place and the appropriate place to make an altar or offering called “q’oa” in Quichua (fig 4). Our driver performed the ritual which offers candy, alcoholic beverages, coca leaves, and incense (resin from a new species of *Clusia*), to the Andean deities like Pachamama (Mother earth) and Achachilas (guardian and spirit of the mountains), and to the Virgin Maria. We all participated in this ceremony, first we gathered t’ola to build a fire (*Baccharis* spp., Asteraceae) in which the offerings are burned and we asked Pachamama for good health and successes in our endeavors (MOBOT 2007, p. 2-3).

While the remainder of the report focuses on the species collected for the overall aim of the project – a taxonomic inventory of the floristic species in the Madidi region – what is interesting is the insistence that the international funders be made aware of the non-western types of knowledge and living involved in the process of carrying out the research. The report discusses in detail not only the mountaintop ritual, but also lists the names of the local guides, porters and cooks who participated in the expedition, along with photographs in which these people appear, and additionally describes the process of obtaining permission and assistance from the communities located in close proximity to the research site. Throughout the process of carrying out my fieldwork in Bolivia, I came across many instances of researchers who were actively seeking ways to learn from and engage with local institutions and communities during the research process, for example, through the practice of co-authorship with indigenous partners on academic papers (see Toomey 2016). However, all acknowledged the challenges inherent in the “co-production” of knowledge, with some interviewees putting forward critique that, in many ways, western scientific and indigenous knowledge systems are inherently incompatible, and suggest that in such cases “integration” was often sought for political, rather than practical or even ethical, reasons.¹⁶

Conversations with scientists and policy makers in Bolivia point to a deep sense of

¹⁶ From written correspondence in 2016 with Igor Patzi Sanjinés, anthropologist.

living in a moment of apparent contradiction about the importance of science in society, which is demonstrated in the diverse positions described in this essay. But they also reflect a growing perception of the importance of dialogue, negotiation, and above-all, rethinking in all of this. The point is that the conflicting positions, ideas and rhetoric around the place of western ideas and indigenous cosmologies are not impeding the development of a 'Bolivian science', rather they are the distinct voices responsible for its very creation. This dialogue is part of a continuing broader debate in the Global South on "internal colonialism" and the need for a "decolonization" of minds as a first step in the alternative path of modernity (Gonzalez Casanovas 1969; Cusicanqui 2012): "There can be no discourse of decolonization, no theory of decolonization, without a practice of decolonization" (Rivera Cusicanqui 2010, 62).

The proof is in the person

Perhaps the most important lesson emerging from the notion of Bolivian science is a simple understanding that 'extractivist science', in any form, is becoming increasingly unacceptable in Bolivia, as in other places. It points to how science is being used as a tool to express resistance to foreign-imposed politics of knowledge, and it additionally calls upon those who cross into Bolivia's borders to do things differently.

For myself, as a foreign researcher, this meant questioning and reflecting on the assumptions and priorities I had upon arrival to Bolivia, and rethinking the subjects of my inquiry. It meant taking a hard look at the ways in which I had been trained and educated, and understanding that there was a clear difference between what was important to my British academic institution as compared to what mattered to the Bolivian institutions, organizations and communities with whom I carried out my research. Having done my research in Bolivia means something also very specific about what I will do with the 'products' of my work. There are things that I have seen and heard that I will never write about, and things that I have written about that I will never publish, because I have learned that they are not my stories to tell.

In 2015, I returned to Bolivia after defending my thesis in England to hand back some of the results of my work through written reports, oral presentations and a short

documentary. Although I felt unsatisfied with the results of my dissemination process (see [a previous blog post](#) on this), I learned a great deal about what reciprocity means in a research context and how I might do it better the next time. Now as a young professor at a university in the United States, I hope to share what I have learned with my own students about what is acceptable and unacceptable scientific practice in different places around the world, such as Bolivia.

At the beginning of this essay I made the somewhat grand claim of having an identity built out of the multiple places I have lived and worked – places that cross complicated cultural, social and political divides. I made this claim not because I feel that by adopting such a hybrid identity I will somehow become exempt from holding a position of privilege, or because I will cease to hold responsibility for the implications of my North American-European heritage. Rather, it is because the alternative, to be a Latin Americanista, or a Bolivianista, is to imply that I simply stand outside and apart from my object of inquiry – that I am not impacted by it in turn. It is also to give recognition and credit to the places, peoples and cultures that have shaped the development of my mind and mode of acting. It acknowledges that the education I have received in the homes and on the lands of sugarcane farmers, indigenous leaders, fruit harvesters, caiman hunters and park rangers in Bolivia, Mexico, Nicaragua and Costa Rica has had at least as much influence over the researcher I have become as my more ‘formal’ instruction in US and British-based academic institutions.

I first came to Bolivia as a researcher seeking to be inspired by the indigenous movements for land and rights, and also with the aim of seeing how natural science methodologies and ideas could support such efforts. I had ideas for what I thought could work, ideas that changed through an often uncomfortable process of learning to be wrong, a slow awakening into the arrogance of my own assumptions. Bolivian science changed not only the subject, methods and implications of the research I conducted there, but it ensured that the work I do in the future will be forever impacted by my encounters with it. In this sense, I am a living, breathing product of Bolivian science, continuously engaged in the transmission of this ‘new breed of science’ to transform the way things are done back in the lands where I was born and