Biopiracy in Peru:

Tracing Biopiracies, Theft, Loss & Traditional Knowledge

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Submitted for the degree of Doctor of Philosophy

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Abstract

This thesis concerns the different ideas, and relationships -to people, plants and knowledge - that -'biopiracy' brings together in Peru. Through assessing different concerns over the use of 'traditional knowledge', the thesis examines the multiple meanings of biopiracy which emerge through particular bundles of relationships. Contribution is made to existing literature concerning indigenous peoples and biodiversity by illustrating the complexity and multiplicity of understandings of 'biopiracy'. The thesis identifies contested meanings of 'biopiracy' and produces a typology of 'biopiracies' through an application of Tsing's (2005) concept of 'friction', and also an analysis of 'biopiracy' as an empirical subject of enquiry in the patent system. In Part One I consider 'biopiracy' and 'traditional knowledge' in international debates, and so establish the main ideological concepts that frame 'global' biopiracy. The thesis explores the plurality of biopiracy by providing nuanced accounts of 'biopirates' and 'traditional knowledge'. Part Two, is an analysis of the work of the Peruvian National Commission Against Biopiracy. This section examines the role of patent searches and of knowledge registers in producing accounts of biopiracy that: reify traditional knowledge, fracture connections with indigenous communities, and that represent the economic interests of the state. The thesis presents a quantitative account of original patent research into 'biopiracy', with an accompanying qualitative analysis that highlights the connections produced - and denied - through 'biopiracy work'. The final section presents ethnographic data from two Amazonian communities - San Francisco de Yarinacocha, and Callería. This data indicates that particular forms of relationships to people, plants, and knowledge are privileged, as well as cast aside in the mobilisation of 'biopiracy'. Chapter Six

presents an analysis of two distinct 'biopiracies': 'Biopiracies of theft' and 'biopiracies of economic opportunity'. These in turn characterise the different, contingent features of 'biopiracy' in Peru.

Keywords: **Biopiracy, bioprospecting, Peru, traditional knowledge, Friction, traditional knowledge registers, Access and Benefit-Sharing.**

I herewith declare that this thesis is my own work, and that it has not been submitted in substantially the same form for the award of a higher degree elsewhere.

Signed,

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Huëtsa tita, huëtsa. jema: katiriki jatibi eara cai itai joríbanoŝh.

Iraquë!

Mëtsárate

List of Acronyms

ABS	Access and Benefit Sharing
AIDER	Association for Integrated Research and Development [Asociación para la Investigación y Desarrollo Integral]
CAH	Aguaruna Huambisa Council [Consejo Aguaruna Huambisa]
CESAGEN	Centre for the Economic and Social Aspects of Genomics
CBD	Convention on Biological Diversity
CGEN	Brazilian Council for the Management of Genetic Patrimony [Conselho de Gestão do Patrimônio Genético]
CIEL	Center for Environmental Law
CIP	International Potato Centre [Centro Internacional de la Papa]
COICA	Coordination of Indigenous Organizations of the Amazon Basin [Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica]
CONAP	Confederation of Amazonian Nationalities of Peru [Confederación de Nacionalidades Amazónicos del Perú]
EPO	European Patent Office
FTA	Free Trade Agreement
FSC	Forest Stewardship Council
GATT	General Agreement on Tariffs and Trade
IARC	International Agricultural Research Centre
ICBG	International Cooperative Biodiversity Groups
IDRC	International Development Research Centre
IGC	The World Intellectual Property Organisation's Intergovernmental Committee on Intellectual Property and Genetic Resources, traditional knowledge and Folklore
INDECOPI	Peruvian National Institute for the Defence of Competition and the Protection of Intellectual Property [Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual]
INDEPA	Peruvian National Commission for the Andean, Amazonian and Afro-Peruvian Peoples [Instituto Nacional de Desarrollo de Pueblos Andinos, Amazónicos y Afroperuanos]
INIA	Peruvian National Institute of Agricultural Research [Instituto Nacional de Investigación Agraria]
INRENA	Peruvian National Institute of Natural Resources [Instituto Nacional de Recursos Naturales]
IPR	Intellectual Property Rights
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
JPO	Japanese Patent Office
MINAM	Peruvian Environment Ministry [Ministerio del Ambiente]
NCAB	Peruvian National Commission against Biopiracy [Comisión Nacional Contra la Biopiratería]
NGO	Non Governmental Organisation
NRCC	Peruvian National Registers of Collective Knowledge
OCCAAM	Organización Central de Comunidades Aguarunas del Alto Marañon
OINT	Office of Inventions and New Technologies [Oficina de Invenciones y Nuevas Tecnologías]
PIC	Prior Informed Consent
PRONARGEB	Peruvian National Programme of Genetic Resources and Biotechnology [Programa Nacional de Recursos Genéticos y Biotecnología]
SIL	Summer Institute of Linguistics
SPDA	Peruvian Society for Environmental Law [Sociedad Peruana de Derecho Ambiental]
SPO	Spanish Patent Office [Oficina Española de Patentes y Marcas]
TK	Traditional Knowledge
TRIPS	Agreement on the Trade Related Aspects of Intellectual Property Rights
UNAM	National Autonomous University of Mexico [Universidad Nacional Autónoma de México]
USPTO	United States Patent and Trademark Office
WIPO	World Intellectual Property Organisation
WTO	World Trade Organisation

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Introduction: Biopiracy: The 'Simple' Story

This thesis is concerned with the relationship between people, plants, plant and animal knowledge, and the uses of plant and animal knowledge in Peru. It concerns the different possibilities, ideas, and relationships that biopiracy - a global concept - brings together in different places. In order to do this, I examine the uses and abuses of indigenous peoples' knowledge. In the coming chapters I will elaborate and analyse particular, local, clusters of relationships involving plants, people and plant knowledge and I examine the particular understandings of biopiracy that they produce - through the provision of ethnographic and also quantitative data.

This thesis will contribute to existing anthropological and sociological literature concerning indigenous peoples and biodiversity by providing nuanced understandings of biopiracy in four different locations that will illustrate the complexity of 'biopiracy'. I identify multiple, contested meanings of biopiracy and produce a typology of 'biopiracies'. I establish this in two ways; through an application of Tsing's (2005) concept of 'friction' in Lima, Peru, as well as in two communities in the Peruvian Amazon, and through an analysis of biopiracy as an empirical subject of enquiry in the patent system.

Firstly, however, the major concept which informs this thesis needs to be 'unpacked'. This introductory chapter seeks to explore the stories that 'biopiracy' tells in academic literature and beyond.[1]

[1]The word *biopiracy* will henceforth generally appear without quotation marks – however I wish to remind the reader of my intention that the use of the word should be understood as appearing within them throughout, so as not to treat biopiracy as a reified, singular artefact, but rather as a label standing in for diverse and contingent ideas and rhetoric. Not to signify biopiracy *per se*, rather 'a claim made in the name of biopiracy [...] concerned with what biopiracy *does* more so than with what it *is*' (Hamilton, 2007:9-10) [emphasis original].

"Biopiracy is about large pharmaceutical companies going into remote places like the jungle, and ripping-off local or indigenous peoples' knowledge about plants and animals, to use it to make money by making things like medicines - and not compensating communities".

The above account is a simple 'biopiracy story' through which I have explained my research in the UK and abroad. However, using this story - a hasty *mise- en-scène* of 'what my thesis is about' - is a way of avoiding the complex and various meanings that the word 'biopiracy' has to those who use it regularly. This (deliberately simplified) representation, is one that that conjures up notions of global inequality, rather than conveying the complexities of the deployments of biopiracy that I would actually encounter.

This short 'story' could never hope to convey the complexities which writers like Shiva (1997), Posey, (1993), Dutfield, (2004;2005) Mgbeoji (2006) and Robinson (2010) have attributed to the term 'biopiracy'. Nor is it a statement about the accuracy of this vision of the multifarious relationships indigenous, or other, local peoples have with the 'outsiders' who come to use, appropriate, and have interest in their knowledges. I repeat it because it is short, descriptive, it evokes several concepts - themselves complex and contested - and says something about the way in which they are connected. It does this whilst also it alludes to the reasons they are connected, and potentially the reasons they should *not* be.

The story succinctly evokes important players in the controversies about biopiracy: the large multinational, the nation state, the exotic and remote land, the exotic and subjugated local or native, the passive and 'natural' plant or animal, 'secret knowledge' and the valuable and beneficial product. The nuances and complexities of biopiracy, 'indigeneity', and 'traditional knowledge' that lie behind simple representations of biopiracy - like that in the story above - also raise the question of how they are to be approached as an empirical subject matter. The requirements of such an approach - taking inspiration from Haraway (1988) - are that a historically situated account, as is discussed in Chapters One & Two, requires an acknowledgement of the continuing relevance of colonising practices and activities. In connecting the different sites of my thesis I will construct what Marcus (1995) has termed a 'multi-sited ethnography'.

This thesis is divided equally into three parts, consisting of two chapters each. In Part One I ask: What biopiracy is supposed to be? In response, Chapter One considers the meaning of the term as well as of several other important terms – 'biodiversity', 'bioprospecting', and 'traditional knowledge'. I provide an overview of existing literature on the subject of biopiracy and examine the development of ideas about biopiracy in relation to colonial histories, intellectual property rights, legislation and also ideas about traditional knowledge. I go on in Chapter Two to 'disentangle' biopiracy – to move my consideration of it from the global to more local contexts. In so doing I give account of my methodological, conceptual, and physical travels with biopiracy in South America. I explain my use of Tsing's (2005) concept of 'friction' as a means to describe the interaction of global and local concepts and knowledges in the remaining four chapters, which head in two different directions. These directions are reflected in Sections Two & Three respectively, and address the kinds of relationships and knowledge mobilised in biopiracy (and also those which are left out).

In Part Two, I begin the presentation of my empirical work by describing and analysing my experiences in Peru. Chapter Three details my experiences with the Peruvian National Institute for the Defence of Competition and the Protection of Intellectual Property (INDECOPI) and especially with the National Commission Against Biopiracy (NCAB). I examine the 'biopiracy work' of the NCAB – the compilation of National Registers of Collective Knowledge (NRCC), and searches of the (international) patent system which produce lists of plants and animals. I argue that this 'biopiracy work' produces unexpected collaborations between the assumed interests of indigenous communities and other groups - such as Peruvian exporters - and that the compilation of lists of plants and animals and their uses in NRCC and in patent searches reifies traditional knowledge.

In Chapter Four, I examine the process of conducting a search for patents in methodological terms. This produces both quantitative and qualitative outputs and sheds light on the kinds of data configurations which are enabled, and which are made difficult in the doing of 'biopiracy work'. I show that traditional knowledge *is* the subject of intellectual property claims in patent documents, in myriad ways. However the types of claim which can be considered as biopiracy by following the (narrow, but practical) definitions of biopiracy that result from 'biopiracy work' are both difficult to assess and are limited in comparison to the ways in which traditional knowledge is actually exploited. This makes the patent system a precarious place in which to follow the movement of global biopiracy.

In the final part of this thesis, I travel with biopiracy to the Amazon rainforest, in order to reconsider the role that traditional knowledge and indigenous communities play in understanding biopiracy. As I start to postulate not biopiracy but 'biopiracies', I ask: Does biopiracy matter to indigenous communities? My response, In Chapter Five, gives an ethnographic account of life in a *Shipibo* community that highlights the multiple ways in which traditional knowledge is used and thought of. I show that the community *do* have concerns about the use, misuse, and also about the *loss* of their traditional knowledge: but these concerns fall outside of the agenda set by 'biopiracy work'. Concerns about theft, about equality in economic opportunities, and about the loss of traditional knowledge are expressed through examples of the uses of particular plants. To enable 'biopiracies' to travel to San Francisco such concerns must be (re)integrated into conceptions of biopiracy as a plural.

Finally, in Chapter Six, I examine the transformations of local knowledge about plants and their uses which are necessary to provide the traditional knowledge that is registered in National Registers of Collective Knowledge. I show that an encounter between global and local perspectives and knowledges in another Amazonian community – Callería – produce transformations of knowledge, as well as two distinct 'biopiracies'. The influence of hegemonic global conceptions of property, and of scientific taxonomies, in this global-local encounter produce an engagement of 'biopiracies' which give rise to important configurations of what is 'left out' (and brought 'in') to traditional knowledge in NRCC.

Local (traditional) knowledge is transformed to become 'registry-ready' or 'registry-recorded' which means that some elements of knowledge - and the importance of some relationships to plants and plant knowledge - both become removed from 'traditional knowledge'. Similarly, other relationships become important, such as those between non-governmental organisations and communities, or between plants and scientific taxonomy. The result is that two biopiracies are produced: 'biopiracies of theft' and 'biopiracies of economic opportunity'. These biopiracies are contingent with, though different from, the multiple forms of biopiracy described in the preceding three chapters. I will now set out the journey I take across the six chapters of this thesis in more detail.

In Chapter One, I will provide a brief summary of existing arguments that inform debates about biopiracy. In so doing, I examine the relationship of biopiracy to what is variously described in the literature as 'indigenous', 'traditional', or 'local' knowledge (and in a Peruvian context as 'ancestral', or 'collective' knowledge). I examine the connections made in existing literature between intellectual property and traditional knowledge, and I also consider the relationship between traditional knowledge and the use of biological resources. I will begin by considering the origins of the concept of biopiracy in terms of the colonial exploitation of plants and plant knowledge. I then define 'biodiversity', before discussing 'bioprospecting', and its ugly twin - biopiracy.

I will outline the Agreement on the Trade Related Aspects of Intellectual Property Rights, and the Convention on Biological Diversity, two key pieces of international legislation which inform discourse on biodiversity and frame the use of traditional knowledge and in terms of ideas about the possibilities of 'benefit sharing'. Central to this framing are particularistic conceptions of property. I then conclude that biopiracy is a global, political, concept that brings together a huge range of histories, actors, and rhetorics. It is a concept which characterises indigenous and local peoples' knowledges in particular – important - ways. In many ways, biopiracy is the newest moral outrage about the subjugation of local knowledges and resources.

As I begin to place biopiracy in the 'real' world, Chapter Two disentangles biopiracy from the global context of Chapter One. I will examine the importance of *connection* in the movement of knowledge between 'global' and 'local' discourses and spaces. I consider the relationship of traditional knowledge to concepts of indigeneity, and the issue of 'biopirates'. I explain the relationship between traditional knowledge and knowledge registers in terms of Agrawal's (2002) concept of 'scientisation'. This is a deliberate reassessment of 'scientific' and 'traditional' knowledge: a nuanced, complex, assessment to compliment the rather static and polarised accounts given (as part of a consideration of the rhetoric of biopiracy) in Chapter One. This will enable the reader to effectively contrast the singular notion of biopiracy from the plural, and *negotiated* accounts I will describe in the remainder of this thesis.

In the second half of Chapter Two, I tell the beginning of my own biopiracy 'story'. I contrast the somewhat essentialized account of traditional knowledge produced in Chapter One (which reflects accounts produced in global discourse on biopiracy) with more nuanced accounts of traditional knowledge as knowledge *per se*. I give an account of the travels and methodological focus of this thesis which uses Tsing's (2005) concept of 'friction' to explain the process and creation of the connections that biopiracy makes in the world. This chapter provides a brief account of the methodological journey I have taken: from examining (global) biopiracy to describing multiple local 'biopiracies', and also stressing the importance of particular configurations of relationships to 'nature', 'biodiversity', and to traditional knowledge in understanding these journeys.

I begin following the trajectory of biopiracy in the world by providing boxes to assist the reader in navigating the terminology used in the two sections of Chapter Three. The first section deals with the legislative and historical context of the development of 'biopiracy work' undertaken by INDECOPI in Peru. Boxes One to Three summarise key pieces of regional and national legislation that give credence and charisma to the biopiracy work undertaken by INDECOPI, as well as reflecting powerful legal frameworks that shape the formation of biopiracy in Peru. Part Two outlines 'biopiracy work' in detail, as well as examining cases of biopiracy (Box Five) and the 'biopiracy patent' in context (Box Four). I will show that the role of both searches of the patent system and of National Registers of Collective Knowledge are key to understanding 'biopiracy work'.

'Global' or universal biopiracy - engaged in biopiracy work - enables indigenous peoples' interests and traditional knowledge to be represented and reified in important ways. The work of classification systems – in intellectual property law and in scientific taxonomy - allow 'convergences' (Tsing, 2005: 89) to emerge which combine the interests of indigenous communities with other groups. These bridges focus the search for biopiracy in ways which also produce important 'gaps' (Tsing, 2005: 175). 'Biopiracy work' reduces, or erases, the need for encounters with indigenous communities, by reifying traditional knowledge from fragments in the public domain.

Chapter Four is complementary to the previous chapter because it examines the consequences of looking for evidence of biopiracy in part of the 'biopiracy work' of the NCAB - through conducting a patent search. From my arrival at INDECOPI, biopiracy became bound up with patents, drifting toward global or universal concepts such as intellectual property rights and scientific taxonomy - even as I had travelled to a different continent to get closer to the 'local' perspectives I sought. Chapter Four offers an insight into how patents can be found and what information they can offer research into biopiracy. It also highlights the types of relationships and connections between knowledge, artefacts, and people, that are not uncovered through 'biopiracy work'

In Chapter Four I address the following general questions: Are selected plants and animals being patented? In what ways are they being patented? And, if so: What can such patents reveal about biopiracy? I do this by carrying out a search of the patent system that highlights documents which mention one or more of 60 chosen animals and plants. Conducting research which both utilises the 'engaged universal' (Tsing, 2005:8) of biopiracy described in Chapter Three, and combines this with a local perspective: one that seeks to avoid confining the uses of traditional knowledge and thus reproduce intellectual property standards) I provide four levels of quantitative data, as well a qualitative response to these questions.

Chapter Four shows the difficulties and constraints imposed by hegemonic classificatory systems and standards in the praxis of conducting patent searches that are based on a search for traditional knowledge. It also demonstrates the particular, limited notions of biopiracy that are produced in searches. Through quantitative data, I will show that the appropriation of traditional knowledge *does* generate claims over valuable and beneficial products, but that this is often outside the confines of restricted notions of biopiracy – when it is understood as an 'engaged universal' (Tsing, 2005:8).

As I begin Chapter Five I will have followed the trajectory of biopiracy from the 'global' – international - stage, to chart its hybrid engagement in 'biopiracy work'. This latter biopiracy is the result of the generative potential of 'friction' (Tsing, 2005). 'Friction' allows the reification of traditional knowledge and representations of indigenous peoples' interests. It also allows the formation of uneasy 'alliances', as well as minimising connections with indigenous communities. These 'global-local encounters' are examples of processes through which biopiracy must continually negotiate its 'universal aspirations' in the world (Tsing, 2005:1). The different, related, understandings of biopiracy at these three levels begin to force consideration of multiple 'biopiracies': as biopiracy struggles to remain singular.

Ethnographic accounts of community level perspectives, such as I present in Chapters Five & Six, enable considerations of traditional knowledge and its connection to biopiracy that are not *merely* representations of indigenous peoples' interests. Travelling to an indigenous community enables research into the major 'gaps' (Tsing, 2005:175) in the 'biopiracy work' of INDECOPI. These 'holes' function to allow the reification of traditional knowledge and *speak for* indigenous peoples. In Chapter Five I ask: How do indigenous peoples conceive of their relationship to plants and traditional knowledge? I also ask what 'biopiracy' might mean in San Francisco de Yarinacocha. By examining 'ethnographic fragments' I will produce an account of biopiracy that can 'pay attention to details' (Tsing, 2005:271). Using anecdotes, I will show that indigenous peoples in San Francisco de Yarinacocha conceive of their relationship to plants and traditional knowledge in multiple ways. I will consider beliefs about the power and agency of plants, the importance of traditional medicine, and the use of traditional knowledge in agroproduction, as well as highlighting concerns about the use of shamanic knowledge.

I will argue that if biopiracy is an appropriate as a lens through which to assess the concerns that indigenous peoples have over the use of their knowledges, it should address the myriad types of theft that can and *do* occur, and also the *relationships* which enable these thefts and the loss of traditional knowledge to occur. Relationships between people, animals, plants and spirits or *Ibobo* are all important factors in considering traditional knowledge. I will show that biopiracy (formed into 'biopiracies' that focus on the inequalities of the relationships involved in the exchange of traditional knowledge), does indeed matter to indigenous people in San Francisco, but so does the rhetoric of *loss.* The latter is important for a consideration of biopiracy as it mobilises concerns about traditional knowledge and provides an important rationale for its registration.

In the final chapter, I will explore the collaborations that enabled Callería to register elements of their local plant knowledge. I show that the transformation of TK from local to 'registry-ready' knowledge in Callería results from the 'friction' (Tsing, 2005) of the encounter between 'global' biopiracy and local plant knowledge. The project is part of a history of connections that the community has with outside agencies. In the creation of 'registry-ready' knowledge, the 'biovalue' (Waldby 2000; 2002) of traditional knowledge is prioritised alongside ideas about the importance of *familiar* plants and plant knowledge. I will argue that the 'particularisation' of traditional knowledge is followed by 'validation' of it (Agrawal, 2002:290-291). This occurs in the production of 'registry-ready' and 'registry-recorded' knowledge respectively.

I will show that 'biopiracies' are concerned with the management (and type) of relationships which govern the flow of plants and plant knowledge. 'Biopiracies of theft' mobilise concerns over the unregulated, uncontrolled, use of plants and knowledge outside the community. 'Biopiracies of economic opportunity' mobilise concerns about inequalities in relationships governing economic exchange, and as a corollary they generate expectations about the receipt of 'benefits'. In the final chapter, I conclude the thesis by drawing on the contingent features of the multiple, hybrid, concepts of biopiracy generated throughout the empirical chapters of this thesis. This multiplicity, or plurality, makes biopiracy too complex to remain singular. I will introduce the contingencies of different concepts of biopiracy, which I introduce as, 'biopiracies of theft' and 'biopiracies of economic opportunity' in Chapter Six.

In this thesis the 'received wisdom' of biopiracy - ineloquently expressed in the simple story above - will become complicated and multiple. The connections that biopiracy makes as it moves around different locations in Peru are not those envisaged in the aforementioned story, nor in those that emerge from international, regional, or national legislation. The connections biopiracy makes and erases in 'biopiracy work' mean that the interests of indigenous communities are 'spoken for' rather than addressed. This is the case, despite the importance of 'indigenous people' as a means to rally concern about the appropriation of traditional knowledge and resources. I argue that conceiving of biopiracy as plural strands of 'biopiracies' – of theft, and of economic opportunity - enables us to better understand the multiple concerns, hopes, and fears which are mobilised under the banner of 'biopiracy' in Peru. In contrast to the issues mobilised by 'global' biopiracy, research into wider ideas about theft and of the loss of traditional knowledge and resources might come to better represent the concerns of indigenous communities. I will now move on to 'unpack' biopiracy before charting its travels through this thesis.

PART ONE

Chapter One

What is Biopiracy (Supposed to Be)?

1.0 Introduction

This thesis is concerned with an exploration of the ways in which people, knowledge, plants and animals are connected through biopiracy in Peru. In order to examine the nuances of such connections, I will first need to give account of the ways in which knowledge, plants and animals are *supposed to be* connected in rhetoric surrounding biopiracy. Hence, in this chapter I will examine the relationship of what I will term 'traditional knowledge' to 'intellectual property' and to the use of biological resources. This relationship has been extensively explored in the existing literature.[2] I will provide a brief summary of existing arguments which inform debates about biopiracy, through charting the development and deployment of the idea of biopiracy in the context of the underlying principles which biopiracy invokes. This chapter is separated into several subsections and will begin by considering the origins of the concept of biopiracy in terms of the colonial exploitation of plants and plant knowledge. I will then consider the importance of naming and classification, before moving on to define the idea of 'biodiversity', to discuss 'bioprospecting', and eventually I examine biopiracy itself.

In doing so, I will outline three pieces of important international legislation that inform discourse about 'biodiversity' and its relationship to traditional knowledge . I consider the view that traditional knowledge is somehow 'special' before assessing it as knowledge. I conclude by stating that biopiracy is a political concept which propels a huge range of histories, actors, and rhetorics that characterises indigenous and local peoples' knowledges

[2] For intellectual property see for example: Dutfield (2004), Hettinger (1989), and especially Drahos (1996). For traditional knowledge, see for example, Ellen et al. (2000).

in important ways. Gaining an understanding of the ways in which biopiracy has developed, been deployed in the world, and of the underlying concepts which travel with it in global space is vital if we are to consider the types of connections and relationships that result from such travels. However - before I move on to assess the connections biopiracy makes in the world - it is necessary to consider the connections which have made it (and the assumptions about knowledge and resources that it makes) travel *at all.*

1.1 The Origins of Biopiracy

The term 'biopiracy' was coined by Pat Mooney of the (then) Rural Advancement Foundation International - now ETC group - in 1994 (Mgbeoji, 2006:12). Dutfield (2004:1) notes that the term was part of a resentful response to allegations of intellectual piracy which were aimed at Southern nations. The ETC Group describe biopiracy as the:

> '[A]ppropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions who seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge. ETC Group believes that intellectual property is predatory on the rights and knowledge of farming communities and indigenous peoples.'
>
> (ETC Group, n.d.)

This definition is clear, and the terms are evocative. Where third parties seek intellectual property rights over local and indigenous peoples' knowledge and genetic resources by third parties, a form of piracy - in the sense of 'plundering' or 'misappropriation ' occurs. Biopiracy, as it has subsequently been elaborated, involves ideas of loss and theft of plants, animals and associated knowledge and is grounded in understanding of the history of colonialism (Shiva 1997:5).

Broadly speaking, the story of biopiracy could begin over 500 years ago with the voyage of Columbus (or perhaps even before this). The colonisation of Africa, Asia and particularly the Americas created not only an explosion in the movement of different languages, cultures and artefacts but also resulted in a 'frantic transfer of trade goods between Europe and its colonies' (Schiebinger 2004:2). Amongst the most important 'exports' of the Americas at that time were exotic plants, with nutritive, decorative or medicinal properties, that came to be highly prized in Europe (Parry, 2004:33). Trading and ownership of particular plants and control of the knowledge of plant uses has been, and continues to be, a major factor in global political relations (Crosby, 2003:208). As Schiebinger notes:

> 'Historians, post-colonialists, even historians of science rarely recognise the importance of plants to the processes that form and reform human societies on a global scale. Yet they are significant natural and cultural artifacts, often at the centre of high intrigue [...] Plants are also often entangled in high stake politics.'
>
> (2004:2)

Schiebinger (2004: 2,3) goes on to tell the story of quinine, an extract of the Peruvian *Cinchona officianalis* tree that enabled the expansion of colonial empires by mitigating the effects of malaria and other fevers that otherwise devastated European attempts to populate colonies, our carry out military offensives in tropical lands. Considering just *how* essential plants - and particularly medicinal plants - have been to European colonisers is vital to understanding the origins of what has come to be known as biopiracy. Juma (1989) has also shown how the theft, or scurrilous acquisition of plants and plant knowledge from the (then) colonies was instrumental in both the development of scientific knowledge, and in the pursuit and maintenance of colonial domination over non-European territories.

Control over the movement of plant knowledge and materials continues to register high in governmental priorities due to their ongoing importance for modern agriculture and medicine. As Schiebinger (2004:5) notes, perhaps this is unsurprising if plant exchange could arguably have been *the* original base for all economics. The widespread circulation of plants encouraged in such exchanges also encouraged the circulation of cultural beliefs. The development of botany in particular, is inextricably bound to notions of gender and sexuality. In classifying plants, Linnaeus, 'simply tended to see anything female as a wife' (Schiebinger, 1996:169). In this way sexual relationships between plant specimens were conceived of as mirroring those of 18th Century European human societies for instance.

More recently, the combination of plants with 'biotechnological' means of production has led to the creation of a new generation of 'biological proxies' (Parry, 2004:142). Such proxies - for example a DNA sequence – can come to represent natural phenomena (such as whole plants) *in absentia*. As a corollary practice, particular qualities of materials (such as their informational forms) are privileged over others - for example - the smell, or appearance of a flower (Parry, 2004:58). The value of 'information' in this sense relates to both its ability to be transported and re-circulated, as well as its use in enabling consumers to acquire "essential" information quickly, or in new combinatorial forms (Parry, 2004:63).

Privileging informational over corporeal forms in this way has had at least two major consequences beyond the biological sciences themselves. Firstly, it has led to an 'inability to conscientiously patrol the boundary between metaphor and material reality' (Parry, 2004:65). Thus, it is difficult to see where information begins and materials end. Lastly, the market for informational substitutes is accompanied by a market for commodifiable products that, 'animate entirely new approaches to the collection and utilization of biological material' (Parry, 2004:64).

Kloppenburg (2004) argues that this means that plant breeding, seed production, and chemical synthesis of plant extracts have become a vital base for capital accumulation under expansive capitalist regimes. The case studies given later in this chapter provide salient examples. Under such conditions, the movement of plants, people and plant knowledge are increasingly fiercely governed by those who seek to control the international movement of plants and plant knowledge – including governments, communities, and corporations. Beedy (2005) provides a useful summary of the changes in international legislation and activities governing the movement of plant genetic materials. The movement of plants and plant knowledges is neither apolitical, or equitable.

In the process of political and social struggles over the movement of plants and plant knowledge under colonial powers, colonised peoples' systems of plant knowledge were often left behind - stripped away from the 'sample' plant materials that were catalogued and sent back to Europe. A tendency for 'ignorance' of the contributions of non-European peoples knowledge was not an unintentional consequence of colonial encounters. As Schiebinger notes:

> 'Ignorance is often not merely the absence of knowledge but an outcome of cultural and political struggle.'
>
> (2004:3)

Plundering the knowledge of colonised peoples, European naturalists extricated mere fragments from entire systems of plant knowledge. The 'bare bones' were sent home while the body of the thing was cast aside. Schiebinger (2004:86) explains:

> 'They collected the bounty of the natural world, but sent "narratively stripped" specimens to be classified by a Linnaeus or a Jussieu [...]'
>
> (2004:86)[3]

Indeed, if certain ideas about nature are re-examined, such plant materials could be said to *embody* the cultural plant knowledges of those (colonised) peoples. Rooted in the canonical traditions of Christian religion, ideas about the relationship of humanity to nature are central to the logic which considers plants embodiments of nature, rather than also of culture – of knowledge. Private property is justified as a means of negotiating this relationship – a logical outcome of the compulsion to appropriate 'wild' nature. As John Locke has argued:

> 'And hence subduing or cultivating the Earth and having dominion, we see, are joined together. The one gave title to the other. So that God, by commanding to subdue, gave authority so far to appropriate. And the condition of human life, which requires labour and materials to work on, necessarily introduces private possessions'.
>
> (2004 :21)

The relationship between *cultivation* and *ownership* in this context comes to the fore. Regarding the 'bounty' of the colonies as cultivars makes morally reprehensible their free appropriation by colonial travellers. Coupled with the transformation of colonised peoples' plant knowledge through the application and construction of 'proto-scientific' modes of enquiry, this appropriation enabled European peoples to seemingly 'purify' plant material of its cultural origins - and represent it as 'new' (Ellen & Harris, 2000:7). For instance in the classification of plant species, a plant appears to be 'discovered' by a named European person when in fact it may have been used for thousands of years. As Ellen and Harris note:

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[3] This is not to claim that European settlers did not also bring plants and plant knowledge to the colonies - both from Europe and sometimes from other colonies.

> 'In such proto-scientific technological practices, it is significant that elements of discrete knowledge do not usually disclose how they were arrived at. In other words, their "epistemic origins" are hidden.'
>
> (2000:214)

1.2 Naming, Classification & Standards

Central to the creation of knowledge – whether 'traditional' or 'scientific' - is the practice of naming, and its powerful cousin - classification. A consideration of how it is possible for different knowledge systems to establish claims of ownership - or of 'discovery' - is vital to understanding biopiracy. In allegations of biopiracy both the claim of science to have discovered the uses of a plant or animal, and the counter-claim that this 'discovery' is in fact an appropriation of traditional knowledge, mobilise names, categories and standards in order to convince us of their importance. Indeed, there is a discernible relationship between naming and creating (Mason, 1990:17). Mason highlights the role of naming and inscription achieved through the naming of the 'New World':

> 'So this naming activity is not the inscription of European names on virgin soil. It is a reinscription over an object which has already received the trace of a name from its earlier discoverers'.
>
> (1990:28)

(Re)naming, when coupled with 'discovery' erases the names, knowledges and labours of the previous inhabitants or of colonial territories. Naming, and as in taxonomies, classifying, takes place according to classification systems. These are, 'artifacts embodying moral and aesthetic choices that in turn craft peoples identities, aspirations and dignity' (Bowker & Star, 2004:4)

Bowker & Star (2000) describe the relationship between classifications and a classification system, which is the use of classifications to organise, or generate knowledge about the world. An example is the Linnaean system of plant taxonomy and classification, which owes much to plants garnered from colonial soils. Such taxonomies are forged using the knowledge of the original inhabitants of those territories as well as the plants and plant knowledge of slave populations brought from Africa to America and the Caribbean, which played a pivotal role in the development of biology as a science (Bowker & Star, 2004:1).

Bowker & Star clarify:

> 'A classification is a spatial, temporal, or spatio-temporal segmentation of the world'. A "classification system" is a set of boxes (metaphorical or literal) into which things can be put to then do some kind of work – bureaucratic or knowledge production.'
>
> (2004:10)

According to Bowker and Star (2000:10), classification systems share three particular characteristics. Firstly, they utilise consistent and unique principles - for example - that 'traditional knowledge' and 'biological resources' are separate classes of thing. Secondly, they produce categories which are mutually exclusive, so that for example traditional knowledge is treated as 'public' *or* 'confidential'. Put simply, 'a rose is a rose, not a rose sometimes and a daisy other times' (Bowker & Star, 2000:10). Lastly, they (appear) complete - there are no particular examples of classes of things that cannot be absorbed into the system (Bowker & Star, 2000:10). For instance there can be no plants, animals or other life-forms that cannot be named and ordered by scientific nomenclature, and no facet of traditional knowledge that is not able to be described and catalogued in corresponding registers. I discuss the issue of traditional knowledge in registers in Chapter Two.

Classification systems are also related to standards, that is, 'any set of agreed-upon rules for the production of (textual or material) objects' (Bowker & Star, 2004:14). Standards have essential characteristics in that they span locations and times to make collaborations across distance. Most often enforced by legal bodies, the *best* standard is not always that which is enforced and yet standards are difficult and expensive to change (Bowker & Star, 2004:14). This has important ramifications for considering the movement of knowledge between difficult classification systems: for instance between traditional knowledge and biological knowledge. The legislation discussed in the remainder of this chapter can be viewed as standards developing from the classification systems which organise and create biology, as well as from particular forms of property.

Biopiracy - read loosely - has its origins in the theft of plants and plant knowledge from colonised to colonising countries under particular historical, economic and discursive conditions. Such practices date back to earlier centuries. However, important nuances in the ways in which the concept has come to be framed owe legacies to more recent conceptualisations of our relationship to plants, as part of 'nature'. A notable development is the advent of 'biodiversity'.

1.3 The Idea of Biodiversity

Guyer and Richards define biodiversity thus:

> 'Biodiversity means, in its broadest sense, the variety of life. More specifically it can refer to the number of species, genetic diversity or the variety of environments in which species or genes are to be found. The concept is in some ways an odd one, since biodiversity is quantitative without necessarily being quantifiable.'
>
> (1996:1)

The point made above about the 'slipperiness' of biodiversity is a good one. Different users of the term often address different agendas, but the concept of biodiversity is inextricably bound up with different ideas about nature. Takacs (1996:106) sees biodiversity as 'a scientized synonym for nature'. He charts the development of the concept in relation to ecology, evolutionary biology, genetics, environmental ethics, and most notably conservation biology (Takacs, 1996:1,2).

Takacs (1996:115) uses the term 'ecosophy' to describe the beliefs about nature – that diversity is valuable independently of the value that nature has for human livelihoods - inherent in conservation biologists' deployments of the term 'biodiversity'. Biodiversity is not merely a way of describing nature, it is a deliberate attempt to posit the relationship that humans have to non-humans in particular ways which create experts and expertise in conservation biology (Takacs, 1996:4). Hence Takacs states:

> 'Conservation biologists seek to redefine the boundaries of science and politics, ethics and religion, nature and our ideas about it.'
>
> (1996:9)

Discourses about 'biodiversity' are also inherently linked to biotechnology through biological or genetic 'resources'. This link is preserved in international legislation which speaks not only to the intrinsic value of biodiversity, but increasingly about the utility value of plants, animals, and associated knowledges. The rhetoric of the conservation of biodiversity for the 'benefit of all humankind' gives particular credence to ideas that areas high in numbers of plant and animal species are fonts of resources for potential developments in foodstuffs, materials, or particularly, medicines. Tropical forests, for example, cover seven per cent of the world's surface but are home to eighty percent of identified species (Djoghlaf, 2007).

Wilson (1988) has produced several volumes describing the state of biodiversity, its value, and the challenges faced in preserving it. He describes the urgent need for attention to and knowledge of how to better manage biodiversity. The threats to biodiversity posed by population expansion and loss of species and habitats, as well as the capacity of science to deliver salvation, are described by Wilson thus:

> 'Biological diversity must be treated more seriously as a global resource, to be indexed, used, and above all, preserved. Three circumstances conspire to give this matter an unprecedented urgency. First, exploding human populations are degrading the environment at an accelerating rate, especially in tropical countries. Second, science is discovering new uses for biological diversity in ways that can relieve both human suffering and environmental destruction. Third, much of the diversity is being irreversibly lost through extinction caused by the destruction of natural habitats, again especially in the tropics. Overall, we are locked into a race. We must hurry to acquire the knowledge on which a wise policy of conservation and development can be based for centuries to come'.
>
> (1988:1)

The excerpt above usefully highlights three principal concerns which arise through discourse on biodiversity. The destruction of nature is global, yet scientific discoveries can save it/us, but only if we learn how to 'manage nature'. The urgency of the need to acquire knowledge is compelling as are the totalising claims made. However, the idea that the destruction of nature is imminent, that the solution to this lies in the management of nature, and that both are apparent on a 'global' scale is contentious. Even more contentious, is the idea that science can 'save' humanity.

Haraway (1997) notes in techno-scientific discourses the omnipresence of a, 'disreputable history of Christian realism and its practices of figuration' which manifests itself in terms of a, 'love/hate relation with apocalyptic disaster-and-salvation stories' (Haraway, 1997:43). Expanding upon the relation of these stories in the arena of biodiversity, Helmreich (2009:12) has shown the tendency for discourse about the deep seas to become a vehicle for the transmission of claims about impending crises for biodiversity - which are also appeals to believe in particular types of salvation. The urgency and unanimity of the need to protect biological diversity creates particular saviours in science and scientists, which have less to do with the application of methodologies than with ideologies. As he states

> 'A historically aggressive and quasi-religious American pioneer narrative might be rewritten in the service of a scientifically oriented project dedicated to preserving life on Earth [...]' (Helmreich, 2009: 12)

1.4 The Value of Biodiversity

Shiva (1997:72) has argued that plant species in tropical regions have come to be seen as precious resources , or 'green gold'. She argues that this is inappropriate given the importance of plants and plant knowledge to local communities (Shiva, 1997:173). However, the economic value of such resources is considerable. For example , In 1999, the market for products developed from genetic resources was valued at between US $500-$800 billion (ten Kate and Laird, 1999:398). Many new drugs are of natural origin, as were sixty percent of all new anti-cancer and anti-infective drugs between the years of 1989-1995 (Cragg *et al 1997* in Dutfield, 2004:19). Alternatively, Wilson (1993:285) concludes that fourth fifths of all new drugs are derived from natural sources. The relationship between local or indigenous knowledge and valuable plants is also considerable: of the 120 pharmaceutical products derived from plants in 1985, 75% were 'discovered' through study of their traditional uses (Farnsworth *et al*, 1985 in Finger & Schuler, 2004:134) .

Brockway (1979) has argued that the expansion of colonialism in the nineteenth century was significantly aided by the role of botanic gardens. Such gardens facilitated the transfer of valuable plants and their subsequent development into plantation crops (such as rubber, *sisal* and *cinchona*)which could then be cultivated in other colonies.[4] More recently, Parry (2005:16) has highlighted the impact of 'spatial relations' – the movement of knowledge itself – on the knowledge that is 'transported'. She argues that by moving plants and animals into to zoos or greenhouses, the work of 'centres of calculation' (such as Kew Gardens) was also the work of ordering and controlling the dissemination of seeds and information, and hence of the commercially valuable products of plants (Parry, 2005:31). The activities of collecting and categorising nature were central to the establishment of both colonial botany and biology.

Such gathering of plants and animals represents more than the simple acquisition of knowledge of plants and animals. Parry (2004:16) argues convincingly that It also represents the creation of value through the process of decontextualising and recontexualising knowledge – 'exoticisation'. This is the removal of artefacts from colonies and ordering them in a collection of art for instance. Such decontextualisation and recontextualisation also involves the control and concentration of flows of knowledge and materials, as well as the realisation of (created) value by effecting regulation of the recirculation of this knowledge and materials (Parry, 2004:15).

[4] *Agave sisalana* and *Cinchona spp.*

The collection and categorisation of nature that is taking place in the 21st Century (and which concerns both advocates of bioprospecting, campaigners against biopiracy and those concerned with monitoring biodiversity differs from colonial practices in important ways. Needless to say the technologies of collection and control have moved on, but so has the object of collecting. Formalin, a preserving chemical used in earlier expeditions, is now viewed as a contaminant material for example – because the molecule, rather than the morphological form is the subject of analysis (Parry, 2004:138).

These 'new' collections of plant, animal and microbial information or materials offer possibilities over the control of the recirculation of information as distinct from the materials which generate it, and also control over yet unformed 'virtual compounds' (Parry, 2005:162). In the 'new' collections then, the role of 'field' collecting is increasingly restricted – samples, coda or compounds are allowed to stand-in for actual organisms (Parry, 2005:162). The hyper-mobility of knowledge *vis-à-vis* whole organisms as a whole more completely extricates plant and animal derivatives from their 'real world' locations than ever in history (Parry, 2005:198). As Parry notes:

> 'This contemporary collection of material can be used not only for purposes of taxonomic identification and comparison, but also as a source of readily replicable and manipulable genetic and biochemical material. These materials remain vital and potent, in other words, unlike the dried and pickled specimens of old.'
> (2005: 144)

Given the value of the products of biogenetics, and of biodiversity and historic and current trends to extricate traditional knowledge from its origins, and in the light of the increasing ease at which bioinformation can be extricated as a commodity in itself - it is unsurprising that there has been rising interest in 'bioprospecting'. Reid *et al* (1993:12) define bioprospecting as 'the exploration of biodiversity for commercially valuable genetic resources and biochemicals'. Under this surge of interest in the uses of biodiversity, the traditional knowledge of indigenous and local communities have received a great deal of interest as potential short-cuts in the identification of commercially valuable plants and animals. According to Darrell Posey, there has been a:

> '[G]rowing interest in the use of traditional knowledge held by local communities on the utilization of flora and fauna, and in the genetic resources, such as agricultural landraces and medicinal plants, held by indigenous peoples , with a potential for the biotechnology development of new products by the pharmaceutical, agrochemical, seed, cosmetics and nutraceutical industries'.
>
> (Posey, 2000:35)

The formation of ideas about the commercial value and control of flows of plant knowledge and materials -'bioprospecting' - have had notable consequences in international relations. Perhaps this is unsurprising, given the multiplicity of interests and interest groups involved. Those who are involved in the negotiation of 'bioprospecting' come from backgrounds as diverse as anthropology and ecology, from the scientific industry, and from multinational corporations or non-governmental organisations. Importantly, bioprospecting arrangements also involve local or indigenous peoples. Hence there are many interests and livelihoods at stake, and these propel debates about 'bioprospecting' or biopiracy. Consequently, control over the nature of relationships between persons and organisations involved in such debates has become so important that such relationships are regulated by landmark international legal agreements. I argue that three separate international agreements are particularly relevant to an analysis of the internationalisation or globalisation of biopiracy.

The three international agreements I consider here are, the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS), the United Nations Convention on Biological Diversity (CBD), and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, but also known as the' plant treaty'). These agreements contribute greatly to contemporary understandings of the value of plants and plant knowledge as 'biodiversity' as well as to the prevalence of concepts of 'bioprospecting' and its alter ego, biopiracy. I shall now briefly address each agreement and comment on the particular ways in which these combine to generate, and to reflect, ideas about 'bioprospecting'.

1.5 TRIPS & Biovalue

The TRIPS Agreement was reached in 1994 as part of the Uruguay Round negotiations of the General Agreement on Tariffs and Trade (GATT) which formed what is now the World Trade Organisation (WTO). The main aim of the TRIPS Agreement is to, 'contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations' (TRIPS, Article 7). The TRIPS Agreement sets out a list of obligations for States related to the internationalisation of minimum IPR standards. The extension of patent protection to all areas of invention is of particular relevance to an analysis of biopiracy because of the potential market for 'inventions' based on biodiversity.[5]

Brush (1993:656) notes that it is widely argued that patents provide an, 'efficient means of securing private contributions to the public domain'. In relation to biodiversity it would seem that inventions – typically medicines, cosmetics, foodstuffs and nutraceuticals – can be

[5] The concept of a patent is dealt with more extensively in Chapter Three.

secured through providing patent protection. If this *was* a convincing assessment of the role patents play, the existence of an international agreement to harmonise the 'rules' under which information and corresponding technologies can be disseminated, from producers to users – and to do so in a socially and economically responsible manner at that – should be a boon for developing nations.[6] After all, does it not follow that these 'megadiverse' countries - nations that boast significant levels of biodiversity - might stand to gain much from the dissemination and transfer of technologies that could develop and commercialise biodiversity?[7]

In practice, the impact of the TRIPS Agreement for developing nations has been most often viewed in a negative light in academic literature, as well in the global media.[8] Importantly for the scope of this thesis, indigenous peoples have also been very critical of the intellectual property rights enshrined in TRIPS legislation. A pertinent example, The International Cancun Declaration of Indigenous Peoples (2003) specifically argues that TRIPS legislation is not appropriate for dealing with traditional knowledge, 'because its basic assumptions contradict the concepts, values and ethics underpinning indigenous knowledge systems'.

Drahos and Braithwaite (2003:11) argue that the implementation of TRIPS has benefitted the United States and the European Community, to the detriment of developing nations. Indeed, even within developed nations, there are significant doubts about the appropriateness of TRIPS legislation (Drahos & Braithwaite, 2003:208). Critical of the justifications given in support of TRIPS, they convincingly argue that:

[6] See Chapter Four for an examination of the role of patents.
[7] Megadiverse is a term frequently used in literature, for example in Mittermeier (1998).
[8] See for example Dutfield(2006), and Wade (2003).

'Attempts by corporate owners to give legitimacy to their intellectual property empires through appeals to romantic notions of authorship and inventorship look less and less morally persuasive in a world where intellectual property rights, and TRIPS especially, are being linked to bigger themes and issues - widening income inequalities such as those between developed and developing countries [...] moral issues about the use and direction of biotechnology, food security, biodiversity (the last three all linked to patenting of plants, seeds, and genes), sustainable development, the self-determination of indigenous people, access to health services and the rights of citizens to cultural goods.'

(Drahos & Braithwaite, 2003:16)

Essentially, the internationalisation of TRIPS, involves the extension of intellectual property regimes into previously 'unprotected' areas of commercial and other activities. Significantly for the consideration of plant-knowledge, TRIPS extended patent-protections in developing countries to the pharmaceutical sector, a sector which ultimately relies heavily on plant-knowledge and plant species. TRIPS (and subsequent 'TRIPS-Plus') protections, have led to the extension of patent protections to essentially 'un-manipulated' genetic resources, such as DNA sequences, independently from the plants themselves.[9] 'Patents on life' are often seen by developing nations as attempts to:

'Legalise misappropriation of resources to which they have sovereign rights and are contrary to an international agreement that emphasises exchange rather than appropriation.'

(Dutfield, 2004:40)

[9] This is not to assume that the biotechnological processes involved in DNA sequencing are not in some way manipulations of seed and plant material. The invasiveness of this type of work is clear. It is however, to point out in essence, that casting the biotechnological gaze onto a seed no more implies the creation of a new seed than does an x-ray create a new bone.

Indeed, post-TRIPS, and especially in the form of bilateral and regional Free-Trade Agreements (FTAs) developing countries are increasingly required to adopt strong patenting regimes. Dutfield (2004:4) notes that developing countries have been pressured to adopt even more rigid forms of patent protection than are to be found in developed countries, which serve the interests of corporations based in developed countries. He astutely shows concern over the development of rhetoric that 'labels copying as piracy as if the two words are synonyms, and even links piracy to terrorism' (Dutfield, 2004:3).

It is not at all clear that the reproduction of some intellectual property is tantamount to the theft of it. One might well ask how it is exactly that the replication of a gene sequence is effectively an act of stealing. This is the case particularly when the patentee has not created any physical material. This rhetoric is an example of how, 'the new IP fundamentalism is dishonest and potentially dangerous' (Dutfield, 2004:3). The copying of certain technologies and knowledge is shrouded in discourse about illegality and threat, and yet the 'copying' of (material and informational forms of) the plants and plant-knowledge of people in developing nations is enabled - even protected - through the granting of patents.

The appropriation of so-called 'natural' resources is not construed as piracy – this type of copying is 'discovery' – but only if plants and plant-knowledge seem to come from 'nowhere'. However, it remains the case that, 'inventions and innovations do not spring *ex nihilo*' (Mgbeoji 2006:17). Patents privilege the creative potential of technoscientific discourses over the creative potential of other knowledge systems. Conceptual reconfiguration of the (traceable) histories of particular knowledge is at the heart of debates about 'piracy' *and* biopiracy. I address this further in the penultimate section of this chapter.

The commodification of plant (and other) genetic materials as intellectual property is enabled in the form of patents, coupled with stronger forms of plant variety protection, or via special types of 'plant patent' (Dutfield, 2004:8).[10] This has led to the proliferation of ways of valuing plants and plant knowledge which are dominated by what has been termed 'biovalue' (Waldby, 2000, 2002). 'Biovalue' is defined as 'the yield of vitality produced by the biotechnical reformulation of living processes' (Waldby, 2002:310). In other words, 'biovalue' is created in attempts by biotechnologies and biotechnology companies to control life and the value of the life that results from biotechnological processes. These processes occur *in vitro* at the molecular rather than organism level (Waldby, 2002:310).

'Biovalue' is formed both from the need of the biotechnology industry to develop applications for the manipulated life – 'use-value' - and from their drive to create 'capital-value' in that life (Waldby, 2002:310). Perhaps it is in understanding the 'bio' in bioprospecting as a derivative of not simply 'biological' but also of 'biovalue' (Waldby, 2002:310) and 'biodiversity' – a commentary on the value of scientific knowledge and of nature-as-product - that the long shadows cast by these formative notional discourses on 'bioprospecting' could be best approached.

1.6 The Convention on Biological Diversity – Bioprospecting & Biopiracy

In international law, States have sovereign rights over their natural resources as an extension of territorial rights. This was upheld by the UN General Assembly of 1962 in, 'Resolution 1803 on Permanent Sovereignty over Natural Resources' (UN, 1992). However, this sovereignty is not absolute, as the common heritage principle also establishes shared international responsibility for biological resources (Dutfield, 2004:5). Nevertheless, the

[10] See Chapter Four.

Convention on Biological Diversity (CBD) adopted in 1993, clarifies that, 'States have sovereign rights over their own biological resources' (CBD, 1993: Preamble). The CBD represents an international attempt to promote the:

> '[C]onservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.'
>
> (CBD, 1993: Article 1)

The CBD asks States to fulfil the three objectives set out above: to conserve biological diversity, to bring about the sustainable use of its components, to promote the equitable sharing of the benefits arising from the use of genetic resources, and to undertake appropriate technology transfers, as well as to provide appropriate funding whilst taking account of all rights over technologies and resources (Dutfield 2004: 37). Of all the Articles of the CBD, Article 8 (j) is arguably the most important for the obligations it places upon States *vis-à-vis* traditional knowledge and indigenous peoples. It sets out the responsibilities of States thus:

1 Respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity

2 Promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices

3 Encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices[11]

At a cursory glance, the objectives of this international legislation may encourage the reader to understand the legislation as an important attempt to regulate relationships between communities, nation states, corporations, plants and plant knowledge. Such objectives are shrouded in the terms of 'conservation' and 'equitable sharing'. Whilst the CBD remains an important mechanism by which developing nations voice concerns about the inequalities of transnational relations – a 'soft' law arena in which the concerns of both developing nations and indigenous peoples' organisations can seek to further their interests– it is far from a panacea in ensuring equality in matters of 'biodiversity' (Helfer, 2004:1). The text is beset with the potential for vagaries, the specific obligations it requires are limited, and importantly the text is subject to national laws (Dutfield, 2004:38).

More recent additions to the body of 'soft' international law under the Convention, concern mechanisms for obtaining the prior informed consent (PIC) of indigenous peoples where they are involved in the transfer of biological materials, and these represent steps towards encouraging the full participation of indigenous peoples. The 'Bonn Guidelines on Access to

[11] United Nations Convention on Biological Diversity (ibid) Article 8 (j) 'Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.'

Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization' are a notable example.[12] The Bonn Guidelines were adopted as part of the 6th Conference of the Parties to the Convention on Biological Diversity in 2002. They set out criteria by which the provisions of Article 15 of the CBD - which relates to the sovereign rights of States over genetic resources - may be established (in line with other objectives of the CBD). Specifically, the text offers guidelines by which 'prior informed consent' (PIC) and 'mutually agreed terms' can be established by contracting parties. Article 11 of the Bonn Guidelines (2002) sets out the objectives of the text. A major feature is the promotion of technology transfers to developing States (Article 11 [g]). Perhaps most importantly, there is mention of the necessity of the:

> '[D]evelopment by Parties of mechanisms and access and benefit sharing regimes that recognize the protection of traditional knowledge, innovations and practices of indigenous and local communities.'
>
> (Bonn Guidelines, Article 11 [k])

Despite such important intentions, both PIC and Access and Benefit Sharing (ABS) mechanisms have encountered serious difficulties in moving from principle to practice. Considerable international effort has been expended in developing mechanisms for appropriate benefit sharing. Such mechanisms and associated discourse have managed to attract considerable international attention, framing debates over the inequalities that often characterise the extractive use and transportation of traditional knowledge and associated life-forms across regional or national borders towards discussion of 'ethical' practices which compensate 'source communities and nations' (Hayden, 2007:7). The language of ABS and the mechanism of PIC have provided an effective means for developing nations, indigenous

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[12] Hereafter 'Bonn Guidelines'.

peoples' and civil society organisations to draw into focus some of the inconsistencies and inequalities which characterise the use and abuse of biological resources.

The concept of prior informed consent - borrowed from biomedical research - may itself be problematic. Emmanuel (2004) has pointed to the wider issues surrounding the ethicality of research which should be considered alongside the question of consent. For instance, the question of whether research generates useful knowledge, if it chooses research subjects fairly and avoids significant risks, or if it is independently reviewed and maintains the privacy and monitors the well-being of participants (Emanuel *et al,* 2004). The issue of PIC is far from easy to translate into real appropriate action (Emanuel *et al*, 2004:38).

The CBD then, with its enabling language of possibilities, treats the thorny issues of the relationship between indigenous peoples, corporations, nation states, and those between developing and developed nations as if such relations were not problematic in the preservation of biodiversity and in terms of obtaining compensation for the use of biogenetic information. It mobilises concerns over the 'loss' of biodiversity at the hands of extractive industries, and environmental degradation in terms of the need for conservation. However it does so by using rhetoric apt to further the interests of developed nations to acquire access to the 'gene-pools' of the South.

1.7 Bioprospecting

The CBD, and the 'language' of bioprospecting both implore indigenous peoples to share their plants and plant knowledge, as well as calling for States to protect them, and for corporations to treat both States and indigenous peoples 'fairly'. In return, the participants are promised a share in the financial rewards gained from the (further) development of those plants and plant knowledges, as well as a share in the benefits of increased circulation of associated technologies. The implicit contradictions involved are in significant measure a reflection of the very different underlying interests of developed and developing countries, and of corporations and communities, in reaching international agreement on the future of the world's biodiversity.

Moreover, the aims of these guidelines must compete with powerful historical precedents and international legislation. For example, Wynberg (2005) suggests two models by which the commercialisation of *Hoodia* - a South African plant with appetite suppressing qualities that has been used traditionally by the San peoples- has taken place. Firstly, the negotiation of agreements by state research institutions has perpetuated a 'disempowering, patronising, unequal' relationship with traditional knowledge holders (Wynberg, 2005, 876).

Secondly, the arena of 'fly-by-night' unregulated trade (including supplements and diet products with unsubstantiated claims for example) has ridden on the back of media attention granted to *Hoodia* in the wake of development of controversial patents (Wynberg, 2005:876). Unregulated commercial activities were not subject to benefit-sharing agreements and hence offer no compensation to source communities (Wynberg, 2006:876). In practice, ABS agreements hence can come to represent 'business as usual with a politically correct face' (Wynberg, 2006:853). This, coupled with the difficulty in delimiting who must consent to the commercialisation of traditional knowledge are the principal reasons that Wynberg (2004:241) is doubtful of the ability of bioprospecting to ever offer, 'benefits or social justice'.

Business as usual then, does not mean equal access to global markets for all. Dutfield (2004) has pointed out the double standard in intellectual property law which meant that the San were unable to patent their traditional knowledge of *Hoodia*, and yet merely translating this knowledge into scientific terms in patent documents is regarded as sufficient evidence to uphold the claims made therein (Dutfield, 2004:53). Vermeylen (2009:199) argues that in the San case, ideas about whether knowledge should be shared - and if so whether this should be undertaken for money, or in terms of legal protection - were unevenly distributed in terms of gender, location and income. This reflects the plurivocality of perspectives within indigenous communities, and makes the concept of ABS problematic in terms of questioning the legitimacy *and* necessity of agreements to commercialise knowledge. This will come to the fore in assessing the role of National Commission Against Biopiracy in Chapter Three. Vermeylen (2009)states:

> 'The debate about traditional knowledge is often still muddied by an implicit assumption that indigenous peoples speak with one coherent, authentic voice and see the defence of their traditional knowledge as their sole, and maybe last stand against the advance of Westernization.'
>
> (Vermeylen, 2009:194)

On the other hand we might question the role of ABS regimes in assisting with the conversion of life-forms and knowledge into commodities. Strathern & Hirsch (2004) argue that attention concerning mechanisms to 'protect' indigenous knowledge further serves to confirm its availability for appropriation. This is on the basis that non-proprietorial relationships between people, knowledge and things become primarily redefined in terms of property ownership. As they note, 'ownership claims emerge in a world of owners' (Strathern & Hirsch, 2004:3). The reconfiguration of relationships to knowledge is dealt with in Chapters Five and Six.

Given the unequal terms set by TRIPS legislation, the historical exploitation of the Southern countries by their Northern colonisers, and the concentration of 'biovalue' (Waldby, 2002:310) in the knowledges and products generated in the bioscience industries rather than in the traditional knowledge which produces plant genetic diversity, the road to implementing ABS mechanisms is an uphill struggle. In the light of the difficulties imposed by strong intellectual property rights-protections and technological and economic inequalities in access to resources are such aims the CBD strives to will into action through ABS guidelines probable?

Marinova & Raven (2006) argue that making TK 'fit' existing intellectual property regimes serves to imply the superiority of 'current institutional and social arrangements' (Marinova & Raven, 2006:598). Correspondingly, making TK 'fit' neither respects or serves the, 'tradition of community ownership' that exists in many indigenous communities. (Marinova, 2005:2329). Marinova & Raven (2006:594)report receiving zero hits in a keyword search of USPTO patent claims, abstracts, titles and descriptions for "indigenous knowledge" and also note that native species are included in 1.2% of all USPTO registered patents between 1974-2004. They conclude that the present patent system cannot protect TK, since the USPTO considers that knowledge is deemed in the public domain (and cannot be patented) if it has been publicly available for more than a year ,without corresponding patents being lodged. As they clarify:

> 'Consequently, the patent system cannot provide any recognition to the owners of indigenous knowledge for their creativity or ingenuity. If used, indigenous knowledge has been hidden or developed further under 'scientific' terms making it unrecognizable and alienated from the place where it originated.'
> (Marinova & Raven, 2006:594)

Marinova & Raven (2006) argue that indigenous communities might be better compensated through extending the relationship between ABS and sustainability. They describe an accreditation protocol between the Australian Kutkabubba Aboriginal community (represented by the Songman Circle of Wisdom) with the USA-based Aveda Corporation and the exporter Mt Romance concerning the use of sandalwood oil. Under the arrangement, both Mt Romance and Aveda Corporation donate $50,000 to the aforementioned community in recognition of the role of indigenous knowledge in the sourcing of local, sustainable sandalwood oil (Marinova & Raven, 2006:599). Marinova & Raven argue that the voluntary protocol represents a 'sustainability value system' in the organisations involved, a system which unlike intellectual property regimes, recognises indigenous peoples' contributions to sustainability (2006: 602). However, they acknowledge the difficulty in determining the appropriate payment level to communities, and acknowledge that in other terms the payment could be seen as a charity handout (2006:600).

Either in respect to the model described above, or as in ABS arrangements, the line between bioprospecting and biopiracy is a contentious and contested one. Loosely speaking, the term 'biopiracy' - a way of describing the commodification of local, or indigenous, knowledge and associated biodiversity - is preferred by those who view the involvement of developed nations' corporations as inherently, or predominantly, exploitative. 'Bioprospecting' is often preferred when this same commodification is seen as at least *potentially* mutually beneficial. The issue of to whom, if anyone, plant knowledge and plant materials belong has also proved complex to determine. In part this complexity stems from the relationship of indigenous or traditional knowledge and plant materials to particularistic notions of property, and to notions of the 'superior' value of scientific knowledge.

Chen (2006:4) tells his own 'paradigmatic biopiracy narrative' before arguing essentially that it does not exist. As he states,

> 'Most allegations of biopiracy [...] must be consigned to the realm of "rural" legend.'
>
> (Chen, 2006:5)

This is in part because of restrictions placed on the movement of plant materials between states. As he argues,

> 'The window of opportunity for unfair exploitation of genetic material traceable to developing countries is very narrow indeed.'
>
> (Chen, 2006:18)

As this empirical chapters of this thesis will demonstrate, this 'window can only be viewed as narrow if the separation of knowledge and material goods is maintained in accordance with both scientific principles and property law. When material is seen as embodying knowledge, the logic breaks down. Furthermore, Chen states,

> 'The seed itself is a *mere* chattel, but the genetic information it contains is conceptually independent.'
>
> (2006:9, emphasis added)

Such an implication – namely - that genetic information is in some way of superior value to its material counterpart is highly contentious. The value of both is dependant upon specific social, cultural, and economic circumstances. However, these types of distinction reflect (and work to produce) hierarchies of knowledge which privilege scientific discourses above other knowledge forms. Attempts to treat *all* knowledge as the product of contested, complex, and intertwining histories might equally suppose that the seed and the knowledge it embodies are conceptually *inter-dependant.* Traditional knowledge, and its relationship to other forms of knowledge are discussed further in Sections 1.10 & 1.11 of this chapter. In what follows, I will consider a third international agreement which highlights issues surrounding the ownership of traditional knowledge and resources that arise from existing collections of 'scientific knowledge'.

1.8 Plant Genetic Resources – The International Treaty on Plant Genetic Resources for Food and Agriculture

The final international agreement I will consider is the International Treaty on Plant Genetic Resources for Food and Agriculture (hereafter 'Plant Treaty'). The Plant Treaty was adopted in 2001 and is written in partial harmony with the objectives of the CBD (Dutfield, 2004:40). In part it represents the outcome of more than twenty years of efforts to reconcile the nature of common and private property in nature. The focus of the 'plant treaty' is mainly upon *ex-situ* collections of plant materials and the plant knowledge embodied in such collections, as well as with issues of farmers rights (Dutfield, 2004:39). The 'plant treaty' currently concerns 63 plant genera, many of which relate to staple food crops, such as sweet potato, cassava, potato and maize (UN FAO, 2009). The 'plant treaty' expressly recognises the farmers' contributions to the production, propagation and conservation of genetic resources, often from developing countries (UN FAO, 2009: Article 9.1).

However, the plant treaty is controversial because in some jurisdictions it is possible to patent isolated gene sequences from such material - which in turn may even restrict access to the material itself (Dutfield, 2004:40). Moreover, many additions to the germplasm contained in International Agricultural Research Centres (IARC) were made prior to the implementation of strong intellectual property regimes. As such the use of such materials in connection with IPR-protections in this way is felt to run counter to the spirit of international cooperation (Dutfield, 2004:40).

The World Intellectual Property Organisation's Intergovernmental Committee on Intellectual Property and Genetic Resources, traditional knowledge and Folklore (IGC) is a major forum in which developing nations have sought to redress some of the inequalities of present intellectual property regimes. The IGC was established in the WIPO General Assembly of 2000 and serves as a forum for States to consider issues arising in the areas of access to genetic resources and benefit sharing, protection of traditional knowledge, and protections of expressions of folklore (WIPO, 2000:4).[13] Developing nations have used this forum to voice concerns over the implementation of *sui generis* laws, or over the construction of traditional knowledge databases, as well as to communicate research on technical issues related to the disclosure of origin of biodiversity-related materials in patents, and to explore new ways to document traditional knowledge in the public domain (Helfer, 2004:70). However the interests of delegates to the forum, and of the local communities they come to 'represent' are by no means identical[14]. As Safrin astutely observes:

> 'Vesting the sovereign with rights over genetic material in order to protect [...] indigenous communities from bioprospectors may be likened to having the proverbial fox guard the henhouse'.
>
> (2004:641)

Despite the activities of the IGC, the scale of the contributions of local communities continues to be under-acknowledged where traditional knowledge is seen as in the public

[13] Article 2 (14).
[14] I return to this theme in Chapter Three.

domain. A Parallel between the *conquistadores'* [Spanish conquerors] devastating deployment of the concept of *terra nullius* – the idea that 'empty' (indigenous communities') land requires colonisation to improve it – is obvious. Correspondingly, when knowledge is treated as emerging from nowhere, plants and plant knowledge in the public domain can be regarded as a kind of *res nullius* – nobody's property. Plants in IARCs appear to be common, and if they are not exactly thought of as 'nobody's property', then the complicated historical origins and complex trajectories of plant materials at least make issues of ownership particularly difficult to determine (Dutfield, 2004:11).

Mgbeoji (2006:89) argues that until recently, International Agricultural Research Centres were the 'largest and most effective institutional mechanism for the appropriation of Southern germplasm'. Such centres are considered to be examples of an:

> '[I]nstitutionalised mechanism facilitating the transfer of plant germplasm from the South to the North without monetary compensation and without recognising the intellectual property interests of traditional farmers, particularly women, who have toiled over millennia to improve those plants.'
>
> (Mgbeoji, 2006:89)

The value of this germplasm in *producing* the economic disparities between Northern and Southern nations is also a case in point, as Kloppenburg (1988) states:

> 'It is no exaggeration to say that the plant genetic resources received as free goods from Third-World nations have been worth untold billions of dollars to the advanced capitalist nations.'
>
> (Kloppenburg, 1988:169).

Biopiracy then, speaks of the inappropriate use, or theft of indigenous or local communities' plant and animal materials or associated knowledge. The routes that such thefts can take are seemingly multifarious. The pro-bioprospecting language of the CBD presents the possibilities of 'benefit sharing' in a manner which obfuscates the considerable economic, linguistic, and cultural obstacles involved in negotiating access to, and equitably sharing, the benefits arising from the utilisation of genetic resources and traditional knowledge. The difficulties and dangers of reconfiguring the relationships which govern the exchange of knowledge and resources amongst such a diverse range of people - from biotech corporations, to governments, and to indigenous people - are formidable.

Conversely, the CBD also seeks to avoid biopiracy by implementing ABS mechanisms, ensuring that communities are compensated for the appropriation – 'sharing' – of their knowledges and resources. Most significantly, biopiracy – configured as the theft of indigenous and local knowledges and resources – is enabled through the appropriating functions of intellectual property rights instruments which are exemplified in TRIPS legislation, and date back far into European intellectual traditions. Recent trends towards the 'hyperownership' of genetic resources are the results of a scramble for wealth in new genetic landscapes as well as more familiar (post) colonial geographical locations (Safrin, 2004).

1.9 Traditional Knowledge, IPR, & Biopiracy

International law loosely upholds the following distinctions in relation to the ownership of 'biodiversity': 'wild' resources are the sovereign property of nation states, 'worked' resources may be subject to IPR regimes, and *ex-situ* International Agricultural Research Centre collections are the 'common heritage' of sovereign states and the international community (Helfer, 2004:34). Whilst I have argued that the maintenance of such divisions has important consequences for indigenous peoples and developing nations alike, the situation regarding the intangible elements - knowledge - associated with biodiversity is more complicated. Knowledge is seen as belonging to individuals, or to communities. This creates a *de facto* standard: a conceptual division which separates some plant materials from plant knowledge. This means that plants as organisms belong to the state, or even to the international community, but the knowledge about their uses can belong to particular individuals or groups of people. This distinction is problematic when applied to the plants and plant knowledges of indigenous and local peoples.

The ways in which specific forms of scientific or traditional knowledges are rendered visible or intelligible (or invisible and unintelligible) in current legal and social discourses, is a product of the ethnocentric origins and trajectories of 'global' concepts (such as 'biodiversity' and 'intellectual property'). The 'international' in agreements over the uses of biodiversity and associated knowledges goes some way to obfuscate the ethnocentricity of many of the concepts used in such discourse. Decisions over the relative value of contrasting epistemes are made by - and are embodied in - understandings derived from these agreements.

Concern with IPR-protection is central to both proponents of 'bioprospecting' and to those - typically NGOs and indigenous peoples' organisations - who rally against biopiracy. It is important in this context to remember the *local* origins of concepts of intellectual property that are now enshrined in the *global* of intellectual property regimes. Mgbeoji clarifies:

> '[T]he patent system is as local, as culture bound and ethnic, as are comparable legal concepts. The contemporary geographic universality of the patent system should not be mistaken for normative universality'
>
> (2006:17)

Stressing the culturally-specific and ethnocentric origins of global IPR discourses also uncovers the visions and enactments of inter-cultural relations which such discourses enable. intellectual property rights and associated biodiversity laws are perhaps *so* vitally contested because of the way in which they rearrange - or foster - unequal relationships between different nations, ethnicities and knowledge systems. IPR regimes and discourses create value in knowledge by extracting plant materials and plant knowledge from the people and lands which developed them. They synchronically necessitate the creation of 'value' of/in registering and indexing knowledge and biodiversity as a means to avoid the unjust appropriation of this (extracted) knowledge. However, loss of knowledge is not all that is at stake. Significant forms of human and non-human relationships - configurations of people, plants, and knowledge in different localities - are being included and excluded in emergent international discourses about traditional knowledge and genetic resources.

I have argued that such unequal relationships - those enacted between indigenous or local peoples, nation states, and corporations - are the product of long colonial histories, of political manoeuvring and of Eurocentric international legislation and discourses. However, analysing how these relationships are enabled in biopiracy is also is a matter of understanding the perceived qualities and characteristics of the different types of knowledges that I have presented thus far in a polarised 'scientific' or 'traditional' manner. I will now focus on some of the qualities of traditional knowledge that IPR and biodiversity discourses fail to acknowledge, or occlude, and which give fertile ground for acts of biopiracy to occur.

1.10 Traditional Knowledge as 'Special'

I use the term traditional knowledge to refer to what is by no means a definite article. The terms used to describe what I have termed 'traditional knowledge' are themselves contentious - a plethora or terms exist which signify similar 'knowledges'. TK has been described as 'indigenous peoples' knowledge', a useful term in that it stresses the opposition of such knowledge to the dominant modes of knowledge production (e.g. Cuneen & Libesman, 1995). However, the use of this term arguably focuses attention exclusively on indigenous peoples at the expense of others such as *mestizo*, Afro-Peruvian, farming and other communities or forms of what has been expressed as 'local' knowledge. TK is sometimes termed 'aboriginal knowledge' but this term carries racist connotations and may not be applicable to countries with majority indigenous populations (Mgbeoji, 2006:9).

TK has been termed 'indigenous environmental knowledge' a term which highlights the role which such knowledge plays in both the preservation of biodiversity and its interrelatedness to local environments (Ellen *et al:* 2000). Posey (2000), taking inspiration from Schultes (1988), uses the term Traditional Ecological Knowledge (TEK). The term 'traditional knowledge' in place of 'indigenous knowledge' is useful, because of the difficulty in defining what is 'indigenous' and to where (Posey, 2000). Convincingly, TK has been described as 'local knowledge' stressing both its divergence from globalised, dominant modes of knowledge and knowledge acquisition, and its connection to people and place (Nygren, 1999).

Mgbeoji (2006) prefers the use of the term, 'traditional knowledge and uses of plants' (TKUP) to highlight applied nature of traditional knowledge. He explains:

> '[TKUP] encompasses a diverse range of tradition-based innovations and creations arising from intellectual activity in the industrial, literary, or artistic fields of indigenous and traditional peoples. Its range includes agricultural products, the medicinal use of plants, and spiritual worldview. TKUP is not a monolithic entity, rather, it is diverse and sophisticated'. (Mgbeoji, 2006:9)

I have chosen the term traditional knowledge in an attempt to include local knowledges and the specificities of indigenous peoples' knowledges in particular, and moreover to stress the historical connection with place that makes these forms of local knowledge (if not distinctive *per se)* a product of particular political and historical subjectivities. I refer to indigenous and local communities' plants and plant knowledges as an application of traditional knowledge, in line with Mgbeoji's (2006) definition above.

Although I refer to traditional knowledge throughout, often the reference is to a mere fragment of what might more comprehensively be referred to as a knowledge *system*. The system is the whole to which the fragment of 'traditional knowledge' I refer to here relates. Its equivalent might be the comparison of the relationship of an aspirin tablet to the science of pharmacology. As an aspirin pill can be appropriated without paying heed to this science, so might a fragment of traditional knowledge be extricated without protecting the system which generated it. As scientific knowledges are possessed of an organising rhetoric and systematic means of acquiring knowledge, TK is derived from intricate knowledge *systems* which are themselves 'structured and systematically organised' (Roué & Nakashima, 2002:340).

Traditional knowledge systems incorporate complex beliefs about the relationship of human beings to non-humans, just as scientific knowledge expressed in biodiversity incorporates complex beliefs about human beings and 'nature' (as well as the 'crisis' facing it). Traditional knowledge systems include distinctive processes for both the validation of knowledge, and for the creation of expertise. Traditional knowledge is epitomised in customary laws which inform community decision making processes concerning complex matters such as the distribution of land and resources. This plethora of information - vital to indigenous peoples' livelihoods - can not be extricated into registers, patent documents or databases.

The vitality of the connection between traditional knowledge, and the people and places in which it originates, is crucial in understanding the potential detrimental effects that intellectual property regimes can foster in communities themselves. Extricating knowledge, as we shall see in Chapter Two, often reduces the creative, dynamic, capacities of traditional knowledge systems. If the dynamic creativity of traditional knowledge systems breaks down or is obstructed it runs the risk of 'freezing' its heritage. This can turn TK into a quasi-obsolete 'memory chest' or, ' a body without life' (Garcia, 2000).

Literature concerning traditional knowledge systems confirms that they are 'typically collective, based on sharing and of a non-barter nature' (Vermeylen, 2009:193). Martin & Vermeylen (2005:39) argue that this is inconsistent with Western notions of private and public property in intellectual property which, 'reflects economic rationalism in the process of granting property rights'. Ignoring the local context of knowledge generation, intellectual property regimes treat (codifiable) knowledge as usable anywhere (Martin & Vermeylen, 2005:34). Such regimes epitomise western market-oriented regimes which treat knowledge - even when socially generated - as individual property (Martin & Vermeylen, 2005:34).

This is particularly inappropriate in relation to indigenous communities where scarcity and exclusivity of knowledge in market economies can threaten to destabilise core values and threaten livelihoods (Martin & Vermeylen, 2005: 34). Ultimately, both intellectual property rights and the CBD are problematic instruments for the treatment of traditional knowledge, not least because they assert the highly questionable belief that, 'private property rights drive the most efficient and sustainable use of biological resources' (Vermeylen, 2007:34). The privileging of scientific over traditional (and other) knowledge is enshrined in discourse surrounding intellectual property rights and this renders the present system of intellectual property rights unsuitable for the protection of traditional knowledge. If intellectual property rights are to be used to 'protect' knowledge, they should be overhauled to end the double standards between scientific and traditional knowledge. As Vermeylen *et al* (2008) state:

> 'Intellectual property rights could become a mechanism that frames the full life cycle of innovation, instead of simply validating its last stage (i.e., the techno-scientific one).'
> (Vermeylen *et al*, 2008:213)

Within intellectual property regimes, and in wider discourse, traditional knowledge, *vis-à-vis* scientific knowledge is 'subjugated knowledge'.

That is,

> '[A] whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated: naive knowledges, located low down on the hierarchy, beneath the required level of cognition or scientificity.'
> (Foucault, 1980:82).

I do not reproduce this statement in order to signal my agreement with this characterisation of TK, but merely to point out that it is - in a normative sense - regarded as being (Spivak, 1988:24). The subjugation of traditional knowledge has a curious twist in the tale of biopiracy, in that TK is sought after because of its perceived value, and yet denigrated in that it is treated as ancillary to the products it can generate. Stressing the inconsistencies of such logic then, a reappraisal of traditional knowledge could perhaps point to the discontinuities of scientific knowledge claims themselves.

Foucault (1982) also sees the potential for subjugated knowledge to provide critique of the dominant ways of knowing. As Foucault states:

> '[I]t is through the re-emergence of these low-ranking knowledges, these unqualified, even directly disqualified knowledges [...] particular, local, regional knowledge, a differential knowledge incapable of unanimity and which owes its force only to the harshness with which it is opposed by everything surrounding it - [...]it is through the re-appearance of this knowledge, of these local popular knowledges, these disqualified knowledges, that criticism performs its work.'
>
> (Foucault, 1980:82)

Traditional knowledge - treated seriously - could provide a destabilising critique of the 'universal' claims of IPR discourses about the relationship of plants to plant-knowledge, and of private property, by highlighting the relationship of knowledge to power. 'Expertise' in scientific modes of knowledge acquisition is bolstered by the extraction of plants and plant-knowledges from the systems of TK which generated them, at the same time that the contribution of that system is denied. This is because whereas the value of knowledge creation in the laboratory is documented and protected, under existing intellectual property rights legislation, its creation in the 'field' is largely ignored.

Traditional knowledge (TK) is incremental, knowledge layered upon pre-existing layers, that is transferred and added to in an intra and intergenerational manner (Brush: 1993:663). TK is 'transgenerational and communally shared' (Posey, 2000:40). This makes considerations about the origin of specific facets of traditional knowledge problematic on both temporal and geographical axes. Belonging synchronically to past generations, present generations and including the inheritance of future generations, TK neither belongs to *nobody*, nor to *everybody.*[15] Expressions of traditional knowledge can belong to specific individuals, specific communities, or groups therein and to to single or multiple ethnicities.

Traditional knowledge is 'traditional' in the sense present day embodiments and enactments of it are derivations from long and culturally rich histories, but not in the sense that it is antiquated or primitive in comparison to 'modern' or scientific knowledges. Scientific knowledges themselves are routed in Northern and Western knowledge traditions and incorporate 'lay' knowledges. Nygren (1999) warns of the tendency for new 'intellectual imperialism' to historicise and appropriate traditional knowledge (Nygren, 1999:273). It follows that the real difficulty in research is not the comprehension of separate indigenous knowledge systems, but in understanding, 'the hegemonic discourses that authorize essentialist representations of heterogeneous knowledges' (Nygren, 1999:269).

As Agrawal (1996) has noted, highlighting to the unsuitability of TK for either the 'public' or 'private' domain is not to set TK apart from Western/Northern scientific knowledge, on practical or epistemic terms, or in an arbitrarily polarised manner. It is rather to point to the plurality and fluidity of *all* knowledges (Agrawal, 1995:31). This is dealt with extensively in Chapter Two, and will be important in considering the encounters between different knowledges and the constructions of expertise that the empirical chapters of this thesis

[15] I use belong in the sense of, 'referring to a relationship of identification rather than of possession' Demian (2004:61).

discuss. The assignment of elements of (scientific or traditional) knowledge to either domain at a particular point in history does not reflect an epistemological realisation arising from the *res* - the thing - to which knowledge refers.

As we have seen, the work of classification systems, and the standards they produce, is to claim to be universal, complete and mutually exclusive. The charismatic appeal of a system, or a standard arising from it may work well, but even charisma can not contain the world. What is considered 'discovered' or 'known' in relation to scientific as well as traditional knowledge is enacted through a constant process of negotiation of the relationships of people to plants and plant-knowledge. That TK can be readily separated from global knowledge economies makes its ascription into either (public or private) domain particularly unsuitable (Forero-Pineda & Zerda-Sarmiento 2002:107; Brown, 2003:237). However, in both TK and scientific knowledge there exist,

> '[M]ultiple domains and types of knowledges, with differing logics and epistemologies. And somewhat contradictorily, but inescapably so, the same knowledge can be classified one way or the other depending on the interests it serves, the purpose for which it is harnessed, or the manner in which it is generated.'
>
> (Agrawal, 1995:31)

The importance of traditional knowledge to indigenous peoples' identities, the incremental nature of TK, and the realisation that TK is owned (or as I prefer *belongs*) in a shared-but-not- public manner are all important factors when considering the unsuitability of TK for inclusion in contemporary IPR-protection. To view TK simply as 'public property' is also to simultaneously ignore the subtleties of traditional knowledges, to collapse them into a subjugated category in relation to existing scientific knowledge. I will now consider the relationship between traditional and other knowledge through examining some of the characteristics of scientific knowledge, and of knowledge-as-practice.

1.11 Traditional (and Other) Knowledge

In order to enrich the present comparison between (what is termed as) 'scientific' or on the other hand as 'traditional' knowledge, it is necessary to undertake a closer examination of the the specific history of science itself. As a profession, science has always been dominated by an elite, white, and male membership. Bronowski (1960) argues that the creation of the Royal Society in 1660 was the major formative event in the history of what we now describe as science. During this period, Bronowski (1960:9) has noted, the Royal Society did not separate science from literature and the arts, when Christopher Wren the architect gave a lecture to be recorded by John Dryden the poet. He notes:

> 'Science and the arts shared the same language at the restoration, they no longer seem to do so today. But the reason is that they share the same silence: they lack the same language.' (Bronowski, 1960:11)

What would come to be disciplinary boundaries were not of concern in the seventeenth century, rather the purpose of the Royal Society (and its counterparts in Europe) was to acquire, and to *test* knowledge. Indeed, Bronowski argues, 'It had a single and universal thirst - 'to improve natural knowledge by experiment' (1960:23). Bronowski (1960:18) goes on to argue that three creative ideas - those of order, of causes and of chance - are central to scientific knowledge and practice. He argues that science is different from other knowledge chiefly on the basis of the 'general law' skeleton by which science orders particular instances or examples (Bronowski, 1960:119).

This organization of knowledge in science is one that, 'commands more of the hidden potential in nature' (Bronowski, 1964:16). The use of vernacular here is telling - the notion of control over nature, through the organisation or ordering of it - is a central tenet of scientific discourse. Furthermore he notes that the notion of order can only defined by the measure of its success (Bronowski, 1960:54). Success that is, in unifying likenesses - the search that characterises all science (Bronowski, 1964:23). As he states:

> 'It is the explicit character of its laws which makes science a different activity, and this character derives from communication. Science is the activity of learning by a whole society, even though that society may so divide its labour that it passes the responsibility for this activity to a few men.'
>
> (Bronowski: 1960:120)

In 1973, Merton describes the lament of scientists who were experiencing a cultural shift in the praxis of scientific work - moving away from solitary, longitudinal, pursuits in which the scientist was in no hurry to publish, or to replicate and proliferate, published work. Merton (1973:328) argues that science has become characterised by a competitive search for industrial or academic priority in research. Certain fields are more beset with such competition, either as a result of the overall numbers of scientists, or as a result of many scientists working on specific issues within the field. Merton describes this as, 'the race for priority'(1973:330). However, the competitive quest for priority is in itself not unique to contemporary science, but was also a feature of the work of the Royal Society in the time of its founding (Merton, 1973:335).

Moreover, Merton argues that

> 'As science has become more institutionalized, it has also become more intimately interrelated with the other institutions of society.'
> (1973:328)

This means that the contributions and merit of scientists are commonly determined by (powerful) peers - or 'status judges' - who function through the refereeing of journal submissions for example (Merton, 1973:460). Particular forms of competition, organisation and hierarchy affect - if they do not entirely *dictate* - the direction and proliferation of scientific research and publication. This works to include and exclude particular scientists - and their research - in specific, socially negotiated ways. Scientific knowledge itself does not develop and become circulated according to simple principles of 'discovery' or invention, but rather according to specific, changing, and socially negotiated principles. A poignant example is the move from the, 'mere *printing* of scientific work into its *publication'* (Merton, 1973:462).

Through the generation of generalised, explicit, laws and the organisation of nature through the use of classifications and order, science has attained a privileged position in relation to non-scientific intellectual pursuits. The strive for universal categories into which other knowledges can (apparently) be assimilated - coupled with a thirst for priority and the creation of particular forms of expertise - have worked to strengthen the position of science in relation to other ways of knowing. In particular, traditional knowledge does not correspond easily to notions of priority - either in scientific research, or in the examination of intellectual property claims. Nor is TK possessed of the same particular thirst for generalisation, and for unification which characterise scientific knowledge.

Watson-Verran &Turnbull (1995:117) have shown that the dichotomy between scientific knowledge and other ways of knowing also corresponds to the differences that are perceived between so called modern and primitive societies. So called 'modern science' is itself a product of a continuing struggle over the definition of (particular kinds of) science. A significant part of this battle has been the struggle to exclude other - equally potent - ways of producing knowledge from what is considered 'science' (Watson-Verran & Turnbull, 1995). The realisation becomes that,

> '[I]n practice science is 'achieved' in much the same way as other forms of knowledge - through social construction and negotiation [...]'
>
> (Nygren, 1999:273)

Ideas about knowledge-as-practice extend beyond the consideration of indigenous or traditional knowledge (e.g. Bourdieu 1990; De Certeau, 1984). Lave and Wenger (1991) have similarly highlighted the role of what they call 'legitimate peripheral participation' (Lave & Wenger, 1991:29) in the acquisition of knowledge. This sees knowledge as not arising from the receipt of information, but of a movement from the periphery (of non-knowing, non-membership) 'towards full participation in the sociocultural practices of a 'community' (Lave & Wenger, 1991:29). Scott (1998) uses the term *métis* to refer to practically-garnered, experientially based knowledge. It is the *reliance* of TK on *métis* rather than on abstractions from the lived world or codified 'rules' forms of knowledge that distinguishes it from other contemporary (formal) knowledge systems.

However *métis* (Scott, 1998) is not simply *practical* knowledge. It is more the space between practical knowledge and the description of it according to the formal, concrete structures of the knowledge system in which it is communicated (Scott, 1998). *Métis* is different than formal knowledge in the way that merely reading about growing bonsai will not guarantee one a healthy tree once a sapling is available to plant - practice and experimentation are needed. Scott explains:

> 'Broadly understood, métis represents a wide array of practical skills and acquired intelligence in responding to a constantly changing natural and human environment.' (1998:315)

Thinking of *métis* is an important means of considering the differences between scientific knowledges and TK. Interestingly, there is nothing exclusive *per se* about the type of knowledge described as *métis* that could not become understood through *participation* in the activities of knowledge generation (Scott, 1998). Correspondingly, the implication is that there is no permanent barrier to the combination of traditional knowledge with scientific knowledge about plants, which offers hope for more adequate treatment of TK in future dialogue. To date however, embodiments of TK in plant materials can be readily appropriated under existing IPR regimes, whereas TK proper – the complex holistic system of knowledge, intrinsically linked to local environments - cannot. As mentioned in the previous paragraph, the experience-linked, and practice-led elements of TK cannot be codified. Nor can the potential of TK to generate new knowledge, or the value to humanity of plants and embodied plant knowledge *in situ* be gathered in specimen collections.

TK, as a form of *métis* is *situated* but it is not 'stuck' - it is possessed of the capacity to extrapolate itself from the daily necessities of living, though its relevance is often not understood outside of this context. TK is not, '*local* knowledge but knowledge of the universal as expressed in the local' (Posey, 1999:3). Attempts to compartmentalise indigenous knowledges using non-indigenous categorical distinctions - or to abstract them from their contextual and practical bases - can result in both a loss of overall knowledge and a reduction of its economic and cultural value (Agrawal, 2002). This theme is explored in Chapter Two.

A last comment on TK is that it may be considered sacred to the people and communities to which it *belongs* (and which *belong* to it). This feature of TK is perhaps the hardest to communicate. It has been communicated broadly in the context of allegations of biopiracy in relating to a South American vine - *ayahuasca (Banisteriopsis caapi).* Infamously, a US plant patent claiming protection over a variety of this plant with subtle 'modifications', was undertaken by an American named Loren Miller, and caused outrage amongst indigenous peoples' organisations.[16] The Coordinating Body of the Indigenous Peoples of the Amazon Basin (COICA) along with the ETC Group campaigned stolidly for the repeal of IPR-protections conferred to this individual, on the basis that the 'new' variety was neither 'new' nor morally appropriate (ETC Group, 1988).

Despite such outrage, the decision of the US Patent and Trademark Office not to consider the oral evidence submitted by indigenous leaders, meant that the patent was eventually upheld following an appeal the patent holder (CIEL, 2003). This is a prime example of the privileging of scientific claims - in this case about the development of new plant varieties - over traditional knowledge claims. The patenting of ayahuasca, a vine which is fundamental to the shamanic practices of many South American indigenous peoples was likened to the acquisition of copyright protection over the Bible. Such an undertaking would doubtless cause a moral outcry in the Judeo - Christian world.

It is interesting to note that there is no evidence this patent was commercially exploited - suggesting that the existence of intellectual property claims over TK is offensive *per se* -

[16] The patent has subsequently expired.

quite apart from matters surrounding access to TK or the sharing of benefits arising from its use or commercialisation. This lends credence to arguments which decry the blatant commodification of TK related to sacred plants such as ayahuasca. Even without commercial viability, the existence of such patents may constitute to an overall denigration of the spiritual and cosmological significance of such plants and plant-knowledge (Silva de Souza, 1994).

1.12 Conclusion

In this chapter I have provided an outline of key issues in the debate that converge and are articulated through the concept of biopiracy. Biopiracy is a global concept which propels and convinces by drawing on a wide range of actors, histories, rhetoric, and moral sentiments. It is a political tool communicating diverse concerns and subjectivities. It is the latest, but different moral outcry over historic and continuing subjugations of the knowledge and resources of local and indigenous peoples.

Biopiracy, and its connection to traditional knowledge have been examined in relation to existing intellectual property rights legislation - (TRIPS) and the Convention on Biodiversity. This legislation frames the use of traditional knowledge in and of plants and animals in terms of 'benefit sharing'. I have considered traditional knowledge, its nuances and its role in biopiracy discourse. In the next chapter I begin the process of disentangling the multiple meanings and deployments of biopiracy and the responses it elicits through an exploration of my own encounters with biopiracy and by drawing on fieldwork in Brazil and Peru.

Chapter Two

Disentangling biopiracy

2.0 Introduction

> 'I think that my problem, and 'our' problem, is how to have *simultaneously* an account of radical historical contingency for all knowledge claims and knowing subjects [...] and a no-nonsense commitment to faithful accounts of a "real" world [...]'.'
>
> (Haraway, 1988:579, emphasis original)

In this chapter, as I begin to place biopiracy in the world, I will begin to disentangle biopiracy from the 'global' context of Chapter One, where I have shown the importance of patents and intellectual property rights, international legislation and the misuse and appropriation of 'traditional knowledge'. Here I will situate biopiracy step-by-step in a more 'local' context, by examining the connections and movement of knowledge between 'global' and 'local' spaces. I do this by examining the story that biopiracy conjured in the introductory chapter, in terms of the relationship of traditional knowledge to concepts of indigeneity, and the issue of biopirates. I move on to discuss the beginning of my own biopiracy 'story' in relation to methodological focus of this thesis which uses Tsing's (2005) concept of 'friction' to explain the nuances and creative dimensions of the connections biopiracy makes in the world. I briefly explain the directions taken in the following chapters, and which I have begun to describe in the introduction to this thesis.

2.1 Disentangling Biopiracy: Reflections on Representation

'An ethnographer: a listener and a teller of tales.'

(Tsing, 2005:271)

Reflexivity involves 'a turning-back on oneself, a process of self-reference' (Davies, 1999:4). In this chapter I begin to look reflexively at the representations I provide in the 'stories' which make up the remainder of this thesis. There are several features of the ethnographic 'stories' I have provided in Chapters Three, Five and Six that I want to emphasise here. They are elements which straddle the line between the theoretical and the methodological. That is, they are as pertinent to the conceptual lens through which my arguments come to be presented, as they are to the question of how my empirical material came to be. The features I want to emphasise are *partiality* and *connection*. I shall briefly address these in turn.

The three ethnographic chapters which I include in this thesis tell stories about people, places, and things. They offer *representations,* made in order to justify my claims about the multiplicity of biopiracy. They claim to speak on behalf of people and about places which are somewhat exotic to the (academic) audience this thesis is prepared for. Such representations are a work of translation - of moving meaning from one allegorical and linguistic context to another - that is the 'bread and butter' of ethnography. The stories conjure impressions of the importance of certain relationships and bypass other relationships and elements of connection in the process.

In doing so, my intention is never to detract from the 'out there' world, or to unwittingly replicate narratives that lose their connection with the external worlds to which they correspond. I simply emphasise my belief that all representations are made at the expense of other possible representations, those which are necessarily suppressed in the development of a coherent 'story' or ethnographic account. To be reflexive, and faithful to the 'real world' accounts proposed by Haraway (1988) at the beginning of this chapter, it is necessary to avoid 'navel gazing', and to end up saying nothing about the 'out there' world.

It is also necessary to avoid presenting a singular, narrative which obfuscates the presence of alternative perspectives. Plurivocality, aside from being a methodological focus is weaved into the fabric of this thesis as I travel with biopiracy into different places and contexts. By focusing on the contingent *and* the changing meanings of biopiracy in each chapter, I produce (necessarily) fragmented, but faithful accounts of the movement of biopiracy that I will describe. Such accounts similarly highlight the possibility of other, unexplored trajectories that biopiracy could take. In providing one of a potential infinitude of 'stories' about how people and things are related to each other in particular locations then, the ethnographic accounts of Chapters Three, Five & Six are deliberately *partial.* They are incomplete, fragmented and politically motivated. The textual reproduction of these (and all other) subjective visions of the world is not a neutral, but an *iterative* act.

What is written has been selected from what is out there to create the world as it appears in these pages. However, this does not mean that the ethnographic accounts are in some way unable to speak of the worlds that they describe in a faithful, transparent way. Partiality is a not the antithesis of a *full* account: it is the recognition and commitment to writing *from* somewhere and *about* somewhere (Haraway, 1988:590). 'Partial perspectives' (Haraway, 1988:590) resist the global claims of both relativism and universalism, by resisting the temptation to make totalising statements and representations. As Haraway states:

> 'Relativism is the perfect mirror twin of totalization in the ideologies of objectivity; both deny the stakes in location, embodiment and partial perspective; both make it impossible to see well.'
>
> (1988:584)

Thinking with partiality is an attempt to produce accounts which are, 'about limited location and situated knowledges, not about transcendence and the splitting of subject and object' (Haraway, 1988:583). A partial perspective in this way can lend itself very well to considering the relationship between 'parts' (e.g. locations, artefacts, or persons), even as it resists reifying the 'whole'. It does this by showing the, 'connections and unexpected openings situated knowledges make possible' (Haraway, 1988:590). Hence, it is a good lens through which to think about the connections I trace here.

As I have begun to highlight in Chapter One, biopiracy is itself a contested and fragmented concept. It has an alter-ego in bioprospecting which sees ABS arrangements as capable of compensating for the appropriation of TK. Biopiracy also draws together fragments of discourses on biodiversity, intellectual property rights, traditional knowledge, and scientific knowledge. This kind of inherent plurality lends itself very well to an emphasis on partiality and elements of connection. An emphasis on connection is also complementary to consideration of the *movement* of ideas, knowledge, people, and artefacts that themselves stifle, or enable, the formation of relationships - and which create biopiracy *per se*.

In methodological terms, the commitment to faithful accounts - and to partiality and connection - in social scientific research increasingly involves, 'multi-sited ethnography' (Marcus, 1995). Thinking about connection, and the various tropes of connection, I became able to *see* (from my partial perspective) the relationships between people, places and things which form the basis of the empirical chapters of this thesis. Pulling together the stories told by the different ethnographic locations of this thesis adds another dimension to the importance of connection, as a multi-sited ethnography. Marcus (1995) defines a multi-sited ethnography thus,

> '[A] strategy or design of research that acknowledges macrotheoretical concepts and narratives of the world system but does not rely on them for the contextual architecture framing of a set of subjects.'
>
> (1995:95)

Marcus (1998) describes the methodology of 'ethnography of thick and thin'. Thick/thin and deliberately multi-sited ethnographies see the 'global' as emerging from the connections between ethnographic locations. Far from apologising for the work of ethnography in creating the 'global' thus, or for the different *depth* of involvement of the ethnographer in different, connected locations, this type of ethnography is a deliberate attempt to reflect the inherent situation of the global *in* the local in methodological terms (Marcus, 2005). It is an attempt at structured partiality (Marcus, 2005:10). As Marcus phrases it:

> 'For ethnography, then, there is no global in the global/local contrast so frequently evoked. The global is an emerging dimension of arguing about the connection among sites in multi-sited ethnography [...] The global collapses into, and is made an integral part of parallel, related local situations rather then something monolithic or external to them.'
>
> (2005:83)

2.2 Traditional Knowledge as 'Indigenous'

In contrast to the depictions of biopiracy and of traditional knowledge given in Chapter One, below I provide a more considered, and nuanced, account. Chapter One deliberately portrays biopiracy and traditional knowledge in a simplified manner which is consistent with the 'received wisdom' of biopiracy. This is important to establish because doing so shows how biopiracy became 'global' in the first place. However, I do not believe that the simple, 'received wisdom' of biopiracy outlined in the previous chapter does justice to the nuances of meaning with which 'biopiracy', 'indigenous peoples', and 'traditional knowledge' are imbued. For this reason I return to assess them here.

In order to begin this task, I begin this section by examining the relationship between indigenous people, and indigenous, or traditional knowledge. 'indigenous', in the discourse of 'indigenous knowledge', (or as I have used 'traditional knowledge') is not a term which simply stands in for a self-evident group. As Dove *et al* (2009) have noted:

> 'Indigeneity is constructed alterity [...] such representations have an upside as well as a downside for the peoples involved.'
>
> (Dove *et al*, 2009:132)

It is a term which has arisen through particular, and negotiated political discourses about the identity of the 'Other'. Agrawal (2005:3) calls the belief in the value of 'indigenous knowledge' and attempts at the valorisation of it "neo-indigenismo". Conklin (2002:1050) has argued that knowledge is now at the 'core of Indigenous Identity'. The positing of the 'value' of indigenous knowledge takes place according to assumptions about the connection between indigenous peoples' livelihoods and the conservation of the 'natural' environment.

Since indigenous peoples are able to live in harmony with the natural environment (goes the story), their knowledge must be able to provide important insights into ways in which we - citizens of developed nations - can better balance our livelihoods. Insights that is, into how *we* can better balance the relationships *we* have to the non-human life-forms with which we share the globe.

In this 'story' both indigenous knowledge and indigenous people are curiously silent, and are *both* apparently accessible to Western selves. As Ramos notes:

> 'Like fauna, flora, or stones, the Indians seem to be just there, passively accessible to Western science and markets.'
>
> (2000:4).

Agrawal notes that in "neo-indigenismo" rhetoric:

> 'The primary dimension of difference and uniqueness [...] seems to lie in an organic relationship between the local community and its knowledge. Indigenous knowledge, therefore, is of crucial significance if one wishes to introduce a cost-effective, participatory and sustainable development process.'
>
> (2005:6)

Agrawal (1995:9) characterises the main differences in neo-indigenismo conceptions of indigenous knowledge and corresponding conceptions of 'Western' or scientific knowledge as: 'substantive', 'methodological and epistemological', and 'contextual'. Substantive differences pertain to the, 'subject matter and characteristics' of the two knowledges (Agrawal, 1995:9). Or, each form of knowledge speaks about different things, and does so differently. Methodological and epistemological dimensions differ between the two knowledges, and correspond to different techniques for learning about the world and different 'worldviews' (Agrawal, 1995:9). Traditional or indigenous knowledge is also seen as different from other knowledge because it is firmly 'rooted' in specific contexts and practices (Agrawal, 1995:9). These postulates serve to obfuscate the heterogeneity of both traditional and scientific knowledges.

2.3 Traditional Knowledge, Scientific Knowledge, &Traditional Knowledge Registers

"Neo-indigenismo" thinking is actually not new, but falls foul of the problematic, dichotomous classification that dominated the world view of the modernization theorists (Agrawal, 1995:13). Both neo-indigenismo espousing theorists and those who see indigenous knowledge as an obstacle to modernising 'progress' reify the dual categories 'western' and 'indigenous' but without recognising the specific histories which create the particular knowledges upon which *both* categories are fixed (Agrawal, 1995). The reification of 'indigenous (traditional) knowledge' (and of scientific knowledge) in this context gives particular credence to attempts to 'protect' or 'preserve' TK *ex-situ*. It does so by polarising scientific knowledge - with its 'global' classifications and 'fixed' notions of order - with the (seemingly) inchoate and awkwardly nebulous nature of traditional knowledges.

Agrawal (2002:290-291) calls the processes by which TK is converted into the object of traditional knowledge registers and databases 'Scientisation'. This is a result of the triple processes of 'particularisation', 'validation' and 'generalisation' (Agrawal, 200:290-291). Particularisation is, 'the identification and separation of useful knowledge' (Agrawal, 2002:291). Validation involves, 'the use of scientific criteria to test and examine' traditional knowledge, and the documentation of such tests (Agrawal, 2002:290). Generalisation means the eventual cataloguing, archiving and (re) circulating the product of the processes of 'validation' and 'particularisation' (Agrawal, 2002: 290-291). The conversion of traditional knowledge in this way has the effect of effacing the complexity and diversity of the practical elements of TK and bundling difference together as sameness. Indeed, Agrawal notes that: 'A database depends for its efficiency on the homogenisation of the elements that constitute it' (2002:293).

'Scientisation' also imposes a singular - linear - narrative of time, in which Western selves appear to have surpassed indigenous selves in terms of development: in turn, this renders 'indigenous knowledge' merely suitable for 'patching up gaps' in scientific knowledge (Agrawal, 2002:294). Importantly, this diverts attention and resources away from addressing power inequalities between different human groups, *and* provides a means for relatively more powerful persons to appropriate 'wheat' of TK - the 'valuable' elements - whilst discarding the 'chaff'. Traditional knowledge registers do not merely order and classify 'natural' plant and animal knowledge (though as I have shown in Chapter One these activities are politically motivated concerns). They *re-order* and *re-classify* culturally meaningful traditional knowledge. Registers can perform the dual function of affirming the legitimacy of scientific classification systems *and* of avoiding the political histories which make 'indigenous knowledge' appear different in the first place.

At the same time significant commercial efforts have been expended to create a legal framework in which (purified) laboratory knowledge can be distanced from impure 'natural' products. This distance equates to another distance, that between traditional knowledge holders and technoscientific corporations (Ramos, 2000:4). *Both* attributes are what apparently make 'indigenous knowledge' special, but which also serve to distance knowledge from praxis and power. As Agrawal states:

> 'If knowledge derives its power from the many ways in which it is practiced, the effort to pin it down in a classificatory-taxonomic structure can only help in separating knowledge from practice and power.'
>
> (2002:294)

2.4 'Biopirates' & 'Bioprospectors'

In this section I continue using the rhetorical device of contrasting accounts of biopiracy in Chapter One with more nuanced accounts which I present in this chapter. The reification of traditional knowledge as the valuable, appropriable and generalisable object of the received wisdom of biopiracy then, the context of traditional knowledge-in-the-world as well as the communities who generate it can be erased. Whether in stories of bioprospecting, or of biopiracy, the relationship of the 'biopirate' or 'bioprospector' to the 'community' is complicated by interlopers and by the difficulty in describing who the community or the biopirate or bioprospector actually are. The movement of traditional knowledge and of 'benefits' does not often follow the lines imagined either in stories of biopiracy or of bioprospecting and benefit sharing.

The attainment of the informed, just, and equitable ('ideal type') of relationships set out in ABS legislation represent one facet of, 'bioprospecting's idioms of inclusion' (Hayden, 2003:359). Hayden (2003) gives an extensive account of the International Cooperative Biodiversity Groups Programme (ICBG) project involving partners in Argentina, Chile and Mexico, of which she provides an ethnographic study of the latter location. Her ethnography highlights other facets of the relationships imagined in bioprospecting projects. In Mexico, the project centred upon a partnership between the National Autonomous University of Mexico (UNAM), the University of Arizona, and the pharmaceutical company

Wyeth Ayers.[17] Hayden (2003) found that the involvement of identifiable indigenous communities in bioprospecting arrangements such as the ICBG Mexico case is often more imaginary than real. As she states:

> 'The UNAM researchers' strategy of prospecting in markets has created a vivid breach in the bioprospecting imaginary, both disrupting and reinscribing some of the fundamental assumptions shaping this kind of enterprise - most notably, the idea that plants and knowledge "come with" identifiable local authors, claimants, or stewards attached.' (Hayden, 2003:360)

In this imaginary, plant materials (already extricated from the communities which propagate them), "come with" traditional knowledge about the uses of the plants, that has also been extricated from communities (Hayden, 2003a). In markets, both plant materials and knowledge are further extricated from their localities by rendering market traders 'invisible' in the flow of traditional knowledge: as, *'outside the 'logics of authorship and ownership'* that accompany bioprospecting imaginaries (Hayden, 2003a: 137, emphasis original). In the ICBG Mexico arrangement, plants, or plant-knowledge are sourced from markets and not from indigenous 'communities', because of the practicality of this arrangement. She calls this the 'paradoxical effects of bioprospecting's fragile incitement to share' (Hayden, 2003:359) . Importantly, the ICBG Mexico agreement also failed to generate any patented products (Hayden, 2003:359).

Any benefits that bioprospecting activity has produced have been distributed by the ICBG Mexico collection teams, according to renegotiated ideas about 'benefit-recipients' (Hayden, 2003a: 126). Genetic materials involved in bioprospecting can easily be sourced in local markets, as can particular plant knowledge concerning their use – all without the direct

[17] *Universidad Nacional Autónoma de México.*

involvement of the indigenous communities which have generated and propagated both (Hayden, 2003a :127). Research conducted in markets provides an extremely effective channel for making TK accessible to non-indigenous peoples. However, the market traders, or indeed their scientific customers, are not the usual (biopirate) suspects in biopiracy 'stories'. Nor are they the imagined recipients of either 'benefits' or traditional knowledge.

The ideal types of relationships imagined in the discourse of bioprospecting can also be viewed in a much more critical light. Scholars such as Spivak (1988) have pointed to the patronising, disempowering, and catastrophically inaccurate portrayal of non-Western persons as powerless subjects. The idea of being able to speak for others interests is central here: setting people in positions of either providing or receiving is also a way of controlling their assumed interests in the project underway, as I return to discuss in Chapter Three. As Hayden (2005) has argued, bioprospecting has the power to both conjure up and to hide people and knowledge as it engages with neoliberal agendas in acts of representation. She notes:

> 'Moeiras and other subaltern studies scholars might not be surprised to find the figure of 'the indigenous' or of 'local people' and their interests constantly invoked in this agreement and yet endlessly deferred. In such circumstances, the inclusion of 'people' (and their knowledge) can only be imagined or conducted through their effacement, or their exclusion.' (Hayden, 2005:195)

We might ask a number of further questions, whilst ever mindful of the ability of discourse on biopiracy or bioprospecting to both conjure and conceal relationships with indigenous communities, researchers, and corporations. What exactly are 'biopirates'? Or, more eloquently, *who* will deliver traditional knowledge into a commercial product - whether through theft or benefit sharing? Moreover, who, or what, are the 'community' from which traditional knowledge is 'taken'? The section below gives examples of two key Peruvian cases of biopiracy or of 'benefit-sharing' - depending on the point of view we take on the knowledge transfers involved. These will serve to identify potential 'biopirate' organisations, and will also highlight multiple types of persons and 'benefits' involved in 'bioprospecting'.

2.5 Two Peruvian Agreements

The controversial International Cooperative Biodiversity Group (ICBG) bioprospecting agreement between G. D. Searle and Co. and the 'Aguaruna people' was one example of an initiative administrated by the US National Institute of Health following a competition for large grants for research into the pharmaceutical potential of international biodiversity. The award of this grant, in 1993, is covered extensively by Greene (2004:214). The agreement originally involved Washington University, as mediator between the Amazonian indigenous organization Consejo Aguaruna Huambisa (CAH) and Searle, and it concerned wide-ranging research into the traditional plant knowledge of the 'Aguaruna people' in the hope of identifying potentially lucrative plants from which to develop medicines. Greene (2004) shows that the use of the term the 'Aguaruna people' at various stages of the development of this agreement changed from signifying CAH - who withdrew in protest of unfair royalty agreements, to the (then) lesser known Organización Central de Comunidades Aguarunas del Alto Marañon (OCCAAM), and how eventually it stood for a group of representatives mediated through the Confederation of the Amazonian Nationalities of Peru (CONAP) and various smaller affiliated organisations.

A second-round agreement was cutting-edge in that the negotiations eventually took place directly between indigenous peoples' representative organisations and Searle, and in that the agreement spawned the notion of a 'know-how' license reflecting the cultural patrimony of the indigenous peoples involved (Greene, 2004:217). The agreement effected the advent of many 'benefits' – in terms of the public relations of the corporate partners and the resources and profile of the indigenous representative organisations for instance – but its termination in 1999 did not result in the development of any new pharmaceuticals based on Aguaruna traditional knowledge, nor any continuing royalty payments (Greene, 2004). Here, the paradigm of 'benefit-sharing' did not deliver.

Another Aguaruna Agreement, between the now defunct Shaman Pharmaceuticals Inc and the Aguaruna people involving the transfer of supplies of *sangre de grado* (*Croton lechleri*) is documented by Carneiro (2010). This agreement, based more on the transfer of materials than specifically on 'know-how', involved an ex-employee of the Peruvian Museum of Natural History at the *Universidad Nacional Mayor de San Marcos* and was utilised by Shaman Pharmaceuticals to advance their clinical trials of two discrete anti-viral drugs - Provir and Virend - as well as to supply online demand for the drugs. Although the Aguaruna people were not the only group (or indeed Peru the only nation) to provide materials to Shaman Pharmaceuticals, they were major suppliers until the Aguaruna agreement effectively ended prior to 2001 with the bankruptcy of Shaman botanicals (Carneiro, 2010:13). Testing of Provir continues and the company have recently updated their patent portfolio.[18]

Drawing upon the examples above, I argue that a more nuanced interpretation of biopiracy - and its 'twin', bioprospecting - might include a whole range of important actors that do not

[18] Chapter Four discusses patents concerning Shaman Pharmaceuticals.

'fit' into the 'received wisdom' version of biopiracy given in the preceding chapter. For example - academics, scientists, taxonomists, and market traders can variously be involved in facilitating the movement of traditional knowledge associated with biopiracy or 'bioprospecting, but are not included in simplified accounts. This proliferates the complexities of understandings of biopiracy.

Academics and scientists are both responsible for the (apparent) conversion of traditional knowledge into a text, via field notes and samples. This corresponds to the processes of 'particularisation' described above (Agrawal, 2002:290-291). The presence of both scientists from Washington University and of an ex-employee of a Peruvian University in the examples above highlights the role of academics and scientists in facilitating the conversion of local knowledge into traditional knowledge. Both cases did not result in traditional knowledge becoming recognised as the *property* of the communities involved, yet the knowledge was taken from communities. Indeed, ten Kate and Laird (2004:143) argue that academic results are the route par excellence of local and traditional knowledge into the public sector.

Taxonomists in particular are responsible for the conversion of local plants and names into plants with a scientific denomination, which have a place in a stratified system of (botanical) knowledge – for example in relation to plant size (Schiebinger, 2004:225). These processes correspond to the 'validation' of traditional knowledge described above (Agrawal, 2002:290-291). In relation to the agreement with Shaman Pharmaceuticals for example, the clinical trials undertaken concerned not (only) the use of plants grown in Aguaruna lands, but any *Croton lechleri* plants. It was the 'exotic' species, rather than the location or peoples which made this material valuable.

In these clinical trials, species denominations come to represent a mass of plant material and knowledge gathered from divergent locations and peoples. The classification of a plant in this way extricates the material from its respective origins. Local names, were they used to denote the material would prove a poignant indicator of the numbers of communities involved in the making of Provir and the process of commodification might become politically and logistically troublesome. Taxonomists, by assimilating these names into classification systems enable the transportation of the traditional knowledge which these plants embody.

The market traders and scientists that figure in Hayden's (2003, 2003a) work (as well as taxonomists, academics and other interlopers) could all variously be configured as biopirates in certain contexts. They can all be argued to be involved in the commodification, reification and utilisation of traditional knowledge without compensating the communities that 'should' come along with TK. But they are not the kinds of spectres conjured in the story I began this thesis with. Their appearance complicates the story by entangling biopiracy in complex chains of events and persons, rather than emphasising the power inequalities and moral wrongs which make the story 'hit home' (or perhaps which create the story *per se*). Although I imagined some of the characters above to be involved in the activities of biopiracy, I had not set out to meet any of them in my research.

In the examples above, the 'exploited persons' or in more conventional language - the 'community' - also becomes problematic, as does the assumption of what is 'exploited' and in the form in which this exploitation takes place. What the stories above, and the work of Hayden (2003, 2003a) also highlights is the slipperiness of concepts like (indigenous) 'community', as well as the various relationships which are imagined, or indeed rendered visible (and invisible) in the construction of stories of biopiracy. In the first Peruvian example, the 'community', or its representatives, shifted according to political allegiances. This enabled different representative organisations to gain precedence, and also enabled Searle to sidestep concerns over contractual inadequacies. In the second example, plant material (embodied traditional knowledge) was utilised from several communities together. However, in the long term, these communities all remained uncompensated due to bankruptcy.

Conscious of this slipperiness, what I considered I was looking for in researching biopiracy were the 'exploited persons and things' which appeared to come along with it. From the outset then my research had a politically motivated concern with speaking with and about people and things that defend traditional knowledge from its unauthorised or inappropriate use. In adopting this position I intend to take seriously the colonial inequalities which were prerequisites for, and live through biopiracy stories. This is consistent with the practice of multi-sited ethnography, which in construing connections between locations, lends itself to a, 'character of activism' (Marcus, 1995:113).

In terms of my own research, I on some level knew, and similarly was ignorant of what exactly 'traditional knowledge' was. That is, I had researched the concept of traditional knowledge, but I had not encountered an empirical example of it. Similarly, I began with an awareness that there were persons whose lives were intimately and professionally entangled with biopiracy and TK issues, but as I sought to elucidate these entangled relationships I had not yet met a 'biopirate' or an indigenous 'community'. Reflexively speaking, it is pertinent to point out that in significant ways such encounters were not a prerequisite for my undertaking empirical research on biopiracy. Happily, they emerged from, and came to form the field of my research.

2.6 Travelling into 'My Biopiracy Story'

My multi-sited ethnography began in 2005, with an initial journey to Brasilia. Brazil is home to over 230 indigenous peoples (*Instituto SocioAmbiental*, 2000), and a non-governmental organisation that I sought to collaborate with was involved with projects concerning traditional knowledge. My idea was to create a partially joint project which would investigate the commercialisation of indigenous plant knowledge amongst an indigenous community in Brazil. The Republic of Brazil had recently set up a Council for the Management of Genetic Patrimony (CGEN) - whose task it was to monitor all uses of indigenous peoples' knowledges and associated biological or natural resources. This appeared to offer a promising site for research in a country that has been leading a campaign to address the problem of biopiracy.

In practice the NGO in Brasilia proved reticent to set up a joint project and did not offer contacts 'in the field' that would allow me to conduct ethnographic research with an indigenous community. In March of 2006 I arrived at the 8th meeting of the Conference of the Parties to the Convention on Biological Diversity in Curitiba, Brazil. The Conference of the Parties is a symposium of diverse actors and interests, a type of worldly *mise-en-scène*. I confidently expected to meet some activists, indigenous people, or persons involved in existing projects with whom to discuss further research - and this proved to be the case. In October, I travelled to a *Jamamadi* community close to Boca do Acre to discuss collaborative research. However, my efforts to obtain the necessary permissions proved fruitless. With hindsight, this reflects the political sensitivities about research on traditional knowledge and indigenous peoples in Brazil. These arise from concerns about biopiracy even where biopiracy itself is the subject of the investigation.

A tactical rethink later, and I set out to pursue research in Peru. Peru is one of only a handful of countries in the world which has implemented *sui generis* legislation for the protection of traditional knowledge, and I was confident of the possibilities in Peru for researching biopiracy. This twist led me to a very different organisation - the National Institute for the Defence of Competition and the Protection of Intellectual Property (INDECOPI) in Lima. Empirically speaking, this location - or more precisely the two offices of the Commission Against Biopiracy (NCAB), and the Office of Inventions and New Technologies (OINT) within the one building there - is interesting primarily as these offices are responsible for counteracting biopiracy in Peru. In particular, Peru is part of the Andean Community which has adopted regional legislation on genetic resources and traditional knowledge and is one of the few countries to have adopted *sui generis* national legislation for the protection of, 'Collective Knowledge of Indigenous Peoples Derived from Biological Resources' outlined in Chapter Three.

The work of the National Commission Against Biopiracy (NCAB) and the Office of Inventions and New Technologies (OINT) is described in detail in Chapter Three. Briefly, the NCAB is responsible for 'vigilance' over potential and existing cases of biopiracy. At the time of my research they were engaged in researching patents that contained references to particular species of plant and animal originating from Peru, and in defending Peruvian interests in cases of biopiracy. For its part, the OINT maintained two National Registers of Collective Knowledge (NRCC) which are intended to 'preserve and safeguard' the knowledges they contain and to provide the NCAB with information that enables it to, 'defend the interests of indigenous peoples' in their knowledges (Law 27811, Article 16).

The OINT are engaged in a programme to encourage indigenous peoples to contribute to these registers, for the purposes of both 'protecting' traditional knowledge against 'loss' and also against its unauthorised use or 'theft'. As one of the only examples of apparently functioning traditional knowledge registers in the world, researching these registers provided an ideal opportunity to explore the realities of addressing biopiracy and protecting traditional knowledge. At the same time, I also hoped to explore the relationship between the efforts of government agencies to address the problem of biopiracy and the perspectives of people in of indigenous communities whose knowledge is the focus of such protection.

2.7 My Biopiracy Story

In my own research, prior to setting foot in Brazil or Peru, global concepts like biopiracy, traditional knowledge and indigenous 'communities' had worked to define the locations of my ethnographic research: where, and what was interesting, or even where research on biopiracy was *possible*. But the field itself 'bites back' - it has its own reality outside these concepts. This would transform my understanding of biopiracy by enabling the exploration of local perspectives, and the elucidation of the connections and relationships that biopiracy brings together. Happily, the renegotiation of research strategies and concepts in the light of field experiences means avoiding the unwitting replication of global, "neo indigenismo" (Agrawal, 2005) concepts of traditional knowledge and its appropriation through biopiracy.

Larner (2000:14) warns of the dangers of failing to engage with the 'messy actualities' of 'neo-liberal projects'. In other words, one must be conscious of the perils of ending up replicating the generalised accounts with which one engages. Concentrating on the deployment of biopiracy and traditional knowledge - on the ways it is constructed and used in the world - I avoid the kind of replication involved in speaking about the trajectories of 'global' concepts like biopiracy and traditional knowledge.

However, in order to avoid the kind of replication mentioned above, a more nuanced understanding of the 'global' must be ventured. Before an insightful understanding of the behaviours of global concepts in the world can be reached, an analysis of the 'global' itself is required. Contemporary anthropological and sociological discourse has dealt extensively with the concept of globalisation (Featherstone, *et al*, 1995; Yearly 1996; and Franklin *et al*, 2000). To generalise from this discourse, globalisation refers to the trajectories taken by dominant, European, or latterly North American ideologies and ideas, to their apparent diffusion in the world. Although any definition of 'globalisation' is a contested one, Franklin *et al* (2000) describe globalisation thus:

> 'Frequently assumed to condense some of the key changes that characterise contemporary sociality, globalisation [...] refers to a set of processes that are said to be transforming the social world at an unprecedented speed. Globalising processes have been seen as indicative of a shrinking of the world through a contradictory set of processes.'
>
> (Franklin *et al*, 2000, 1-2)

Robinson (1995:48) has highlighted the role of the 'local' as both juxtaposed to 'global' when 'global' is understood to stand for 'dominant' or 'placeless', and as involved in its own particular kind of 'globalisation'. 'Local' positions and perspectives can have a 'global' appeal. Robinson (1995) calls this 'glocalization':

> 'Globalization can mean the reinforcement of or go together with localism, as in 'Think globally, act locally'. This kind of tandem operation of local/global dynamics, global localization or glocalization, is at work in the case of minorities who appeal to transnational human rights standards beyond state authorities, or indigenous peoples who find support for local demands from transnational networks.'
>
> (Robinson, 1995:49).

Biopiracy and traditional knowledge can be viewed as 'global' concepts which make appeals on behalf of these kinds of 'glocal' perspectives. The coining of the term 'biopiracy' by a non-governmental organisation is a case in point, as is the development of ideas about 'indigeneity' in relation to discourses of 'sustainable development' and biodiversity. If biopiracy represents a collision or collaboration between local appeals about the 'loss' and 'misuse' of traditional knowledge and global ideas about its 'value' and its appropriability – then it is in understanding the specific trajectories of these encounters that the phenomenon (of biopiracy) can be illuminated in context.

Theorists such as Larner (2000), Ong (2006), and Tsing (2005) have stressed the importance of looking at the behaviour of 'global' concepts and ideologies in the world, in order to understand the work of reproduction, replication, contestation and change that are inherent in following the paths of these concepts around the globe. I am particularly inspired by Tsing's (2005) use of the concept of 'Friction' which I shall go on to describe here in more detail. This concept has provided a lens through which to conceptualise the contested, fragmentary knowledges I found produced through the interactions I researched in the respective field locations which provide the empirical chapters of this thesis. It remains to elaborate upon Tsing's (2005) work in order to provide a thorough appreciation of the subtleties of the concept as it will be unravelled in this thesis.

2.8 'Friction'

Tsing (2005:1) argues that 'global connections', or encounters 'give grip to universal aspirations'. Emerging claims over 'universal' understandings of biopiracy or traditional knowledge must be 'enacted in the sticky materiality of practical encounters' (Tsing, 2005:1).

She uses the terms 'universal' and 'engaged universal' to describe the activities of 'global' knowledge in the world (Tsing, 2005:7,8). In her work she gives a selection of examples, relating to conservation and indigenous livelihoods in Indonesia. I argue that biopiracy and traditional knowledge, in the context of international discourse, appear as 'universals' - claims to universal truths (Tsing, 2005:7). It is the mobility of such concepts that gives them a particular status amongst other knowledge. 'Universals' are examples of 'knowledge that moves - mobile and mobilizing - across localities and cultures' (Tsing, 2005:7).

However, the particular status of 'universals' *vis-à-vis* other knowledge must be continuously negotiated in different locations - as 'practical objects accomplished in a heterogeneous world (Tsing, 2005:8). When biopiracy and traditional knowledge are examined in the world– for example by analysing how they appear in the three locations that I visit in Peru – they necessarily become 'engaged universals':

> 'Engaged universals travel across difference and are charged and changed by their travels. Through friction, universals become practically effective. Yet they can never fulfil their promises of universality. Even in transcending localities, they don't take over the world. They are limited by the practical necessity of mobilising adherents. Engaged universals must convince us to pay attention to them.'
>
> (Tsing, 2005:8)

'Friction' is the result of the practical - real world - interactions of local knowledge with such 'universals' (Tsing, 2005:10). It is a metaphor which allows us to establish plurivocality, between apparently incommensurable perspectives on a specific issue (such as biopiracy). It happens when people in Lima, or in the Amazon begin to think about words which were not on the agenda before, when the words are reached out to, and given meaning in a local context. It is *only* through the ensuing 'friction' of the encounter between 'universals' - such as biopiracy or traditional knowledge - with the particular, local contexts, people, and places of the world that an 'engaged universal' is allowed to take hold at all. Global or universal biopiracy does not exist in the outside world aside from its engagement in these places. Tsing explains:

> 'Friction gives purchase to universals allowing them to spread as frameworks for the practice of power. But engaged universals are never fully successful in being everywhere at the same time because of this same friction.'
>
> (2005:10)

But the point here is not that 'local' knowledge - about biopiracy or as in (local) traditional knowledge is somehow the opposite of the 'global'. Once the 'local' emerges from its particular place in the world, once it moves - it too becomes hybrid. Mobile knowledge is the product of 'congeries of local/global interaction' (Tsing, 2005:3). Such congeries have 'unexpected and unstable aspects' (Tsing, 2005:3). The aspirations of these global/local mixes - these hybrid claims to truth - must be negotiated in order to travel elsewhere. As Tsing explains:

> 'Every truth forms in negotiation, however messy, with aspirations to the universal.'
>
> (2005:1).

The understandings of biopiracy and traditional knowledge that emerge from particular local contexts can only support their claims to truth - to be 'biopiracy', a *thing* that really exists - by negotiating aspirations to apply beyond particular localities. If an anecdote or phenomenon is to convince us it represents (generalisable) phenomena, it must reach into to the 'global'. That is, it must negotiate its appeal and cleave itself to the situations and knowledges of other groups of people.

'Friction' is, 'the awkward, unequal, unstable and creative qualities of global interconnection across difference' (Tsing, 2005:4). Recalling the *creative* capacities of 'friction' is vital to understanding the possibilities for dialogue offered by global encounters (Tsing, 2005:10). Biopiracy does not move in different locations without also opening up different possibilities. The meanings attributed to the term itself must be reified or altered - renegotiated - as it moves in the world. The processes of this renegotiation offer up the potential for plural understandings of biopiracy to emerge.

However, the negotiations which surround the formation of (hybrid) claims to truth - to universal knowledge - are political processes. As Tsing notes, 'knowledge goes through multiple layers of collaboration - as both empathy and betrayal' (2005:155). In collaborative encounters, emerging - mobile - knowledge claims legitimise the specific interests of certain parties and delegitimize the specific interests of other parties. Encounters between 'global' knowledge and 'local' knowledge often work to confirm the continuities of hegemonic (global) discourses - so that biopiracy or traditional knowledge appears to transcend the locations from which it has emerged (and to be unchanged through this travel).

If the 'engaged universals' of biopiracy or of traditional knowledge - outcomes of the 'friction' that enables global connections - are definitively uncertain and essentially creative, Tsing (2005) is not ignorant of the very real power differentials involved in the negotiation of knowledge which takes place in such encounters. She reminds us that, 'Hegemony is made as well as unmade with friction' (Tsing, 2005:6). However, when the movement of knowledge is coupled with the its commodification, the effects of the betrayal of local knowledge have been catastrophic:

> 'Infused with practices of enslavement, terror, theft, murder and deceit, the expansion of European and "international" knowledge of economic products has been deeply entangled with subjugation.'
>
> (Tsing, 2005:159)

Friction then, is the process by which knowledge claims compete, collude and collaborate - where knowledge is generated in different locations across the world. This process leads to some knowledge becoming generalised – made (to seem) universal (Tsing, 2005). It is the prior process of generalisation in disparate localities that enables me to begin research into biopiracy and to begin to think about traditional knowledge *before* I have had 'real world' encounters with them. Global or 'universal' understandings of biopiracy and traditional knowledge forge claims in the world where the 'facts speak for themselves' (Tsing, 2005:89).

It is also important to remember that encounters between 'engaged universals' and local knowledge emerge when solid, 'real-life' problems do exist in the 'out-there' world (Tsing, 2005:10). The 'theft' or 'loss' of traditional knowledge must relate to actual problems experienced in different localities for there to be 'friction' at all (Tsing, 2005). Biopiracy and traditional knowledge, in the locations that I discuss, are *situated examples* of the contested, generative, process of the collision of global forces and local contexts. Examining the nature and scope of the claims - about relationships between knowledge, artefacts and people - that biopiracy makes in its movement in the world is vital in teasing out alternative perspectives on the appropriation and use of traditional knowledge.

As I have highlighted in this and the previous chapter, claims about biopiracy are contested. But the work of generalisation erases these areas of contestation *and* gives the impression of '*a priori* unity' between different dialogues (Tsing, 2005:89). Or, instead of a collection of tales about the inequalities of relationships that govern the uses and values of knowledge, plants, and animals - between indigenous communities, corporations, and governments - we have a collection of 'cases of biopiracy' in which traditional knowledge is appropriated, or can be protected. Tsing clarifies:

> 'As long as the facts are apples and oranges, one cannot generalise across them, one must first see them as "fruit" to make general claims. Compatibility standardises difference. It allows transcendence - the general can rise above the particular. For this, compatibility must pre-exist the particular facts being examined, and it must unify the field of enquiry. The searcher for universal truths must establish an axiom of unity - whether on spiritual, aesthetic, mathematical, logical or moral principles'.
>
> (2005:89)

Tsing (2005:89) uses the term 'convergences' to describe conceptual bridges which enable the movement of knowledge over areas of incompatibility. To illustrate, indigenous communities may express a wide range of concerns over inequalities in relationships surrounding the movement of traditional knowledge and the use of traditional resources. But it is only through the construction of various 'bridges' between experiences that their unification into biopiracy is brought about. Examining areas of convergence between 'global' understandings of biopiracy and traditional knowledge is crucial in discovering how it is that these concepts travel.

As well as charting the places into which global biopiracy travels, it is also vital to understand the places into which global biopiracy cannot - or does not - travel. Tsing uses the term 'gaps' to describe the, 'conceptual spaces and real places into which powerful demarcations do not travel well' (2005:175). Researching these 'holes' in the trajectories of biopiracy and traditional knowledge will perform a vital role in telling stories about who and what is being *left out* of 'global' accounts. The ethnographic accounts I produce attempt to illustrate examples of these 'bridges', and of the 'holes' made in the encounters that enable the movement of biopiracy in Peru.

2.9 Friction & Biopiracy: Listing the Global

To better illustrate the concept of 'friction', and its usefulness in exploring the flows and creation of knowledge associated with traditional knowledge and biopiracy, I draw upon a short chapter, "This earth, this island Borneo" [Biodiversity assessment as a multicultural exercise]' from the aforementioned book by Tsing (2005, 155-170). The chapter is an account of a list-making exercise undertaken by the author and Uma Adang, her *Meratus Dayak* mentor, in which Uma lists from memory a meandering compilation of over one thousand local plants, animals and organisms (Tsing, 2005:156).

The task began as a result of the perceived necessity of its undertaking on the part of Uma, and charts well both the impressive mobility of 'global' nature and concerns about the crisis facing it (Tsing, 2005:155). The crisis here is similar to that which propels the 'race' to index biodiversity mentioned in Chapter One. The list however is also an impressive account of how 'global' nature is made local, made to reflect local preoccupations, knowledge and priorities. In accomplishing these feats, list-making also charts the two-way movement of ideas and knowledge generation between 'global' and 'local' relationships to nature (Tsing, 2005:156).

Tsing explains:

> 'She [Uma Adang] was not in touch with global biodiversity experts, although surely some radio announcer or nature hiker had brought the rhetoric of environmentalism to her village. Yet she beautifully articulated the spirit of environmental prophecy: the looming, apocalyptic crisis of nature as revealed at the turn of the millennium, the chance to save the earth through proper naming, and the necessity, in doing so, of moving back and forth between "the island" and "the earth" – the minutely local and the whole globe.'
>
> (2005, 155)

Uma Adang limited the list in various ways, for example not including coastal life forms, but including local fields and forest (Tsing, 2005:156). These limits themselves highlight the perceived place of the local in the global 'biodiversity' or nature imagined as the outer limits of the task. As well as limits, the list was propelled by a consideration of a wide array of aesthetic and practical considerations that indicate the diversity of human relationships to 'nature' for example taste, texture, or considerations about *who* may consume a thing and the place of the plant or animal in spatial and temporal niches of local existence (Tsing, 2005:156-8). As Tsing explains:

> 'This was a self-conscious project of placing a local niche within a global imagining. The lists acknowledged and acclaimed global biodiversity by conserving a local space within it.'
>
> (2005:156)

What should be in the list, and how, were both the result of local concerns (over the availability of the fish to catch for instance), and of global ones, such as the 'loss' of the plants and animals of the *earth* (Tsing, 2005:155). Emphasis on the eclecticism of lists, 'allows us to imagine the list within historically changing conversations, rather than as transcendent knowledge' (Tsing, 2005:162). Similarly, the use of list-making, either as a means to order the world, to tell stories of ones experiences in it, or as a means to incite others to acknowledge the importance of the class of thing the list intends to record, are not particular to this 'local' list. As Tsing notes:

> 'A prospective, incipient nostalgia helped motivate the list: the same incipient nostalgia as that which motivates so much of the science of environmental conservation, particularly concerning the conservation of biodiversity.'
>
> (2005:157)

This nostalgia reveals the belief that elements of nature (or maybe nature itself?) is being 'lost' or even, 'stolen'. These are important considerations regarding the use and abuse of traditional knowledge and resources, as we shall see in Chapters Five & Six. The 'shared' nostalgia given above also is important for the representation it makes between shared and divergent experiences and concerns. Nostalgia over the dwindling numbers of beautiful local birds is not the same as concern over the 'loss' of biodiversity for example (though the two emotions may converge in particular places). These representations are central in forging (uneasy) alliances between indigenous or local communities and scientists, activists or policy makers. This is because of the collaborations they reveal, as well as the conflicts they conceal in the construction of generalised 'anti-biopiracy' agendas.

Tsing describes the production of generalisation thus:

> 'Axioms of unity and collaborations both need each other and hide each other; generalization – with its particularistic exclusions and biases – is produced as a result of this interaction.'
>
> (2005:90)

The inclusion and exclusion of certain perspectives, claims, and persons that accompanies - or produces - generalisation is a critical issue in tracing the *movement* of ideas between the 'global' and 'local' locations. This is as important to a consideration of the documenting and utilisation of traditional knowledge, plants and animals, that gives rise to allegations of biopiracy as it is in relation to biodiversity conservation more generally. In biodiversity conservation the appearance or disappearance of names on different lists is crucial in defining the claims such lists make about the relationships between human beings and other life-forms. As Tsing (2005) has shown, list-making vitalises *and* dismisses particular types of human-human or human-non-human relationships - an integral feature of conversations about 'nature'.

The effects of separating 'knowledge' from organisms, and of the assumed superiority of scientific knowledge have been discussed this and the previous chapter. What such characterisations of the relationships human beings may have to 'nature' reveal is that biopiracy, if it remains singular, cannot avoid replication of the (contested) hegemonic discourses embodied in the concepts which underlie it. What connects biodiversity, bioprospecting, and biopiracy is the emphasis they each place on (contested) relationships between groups of people and between humans and non-humans. In biopiracy discourse, the negotiation of particular kinds of relationships to knowledge, or to plants and animals, and the degree to which knowledge can appear separated from power and politics, are all at stake. Tracking the, 'use and disavowal of cross-cultural collaboration' (Tsing, 2005:95) in these negotiations is vital if we seek to provide plural accounts of biopiracy.

2.10 Partial Connections: Two Different Directions

'Nature', 'biodiversity', 'traditional knowledge' and biopiracy: even before empirical work begins grappling with these concepts shows them to be both slippery and expansive. I needed a framework with which to make sense of the messiness of my field experiences. Accepting that the application of any framework would be an iterative act - I also needed some way to 'pull it all together/apart'. I sought some way to conceptualise what biopiracy seemed to *be* and of connecting all the different 'players' involved in my navigation of the connections I had uncovered in researching biopiracy. The connection that biopiracy makes between unjust commercial activities on the one hand and with traditional knowledge and the conservation of biodiversity on the other, became increasingly difficult to investigate. The 'convergences', and 'gaps' created under this umbrella term made research problematic (Tsing, 2005:98, 175).

Empirically, biopiracy became too large and full of contrasts and contradictions to remain singular. In each of the remaining chapters of this thesis, the 'engaged universals' (Tsing, 2005:8) of biopiracy are different, a result of the unpredictable outcome of encounters between global and local knowledges, people and artefacts. And yet, two identifiable strands of (global) biopiracy emerge in and connect each location. In Chapters Four, Five and culminating in Chapter Six, I describe *'biopiracies'*- multiple, but contingent understandings of biopiracy that emerge in actual locations in the world. Such 'biopiracies' reify traditional knowledge and represent indigenous peoples interests in particular ways. This realisation was pivotal in shaping my understanding of biopiracy and shapes the conclusion and argument throughout the remainder of the thesis.

In methodological terms, I was confronted by two divergent paths of research. The first focused on the work of NCAB and OINT and their engagement with the patent system and efforts to identify and track biodiversity. The qualitative dimensions of this research are discussed in Chapter Three, and the results of my own quantitative research are discussed in Chapter Four. The second path of my research sought to address the apparent absence of the experiences and perspectives of the 'indigenous communities' I wanted so much to meet. At this point in my empirical research, 'indigenous communities' had only been spoken *about,* and thus they had not been spoken *with.* Speaking about traditional knowledge without being in the places that create and propagate it *in-situ* became overly restrictive, and moreover important questions had yet to be addressed. In order to gain some first-hand ethnographic experience of the ways in which indigenous peoples were affected by issues surrounding the 'loss' or misuse of their traditional knowledge - I travelled to two different communities in the district of Colonel Portillo, in the Peruvian Amazon.

The first community I visited was the Shipibo-Konibo village of San Francisco de Yarinacocha, close to Pucallpa in the Centre-West of Peru. I set out over a total of seven months to try to understand the meaning of 'traditional knowledge' in relation to plants in this community. I did this through the use of participant observation, interviews and workshops as well as through examining existing ethnographic material. I also asked questions about the 'theft' and 'loss' of traditional knowledge and examined some of the ways that it is being used in San Francisco.

I found a vibrant world in which TK was situated, one involving multiple human and non-human actors: from healers, market traders, and plant spirit-owners [*Ibobo*], to corporations, shamans and tourists. This world conveyed important dimensions of experiences and perceptions of the 'theft' and 'loss' of traditional knowledge, dimensions left out of 'global' concepts of biopiracy. The ethnographic material also points to the existence of 'rhetorics of loss' in San Francisco. In Chapter Five I present an assessment of this material and argue it is constitutive of an alternative biopiracy than that which I describe in Chapter Three.

The experiences I had in San Francisco had given me important insights into the relationship of (multiple) concepts of biopiracy to the theft of traditional knowledge and also into the existence of 'rhetorics of loss'. The influence of 'global' understandings of biopiracy in the the Peruvian Patent Office (INDECOPI) and in San Francisco were clearly different. However, rather than positing a simple, 'community' versus 'national' view division in the ways that biopiracy is differently constituted in these places, I wanted to examine the connections between indigenous communities and the National Registers of Collective Knowledge. I was fortunate that during the course of my research an opportunity arose to study exactly this.

Callería, is another Shipibo-Konibo community that is located some 6 hours by boat from San Francisco, had taken part in a project to register some of their traditional knowledge in July 2008. I travelled to Callería twice during August 2009, in order to ask the community about their experiences of the aforementioned project. Over two visits, each totalling a few days in duration, I conducted interviews with a small sample of the community. I wanted to understand the factors which made the project possible, and to understand the process by which traditional knowledge is converted into 'Collective Knowledge' which is held in NRCC. I found that two categories of knowledge transformation occurred as a result of the 'friction' (Tsing, 2005) generated by the encounter of global and local discourses in Callería.

These transformations, and the suppression of the generative, contested, process by which they were created are necessary in order for traditional knowledge to become part of the

National Registers. In Chapter Six, I describe the creation of what I have called 'registry-ready' and 'registry-recorded' knowledge in the process of registering TK. I argue that the different expectations and interests which the NCAB and the community of Callería have in participating in the project are produced by 'congeries of local/global interaction' (Tsing, 2005:3). This gives rise to alternative understandings of biopiracy, and produces transformations in the way that the community relate to their traditional knowledge. I argue that though the 'biopiracies of theft or exploitation' which motivated people in Callería to register their TK convey concerns over unequal and changing relationships to traditional knowledge, and that these concerns share much with those I describe in Chapter Five, these concerns are nonetheless very different from the 'biopiracies of economic loss' which motivate the 'biopiracy work' described in Chapters Three & Four.

2.11 Conclusion

In this chapter I have provided a brief account of the methodological journey from examining 'global' biopiracy to multiple local 'biopiracies', and of the importance of particular configurations of relationships to 'nature', 'biodiversity', and to 'traditional knowledge' in understanding these journeys. I have affirmed my commitment to a partial perspective and my realisation that the most appropriate means to address biopiracy (as it is actually understood, deployed, and encountered in Peru) involves disaggregating biopiracy as a global concept to distinguish multiple - and two particular - 'biopiracies'. Pervasive in the work of biopiracy in Peru are 'rhetorics of loss'. The next two chapters will explore ethnographic research conducted at INDECOPI, and provides a quantitative account of a search for biopiracy in the patent system - using a list of Peruvian Species of Flora and Fauna.

PART TWO

Chapter Three

'Biopiracy work': The National Commission Against Biopiracy

3.0 Introduction

'The only way to find a larger vision is to be somewhere in particular.'

(Haraway, 1988:590)

In this chapter I will situate biopiracy step-by-step in a more 'local' context. I do this throughout by providing boxes to assist the reader in navigating the terminology and terrain of this chapter, which is divided into two sections. Section one deals with the legislative and historical context of the development of 'biopiracy work' undertaken by INDECOPI in Peru. Box One is a brief summary of regional - Andean Community legislation concerning intellectual property provisions, those for plant varieties, and those concerning genetic resources.[19] Box Two summarises Peruvian legislation concerning biodiversity and protection for plant varieties, and Box Three summarises Peruvian legislation about 'Collective [traditional] Knowledge', biological resources, and genetic resources.

Section two outlines 'biopiracy work' in detail, as well as examining cases of biopiracy (Box Five) and the 'biopiracy patent' in context (Box Four). Section two goes on to examine the role of both searches of the patent system and of National Registers of Collective Knowledge in 'biopiracy work' and presents two tables. Table One is located in Annexe One and highlights the selection of specific plants and animals, and Table Two (in Annexe Two) shows the challenges levied against particular patents and the outcome of such challenges. In the 'biopiracy work' of INDECOPI, indigenous peoples' interests and traditional knowledge are

[19] The Andean Community consists of Bolivia, Colombia, Ecuador, and Peru.

represented and reified in important ways which reveal the existence of both 'convergences' and 'gaps' (Tsing, 2005:172) in understandings of biopiracy generated there.

3.1 Biopiracy & INDECOPI

> 'Biopiracy, the access and unauthorised and uncompensated use of biological resources or traditional knowledge of indigenous peoples by third parties, without the corresponding authorisation and in contravention of the principles established in the Convention on Biological Diversity and the norms in force concerning such material. This appropriation could occur through physical control, or through intellectual property rights which incorporate those elements.'
> (Law 28216, 2nd Deposition)

The above is a definition of 'biopiracy' which was taken from Law 28216, 'Protection of Access to Peruvian Biological Diversity and the Collective Knowledge of Indigenous Peoples' (implemented in 2004). This law (hereafter 'Access to Biodiversity Law') clarifies the roles and responsibilities of the NCAB in putting into practice the responsibilities laid down in the influential Law 27811, 'Introducing a Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources', implemented two years earlier (hereafter 'Biopiracy Law'). The key features of both these laws are set out in Box Three. The Biopiracy Law did not of course emerge in isolation. Hence other legislation relating to the regional and national contexts in which biopiracy and traditional knowledge have developed in South America, and in Peru, is presented in Boxes One & Two respectively.

A third law - No. 28477, 'Law declaring Crops, Native Breeds and Usufruct Wildlife Species part of the Nation's Natural Heritage' that came into force in 2005 (hereafter 'Natural Heritage Law', described in Box Two) adds a further dimension to the complexities of doing 'biopiracy work' in Peru. 'Biopiracy work' here is portrayed as the work of identifying and defending against biopiracy undertaken by two offices inside INDECOPI. It refers specifically to the uses of traditional knowledge in connection with National Registers of Collective Knowledge (NRCC). It also refers to searches of the patent system undertaken using lists of names of plants and animals, and actions taken following the results of these searches (hereafter 'patent searches'). Following the provisions set out in the Biopiracy Law, and clarified in The Access to Biodiversity Law, INDECOPI are given national responsibility for undertaking work on the, 'Protection of Access to Peruvian Biodiversity and associated Collective Knowledge of Indigenous peoples (Law 28216, Article 2).

In this chapter, I concentrate on two important aspects of the way these responsibilities are converted into 'biopiracy work' in the two different offices within INDECOPI. Firstly, the National Commission Against Biopiracy (NCAB) is responsible for identifying, analysing and counteracting cases of biopiracy – typically identified in patent documents. Secondly, the Office of Inventions and New Technologies (OINT) are responsible for the maintenance of both 'Public' and 'Confidential' National Registers of Collective Knowledge (NRCC). Patent searches and NRCC are the subjects of section two. I will show that 'biopiracy work' is carried out according to, and produces, particular fragmentations and collaborations of knowledge in unequal relationships between people (patentees, exporters and indigenous people). It does this through the reification of TK - by establishing particular relationships between knowledge and artefacts. I now introduce the ethnographic, legislative, and historical context in which INDECOPI carries out 'biopiracy work'.

3.2 INDECOPI

In January 2008 I first ventured into the small, clammy, office of the National Commission Against Biopiracy in San Borja, Lima, Peru. The NCAB consisted of a single, windowless office and two members of staff, with backgrounds in law or agronomical engineering. These two join a larger group, consisting of delegates from government, industry and other organisations on a monthly basis for meetings which form the decision making arm of the NCAB.[20] The OINT were a handful of legal staff and worked in a large open office space alongside employees from other *'direcciones'* such as copyright. The permanent staff of the OINT work with various experts, such as biological taxonomists and international lawyers - in the analysis of traditional knowledge and biological resources. They also conduct field visits, and enter into correspondence with indigenous peoples' representative organisations in the collection of biological samples and recording of traditional knowledge.

For three months I was given office space in the NCAB, with whom I worked much more closely than with the OINT. My arrival was both 'opportunistic' (my supervisor had contacts there) and 'pragmatic' - as highlighted in Chapter Two Peru was the only South American country to have implemented *sui generis* legislation relating to biopiracy at the time of my research. The opportunity was also 'collaborative' as the patent office staff were keen to promote links with international colleagues. I had agreed to take direction from the NCAB on work to develop a quantitative account of the ways in which selected plants are used in the patent system, and the majority of my time at the NCAB was spent pursuing this work,

[20] The National Commission Against Biopiracy is composed of 13 institutions: Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOPI), Ministerio de Relaciones Exteriores Ministerio de Comercio Exterior y Turismo (MINCETUR), Ministerio del Ambiente (MINAM), Comisión de Promoción del Perú para la Exportación y el Turismo (PROMPERU), Dirección General Forestal y de Fauna Silvestre del Ministerio de Agricultura, Instituto Nacional de Innovación Agraria (INIA), Centro Internacional de la Papa (CIP), Centro Nacional de Salud Intercultural (CENSI), Instituto Nacional de Desarrollo de Pueblos Andinos, Amazónicos y Afroperuano (INDEPA), Asamblea Nacional de Rectores (ANR), Sociedad Peruana de Derecho Ambiental (SPDA), and Instituto Peruano de Productos Naturales (IPPN).

which provides the basis for Chapter Four. I had also set out with intentions to shadow the work of the NCAB and develop a brief ethnographic account of 'biopiracy work' there.

3.3 The National Commission on Biopiracy – NCAB

In the first few days of the time I spent with the commission, I became very aware of aspects of life there which would greatly affect the direction of my ethnographic research. These concern the relationships between the traditional knowledge in NRCC, and lists of the names of plants and animals which are the subject of patent searches. However, from the outset, the influence of legislation - such as that outlined in Boxes One, 2 and 3 - in the making and of discourses which formalise 'biopiracy agendas' in Peru's capital city was obvious. This deserves reflection, the legislation plays a vital role in shaping conceptions of biopiracy as well as defining the type of 'biopiracy work' needed to counteract it. In addition I began to see how isolated the daily work of the NCAB seemed from all but a specific set of contacts, such as the key staff at the Peruvian Society for Environmental Law (SPDA), and other professional and governmental attendants of the (monthly) commission meetings.

With respect to the importance of legislation, my previous familiarity with intellectual property rights discourses did a lot to advance the semblance of logicality to much of the work of the NCAB and its definitions and understandings of biopiracy. Thinking in 'legalese' also served to occlude some avenues of enquiry, in that epistemologically interesting questions became functionally 'irrelevant' due to their lack of 'fit' with the tasks which were underway. For example the etymology of the names of plants and animals was unimportant when a species denomination was available.

Some tasks were only undertaken by legal or administrative professionals, such as communication with other patent offices, meaning that ethnographic experience of these tasks was 'off-limits' to me. Working with the NCAB did not mean I was given access to the records and information to which staff members are privileged. For example ascribing the status of 'public' or 'confidential' to the TK contained in NRCC meant that certain classes of information, such any information contained in the National Confidential Register of Collective Knowledge, as well as detailed information contained in the Public National Register of Collective Knowledge, were inaccessible to me.

Determining which classes of information may be accessed by which classes of person then, legal idioms or paradigms - epitomised in legislation - began from the outset of my work with INDECOPI to shape the meaning of 'biopiracy' there. This is one example of how understandings of biopiracy which are heavily influenced by intellectual property rights discourse lend, 'frameworks for the practice of power' (Tsing, 2005: 10) to the work that Peruvian National Commission Against Biopiracy carry out. Subsequent sections elaborate these influences. Below is an overview of pertinent legislation in boxes One, Two and Three.

3.4 Legislation

Box One - Regional Legislation

Decision No. 345 of October 21, 1993 of the Commission of the Cartagena Agreement on the Common Regime for the Protection of Plant Breeders' Rights

Article 1 of the decision provides protection for new plant varieties, protecting 'the rights of breeders' through the issuing of 'breeders certificates'. These are also designed to 'promote research activities in the Andean area' and encourage technology transfer (Article 1). Varieties must 'fulfil the conditions of novelty, distinctness, uniformity, and stability and have an, 'appropriate generic denomination' which is to be entered in a, 'National Register of Protected Plant Varieties' (Article 7). A new variety is 'created' if obtained through the, 'application of scientific skills to the genetic improvement of plants' (Article 4). Breeders' certificates allow breeders' to restrict the, 'production, reproduction, multiplication or propagation' of specific plants, for sale, commercial activities or for import or export (Article 24). These rights last for between 15-25 years depending on the plant species involved (Article 21).

Decision No. 391 of July 2, 1996 of the Commission of the Cartagena Agreement – Common Regime on Access to Genetic Resources

The decision concerns the mechanisms for access to and use of, 'genetic resources conserved *in situ* and *ex situ* [...] their by-products and [...] intangible components' for both commercial and other research purposes (Article 1). Its purpose is to enable, 'just and equitable participation in the benefits of access' to, as well as to promote the 'recognition and valuation' of, genetic resources or traditional knowledge, and to develop, 'technological and technical capacities' at 'local, national and sub-regional levels' (Article 2). Exchange between 'native, Afro-American and local communities' is excluded (Article 4). Member States, 'recognize and value the rights and the authority of the native, Afro-American and local communities to decide about their Know-How, innovations and traditional practices associated with genetic resources and their by-products', though rights are subject to national laws (Article 7). Access contracts should strengthen the capacities of native, Afro-American and local communities in relation to both 'intangible components, genetic resources and their by-products' (Article 17). Access contracts should take account of the, 'rights and interests of the suppliers' of biological or genetic resources, by-products or associated knowledge (Article 34). Access contracts between users and the originators of these resources are issued by 'competent national authorities' (Article 41).

Decision No. 486 of September 14, 2000 of the Commission of the Andean Community - Common Intellectual Property Regime

Under this decision, Andean Community states must give protection to intellectual property elements, while, 'safeguarding and respecting their biological and genetic heritage' and traditional knowledge (Article 3). Thus, applications for patent protection must include two copies of a 'license contract' – one permitting the use of genetic resources from the member country, and the other (from indigenous peoples' representative organisations) which authorises the use of the traditional knowledge where, 'protection is being requested [that was] was obtained or developed on the basis of [their] knowledge' (Article 26). Patents provide protection for 20 years in member countries (Article 50). Provisions prevent patent holders from restricting the making of patented products, or use of processes that are, 'exclusively for the purposes of teaching or scientific or academic research' (Article 53). Trademarks cannot be registered if they are, 'denominations, words, letters, characters, or signs' that are used by communities to, 'distinguish their products, services or methods of processing' or that form an, 'expression of their culture or practice' except by the community itself or with its express consent (Article 136).

Box Two – Peru: Plant Breeders' Rights & Biodiversity

Supreme Decree No. 008-96-ITINCI, of May 3, 1996, Regulations for the Protection of Plant Breeders' Rights

This legislation sets out national protection for Plant Breeders' Rights in line with Decision 345 of the Andean Community. It establishes functions of the Office of Inventions and New Technologies (OINT) of INDECOPI and the National Programme for Biotechnology and Genetic Resources (PRONARGEB) of the National Agricultural Research Institute (INIA). OINT is responsible for maintaining a, 'National Register of Protected Plant Varieties' and issuing plant breeders' certificates (Article 3). OINT also has the responsibility for establishing criteria to define, 'distinguishable, homogenous, and stable' plant varieties, and to examine and validate these plant varieties (Article 4). Protection is for a period of between 20-25 years, depending on the plant type (Article 11). Registration requires the disclosure of both the, 'proposed generic denomination' of the plant, details of the, 'origin and genetic content of the variety', and of the geographical origin of the raw material (Article 15).

Law No. 26839 of July 8, 1997, Law on the Conservation and Sustainable Use of Biological Diversity

This law sets out responsibilities of the Peruvian state towards the conservation and sustainable use of biological diversity, pursuant to the Articles of the Convention on Biological Diversity (CBD). Article 23 recognises the value and importance of, 'the knowledge, innovations and practices of *campesino* and native communities' for biological diversity and sustainable development. This law also recognises the rights of *campesino,* native and local communities to control access to, and decide upon uses of their knowledge, innovations and practices (associated to biological resources), because they constitute the 'cultural patrimony' of the aforementioned communities (Article 24).

Law No. 28477 of March 22, 2005, Law declaring Crops, Native Breeds and Usufruct Wildlife Species part of the Nation's Natural Heritage

The legislation introduces an Annexe listing crops, native breeds and usufruct wildlife species that are the national heritage of Peru (Article 1). The law confers responsibility upon the Ministry of Agriculture and other entities to ensure the, 'registering, diffusion, conservation and promotion of genetic material, the development of of the activities of production, industrialisation, commercialisation and international consumption of crops, native breeds and wildlife species' (Article 3). The Annexe contains a list of some 45 crops, 3 native breeds, and 11 species of wild fauna.

Box Three - Peruvian Legislation: 'Collective Knowledge' & 'Biological' Resources

Law No. 27811 of 24 July 2002 Introducing a Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources

This law introduces a, 'Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources'. The protections of the regime do not affect the, 'traditional exchange between indigenous peoples' (Article 4). INDECOPI are the competent national authority concerning the implementation of the Law (Article 63). This law's objectives are to, 'promote respect for, and the protection, preservation, wider application and development of, the collective knowledge of indigenous peoples' as well as to avoid granting of patents for, 'inventions made or developed using collective knowledge', where such knowledge does not feature as part of the 'prior art' of patent documents (Article 5). The regime consists of:

- recognition of the 'inalienable and indefeasible' rights of communities to their collective knowledge (Article 12),
- a National Public Register of Collective Knowledge (Article 15a),
- a Confidential National Register of Collective Knowledge (Article 15b),
- Local Registers of Collective Knowledge (Article 15c) which are maintained according to customary laws and for the which INDECOPI can 'lend technical assistance' to communities (Article 24),
- negotiation of access to collective knowledge through the prior informed consent of 'representative organisations of indigenous peoples' (Article 6),
- the issuing of 'licence contracts' for the use of Collective Knowledge (Article 25 *et seq.*),
- the sharing of benefits arising from the use of Collective Knowledge via financial contributions to the, 'Fund for the Development of Indigenous Peoples and Communities' (Article 37).

Registers are designed to, 'preserve and safeguard' knowledge and also to enable INDECOPI to 'defend the interests of indigenous peoples' in their knowledges (Article 16). Protection is of the, 'disclosure, acquisition or use of that collective knowledge without their consent and in an improper manner provided that the collective knowledge is *not in the public domain*' (Article 42, added emphasis).

Law No. 28216 of April 30, 2004 on the Protection of Access to Peruvian Biological Diversity and the Collective Knowledge of Indigenous Peoples

This law gives a list of 13 members of a National Commission for the Protection of Access to Peruvian Biological Diversity and to the Collective Knowledge of Indigenous Peoples, over which INDECOPI presides. Members include representatives from the Peruvian law, and one each from industry, non-governmental organisations and from The National Commission for Andean, Amazonian and Afro-Peruvian Peoples (Art 3). Article 4 states the responsibility of the commission to:

a) 'maintain a register of the biological resources and collective knowledge of indigenous peoples in Peru',
b) protect against 'acts of biopiracy',
c) identify patents or patent applications granted abroad that relate to the, 'biological resources or the collective knowledge of indigenous peoples of Peru',
d) undertake 'technical evaluations' of the above,
e) issue reports concerning cases of biopiracy, and make recommendations for action,
f) carry out 'actions for annulment' or raise objections against patents (cases of biopiracy),
g) establish permanent, 'channels of information and dialogue' with patent offices worldwide,
h) promote links with regional state and civil society organisations,
i) draw up proposals for the defence of the position of the state and of the indigenous and native peoples of Peru in international arenas with the aim of, 'preventing and avoiding acts of biopiracy'.

3.5 Legislation in Context

The context of the development the Biopiracy Law and the Access to Biodiversity Law was heavily influenced by the provisions decided at a regional level and set out in Andean Community Decisions 345, 391 and 486. It is important to recognise however that these decisions were made in an international climate in which the relationship of commerce, science, indigenous peoples and nation states to 'biodiversity' - to biologically diverse life-forms -was already being debated according to a particular kind of language. This language can to some extent be considered to be 'post-CBD'. That is, it reflects a development of specific terminologies which have come to describe these relationships, notably so in the wake of the creation of the UN Convention on Biological Diversity and discussions about 'benefit sharing' in relation to the governance of natural resources (Hayden, 2007:7).

Legislation in Peru has not avoided reproducing the inequalities which result from the differential treatment of 'traditional' and 'scientific' knowledge forms in relation to property claims. As Peterson states:

> 'Importantly, "discovery," particularly scientific discovery, distinguishes and legally legitimizes a very particular form of individual labor over and above communal intellectual labor and knowledge.'
>
> (2001:84)

The 'double standards' which accompany the treatment of 'scientific' and 'traditional' knowledge used in seed development are enshrined in both Andean Community Decision 345 (Box One) and Supreme Decree No. 008-96-ITINCI (Box Two). These pieces of legislation establish that the definition of a 'new' variety is a variety which is developed through the application of scientific knowledge. The requirement that a scientific denomination be arrived at and that the variety be stable and homogenous (as well as novel), work together to effectively exclude the varieties developed by traditional farmers from protection under such regimes.

On a more fundamental level, TK is catalogued according to scientific taxonomy in the 'biopiracy work' of INDECOPI, so that NRCC, patent searches and challenges depend largely upon species names. I return to this later in this chapter. However the current preoccupation with asking questions about how resources should be divided between 'stakeholders' - between corporate shareholders, governments and local communities - disguises more fundamental questions about if indeed traditional knowledge and resources *can* be fairly compensated for under the present socio-economic conditions which favour northern, industrialised countries (Moeller, 2010). The kinds of relationships Andean Community and Peruvian legislation imagines are possible, (and desirable) between local communities and corporations,(and mediated through governments) are open to similar criticisms such as those outlined in the discussion of the CBD in Chapter One.

Andean Community Decision 391 concerns the negotiation of access to traditional knowledge related to genetic resources (and their derivatives). It is followed in Peru by both the Biopiracy Law and the Access to Biodiversity Law. These pieces of regional and national legislation share common characteristics (themselves emerging from the international Access and Benefit Sharing discussions surrounding the implementation of the CBD). The most important are the promotion of access contracts, managed by competent national authorities. These require the prior informed consent of local communities, and negotiate the receipt of benefits by local communities from the commercial use of their knowledge. The Biopiracy Law also covers the issue of avoiding the existence of patents which have been granted without consideration of the existence of traditional knowledge concerning the use of specific resources. As such the Biopiracy Law also incorporates elements of Andean Community Decision 486, although there is no provision in the former for the protection of indigenous names, signs and symbols.

However the actual language of each piece of legislation differs in important ways. Decision 391 stresses the need to, 'establish the conditions for just and equitable participation in the benefits of the access' (to genetic resources) (Decision 391, Article 2a). The Biopiracy Law on the other hand is concerned, 'to promote the fair and equitable distribution of the benefits derived from the use of [...] collective knowledge' (Law 27811, Article 5b). The 'participation' of indigenous communities has been narrowed to receipt of or distributing of benefits in the translation of benefit sharing from regional to national level.[21] Although the clauses are ostensibly similar, the narrowing is important. The legal consequences of the inclusion or exclusion of specific terminology can become extremely important following subsequent interpretations which put legislation into practice. For example, Anaya (1996:77) has shown that the terming of indigenous people as 'people' or 'peoples' has significant consequences in conjunction with autochthonous peoples issues over self-determination.

Whilst at the regional level, technological capacity building and development are part of core objectives of Decision 391, in the Biopiracy Law the development is more vaguely of the 'potential' of indigenous peoples (and of the machinery they use). This move is important in terms of the nod it makes in the direction of customary law - part of the 'machinery' - but also in that it obfuscates the emphasis on the 'user' sharing technological knowledge or capacities with indigenous people. Perhaps the most significant difference between

[21] This is also a common occurrence beyond Peru.

Decision 391 and the Biopiracy Law is absence in the latter of a specific objective concerning the conservation of biodiversity. This is an important deviation, given the influence of the CBD in developing the rhetoric of ABS. Conservation of biological diversity is dealt with in Peru by Law 26839, of July 1997, which recognises the cultural patrimony of local communities, but the link with conservation is not carried over into the development of the *sui generis* regime which culminated in the adoption of the Biopiracy Law. Neither does the Biopiracy Law make reference to the 'innovations and practices' of indigenous peoples which are considered in Andean Decision 391.

The relationship of 'new' plant varieties (eligible for protection through the assertion of Plant Breeders' Rights), or of species that appear in the Natural Heritage Law, (which introduces an Annexe of 59 species) to traditional knowledge as it is 'protected' under the Biopiracy Law is unclear. A wide reading of the, 'inalienable and defeasible rights' of indigenous peoples in their knowledge given in the Biopiracy Law, (Law 27811, Article 12) or the 'rights and authority' of native, Afro-American or local communities to the same (as Decision 391, Article 7) make Plant Breeders' Rights and national heritage ownership of common crops and wild species appear somewhat inconsistent with these rights.

Plants are developed through centuries of the use and incremental development of traditional knowledge concerning them. Under the Biopiracy Law, traditional (plant) knowledge is the subject of the granting of inalienable rights to the peoples who propagate this knowledge. Hence, one might reasonably ask: What justification can exist for the privileging the biological or genetic manipulation of this plant through the granting of exclusive property rights over some plant varieties? Why does the imposition and description of certain plant characteristics (such as in a 'novel' variety) provide for the granting of intellectual property rights over a particular plant? Or, if vital crop cultivars and wild fauna and flora are made 'national heritage' how can the local communities whose traditional knowledge has been used to develop those crops also possess rights over the use of this knowledge (as it is *embodied* in the plants)?

There are no easy answers to these questions, and I do not pretend to have the legal expertise that might answer them appropriately in this legislative context. Pointing to the inconsistencies between the Biopiracy Law and other legislation which characterise the legislative landscape in which the 'biopiracy work' of INDECOPI takes place is however a poignant reminder of the implications of existence of powerful legal tautologies which distinguish *res* from artefact and 'public' from 'private' knowledge, alongside which *sui generis* legislation must exist in contemporary Peru. Legislation enables the *de facto* separation of an organism from 'biological proxies' (Parry, 2004:142) which are allowed to stand for it – as in a gene sequence or a phytological description. But the same legislation, in amplifying the differential standards by which 'scientific' and 'traditional' knowledge are treated, obfuscates the necessary conceptual pre-separation of the organism from the TK which it embodies. This has important ramifications for the way in which traditional knowledge and 'biological resources' become the subject of different ownership claims in Peru.

As well as the influence of other legislation discussed above, the formation of the Biopiracy Law developed alongside research into the patenting of *maca* [*Lepidium meyenii*] and also alongside the controversial ICBG bioprospecting agreement between G. D. Searle and Co. and the 'Aguaruna people' (see Chapter Two). The controversy surrounding several patents whet the Peruvian government's appetite for fighting biopiracy as well encouraging links between INDECOPI and other non-governmental organisations including the International Development Research Centre (IDRC), and the Peruvian Society for Environmental Law

(SPDA). These two organisations have provided financial and technical assistance to INDECOPI in developing its portfolio of cases of biopiracy.[22] The results of this technical assistance formed the basis of subsequent submissions made on behalf of Peru to WIPO and other international organisations that greatly increased the international profile of Peru in matters relating to biopiracy.

3.6 The Biopiracy Law, the Access to Biodiversity Law & 'Biopiracy Work'

Arguably the most important features of the regime introduced by the Biopiracy Law are that it attempts to set out mechanisms for the issuing of licence contracts which are made between communities' representative organisations and third parties wishing to use TK with the prior informed consent of local communities. Such contracts are administered by INDECOPI and if infringed can incur sanctions. The regime also establishes the need for the development of two different forms of National Registers of Collective Knowledge – Public and Confidential – which deal with knowledge considered to be in the 'public domain', and knowledge which is not widely known outside communities respectively.

Whilst Confidential Collective Knowledge is protected from, 'disclosure acquisition or use' by third parties under the Biopiracy Law, this is not the case for knowledge deemed to be in the public domain. Where products are marketed from Confidential Collective Knowledge', a minimum of 10% of the gross pre-tax sales of these products must be contributed to the Fund for the Development of Indigenous Peoples (Law 27811, Article 8). Similar sales of products derived from Public Collective Knowledge will only require a contribution the fund if the has been knowledge passed to the public domain in the last 20 years (Law 27811, Article 13).

[22] (Valladolid, 2008).

According to the Biopiracy Law, the Fund for the Development of Indigenous Peoples will be distributed and administered following applications from indigenous peoples' representative organisations by the seven members of the 'Administrative Committee'. This is to be made up of five indigenous peoples' representatives and two members of the National Commission for the Andean, Amazonian and Afro-Peruvian Peoples (INDEPA). This fund in 2008 was not in operation, as no contributions had so far been received.[23] Importantly, this means that no financial benefits for the use of knowledge in the 'public domain', or for the use of 'Confidential Collective Knowledge' in license contracts, have as yet been received, despite the cases of biopiracy identified in the 'biopiracy work' carried out to date (see Box Four).

The Access to Biodiversity Law establishes the duties and membership of the National Commission Against Biopiracy. It lays out the responsibilities of the NCAB, chiefly those of: identifying, informing about, and analysing cases of biopiracy. The most concrete proposals of this law relate to instructions for the OINT to create and maintain NRCC; and for identifying and acting against foreign patents; as well as developing dialogue with other patent offices worldwide. Alongside this designated 'biopiracy work' is the requirement for the NCAB to provide information about cases studied and recommendations for future actions as well as to elaborate proposals for the advancement of the Peru's and the indigenous peoples of Peru's positions internationally.

It is pertinent to mention the slipperiness with which the responsibility to inform about biopiracy is presented alongside requirements to address the *existence* of it in particular ways. Forming NRCC and analysing the results of patent searches, or increasing communication with other patent offices will not easily lead to the development of research

[23] (Valladolid, 2008).

into the wider socio-political context of biopiracy for example. Such activities run the risk of reproducing regimes that more closely replicate existing intellectual property rights discourses – that are more pro-patent than *sui generis*.

This is particularly the case as the Access to Biodiversity Law states, the resources of the NCAB are to be derived from international cooperation and donations (Law 27811, Article 15). Cooperation, whatever the conditions of dialogue, is always accompanied by influence. Peterson (2001:78) argues that 'structural asymmetries' in legal regimes associated with ABS have enabled interested NGO's and private affiliates to gain, 'increasing policy-making influence on market-driven development practices throughout the Third World'.

The responsibility to make recommendations based on analyses of cases of biopiracy is also placed alongside the responsibility to act upon existing cases of it in the patent system. On the one hand, the formation of the NCAB, its supporting legislation and the requirements that this legislation sets out for NCAB and OINT, suggest that biopiracy is 'out there'. It is a phenomenon which exists outside of legislation - a universal problem for which evidence can be sourced in the patent system and beyond. However, as discussed in Chapter One, universal claims - when engaged in the world - are always incomplete, and require local collaborations and convergences to convince us of the accuracy of what is claimed (Tsing, 2005:8)

On the other hand the evaluative and analytical responsibilities of NCAB - its responsibility to assess and inform about biopiracy point to the creative work that is required to define exactly what is (and is not) 'biopiracy'. This is undertaken through the analysis of particular cases of the patents concerning uses of particular plants and animals. The universal appeal of biopiracy is negotiated through what I have termed 'biopiracy work'. If biopiracy is being constructed as well as 'dealt with' in 'biopiracy work' then, what are the conditions under which this negotiation takes place?

3.7 'Administrative Governance'

Drahos (2007:3) has examined the phenomena of developing nations patent offices and their reliance on foreign patent offices for 'technical assistance' –advice, training and resources. He notes that the offices providing these – the European Patent Office, Japanese Patent Office and the United States Patent and Trademark Office – have interpreted international agreements by forming separate administrative agendas, much of which is contrary to the political position of developing countries (Drahos, 2007:3). Such agendas have become easily incorporated into the agendas of some developing nations patent offices. As Drahos states:

> '[D]eveloping country patent offices have been integrated into a system of international patent administration in which the grant of low-quality patents by major patent offices is a daily occurrence. Developing countries for the most part have only had modest success in influencing the evolution of standards at the international level.'
>
> (2007:4)

The development of 'technocratic trust' between the three patent offices named above and their developing nation counterparts - through relationships based on an advisor-advisee approach - can influence the decision making processes of developing nation patent offices, which in turn grant patents that help to perpetuate the structure of the pharmaceutical market (Drahos, 2007:3). Examples of the ways in which the 'trilateral offices' exert influence include electronic filing, search capabilities, and crucially, harmonisation of patent practices (Drahos, 2007:6). This influence is gleaned by the trilateral offices ability to maintain the appearance of technological and organisational superiority over developing nations patent offices (Drahos, 2007:13). If the staffing and equipment provision at the single intellectual property office at INDECOPI is compared with the, '17 kilometres of shelving used to store the patent documents' (Drahos, 2007: 13) at the Hague, we can perhaps imagine the persuasiveness of this vision.

Quite apart from the international treaties which are debated and signed, a system of 'administrative governance' is emerging from patent offices, which greatly affects the implementation of patent law around the world (Drahos, 2007:8). This system is characterised by the establishment of long term relationships of technocratic trust and of resource provision, which work to integrate the practices of developing country patent examiners into one or more of the trilateral offices (Drahos, 2007:18). Notably, the volume of patent applications in trilateral patent offices has increased dramatically in recent years (Drahos, 2007:19). This has led to a situation where the patent offices prioritise concerns over, 'productive efficiency rather than patent quality' (Drahos, 2007:19).

It is the *quality* of patents which is often at stake in accusations of biopiracy, which make such drives for efficiency particularly problematic. If the basis for fighting biopiracy revolves around legal arguments that a supposed 'invention' is not new, or is ostensibly not an invention of sufficient distinction, granting patents rapidly in order to increase efficiency could easily be argued to run contrary to the interests of developing nations (Drahos, 2007:17). Hence the adoption of techniques and strategies to serve this priority is a worrying scenario for developing countries who wish to implement strong anti-biopiracy measures.

The work of developing country patent offices is funded by the generation of income through the processing of fees from largely foreign patentees rather than internal revenue sources and is also somewhat alien to other government agencies by virtue of the 'jurisprudential complexity of patent work' (Drahos, 2007:17). The culmination of these factors create an extraordinary and unique position from which patent offices can influence national policies regarding patents. To clarify:

> 'Patent offices do not behave as simple land title registries. [...] Developing country patent offices are thus unusual players in national policy networks because they are disposed to be pro-patent, are integrated into international patent policy networks from which they draw resources and serve a clientele that is predominantly foreign. From the perspective of innovation policy, patent offices as actors in policy networks are likely to close off or circumscribe policy initiatives that question the role of patents in innovation.'
> (Drahos, 2007:18)

The development of this system of 'administrative governance' is more a matter of a slow tide of influence which is often met with little or no resistance in developing countries. It is *not* the outcome of international agreements, where individual States still have discretion to implement divergent regimes which interpret international legislation in the most favourable manner (Drahos, 2007:25). The lack of resources and technical expertise which are found in developing countries may in fact lead to the favouring of paternal relations between smaller developing country offices and their larger developed nation counterparts. It is these relationships which help spread pro-patent agendas that far from serving the interests of developing nations may indeed 'predominantly benefit foreign companies' (Drahos, 2007:17).

Viewed in this context, the position of the NCAB, situated within the Peruvian Patent Office becomes intriguing. Patent offices derive revenue not from donations, but chiefly from processing fees. The vested interest of the OINT in continuing to process patent applications is obvious, and would make an anti-patent stance on biopiracy by the NCAB difficult to maintain. NCAB's ties with the Peruvian Patent Office are critical - INDECOPI logistically support the 'biopiracy work' of the NCAB, and the INDECOPI building houses the NCAB office. Conversely, the commission of the NCAB integrates its work with that of other Peruvian government agencies, NGO's, and with indigenous peoples whose interests may differ.

More notably perhaps, the role of the Office of Inventions and New Technologies, in 'biopiracy work' is precarious. Intimately involved in the administration and provision of information regarding innovation policies, as well as with patenting procedures and grants, the OINT is also responsible for the documentation of traditional knowledge and biological resources. Decisions over how to treat traditional knowledge are made by experts who also examine patent applications, in an office that receives revenue from the granting of patents and applications. Whilst the benefits of locating NRCC in the same office that must decide over the quality of patents is obvious in terms of the role that such registers of information can play in assisting examiners decisions, the benefit to traditional knowledge holders of such institutional arrangements is less clear.

The 'biopiracy work' of the OINT and NCAB is influenced by the doctrines of patent offices in more developed countries. The continuance of (neo-) colonial working relationships with the Spanish Patent Office[24] (SPO), as well as developing links with the USPTO are poignant examples of how the administration of 'biopiracy-work' in INDECOPI becomes entangled

[24] Oficina Española de Patentes y Marcas.

with the administrative agendas of developed nations' patent offices. In 2005 the NCAB worked closely with the SPO to conduct a series of patent searches using the European Patent Office databases for several Peruvian plant species including purple corn (*Zea Mays*) and coloured cotton (*Gossypium barbadense*).[25]

The results of these searches contributed significantly to the development of further 'biopiracy work' in terms of the development of searching strategies and research priorities.[26] At least one member of staff from the OINT had been on expenses paid training visits to the USPTO prior to my arrival. The coordinator of the NCAB member confirmed that they had disseminated the outcomes of their training to other staff.[27] The USPTO considerations for determining prior art were primarily used to begin an analysis to determine the state of the art of patents relating to the cases of biopiracy relating to maca .

However, despite the influence of systems of 'administrative governance' promoted by trilateral patent offices, other factors are equally integral to the daily functioning of the NCAB and the OINT. To presume that information and agendas are reproduced naively by staff in the OINT or the NCAB would be grossly unfair. To suppose this would be to deny the agency of individual staff and of the organisation as a whole to decide upon which working practices to institute or how to fight biopiracy. Internationally, in a submission to the WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) Peru states that:

[25] Given in Table One (Annexe One).
[26] (Valladolid, personal communication).
[27] (Valladolid, personal communication).

'Peru has been one of the main driving forces behind the idea of modifying and adjusting the international patent system to include requirements on disclosure of the origin and legal source of genetic resources and traditional knowledge.'

(IGC, 2007:4)

The 'biopiracy work' of INDECOPI, which reaches international audiences through WIPO and other international fora, is dynamic. In the particular local context of the INDECOPI offices, legislation is 'brought to life' in the 'friction' (Tsing, 2005) which produces particular transformations of traditional knowledge in NRCC and the context of patent searches. In INDECOPI, this shapes the context in which biopiracy is formed, and 'dealt with' as an 'engaged universal' (Tsing, 2005:8).

3.8 Engaging Biopiracy: The National Commission Against Biopiracy & 'Biopiracy Work'

'As I reach to describe global connections, my ethnography necessarily diverges from the holism of more familiar models, in which each anecdote or custom forms a scrap in a larger, unified pattern [...]Ethnographic fragments ask us to pay attention to details. The travels that inspire global connection turn out to be less controllable than those at the top imply. Making claims about scale, including globalisation, turns out to be an arena of contention.'

(Tsing, 2005:271)

Notwithstanding the kinds of 'global' - international or regional - influences described so far in this thesis, researching 'biopiracy work' in Lima meant I began chasing 'fragments'. These formed 'stories' about how biopiracy and traditional knowledge were used in the work of biopiracy in Lima. Struggling with Spanish and unfamiliar surroundings I began to translate the work of the National Commission Against Biopiracy and its relationship with the Office of Inventions and New Technologies into terms I could understand. I began by trying to understand how decisions were made over whether traditional knowledge was classed as 'Confidential' or 'Public'.

Article 13 of Law 27811 defines Collective Knowledge in the public domain thus:

> '[C]ollective knowledge is in the public domain when it has been made accessible to persons other than the indigenous peoples by mass communication media such as publication or, when the properties, uses or characteristics of a biological resource are concerned, where it has become extensively known outside the confines of the indigenous peoples and communities.'

'Protection' of TK under the Biopiracy Law can mean at least two different things. Protection against the, 'disclosure, acquisition, or use' only applies to TK that is *not* in the public domain (Law 27811, Article 42). Hence, indigenous people can not necessarily expect to be consulted over the use of TK in the public domain, nor hope to prevent the issuing of patents regarding the use of it (Law 27811, 2nd Complementary provision). The only other form of 'protection', is that compensation can be demanded, for the use of TK that has passed into the public domain in the last 20 years (Law 27811, Article 13). The Confidential National Register of Collective Knowledge protects TK that is not in the public domain and consequently the register is not accessible to third parties. Conversely the Public National Register of Collective Knowledge collates TK already in the public domain and is sent to patent offices worldwide (Law 27811, Article 18). Access to the use of either TK may be (and must be in the case of 'Confidential Knowledge' subject to the issuing of licence contracts, which which require the prior informed consent of the indigenous peoples concerned (Law 27811, Article 6).

As such the Biopiracy Law incorporates both defensive and positive protections for 'traditional knowledge' associated with biological resources. The Biopiracy Law introduces a declaratory regime for the protection of TK by recognising that rights over TK result from the cultural patrimony of indigenous peoples (UNU IAS, 2003:7). Conversely, the regime seeks to provide defensive protection for TK through the compilation of NRCC and from patent searches and resulting activities which strive to defend TK holders from patents and other unauthorised uses of traditional knowledge. Despite nods towards the creation of local registers, the NRCC remain the focus of 'biopiracy work' by the OINT. In July 2009, the OINT had assisted with only one local registering project with an Andean Peoples' organisation.[28] This underutilisation of local registers is lamentable, given the potential role of local registers outlined in Law 27811, and considering the impressive record local registers have for preserving traditional knowledge (Tobin & Taylor, 2009:48).

Given the role that NRCC play in the preservation of TK, I was keen to get as close to these registers and the people who worked with them as possible - bearing in mind the limitations on access stipulated. I had even envisaged, as part of the agreed-via-email collaboration to use these registers as the basis for a quantitative study of biopiracy in the patent system that I present in Chapter Four. I was disappointed then, to spend most of three months trying to find the 'location' of the registers in the work I saw going on and came to participate in at INDECOPI.

The location of the registers eluded me in physical terms – I never saw or touched them - although the stories I heard about them led me to believe that they were actually in the building somewhere. But more disappointing and downright disorientating from an ethnographic point of view, was the apparent lack of connection between the registers and

[28] (Ortega, 2009).

patent searches, which are an important element of 'biopiracy work' of the NCAB. I did not witness the direct use of the NRCC by NCAB at all.

The NCAB *was* very active in 'chasing' patents involving species originating in Peru and in contesting these patents through legal or other means. However, I imagined that there was a close operational connection between the knowledge in the registers and the work to address biopiracy in patent searches. I had imagined, for example, that a list of known uses of particular plants and animals (arising from NRCC) might be consulted with when patents mentioning those organisms were encountered, or that such a list might be the prime basis for the prioritisation of certain plant and animal names in patent searches. The initial results of my own searches of patent activity were quickly dismissed by NCAB staff, owing to the fact they did not correspond to biopiracy in terms of narrow legal definitions of what was and was not considered 'interesting'. Without the legal expertise necessary to elucidate the 'rules' upon which these decisions were made, an understanding of which patents were 'interesting' and which were not was deeply confusing. I elaborate this confusion in section four of this chapter.

As will become clear, the close relationship between the creation and use of traditional knowledge in NRCC and the searches of the patent system conducted - the relationship I had inferred from the Biopiracy Law and 28216 -did not exist in the 'messy actualities' (Larner, 2000:14) of work in INDECOPI. Importantly, the names of species contained in registers were only one type of list that came to form the list of species from which searches of patent activity were carried out. I had assumed that TK - in the codified form of names of plants and animals - would connect both activities in a way which reflected the priorities of indigenous communities. The ways in which patent searches and NRCC are actually connected brings to light the 'convergences' and 'gaps' (Tsing, 2005: 89, 175) produced by the engagement of biopiracy and its relationship to traditional knowledge in Peru. To assist the later discussion of the 'biopiracy work' of the NCAB, I will briefly consider patents as objects and how they relate to biopiracy in Box Four. In Box Five I present an overview of important 'successes' of 'biopiracy work' in Peru, before examining one of these stories in detail.

3.9 Patents in Context

Box Four: Patents

What is a Patent?

'A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem' (WIPO, n.d). The right is expressed in a legal document or certificate and generally lasts for 20 years. A patented invention must be:
a) of practical use,
b) be new or novel (not be found in searches for 'prior art')and,
c) involve an inventive step (be non-obvious).
Patent-protected inventions cannot be commercially made, used, distributed or sold without the patent owner's consent. These patent rights are usually enforced in most legal systems, to stop patent infringement. A court can also declare a patent invalid upon a successful challenge by a third party (WIPO, n.d). These rights are transferable by licence agreement and can be sold. After the protection period, inventions are classed as in the public domain – i.e. available for commercial exploitation. Though the definition of prior art is complicated, (not least because of variations in national standards), it generally means the documentation, or publication of information regarding the previous use of a particular invention, which has subsequently been claimed as novel in a patent application.

Why have Patents?

Moral, economic, labour-led and innovation-led arguments have been provided as the justification for patent protections (Hettinger, 1989; Vaver, 1990). Most commonly, it is assumed that by granting monopoly rights the triple boon of compensating the creative endeavours of inventors, providing incentives for the development of innovations, and encouraging the dissemination of technologies into the public domain after rights expire is ensured. The rhetoric is, 'presented in terms of a "bargain" between society and inventors in which society agrees to accept the burden of a limited period of monopoly in return for useful inventions becoming widely available to the public once the period of protection ends' (Oldham, 2006:3). This rhetoric is highly questionable, not least as most 'inventors' do not own the rights to their inventions (Hettinger, 1989:50). Indeed, the granting of patents may actually *discourage* innovation (Vaver, 1990:491).

Biodiversity & Patents - TRIPS

Article 27 states all inventions can be patented, with limited exceptions.

The main exclusions from patentability are as follows:

2. Members may exclude to, 'protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment',
3(a) 'diagnostic, therapeutic and surgical methods for the treatment of humans or animals' and,
3(b) 'plants and animals other than microorganisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes'.

The provisions of the TRIPS Agreement have been strengthened by supplementary provisions for intellectual property protection relating to biological and genetic material within regional or bi-lateral trade agreements (Grain, 2004). The Peru-US Free Trade Agreement is a particularly relevant example (Law 29316).

As Box Four elucidates, in the context of the 'biopiracy work' of the NCAB the task of establishing the existence of a 'biopiracy patent' centres around the patenting requirements of *novelty* and *inventive step*. This is done via the establishment of 'prior art' - by arguing that the use of a particular plant or animal was known about previously (that it was traditionally used in a specific way). It is the ability to challenge patents upon such grounds which gives so much international importance to the searches of the patent system which are undertaken by the NCAB. The NCAB, in identifying patents which contain claims about the use of specific plants and animals can compare this use to the information they compile about the 'traditional' uses of such plants and animals in Peru. If the claim made in the patent document corresponds with information recorded in the NRCC but this is not adequately reflected in the patent claim itself, the patent may be considered an example of biopiracy.

This is also the strongest point of connection between the work of the NCAB and the National Registers of Collective Knowledge maintained by OINT. It is the potential for information contained within NRCC to be used to provide evidence of 'prior art' or sometimes of lack of 'inventive step' which renders them most useful to the repudiation of 'biopiracy patents'. Or, put more simply, if it can be *demonstrated* that traditional knowledge exists which undermines the claims made in a patent document, and this knowledge has not been recognised (and if the prior informed consent of the communities to use this knowledge was not sought) then the patent can be challenged on the grounds that it has failed to do this.

Prevention, as the saying goes, is better than cure. Unfortunately, preventing the granting of patents which make use of traditional knowledge in some way, but which do not acknowledge (much less compensate) the traditional knowledge holders, is even more difficult to achieve than is the post-hoc identification of 'biopiracy patents'.[29] Significant work has been undertaken towards the implementation of standards which require the disclosure of origin of genetic materials which offers hope in this direction (UNCTAD, 2006). However, Dutfield (2005:2) notes that the term, 'disclosure of origin' is itself a bundle of differing legal calls to address the issue of acknowledging the source of genetic and biological materials. These range from voluntary or mandatory measures to more robust calls for, 'proof of legal acquisition' which would make patent applications more complicit with the ABS requirements of the CBD (Dutfield 2005:2).

Contesting pharmaceutical patents - even on non-traditional knowledge based grounds - is costly, slow and incredibly complex. A case in point is the example of an challenge by the Thai government to the validity of a didanosine (ddl) patent owned by Bristol Myer Squibb: it took the intervention of various civil society groups, and over 6 years of expensive legal wrangling, to effect even the withdrawal of this patent (Drahos, 2007:23). In Peru, the ongoing nature of struggles against the patenting of maca, camu camu and sacha inchi echo this experience (see Box Five). Despite the important successes detailed in Box Five and in Table Two (Annexe Two) the proliferation of patenting on these plants and their active ingredients continues to date. Box Five below gives details of the recent 'successes' of 'biopiracy-work' in Peru and the wider context of these in terms of the work of the NCAB and OINT.

[29] See Chapter Four.

3.10 Biopiracy Cases

Box Five: Cases of Biopiracy

- In 2009, Peru successfully contested the granting of several patents concerning three plants and their derivatives – in Japan, the US and in France (Portillo, 2009).

1. *Maca* [*Lepidium meyenii*] – an Andean plant which is widely used amongst Andean peoples as a metabolism and libidinal stimulant.
2. *Camu camu* [*Myrciaria dubia*] - valued as a preserve and a juice for its antioxidant and vitamin C content.
3. *Sacha inchi [Plukenetia volubilis*] - 'Incan peanut', a seed that is high in omega oils, is valued for its superb nutritional qualities, and as a cosmetic (See Box Six).

- The 2009 successes were the outcome of investigations which began in 2002, and were published in 2005 in, 'Analysis of Potential Cases of biopiracy in Peru'. In this document the NCAB set out the activities of the first stage of the processes undertaken by them in investigating biopiracy (NCAB, 2005:3).

The document lists 33 plant species and 2 animal species that form the initial list of names used to investigate the use of collective knowledge or biological resources in patent documents. A presentation given by an INDECOPI staff member in 2006 lists 18 of these species as priorities, from which a further 6 are investigated (Leigh, 2006). The results are given for 6 plant species, including maca, camu camu and sacha inchi. In the document, the three stages of research to find biopiracy are given as:

i) Identifying mention of the names of plants in patent documents,
ii) Identifying the presence or absence of recognition of the origin of the resources,
iii) Technical evaluation of judicial and administrative actions undertaken (listed on patent documents).
(NCAB, 2005:4)

a. 17 plant and animal species of the 33 listed also appear in the Natural Heritage Law.
b. The document makes no mention of how or if NRCC provided the species names for searches.
c. The NCAB in 2009 states it is 'monitoring' 69 species (Portillo, 2009).
d. An internet search of the Public National Register reveals 70+ plants registered under the letter 'A' alone (INDECOPI, n.d[a]).
e. In 2009, the OINT had only conceded 36 requests for inclusion in both NRCC from indigenous peoples (INDECOPI, unpublished).
f. In 2009, no license contracts or payments to indigenous peoples' organisations had been administered.

Box Five gives six bullet points (a to f) which reveal insights into the ways in which traditional knowledge and biopiracy are connected in the 'biopiracy work' of INDECOPI. The cases of maca, and camu camu do not demonstrate evidence of the connection of what comes to stand for 'Collective Knowledge' with *specific* indigenous communities. The 2005 searches utilise more species than the OINT had registered in NRCC in that year, demonstrating that traditional knowledge had been sourced from information considered in the 'public domain'. Four years later in 2009, only 36 species had been added added to NRCC at the direct behest of indigenous communities (point e). The successes the NCAB celebrates chiefly concern information that was deemed to be in the public domain, and concern products which were previously commercialised in Peru.

The 2005 searches make no mention of the specific use of NRCC in determining 'priority species' (point b). Hence, if traditional knowledge was used to either foment searches, or to defend against problematic patents that were the result of such searches, it was not as a result the traditional knowledge offered for registration by indigenous communities themselves. Although consultations with indigenous peoples were undertaken in the 6 years prior to the adoption of the Biopiracy Law, these attempts have not been without criticism (United Nations University, 2003:24). Tobin & Swiderska (2006) have noted serious difficulties in consultations between the Peruvian State and indigenous peoples. The outcome of this is that the question of who exactly sets the agenda for which species to prioritise and how is not easily resolved.

Point 'a' shows the cross-correlation of species names used in the search described in Box One with the list of species annexed to the Natural Heritage Law. As demonstrated in Table One (Annexe One), 17 of the 33 plant and animal species originally prioritised by NCAB, are also present in the Annexe of the Natural Heritage Law (and of those, 11 of the 18 further prioritised also feature in this list). All the 'successes' of 'biopiracy work' to date (see Annexe Two) concern species that have been consistently prioritised by the NCAB, and are species listed in the Natural Heritage Law - maca, sacha inchi and camu camu. This being the case, allegations of biopiracy would not necessarily need to involve an identifiable indigenous 'community' at all. When reference to specific TK as prior art is made (and as Table Two shows, it was not in the maca or camu camu cases) then vague references to large groups of historic and present day peoples (such as in the case outlined in Box Six) can suffice. The outcome is that TK is reified in the fight against biopiracy, allowing allegations to be made on the basis of being cases of biopiracy on a generalisable 'national' level. This has important ramifications in terms of the way indigenous peoples' interests come to be represented.

In the definition of biopiracy in Chapter One, 'biopiracy' is characterised as the 'appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions' (ETC Group, n.d.). The Cassell Concise Dictionary defines 'appropriation' as, 'to take as one's own, to take possession of; to devote or set apart for a special purpose or use.' (1997:58). Clearly the patenting of traditional knowledge can be seen as appropriation. But the reification of traditional knowledge without attributing it to specific communities, or deriving it from the testimony of people in those communities, is also a kind of appropriation. The definition of 'biopiracy' offered at the beginning of this chapter invokes concordant themes, of the 'unauthorised' or 'uncompensated' use of TK.

The TK used in 'biopiracy work', if it is reified without extensive consultation with communities themselves; and when the interests of indigenous communities are assumed rather than arrived at through consultation, is itself somewhat 'unauthorised' - from the point of view of indigenous communities. If the results of the 'successes' of 'biopiracy work' do not generate benefits for indigenous communities, then such uses are also uncompensated. The cases of maca, camu camu and sacha inchi, bring to light the formulation of traditional knowledge in particular ways which speak for, rather than respond to the interests of indigenous peoples. Biopiracy work erases the problems and obstacles inherent in claiming to represent indigenous communities, without consulting them.

In 2003, a submission to the Intergovernmental Committee was amongst the first outcomes of the establishment of the working group on biopiracy and maca which preceded the NCAB, gives three distinct concerns which led to the formation of the group. They are: Peru's rights as a country of origin, the rights of indigenous peoples in their ancestral knowledge over uses of maca, and, 'the possible commercial effects which these patents might have on Peruvian producers and exporters of maca' (IGC, 2003:2). In this way the interests of the state, commercial traders and indigenous people are seemingly aligned against biopiracy patents. In the meetings preceding this report, both scientists and exporters were invited to participate (and did) but no invitation was sent to indigenous peoples themselves (IGC, 2003:11). Such assumed alliances are especially a cause for concern given the opinion of the NCAB that, 'biopiracy should be understood as a political rather than a legal concept' (IGC, 2003:4).

The role of INDECOPI in protecting traditional knowledge which is traceable to *particular* indigenous communities is unclear. It is clear from a visit to Cusco that maca is indeed widely used and sold, and likewise a visit to the Amazon region will offer up the easy purchase of camu camu sweets and juices, just as sacha inchi oil and nuts are available in retail outlets across Peru. The indigenous people who might be considered the 'holders' of traditional knowledge concerning these three plants are many and diffuse. However, to acknowledge this is not the same as to assume that such resources are nationally-owned, or that the interests of different indigenous peoples in the use of their traditional knowledge are united, much less that these interests are shared with the state, or with commercial producers and traders. The coterminous status of maca, sacha inchi and camu camu as both the traditional knowledge of indigenous peoples, and national heritage of Peru goes further to deepen the ambiguous status of traditional knowledge in the public domain. The danger of TK becoming consigned to the public domain through the creation of NRCC was a prime concern for indigenous communities themselves from the beginning of the negotiations that led to the implementation of the Biopiracy Law (Tobin & Taylor, 2009:30).

Point 'd' shows that more than seventy names of plants or animals are listed as part of the existing Public National Register of Collective (traditional) Knowledge beginning with the letter 'A' alone, and yet point 'c' shows that INDECOPI are monitoring developments in the patent system (and possibly elsewhere) for just sixty-nine species. Point 'e' shows that only 36 entries into NRCC have been registered by INDECOPI at the behest of indigenous communities. Without proper access to the NRCC, it is only possible to speculate that those 69 species represent the sum of the thirty-three priority species plus the 36 species registered in NRCC, but the coincidence seems to offer this probability. Reports suggest that Peru is simply concentrating on three species - those mentioned above in the fight against biopiracy (ICTSD, 2009:3). During my time with the commission, maca, camu camu and sacha inchi were the only species with which 'biopiracy patents' were discussed. The juxtaposition of these figures throws light on large holes in the 'protection' regime of the Biopiracy Law.

The difficulties of access to resources, and the considerable number of work hours needed to monitor sixty-nine species in-depth, as well as the chronically long duration of time needed to contest even a single patent mean that attention is prioritised on patents which may offer the best chances of 'success' (whose claims are refutable), rather than those which may most concern indigenous peoples themselves. A notable example is the omission of ayahuasca from the priority species chosen by INDECOPI, despite the renowned importance of this vine to numerous South American peoples.[30]

The concentration of 'biopiracy work' is a constant juggling of resources and priorities according to ongoing developments in the patent system. Having identified, and analysed, scores of patents relating to a particular use of a single species on a given date, henceforth the work of challenging patents continues with each new document or claim lodged. This demands the coordination of scientific experts in biological resources, legal experts and the compilation of various legal documents, as well as the review of hundreds of instances of scientific and other literature, and is resource intensive work (requiring a considerable length of time to complete).

During the execution of this type of 'biopiracy work', the applications for and grants of both new and existing uses of the same species continue, so that there is a continuous need for monitoring the patent system and evaluating the claims made in patent documents. This is one reason why the 'successes' of 'biopiracy work' in Peru do not represent either a reversal of the commercialisation of maca, camu camu, or sacha inchi, or indeed a reversal of the commodification of traditional knowledge concerning them, and neither do they facilitate the generation of revenues for indigenous communities. Claims can be re-written, so that they no longer fall foul of (narrow definitions of) prior art, or patents can be scrapped while sales continue - so that no benefits are generated. Success has been limited in terms of the practical outcomes of 'biopiracy work' to date.

'Success' in relation to certain patents on maca, for example, is also partial. It represents the refusal of two European patents, and on the issuing of the patent in Australia, and the

[30] See Chapter One.

requirement to reissue applications on, 'compositions and methods for their preparation from Lepidium' (see Annexe Two). After almost ten years of work, there still has been no renunciation of **all** patents concerning the plant, nor the negotiation of license contracts or 'benefit-sharing' for indigenous communities from the use of the plants. The 'successes' shown in Annexe Two highlight important 'gaps' (Tsing, 2005:175) in the effectiveness of 'biopiracy work' even as they show the effectiveness of it for Peru. I now examine one case in more detail.

3.11 Sacha Inchi

In 2005 sacha inchi appears both in the Annexe of the Natural Heritage Law and in the results of a search of 6 species undertaken by the NCAB (IGC, 2005). The results of initial searches of the patent system highlighted the existence of several patents which mention the use of the genus *Plukenetia*, without mentioning the species. These patents were not considered cases of biopiracy as the scientific name of the species could not be identified (IGC, 2005:21).

In 2006, a Peruvian businesswoman attended a trade exhibition for the cosmetics industry in France. Upon examining the label of one moisturiser, she was alarmed to see that a patent had been granted over *sacha inchi,* the main ingredient of the cream. She noted the details of the organisation, Greentech S.A., and then contacted the NCAB. The NCAB investigated the patent and decided that it and another patent also from a French corporation (Cognis S.A.) were potential examples of biopiracy. Evidence was gathered of 'prior art', documenting the use of sacha inchi as a cosmetic by a number of indigenous peoples in Peru for many years. The sole evidence came from, 'A publication in which it is stated that "the old Mayoruna, Chayuhuita, Campa, Huitoto, Shipibo, Yagua and Bora [indigenous peoples of the Peruvian Amazon] mix the oil of Plukenetia volubilis with flour from this same kernel and prepare a special cream to revitalize and rejuvenate the skin"(Correa *et al,* 1992).

This evidence was gathered from the Public National Register of Collective Knowledge, and from an extensive study of other information in the public domain. When the evidence was collated, it was decided that the patents were claiming uses of the plant that were part of the Collective Knowledge of indigenous peoples. Legal correspondence was entered into between the NCAB and the two corporations. Cognis then offered to transfer its patent to the NCAB but this was refused on the grounds that it is the patent itself that was wrongly granted.[31] The Cognis patent is still existent, but the company have chosen to abandon it.

As a result of prior negations in 2008 and 2009, Andres Valladolid, the Coordinator of the NCAB, travelled to France and met Danielle Mitterrand, President of France Libertés. The event he attended was organised by the *'Le Collectif Biopiraterie'* [The Biopiracy Collective], which is composed of independent experts from France Libertés, *Commission Internationale pour les Droits des Peuples Autochtones*[32], *Paroles de Nature*, and Sherpa. These are influential French non-governmental organisations who had organised the event to address the issue of biopiracy.[33] As a result of the public relations storm surrounding this conference, Greentech S. A. renounces the patent on the 18th September 2009. The move is reported in a press communiqué bearing the logos of the Le Collectif Biopiraterie and the NCAB and heralded as a victory (Collectif Biopiraterie, 2009).

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[31] (Valladolid, 2009).
[32] International Commission for the Rights of Indigenous Peoples.
[33] (Valladolid, 2009).

3.12 Species Lists

For the NCAB, the importance of particular species changes in relation to its relative importance for third parties. In an edition of Herbalgram magazine Brinckmann (2007:44) lists over 30 species that INDECOPI had declared interest in monitoring and protecting. The article goes on to state that the INDECOPI had explained their interest in these species by ranking them in order to the number of relevant patents that had been issued concerning the 'resource' (Brinckmann, 2007:45). The extent of existing commodification of TK, in terms of patents appertaining to the use of particular plants and animals, was a leading factor in the prioritisation of certain species over others.[34]

However, resources like maca and sacha inchi are in no imminent danger of being 'lost' to humanity, nor lost to the people whose knowledge has converted it into a 'useful resource' (whether we consider these scientists or local communities). Indeed, the attention paid to these plants as a result of biopiracy allegations intensified their commercial use and value. The close association of TK with biodiversity, which in part prompted the increase in international attention to biopiracy in international fora such as the CBD is brought into question when plants and animals are prioritised on the basis of their commercial value, rather than on their value for indigenous peoples livelihoods. Why should it make sense that resources like these receive the administrative and technical attentions of INDECOPI staff? And why should non-equitable commercial relationships, pursued through intellectual property claims (and not in regular trade), be the chief concern of the indigenous communities whose knowledge in these resources are 'stolen'?

[34] (Valladolid, 2008).

There are important factors which complicate and obfuscate answering these questions. The difficulties of ascertaining this information in such an ethnically and biologically diverse region as Peru are immense. Peru is also estimated to be home to over 4,000 medicinal plants and 130 native crop species (Ruiz *et al*, 2004:770). Peru is also home to many different ethnic groups. Hence diverse groups of animals, plants, and peoples complicate attempts to unite (Peruvian) indigenous peoples' interests in the use of their knowledges. The organisms over which TK may relate are the subject of complex inter and intra-national claims to patrimony. The issue of which plants and animals to monitor and why is no simple matter when the plethora of peoples, life-forms and perspectives, and interests which commercial uses of indigenous knowledge throw together in 'biopiracy work' are reconciled.

The question of *why* certain species are prioritised over others cannot be explained merely by reference to temporal and financial constraints of undertaking resource-intensive 'biopiracy work'. The need for 'prioritisation' of national resources underpins the development of 'more or less' consistent lists of species. The selection of certain plants and animals that appear on these species lists can also be viewed in the light of other pertinent legal developments, themselves examples of the influence of 'global forces' (Tsing, 2005:58). The Natural Heritage Law formalises the proprietary relationship of the state with some of its most economically valuable resources, not in terms of the granting of exclusive property rights, but in terms of declaring these species (some of whom are protected under the International Treaty on Plant Genetic Resources for Food and Agriculture) the, 'national heritage of Peru'. It is not clear how the legal status of these plants and animals may be at odds with the potential protections offered by intellectual property rights-protections such as those applicable plant varieties (Ruiz, 2006:23). As Ruiz makes clear however, legislation like Law 28477 is likely to benefit *campesino,* or smaller scale farmers much less than it might benefit costal farmers involved in larger scale agroproduction (2006:24).

I argue that the lists of prioritised plants and animals (species lists) offer an example of the interplay of global concepts and local - NCAB - concerns in the protection of TK. The names of plants and animals in the lists must reflect myriad concerns over the use of TK *and* biological resources. For instance, the interests of agroproducers, in monitoring the use of economically valuable crop varieties such as maize, are not necessarily aligned with the interests of smaller scale farmers who may find protection of crop varieties as 'Collective Knowledge' more advantageous. Neither are the interests of either group necessarily aligned with those of indigenous peoples who may for example wish to monitor the use of sacred resources or knowledge (as indicated by a controversial patent over ayahuasca).[35] The NCAB, by constructing species lists (determining which plants and animals are looked for in the patent system) appears to reconcile the (potentially conflicting) 'interests' of these and other groups in the fight against biopiracy.

The interests of agroproducers in Peru, are not necessarily concerned with the use of traditional knowledge but with the control of biological resources. The ABS agenda becomes submerged with the concern of exporters and producers who wish to ensure that foreign patents do not compromise their interests in commodifying Peruvian biodiversity. The example of sacha inchi shows an example of how the trajectory of biopiracy involved multiple actors and travel across continents, but delivered no financial benefit for local communities, who were not consulted in the decisive stages of 'biopiracy work'. Ensuring that the 'rights' of indigenous peoples are asserted, and that 'source communities' receive benefits is not parallel to ensuring that Peruvian companies can effectively commercialise 'Peruvian' TK or 'Peruvian' resources. When the hunt for patents is determined *without* specific mention of the use of traditional knowledge linking the species that appear on these

[35] See Chapter One.

lists to particular local communities, the outcome of such 'biopiracy work' does not easily forward an ABS agenda.

What it does do is address issues about the inequalities of international trade relations between developing and developed nations. The presence of over half of the 33 species originally prioritised by NCAB in the Annexe of the Natural Heritage Law supports this view as does the observation that the three plants over which 'successes' are celebrated are also national 'natural heritage'. Indigenous communities themselves have not had significant influence in setting (through the determination of priority species) or informing (through 'prior art' considerations) the trajectories of patent-related biopiracy work to date.

It is important to state that I do not argue that the species mentioned in The Natural Heritage Law, or those prioritised by the NCAB are *unimportant* to local communities in Peru. The cultivation and harvest of such plants *in situ* is indeed dependent on traditional knowledge, which is a vital factor in the continued development of the diversity and variety of such cultivars. However it is not evident that the plants and animals which are most significant to indigenous communities themselves are those that form the priority species of the NCAB, or that the uses which are vaguely attributed to indigenous peoples in publications represent the extent of traditional knowledge held regarding these plants and animals.

To this end, it is indeed significant that the majority of plants and animals which form the basis of species lists are also annexed to the Natural Heritage Law, which does not expressly relate to traditional knowledge, only to biological resources. Focusing biopiracy in this way, the economic opportunities presented by the commodification of (reified) traditional knowledge are addressed in 'biopiracy work', whilst the 'protection' of TK as a moral aim is mobilised in order to provide charisma and validity to the work of the NCAB.

There are pragmatic reasons which facilitate the ease at which local communities become erased from the agenda too. In both committee meetings I attended in January and February 2008, there were no indigenous representatives present (from INDEPA)[36] and representatives from INDEPA attend meetings of the NCAB infrequently.[37] The reasons behind this lack of attendance are not clear. However, the limited attendance of indigenous peoples' representatives in committee meetings which review the agenda for researching biopiracy undoubtedly does little to advance the priorities of local communities. This lack of engagement does not mean that traditional knowledge slips off the agenda however.

In the search for biopiracy, traditional knowledge remains the ostensible object of protective activities. Cases of biopiracy are identified and assessed via use of species lists by generalising traditional knowledge to knowledge extracted from the 'public domain' - knowledge which works to erase the need for actual encounters with indigenous peoples in setting the agenda over which species are monitored. The sacha inchi case became justified by an examination of the patent claims, and counter claims about the existence of 'prior art' in the field of the invention were identified by recourse to a published claim about the traditional knowledge of (various) indigenous peoples. By collating the information about uses contained in second-hand accounts of the traditional knowledge of local communities in Peru, the existence of traditional knowledge over the use of sacha inchi was established, but at no stage was the *direct participation* of indigenous peoples necessary. This lack of engagement is, of course, subject to change. If INDEPA actively participated to set different agendas, or if there were flourishes in media activity regarding another species that do not

[36] The National Institute for the Development of Andean, Amazonian, and Afroperuvian Peoples.
[37] (Valladolid, 2008).

appear on species lists, the content of the list, and thus the biopiracy it produces could change.

Lastly, the work of traditional knowledge in patent searches does not end when a patent - a potential case of biopiracy - is identified. In the coming chapter, I will show that the mention of a plant or animal species, even in the claims section of the patent, is not sufficient for it to be considered a case of biopiracy. If a 'case' is to be 'put forward', then conflicting intellectual property rights (like those set out in TRIPS legislation) must be negotiated with. The plant or animal must be used in particular ways : as an identifiable species, without mention of the origin of the species, as a single ingredient, or part of a simple compound for example. The ways in which traditional knowledge whatever its source, can be utilised as 'prior art' are thus extremely limited. The results that these searches generate go on to inform notions of what 'biopiracy' is. Biopiracy becomes a handful of patent cases rather than a wide-reaching protest over social and colonial inequalities.

The example of sacha inchi shows traditional knowledge was used to mobilise the actors involved, and was instrumental in creating both bad publicity for the corporations involved and good publicity for the NCAB. However, the result was not that such traditional knowledge ceased to be commercialised, or that the companies involved contributed to the 'Fund for the Development of Indigenous Peoples'. The coordinator of the commission himself recognises the value of public relations in the fight against biopiracy, stating that the power of the NCAB lies not so much in the re-examination of patents, but by creating bad publicity for corporations that carry out biopiracy'[38]. The reification of traditional knowledge that belongs to present day indigenous communities is a vital element in the creation of

[38] (Valladolid, 2009).

such bad PR. Indigenous communities, in this way are effective in 'mobilising adherents' (Tsing, 2005:8).

The production of biopiracy in the work of INDECOPI takes place at the level of deciding *where* (in the patent system, and in relation to what plants and animals) it is to be identified (with species lists). Secondly traditional knowledge is negotiated in the technical identification of selected patent documents by reference to published sources. Lastly, biopiracy is established by convincing other agencies of the existence of a 'case' (patent offices, and in the case of sacha inchi, NGO's). Reifying both the traditional knowledge of indigenous peoples and the interests of indigenous communities concerning the use of traditional knowledge (as that which forms the Public National Register of Collective Knowledge) are vital to the trajectory of biopiracy as it is engaged in 'biopiracy work'.

3.13 National Registers of Collective Knowledge

Compilation of the traditional knowledge of Peruvian indigenous peoples in NRCC began following the adoption of the Biopiracy Law. As the maca case shows however, the compilation of selected traditional knowledge in the 'public domain' - and/or compiled from published sources predates NRCC. The first NRCC entries arising from the participation of indigenous communities in projects to register their knowledges were conceded in 2005. In 2009, a total of 36 separate entries had been recorded from over 140 examples of traditional knowledge presented by specific local communities for inclusion in NRCC. A cursory glance at the dates of the three pieces of legislation to which I refer in this chapter will show that both the Biopiracy Law, the Access to Biodiversity Law and the Natural

Heritage Law were underway before (or as) the registration of TK provided by local communities began.

The pace at which the documentation of TK from local communities developed, was considerably slower than the pace at which research in the patent system and the creation of the Natural Heritage Law proceeded. In part, this can be understood by examining the difficulties inherent in the task of standardising the intellectual outputs of the multifarious cultures and languages of the indigenous peoples of Peru. It is also probable that the already considerable and unique challenges faced by Peru in its implementation of a completely new *sui generis* regime were particularly significant considering the scant resources available to the NCAB.

In order for TK to be added to the NRCC, there are changes it must undergo, or ways it must be categorised. INDECOPI (n.d.) has published guidelines on how communities or representative organisations can 'prepare' knowledge in order that it can be accepted into NRCC. It is notable that OINT deal only with representative organisations, not with communities directly. NRCC transform the knowledge of local communities in extensive ways by requiring traditional knowledge to be submitted via bureaucratic application forms. These demand the supply of certain information – for example, the nutritional and medicinal utility of the plant, and its description (INDECOPI, n.d). At the same time such forms disavow other information such as the scarcity of the plant for example.

For example, 'a clear and full description' of the TK to be registered must contain biological samples, or at least photographic evidence, and a scientific name for the resource must be arrived at (i.e. acknowledged by professionals) (Law 27811, Article 20). As discussed in Chapter Two, Agrawal (2002:290-291) has argued that TK which has been transformed through 'scientisation', is not afterwards the same entity as the TK that local communities themselves might express. I do not intend to reify traditional knowledge as some kind of contextually or epistemologically distinct form of knowledge *per se* (Agrawal, 1995:3). However, important changes occur when the knowledges offered up by local communities become transformed by scientific naming practices and categorisation.

Through such processes, the TK in National Registers of Collective Knowledge performs the function of making local (traditional) knowledge appear compatible with scientific knowledge. This also means that TK to a large extent can be compared with instances of the mention of specific species names in patent documents - an obvious advantage for patent examiners and the NCAB. Transforming the TK offered by local communities into the registered TK that comes to stand in for traditional knowledge in NRCC makes TK appear to share 'fixed' characteristics - such as scientific nomenclature - which means it is useable outside of the NRCC themselves. The utility of such registers for indigenous communities themselves - as a means to preserve knowledge- is much less obvious because of the knowledge that is *excluded*.

The registration of TK creates 'gaps' - unreadable or uninteresting areas (Tsing, 2005: 175). Traditional knowledge must ultimately be assigned a recognised species denomination if it is to form part of NRCC. The difficulties in providing a species name at least partly account for the considerable difference in the number of species registered by OINT (thirty-six), and the number of plants and animals officially presented for inclusion by indigenous communities (one hundred and forty). This highlights the importance of the relations and connections that the NCAB has with the other organisations and individuals, that make up networks of human and non-human actors who define 'traditional knowledge' and biopiracy in Peru - the existence of 'significant elsewheres' (Massey, 1994).

The concept of a significant elsewhere is also used by Lowe (2004:492). She uses the term to describe the ways in which biologists from the Togean Islands used species identification as a key constituent of their claims to scientific knowledge production: to what she calls, 'nature-making', and the links which this identification required between other (developed nation) research organisations (Lowe, 2004:492). Such links are vital in establishing the credibility of 'discoveries' (of new species) of Third World scientists (Lowe, 2004). The collaboration of OINT with 'biological experts' is indicative of the existence of other significant institutions, as well the existence of practices within taxonomy or microbiology, that themselves influence the kind of traditional knowledge that becomes included in NRCC. An analysis of the precise role in which these other organisations play in the transformation of TK into knowledge in NRCC is beyond the scope of this thesis, but would be extremely interesting to undertake.

The role of NRCC in 'biopiracy work' effectively removes the ambiguity of TK that is used outside indigenous communities, by categorizing it as relating to uses of particular species (and not unspecified others) as well as either *'public'* **or** *confidential.*. As we have seen in Chapter One, this kind of distinction is integral to the charisma of classification systems (Bowker & Star, 2004:1). In the context of the work of INDECOPI, standards are enforced by international, or regional legislation, (such as TRIPS and Andean Community Decisions). These pieces of legislation enforce standards about the treatment of knowledge and artefacts - of traditional knowledge, and biological resources. To a lesser extent, standards are also produced by INDECOPI itself, in conjunction with national legislation. This is evident in the distinctions it makes between classes of traditional knowledge that are, or are not, to be included in NRCC, and over which of the two NRCC traditional knowledge will be placed in, as well as over which species will appear on species lists, or which patents will be classed as cases of biopiracy. These standards go on to limit the ways in which traditional knowledge can be used in the fight against biopiracy, and the ways in which indigenous communities interests can be defended and protected.

The different trajectory taken by work undertaken specifically to control the use of TK (NRCC), to that of work primarily concerning the control the use of biological resources (species lists), makes the slower development of NRCC interesting in another important way. What comes to stand for TK in Public National Registers of Collective Knowledge does not come *directly* from local communities. This decision was no doubt pragmatic - given the difficult task of cataloguing TK. It is ostensibly an appropriate decision to make over a register which deals with information in the 'public domain'. However, indigenous peoples have little control over what comes to stand for TK as it appears in the public domain. This This is worrying as much of the traditional knowledge in the public domain could be considered to be the result of historic appropriation of TK.

Allowing documentation of the significance and uses of plants and animals and their names, to stand for traditional knowledge means that the TK in Public National Registers of Collective Knowledge is necessarily hybrid, even before its categorisation in NRCC. Reference to the uses of plants and animals in academic literature often takes place without the knowledge of local communities, and it is often presented in forms (in different languages, or in scientific nomenclature, or jargon) that local communities may not even be able to access. Many published sources also neglect to mention the proper names of the peoples who generate this knowledge, or omit other details which would identify the knowledge to its present day holders. This means that the names of the persons and communities which have contributed to the existence of this TK in the public domain disappear when TK is 'pulled back' from the public domain and re-categorised in NRCC.

A case in point is the disappearance of the names of the local communities to whom Walpers spoke when he wrote about maca, or the 'local people' in Peru who so enlightened the travelling 'friend' of Dr. Zheng (one of the patent holders of an early patent on maca).[39] If the Public National Register of Collective Knowledge contains this 'reconstituted' TK there is also no guarantee that the fragments of TK recorded by scholars, or by would-be commercializers, represent either the interests, perspectives, or the extent of knowledge that local communities have about particular plants and animals. This 'omission', means that links to the local communities who preserve and develop the use of such plants and animals and propagate knowledge concerning them are lost - when TK becomes synonymous with what is known about local, or indigenous communities' knowledges by (interested) 'outsiders'.

This affects the meaning of 'traditional knowledge' and the ways in which it is used to add credence to 'biopiracy work'. The reification of traditional knowledge and of 'indigenous peoples interests' is vital in mobilizing external allies in the fight against biopiracy, but maintaining an open dialogue with indigenous communities has not been. Likewise, the Biopiracy Law fails to address the potentially negative effect of centralised registers themselves on local customs and organisation (United Nations University, 2003:28). Ideas about the income-generating potential of traditional knowledge are crystallised in debates about access and benefit-sharing, and these have had a marked effect on the development of ideas about 'giving back' (Hayden, 2007:732) in Peru. In the Biopiracy Law, the primary mode of compensation to local communities is through monetary contributions made to the 'Fund for the Development of Indigenous Peoples'. Conceiving of the 'theft' as of particular economic opportunity traverses the question of whether or not local communities *wish to be* involved in the commercialisation of their knowledges.

[39] (Balick & Lee, 2002).

The protections conferred by *sui generis* legislation, however, operate in a context of existing legal norms and precedents such as TRIPS legislation. This would make the *de facto* control of TK in the public domain, in such a way as places the interests of local communities over those of existing patent holders, extremely difficult to enforce without cooperation at the international level. As such, the inability of existing efforts to secure financial compensation for indigenous peoples, coupled with the representation of indigenous peoples' interests in patent searches which target economically important species, make the use of TK in 'biopiracy work' questionable. Under the present conditions, it seems that 'biopiracy work' is being carried out in the name of indigenous peoples but *without* maintaining a connection with - much less offering many benefits to - indigenous communities themselves.

'Biopiracy work' legitimises the position and interests of Peruvian exporters and producers by creating a category of TK in the 'public domain'. Traditional knowledge, and its link to local communities, is vital in mobilising the anti-biopiracy activities of the NCAB, and to producing understandings of biopiracy as a matter of theft or exploitation. The apparent connection with marginalised peoples is vital to ensuring the kind of international attention which arose from the sacha inchi case. The plight of Peruvian businesspeople *vis*-à-*vis* their Japanese or American counterparts is unlikely to generate this kind of response.
Peruvian corporations are involved in the processing of sacha inchi, or maca, but this does not posit them as 'biopirates' because of the creation of a 'united' national position against biopiracy. This is enabled through the pivotal role of TK in the public domain - which is seen as legitimately commodified. In using public domain TK thus, Tobin & Taylor (2009:30) note that, 'the result has been to define rights over knowledge on the basis of where the knowledge is found, not on the basis of how it got there.'

3.14 Friction

The construction of species lists which concentrate the search for biopiracy to particular plant and animal species is an example of how the 'friction' (Tsing, 2005) involved in combining the interests of multiple groups is (seemingly) erased in biopiracy work. In the production of lists of species which represent 'Peruvian' interests over the misuse of TK, a preoccupation with the use of biological resources – with or without associated TK - is legitimised. These tensions and alliances result from the encounter between the different, varied, interests of agroproducers and farmers (interests, for example in monitoring the use of particular cultivars) which do not necessarily correlate with the interests of local communities. The interests of national research centres such as The National Institute for Agricultural Research (INIA) and of international organisations such as the International Potato Centre (CIP) who also have membership to the NCAB are also encountered, further complicating the task.

The priorities and perspectives of local communities are largely absent in the construction of species lists, owing to both the persuasive agendas of other interest groups, and the reification of traditional knowledge from second-hand sources (in line with commercial interests). The work of the NCAB in bringing these groups together serves to create an, 'axiom of unity' (Tsing, 2005:89) in which the interests of the different groups appear united in the hunt to find and in the stand against biopiracy. As I will show in Chapter Five, the interests of commercial traders (even when they are also members of indigenous communities) are not synonymous with the interests of the local communities in which they reside.

The negotiation of which species are included onto species lists, is the generative, contested process. In this process, the focus on delivering the protections offered to local communities that relate to traditional knowledge under the Biopiracy Law effectively disappears, as does the connection to specific indigenous peoples. The focus of anti-biopiracy *action* becomes biological resources with associated traditional knowledge rather than the converse. This is important in relation to issues concerning indigenous peoples rights, and their own interests in the uses of their traditional knowledge. This is particularly the case because the focus of anti-biopiracy actions may come to effectively pit the interests of TK holders *against* the interests of those involved in the commercialisation of biological resources, in terms of competition for the assistance of INDECOPI.

The negotiation of divergent perspectives on the creation of species lists, is erased by allowing the interests of indigenous communities to become synonymous with the interests of the Peruvian State, or with Peruvian industry. This 'convergence' (Tsing, 2005:89), is created by the apparent similarity of TK held in indigenous communities, and the TK reified in NRCC. This 'similarity' works to establish a point of unity between the interests of local communities, of Peruvian agroproducers, and of the state. This bridging of vital differences (given form in Public NRCC) allows biopiracy to convince us that the connections it makes in 'biopiracy work' represent evidence of global phenomena. The device of Public TK also gives credence to that 'biopiracy work': allowing it to stand for 'real' action that legitimately represents the interests of indigenous communities. This means that the identification of 'biopiracy (enabled by the use of species lists), and the generation of biopiracy 'cases' can become concentrated upon locating and defending uses of Peruvian biological resources. The myriad differences in the political and economic interests of groups such as agroproducers and indigenous peoples become seemingly 'united' in the (singular) fight against biopiracy.

The utilisation of traditional knowledge in the defence of these biological resources (largely compiled from that in the public domain) is complementary to the defence of national interests – in crop cultivars for example. Even when such activities do not contradict the interests of local communities, 'biopiracy work' makes assumptions about the unity of interests in biopiracy – assumptions that actual encounters with indigenous communities would complicate. Negotiations over list-making might result from direct consultation with local communities, but these are erased by the paternalistic nature of assumptions about the interests of local communities, and are enabled through the use of (what stands for)TK from secondary sources. As we shall see in Chapters Five & Six, the transformations of knowledge which take place in encounters with indigenous communities make these assumptions problematic.

The 'convergences', and the 'gaps' (Tsing, 2005:89, 175) created by the inclusion of traditional knowledge which does not maintain its link to local communities, have led to a particular global-local hybrid understanding of biopiracy. As I have set out in Chapter Two, the role of an assumed '*a priori* unity' in dialogue is instrumental: obfuscating the need for encounters (Tsing, 2005:89). In 'biopiracy work' this is the assumption that traditional knowledge is made commensurate with scientific knowledge - through the process of registering. This unity works to erase the necessity to compile NRCC, or species lists, on the basis of encounters with (or using the testimonies of) local communities. It does so, even as biopiracy work ostensibly asserts the importance of such encounters in fighting biopiracy - through the successful creation of NRCC, and through high profile publicity campaigns.

Encounters with local communities, either involving OINT staff (or with myriad other actors when traditional knowledge in the public domain is concerned), work to conceal the reification of traditional knowledge that is integral to biopiracy work. Such concealment is enabled by engaging the charismatic appeals of other 'universals' - such as scientific taxonomies and property discourses - which lend credence to the work at hand. However, neither these second 'universals', nor the biopiracy which makes use of them, could find purchase without the provision of local 'bridges', which enable knowledge to travel across distance and difference. These are forged by the (re) classification and transformation of TK that takes place through the gathering and classifying activities of the OINT. The resulting 'local/global congeries of interaction' (Tsing, 2005: 3) produce a TK that is able to be generalised and to be mobilised in the fight against biopiracy.

By restricting the information contained in NRCC, and thus insisting on the superiority of a system of classification over the TK that it classifies, the ability of NRCC to, 'preserve and safeguard' (Law 28711, Article 15a) traditional knowledge are brought into question. A cacophony of different fragments of TK, selected by communities themselves, would not have the nascent charm of a register that is organised by appeal to scientific nomenclature and concepts of public and collective property. However, the type of knowledge that is able to move between local communities, is not necessarily the same class of knowledge which is able to move between the patent offices of the world.

In this way TK is reified according to the utility it has for the patent examiner, sidestepping the fundamental issues which surround the transformations of TK that are necessary to prepare it as 'prior art'. In addition, the issue of the representation of the interests of indigenous peoples by the NCAB is sidestepped, as if this itself were unproblematic. Both NRCC and the species names used in patent searches, are essentially different forms of list, negotiated and compiled by different people, to serve different ends. As, such they are illustrative examples of the fact that a list is, 'a motivated set of translations [...]not a simple addition to either universal or local cultural knowledge' (Tsing, 2005:162)

3.15 Conclusion

In this chapter, I have situated biopiracy in a local context - by providing an overview of the impact of regional and national legislation that gives charisma to the biopiracy produced through the 'biopiracy work' of INDECOPI. I have shown that the work of classification systems - in intellectual property law and in scientific taxonomy - allow bridges to materialise (combining the interests of indigenous communities with other groups) which focus the search for biopiracy in ways which produce important 'omissions'. These reduce or erase the need for encounters with indigenous communities, by reifying traditional knowledge from fragments in the public domain. I will now move on to describe my own patent search in Chapter Four.

Chapter Four

'Biopiracy Work': Patent Searches

'Global connections are made in fragments – although some fragments are more powerful than others.'

(Tsing 2005:271)

4.0 Introduction

Acts of biopiracy are by no means confined to activities within the patent system. Indeed I argue that many of the connections biopiracy makes in its trajectories take place in locations so diverse, or so remote that they are difficult to track at all, much less to document. Plants, animals, people, and knowledge become connected through documents, governments, corporations, laboratories and patent offices, and these are just some of the the locations involved in the iteration and production of biopiracy. In the following chapters I hope to follow some of these connections in order to identify, illuminate and discuss them and to show how such connections (and the persons and things involved in them) come to stand for 'biopiracies' in Peru.

The previous chapter has documented my experiences with 'biopiracy work' in the National Commission Against Biopiracy and described the 'engaged universal' (Tsing, 2005:8) of biopiracy which such work produces. I have established the role of patent searches in conducting the 'biopiracy work' of the NCAB. This chapter will further expand upon the journey I took when I began looking for evidence of biopiracy, inspired by an engagement of biopiracy that became bound up with patents, and drifted towards global or universal concepts - intellectual property standards and scientific taxonomy. This chapter will examine what is left out of 'biopiracy work', and how such work comes to empathise with the global concepts which underpin intellectual property regimes and standards.

This chapter offers an insight into how patents relevant to the uses of specific plants and animals can be found. It also provides (in Table Six) a list of patents which correspond to uses of biodiversity which are potential cases of biopiracy - the type of patent which the 'biopiracy work' of the NCAB would analyse - and comments upon these results. Secondly, this chapter analyses the constraints and limitations placed on research in the patent system that seeks to identify the uses of traditional knowledge, and associated plants and animals. These limitations include both practical and conceptual restrictions which limit the kinds of connections between knowledge, artefacts and people that can be explored in 'biopiracy work'.

After providing an introduction to patents, to the patent system, and after defining the research aims and of the methodology used, I summarise the quantitative data on four levels which are given in Table Three below. 'Potential biopiracy' represents the type of patent most likely to be identified in 'biopiracy work' (Level Four). I summarise and comment upon the patents generated by my search by individual species in the results section of this chapter. Data Levels One and Two are important because they show how introducing various methodological strategies (in response to the vastness and complexity of the patent system) limits the search for patents to a significantly smaller number of patents. In terms of conceptual limitations, Level 3 (**Relevant Patents**) are explored in order to reveal how assumptions about the relationship between knowledge, people, and artefacts that are embodied in 'biopiracy work' function in the practice of doing patent research. In the discussion of results section, I return to consider the narrowing of search parameters and data output in Levels One to Three, and its implications for patent searches that seek to identify biopiracy. The presentation of data in this way illuminates the difficulties and constraints imposed by hegemonic classificatory systems and standards, and thus, shows the 'friction' (Tsing, 2005) involved in conducting patent searches that are based on a search for traditional knowledge, as well as charting the engagement of (global) biopiracy in such research.

Table Three: Levels of Data

Level	**Analysis**	**Represented by**	**Table/Chart (Annexe)**
1	Use of biodiversity	**'Raw & TAC Scores'**	Annexe Five
2	Claim on biodiversity	**' Biodiversity Patents'**	Table Eight Chart One &Two (Annexe Six & Seven) Annexes Eight & Nine
3	'Not' biopiracy	**'Relevant Patents'**	Table Eight Chart 15 (Annexe Ten) Table Ten (Annexe 11)
4	Potential biopiracy	**'Selected Patents'**	Table Eight Chart 16 Table 11

4.1 The Patent

A patent is ostensibly a techno-legal document created on the part of an 'inventor' - or an 'assignee' - in which the former, or indeed more commonly the latter, wish to assert their claims over an 'invention'. Such inventions must claim to meet the criteria of being of practical use, of being novel, and of being non-obvious.[40] Furthermore, patent documents relate to inventions which can potentially be exploited for economic gain, constituents of wider 'innovations' which have *'industrial application'*. To clarify, an invention is a 'technical solution' to a problem in the 'physical world - a 'product or a process' - which does not already exist in nature (WIPO, n.d.[a]). For example, a chemical extract is a *product* - which may be patentable - but a means of acquiring it is a *process* (which also may be). Innovations however, are the, 'development of a solution' and are not patentable *per se*, but may or may not be commercially viable and may or may not *include* an invention (WIPO, n.d.[a]).

Recalling the relationship between naming and creating mentioned in Chapter One, we can see that the patent is in one sense a means of creating technology itself, and in another sense, of defining its intended use. A patent gives a legal 'date of birth', to inventions, and the document is thought to tell the reader what type of 'thing' the invention is, what it can be used for, and when it was created. Legitimate patents should also include a consideration of literature and other patent documents which may relate to the invention but precede it.

As well as conferring the legal status of 'invention' upon an entity then, and of crediting individuals or (more commonly) organisations with its invention on a given date, patents are

[40] See Chapter Three, Box Four.

intended to tell anyone who is interested that such a 'thing' exists, and that it cannot be used without permission.[41] The patent document is intended to address the dual aims of *informing* and *restricting* the use of technologies, or at least their use for economic gain. The ways in which the disclosure and enforcement requirements of individual patent offices achieve these aims is manifold.

National patent offices are at liberty to stipulate the conditions upon which a patent will be granted, and how infringements upon the intellectual property of the patentee will be enforced. Despite this potentially broad spectrum of conditions for the granting of patents, the adherence of many countries to regional or international agreements over the use of intellectual property, and most notably the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS), curtails the freedom of sovereign nations to apply internally devised criteria to patent applications.[42] As we have seen in Chapter Three, there is also an informal tide sweeping the patent offices of developing countries, which bring procedures in diverse locations 'in line' with the bureaucratic and political priorities of developed nations (Drahos, 1997).

There are essentially four classes of patent in which the patent documents that I am concerned with can be divided: patent applications, patent grants, plant patent applications, and plant patent grants. An application is a document which is presented for consideration by patent examiners. The claims of this document may or may not be granted, but the document is important in chronological terms it can be evidence of the priority of a claim. A patent grant is a document which has undergone examination and whose claims are upheld. The situation of plants in the patent system is further complicated, in that patents may be granted *over* plant processes or products, transgenic plants, plant traits, plant breeding

[41] In the sense that infringements that involve the use of protected inventions are heavily regulated.
[42] See Chapter One for a discussion of TRIPS.

technologies etc. It is important to note also that in the case of plants a ('standard') patent can be applied for over an invention relating to the phenotype or genotype of a plant which would then confer upon the patent owner the right to prevent others from 'making' (or, in the case of a patent over a process from 'using') the invention without licence from the patent holder. In this way plants are treated as patentable inventions similar to any other - providing the criteria for patenting have been met.

Plant patents on the other hand confer upon the patent owner the right to prevent third parties from *asexually reproducing* plant varieties. This is in line with restrictions over the patenting of 'natural source material' (BIOS, n.d.). In this way plant varieties cannot be inventions that satisfy standard patent criteria, as the protection claimed is not over something 'made' but something reproduced. Hence plant patents (as apposed to *patents on plants*) are granted under less stringent conditions - including a relaxed application of the non-obvious requirement. However the protections offered by plant patents are also less than those offered for standard patents - the protection only applies to the whole plant or genome of an asexually reproducing, non-tuber propagated and cultivated plant (BIOS, n.d.). Plant patents are used in the US, but are not available in the majority of countries, where an alternative regime may instead cover the intellectual property rights of plant breeders (such as in Peru).[43] Patents are discussed in Chapter Three, Box Four.

As we have seen in Chapter Three, the USPTO, EPO and JPO are the most prolific and internationally important databases of patent documents. These databases consist of a wealth of information: how the document was lodged, when, by whom and in what manner, as well as complicated textual and codified information about the invention (and legal information as to the viability of the claims made). In the next section I describe the types of

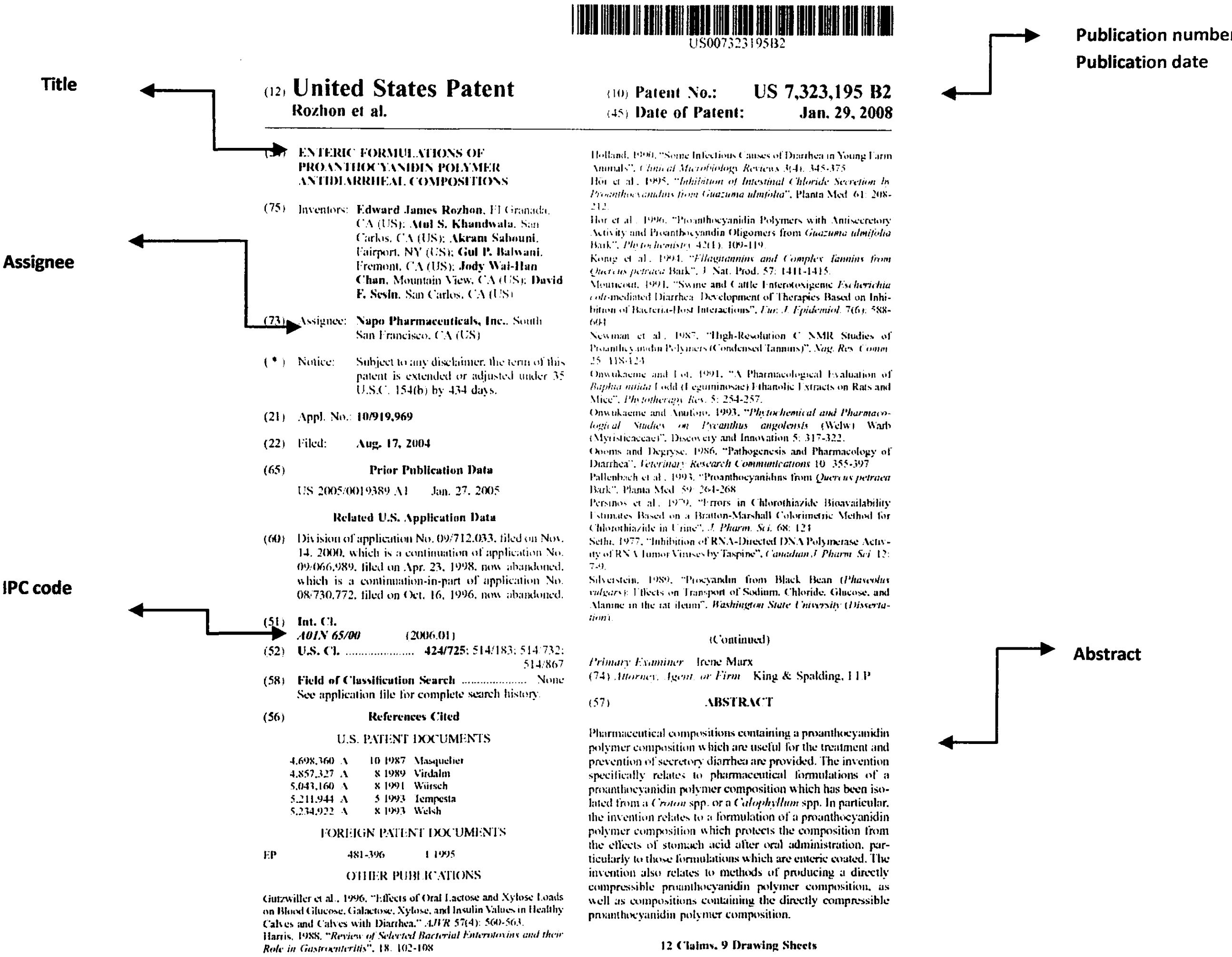
[43] See Chapter Three, Box Two

patents which appertain to biodiversity and the system in which they are located. Briefly however, I give a list of the most pertinent sections of patent documents from which the empirical data presented in this chapter is drawn. The following sections of selected patent documents (those in italics are indicated in Figure Six below) were analysed:[44]

- **Publication number** of the patent or application (a unique identifier that relates only to the document),
- **Publication date** of the patent (when the patent was granted or patent application was accepted and published),
- ***Title*** *of the patent or application,*
- ***Abstract*** *of the patent or application(detailing the nature of the invention),*
- **International Patent Classifier Codes or [IPC Codes]**(categorising the nature of the invention and the claims made about it),
- **Claims** (made about what the invention does, how and to what purpose),
- **Priority Country** (The country where the patent or application was first filed),
- ***Assignee/Inventor*** *(s) of the patent or application - (who is seeking to patent the invention),*
- **Patent family** of the patent or application (a grouping by which various patents and applications concerning the same invention are reduced into a single publication number).

[44] In relation to Level Four (**Selected Patents**) data information relating to the legal status of the patent (where available) was also reviewed.

Figure Six –US Patent 7323195 – 'Enteric Formulations of Proanthocyanidin Polymer Antidiarrheal Compositions' (Rozhom *et al, 2008*)



US007323195B2

(12) **United States Patent**
Rozhon et al.

(10) **Patent No.: US 7,323,195 B2**
(45) **Date of Patent: Jan. 29, 2008**

(54) **ENTERIC FORMULATIONS OF PROANTHOCYANIDIN POLYMER ANTIDIARRHEAL COMPOSITIONS**

(75) Inventors: **Edward James Rozhon**, El Granada, CA (US); **Atul S. Khandwala**, San Carlos, CA (US); **Akram Sabouni**, Fairport, NY (US); **Gul P. Balwani**, Fremont, CA (US); **Jody Wai-Han Chan**, Mountain View, CA (US); **David F. Sesin**, San Carlos, CA (US)

(73) Assignee: **Napo Pharmaceuticals, Inc.**, South San Francisco, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 434 days.

(21) Appl. No.: **10/919,969**

(22) Filed: **Aug. 17, 2004**

(65) **Prior Publication Data**

US 2005/0019389 A1 Jan. 27, 2005

Related U.S. Application Data

(60) Division of application No. 09/712,033, filed on Nov. 14, 2000, which is a continuation of application No. 09/066,989, filed on Apr. 23, 1998, now abandoned, which is a continuation-in-part of application No. 08/730,772, filed on Oct. 16, 1996, now abandoned.

(51) **Int. Cl.**
A01N 65/00 (2006.01)

(52) **U.S. Cl.** **424/725**; 514/183; 514/732; 514/867

(58) **Field of Classification Search** .... None
See application file for complete search history.

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(74) *Attorney, Agent, or Firm*—King & Spalding, LLP

(57) **ABSTRACT**

Pharmaceutical compositions containing a proanthocyanidin polymer composition which are useful for the treatment and prevention of secretory diarrhea are provided. The invention specifically relates to pharmaceutical formulations of a proanthocyanidin polymer composition which has been isolated from a *Croton* spp. or a *Calophyllum* spp. In particular, the invention relates to a formulation of a proanthocyanidin polymer composition which protects the composition from the effects of stomach acid after oral administration, particularly to those formulations which are enteric coated. The invention also relates to methods of producing a directly compressible proanthocyanidin polymer composition, as well as compositions containing the directly compressible proanthocyanidin polymer composition.

12 Claims, 9 Drawing Sheets

An annotated front page of a patent document relating to sangre de grado.

4.2 The Patent System

How do such masses of documents, originating in many patent offices around the globe, end up in something which can be referred to as the 'patent system'?[45] The first thing to say is 'it' is actually an amalgamation of 'them'. That is, the patent system I refer to here stands for a particular electronic resource, one of many which compile data about the individual patent documents held in a plethora of collections by patent offices worldwide. The variety of such collections mean that different data is available from different offices, and the means of searching and indexing such collections varies. A good deal of patent information is freely available through the internet. This enables the researcher to access collections held by particular patent offices, by entering specific search criteria. Words, phrases, publication numbers, or other terms of interest can all be searched for. Information about the scope and variety of collections which are available to search free of charge is provided by Oldham (2006) in, *'Biodiversity and the Patent system: An Introduction to Research Methods'*. The methodological directions taken in this chapter are greatly influenced by the aforementioned publication.

Rather than making use of several electronic databases to search the patent system, I utilised commercial software (to which CesaGEN provided access).[46] Using the Thompson Innovation Database®, along with VantagePoint™ text mining software enabled me to conduct a search of the United States Patent and Trademark Office (USPTO), the Japanese Patent Office (JPO), the European Patent Office (EPO), and a number of other databases simultaneously. This has the notable advantage of providing a single search platform with which to access data, and providing uniformity of data for later analysis, as well as offering a

[45] The 'patent system' hereafter signifies the total mass of patents which were held in depositories in various international locations and were electronically accessible through the search strategies elaborated here.
[46] Centre for the Economic and Social Aspects of Genomics.

much wider range of searching options and criteria for compiling information in terms of results. In order to research patents which may constitute cases of biopiracy, considerable technological difficulties are presented for the researcher who does not have access to commercial software in this way.

It is pertinent to note however, that the existence of such software itself provides the possibility to search in this manner. In this way, the software is an artefact that enables 'convergences' (Tsing, 2005:89) – bridges across difference - to be forged between the differing administrative systems of individual patent offices. As we have seen in Chapter Two, such bridges are important mechanisms by which 'global' concepts travel. Their role in assisting both the international issue of patents relating to the uses of biodiversity, and also in tracking those uses in terms of identifying biopiracy, is an important, yet often unacknowledged one.[47]

The software used was not designed with the necessities of biopiracy research in mind – rather - it was made for corporate clients, and has a particular agency in itself. Regrettably, there is not space here to consider this issue fully, but the contributions such software makes in assisting the trajectory of global/universal concepts such as intellectual property rights is an interesting area for further research. In an important sense then, the patent system as I refer to it here, exists as a result of the ability to search databases using this software: *it* is a singular system because I was able to access it thus.

However, the patent system also exists 'out there'. It exists in the collation of millions of documents - 1,907,915 patents were filed in 2008 alone.[48] Patenting is also on the rise - the

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[47] See also observations made about the simultaneity of patent searches from trilateral offices in Chapter Three.
[48] Source: WIPO Statistics Database

number of patents filed worldwide has more than doubled since 1994.[49] This points to not only an increase in the overall use of the patent system but also to a growing 'internationalisation' of the patent system - largely reflected in the increased number of patent applications and grants from countries like China and India (WIPO, 2008). However, despite this growing trend towards internationalisation of patent applications and grants, evidence suggests that the majority of patent grants are made at the national, rather than international level (Oldham, 1996:4).

Patent applications can be made with the relevant national patent office, regionally through organisations such as the European Patent Office, or internationally in up to 142 member States through the Patent Cooperation Treaty (PCT). This research seeks to compile available data from all the said levels, through the utilisation of the International Patent Classification System (IPC) provided by WIPO. The PCT, concluded in 1970, is a mechanism which enables applicants to lodge a single 'international' application in all member countries around the world at the same time.

Such applications may be lodged in the applicants own (member) country, or with WIPO. Applicants from some countries can instead lodge an application with either the European Patent Office (EPO), the African Regional Industrial Property Organization (ARIPO), the African Intellectual Property Organization (OAPI), or the Eurasian Patent Office (EAPO). An International Searching Authority (such as the EPO, or WIPO for example) will then conduct searches on any existing published citations which may affect the patent's claims, before individual member countries decide to grant or refuse the patent, to allow, 'entry into the national phase' (WIPO, n.d [b])

[49] Source: WIPO Statistics Database

Oldham (2006) provides a succinct introduction to the IPC system. The most basic level of an International Patent Classification code consists of a letter and two numbers, and the number of characters increases as the scope of the item it describes becomes more specific. The IPC system deals with patents that relate to any area of inventions and contains about 70,000 classification symbols (WIPO, n.d[c]). The classification codes are arranged in a hierarchical structure from section to subgroup which has six levels of stratification. For example the complete IPC code for 'producing new embryos through genetic engineering' is represented in the section relating to Chemistry, by C12N15/873 (C12=class, C12N=subclass, C12N15=group, C12N15/873=subgroup).[50] Table Four below shows how the patent system is divided into the following symbols in the International Patent Classification System.

Table Four: International Patent Classification Sections

Section	**Corresponding to**
Section A:	Human Necessities
Section B:	Performing Operations; Transporting
Section C:	Chemistry; Metallurgy
Section D:	Textiles, Paper
Section E:	Fixed Constructions
Section F:	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
Section G:	Physics
Section E:	Electricity

[50] 1) Section – Chemistry/Metallurgy, 2) sub-section Chemistry 3) Class, Chemistry; Biochemistry; Beer; Spirits; Wine; Vinegar; Microbiology; Enzymology; 4) Sub-class, Microorganisms or Enzymes, 5) Group, Mutation or Genetic Engineering; 6) Sub-group, Techniques for producing new embryos.

4.3 Biodiversity & the IPC

The IPC system is a valuable tool in the search for patent activity relating to biodiversity which may or not become the subject of biopiracy. The ability to search specific areas of patent activity greatly increases the effectiveness of search strategies which begin with the name of a plant for example. To illustrate, a search for *'tuna'* (*Opuntia ficus indica*) that wishes to exclude references to fish, can seek to exclude the word the section of activity related to fishing, (sub-class A01K).[51] This chapter makes great use of the IPC in order to highlight relevant, and exclude irrelevant, patent documents. Patents concerning the use of plants, animals, and materials, in ways that may be of interest to researchers in the area of biodiversity, reside mainly in specific areas of the IPC. Most notable of these are the areas of Human Necessities and Chemistry (Oldham, 2006:7). The following table reproduces the areas suggested for such research.

[51] Relates to, 'Animal Husbandry, Care of Birds, Fishes, Insects, Fishing, Rearing or Breeding Animals not Otherwise Provided For, and New Breeds of Animals'.

Table Five: Areas of the IPC Relevant for Biodiversity

Classifier	Section	Corresponds to
A	Human Necessities	Agriculture; Forestry; Animal Husbandry; Hunting; Trapping; Fishing
A23	Human Necessities	Food or Foodstuffs; their Treatment
A61	Human Necessities	Medical or Veterinary Science; Hygiene
B82	Transporting	Nanotechnology
C07	Chemistry	Organic Chemistry
C08	Chemistry	Organic Macromolecular Compounds
C11	Chemistry	Animal or vegetable oils, fats, fatty substances or waxes; fatty acids
C12	Chemistry	Biochemistry; Beer; Spirits; Wine; Vinegar; Microbiology; Enzymology; Mutation or Genetic Engineering
C40	Chemistry	Combinatorial Technology
G01	Physics	Measuring; Testing
G06	Physics	Computing

Aside from restricting searches for patents relating to biodiversity in the above areas, it is necessary to develop more specific criteria (especially that based on the use of classification codes) for locating desired and easily omitting undesired results in the lists of patent documents generated by searches of patent databases. One obstacle to be overcome is that a particular patent document frequently has a number of different IPC codes assigned to it. For instance a patent ostensibly about baking dough (under A21D for example), can also be assigned classifiers from A23 (as a supplement to a food) from chemistry (e.g. C12 if claims are made about the yeast for example) and beyond. References to other classification codes can be made due to a proliferation of possible uses (e.g. as a pet food, or a supplement for humans) or because the invention draws together many areas of technologies (e.g. in the case of genetic engineering and agriculture).

4.4 Tracking Biopiracy

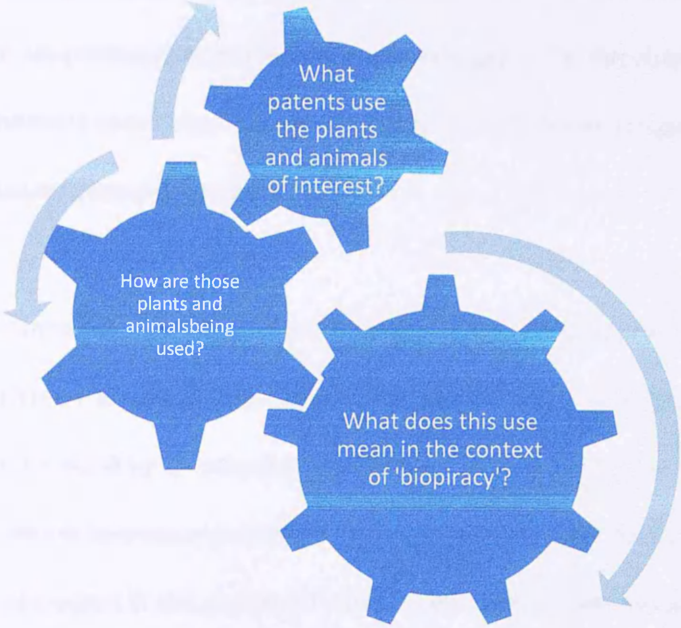
What then, is a patent which uses biodiversity, or which represents a case of biopiracy? What connections are made in the patent system that concern the use of traditional knowledge and the plants and animals which embody it? Beginning to answer this requires the use of a list of search terms. A logical starting point is the name of a plant, animal or microbe, bacteria etc. Similarly the name of a region, place, ethnic group and other terms could provide the basis for a search, depending on the information sought. Strategies for constructing searches are discussed at length by Oldham (2006). As indicated in Table Three, I will conduct this research in order to gather four levels of data, which are important to this thesis in four different ways.

Firstly, I will monitor the use of biodiversity in the international patent system in relation to specific Peruvian plants and animals. This is the first level of data which will provide an overview of the extent of patenting relating to scale of the uses of biodiversity, broken down by individual species. Secondly, I will present the number of patent documents - again by species - which contain specific claims about the uses of biodiversity. This is the second level of data, which will provide information about the uses of biodiversity that are claimed as the intellectual property of the patent assignee. This provides an insight into the methodological or practical difficulties in ascertaining what patents are and are not relevant for a consideration of biopiracy.

Thirdly, I will present a summary of patents which are *not* likely to represent biopiracy cases. Although this may seem an odd intent, **'Relevant Patents'** are thus titled because of the connections that they *could* make between claims over the use of biodiversity and biopiracy - if the 'theft' of traditional knowledge were to be expanded outside of existing intellectual property standards. These are the kinds of patents 'left out' when global biopiracy is engaged through 'biopiracy work' (as in Chapter Three). This will enable an elucidation of the kinds of relationships - between knowledge, artefacts, and people - which are not included in 'biopiracy work'.

Lastly, I will present a tabular summary of the pertinent sections of patent documents and comment about the results generated. This will provide insight into the kinds of connections that the 'engaged universal' (Tsing, 2005:8) - the global concept mediated in the practical world - of biopiracy makes in patent searches. The developing qualitative considerations that defined a the different aims of this patent search are represented in Figure Seven below.

Figure Seven - A Schema



All three elements go on to co-construct each other as well as existing as separate considerations. This schema can itself be seen as a representation of the thought processes involved in my translation of global/universals into workable research aims. Negotiating biopiracy and 'biodiversity' into meaningful research terms, in terms of the particular 'local' parameters of my NCAB-inspired focus on 'biopiracy work', creates a new path in which global biopiracy must attempt to travel. I began tracing the trajectories of the global biopiracy describe in Chapter Three in the patent system itself. The possibilities or limitations of the artefacts, or the software and methodologies through which I negotiated this trajectory, coupled with (different) interests I had in hunting for patents, all mean that the 'biopiracy work' I have undertaken here is different from that described in Chapter Three. Global biopiracy, engaged here makes different connections to patent documents.

By charting the movement of biopiracy in terms of the uses of biodiversity (in **TAC scores** and **Biodiversity Patents**), as well as noting **Relevant Patents** (which are not considered as potential cases of biopiracy) I am able to show the kinds of connections left out of 'biopiracy work'. These connections reveal the kinds of relationships - between knowledge, artefacts and people - which are privileged in intellectual property regimes. In this chapter I will portray some of the most convincing connections I have made between (engaged) global biopiracy and particular patent documents.

In the generative, contradictory process of what ensues during this quantitative research, the results of this chapter are generated. My own 'biopiracy work' in part replicates the patent searches of the NCAB by showing **Selected Patents**. At the same time, I question the mobilisations of scientific taxonomy and intellectual property standards implicit in such searches. I am not an expert in the analysis of patents, and cannot claim to carry out 'biopiracy work' by replicating the patent searches and evaluations that the legal and other professionals assembled by the NCAB carry out. What I do offer is an account of the 'messy actualities' (Larner, 2000:14) of conducting patent research. I draw on my experiences in the NCAB in order to highlight some of the 'gaps' and 'convergences' (Tsing, 2005:89) produced when traditional knowledge - represented in the uses of plants and animals - is utilised in the patent system. These 'uninteresting' areas, and areas of collusion are those not necessarily highlighted in the 'biopiracy work' of the NCAB itself. In this way I consider the 'engaged universal' (Tsing, 2005:8) of biopiracy described in Chapter Three in a context which does not simply replicate the somewhat pro-patent agenda of the NCAB.

4.5 List-making

Given the focus of this chapter, an ideal starting point for considering biopiracy, and the use of traditional knowledge in patents, would be to compile a list of plants and animals from those which have been identified by indigenous communities in Peru. Unfortunately, as we have seen in Chapter Three, such a list was not forthcoming from the 'biopiracy work' of the NCAB. Though I later travelled to two indigenous communities - in an attempt to learn more about the relevance of particular plants and animals - I had not had the opportunity to consult directly with indigenous delegates while at the NCAB. This created a dilemma over how to research the use of traditional knowledge without reifying it. Even in a necessary, self-conscious way, I became complicit in the construction and reification of traditional knowledge, and of indigenous peoples' interests, through defining the list of plants and animals that provides the basis for the patent search described in this chapter.

The United Nations states that 5,528 plant species and 760 animal species are endemic to Peru (UN, n.d.). Amongst all this choice, how should I focus a patent search? In Chapter Three, I provide an overview of the 'friction' (Tsing, 2005) involved in the production of species lists which direct patent searches in the NCAB. As I have also described in the previous chapter, over half of the species prioritised by NCAB (17) were also present in the Annexe of the Natural Heritage Law (Law 28477, Annexe). I decided to proceed, using the plant and wild animal species mentioned in the Natural Heritage Law as a basis for my patent search. These plants and animals seemed to offer the best compromise between repeating some of the 'biopiracy work' of the NCAB (by searching for the same species they had previously prioritised), and extending this work to cover plants and animals not yet prioritised in patent searches, while at the same time utilising species which were of 'national heritage'. However, there were notable exceptions to both lists, which I present in Table Six below.

Table Six - Missing Species

Common name	Botanical name	Known uses
Ayahuasca	Banisteriopsis caapi	Psychoactive drink
Chalipanga	Diplopterys cabrerana	Psychoactive drink
Chacruna	Psychotria viridis	Psychoactive drink
Sangre de Grado	Croton lechleri	Skin healing resin

As we have seen in Chapter One, ayahuasca has been the subject of an infamous case of biopiracy, and in Chapter Two, I have described two bioprospecting agreements concerning the use of sangre de grado. A hunt for biopiracy in the patent system hardly seemed complete without investigating the controversial uses of these plants. The remaining two plants listed in Table Six - *chacruna* and *chalipanga* - are used to prepare ayahuasca for consumption in the Amazon, hence I was confident of their importance to indigenous communities in this region.[52]

[52] Such plants were selected, not as the basis of some prior claim to understand the perspectives of indigenous peoples in Peru, but because I felt confident that in extending my fieldwork to other sites I would find the importance of these plants confirmed.

Despite the addition of these four plants, the problem of 'speaking for' indigenous peoples' interests persists. It is a lamentable fact then, that this empirical chapter cannot tell the reader what species *indigenous peoples* are concerned about in relation to the use of traditional knowledge in the patent system. Further research could usefully address this concern. However, this chapter *will* tell the reader about the trajectory of global/universal biopiracy and the connections it makes to uses of plants and animals in the patent system. I do this by highlighting the myriad uses to which such life-forms are put, as well as highlighting the messiness and complexity of the patent system, and also examining what kinds of patents are considered as potential cases of biopiracy in 'biopiracy work'. The next subsection outlines the methodology used to attain the four levels of data presented in this chapter.

4.6 Methodology

To begin the patent search, the plants and wildlife listed in the Annex of the Natural Heritage Law described in the previous chapter were added to the four species listed in Table Six, to form a list of 60 discrete plants and animals.[53] Of the 60, 49 were of the order plantae and 11 animalia. The list is reproduced in Annexe Three and consists of the scientific and common names of the 60 plants. Annexe Four shows the main body of the search parameters ('Query') which were entered into the Thompson Innovation Database®. The far right column of Annexe Four shows any limitations that were placed upon the Query, to exclude patents relating to easily identifiable and irrelevant areas of patent activity.

[53] I have excluded three native animal breeds which are native to the Andean region due to my focus on Amazonia and the differing agenda which as agricultural livestock they introduce. They are: cuy, [*Cavia porcellus*] alpaca, [*Lama pacos*] and llama: [*Lama glama*]. The reader will judge the wisdom of this decision.

The 'common' and 'scientific' names listed were both taken directly from the the Natural Heritage Law (Law 28477, Annexe). Further synonyms were also added as a result of searches undertaken using a variety of online sources, most notably the Catalogue of life 2000 database (Bisby *et al*, 2009). What the use of these queries means is that a reference made to a particular plant or animal made in any part of the patent document will generate a single patent 'score'. These 'raw' scores are are given in Annexe Five. These scores need to be manipulated to ensure that the documents listed are actually relevant to the research at hand, due to both the high numbers of patent documents that search terms can generate and the fact that many documents will not relate to biopiracy (or even claims about the uses of biodiversity). I detail the ways in which data has been manipulated in the following section.

4.7 Capturing Data

It is important to note two things when looking at the raw scores:

1. The data contains irrelevant documents
2. The data contains duplicate documents

It was necessary to adapt a methodology to control for these factors. Table Seven below shows the problem to be addressed and the methodological solutions developed.

Table Seven – Data Problems

Problem	Considerations	Solution
1	Capturing relevant data and excluding irrelevant data	a) Select only patents which mention Query in the 'Title', 'Claims', or 'Abstract' sections of the patent document b) Select only patents which fall under specific IPC codes c) Record instances of scientific names mentioned in the 'Claims' section of patent documents d) Analyse documents not present in c) for instances of common names and assess relevance
2	Different versions of same document	a) Control for duplicate results by eliminating duplicate publication numbers b) Control for duplicates by eliminating discrete, but replicated publication numbers, through eliminating exactly identical patent titles b) Control for different, related patent documents by searching for patent 'families' - which show only one 'hit' for all related patent documents (patents registered in different countries which relate to the same invention)

As highlighted in the table above, by far the biggest problem in undertaking this research is the 'cleaning' of the data. Oldham (2006) notes this is a general issue when attempting to capture data about biodiversity through patent searches. In response to the scale of the problem presented by this dataset, which numbers over 18,000 patent documents for maize alone, the first step, (detailed in Table Six above) was to focus on the patent sections where the Query text would be most significant. Patent documents can include instances of the Query text in almost any context, as a reference or citation for example.

It would be interesting to note the lexical context in which all such instances occur as the subject of further analysis. Owing to the numbers of patent documents involved in this study, such large scale research cannot be investigated here. In any case, what is more valuable to this thesis is knowledge of what a patent is 'really about' rather than just the knowledge that it contains reference to the Query text. This will enable us to assess the uses of biodiversity most relevant to a consideration of the movement of biopiracy - as well as showing which patents are left out (**Relevant Patents**) and drawn in (**Selected Patents**).

In order to reach the best compromise between data capture and brevity, results were filtered, with the overall objective of narrowing down the results to a more manageable and meaningful set. Hence only if the Query terms were found in the 'Title', 'Abstract' or 'Claims' sections of patent documents were documents included. The 'Title' and 'Abstract' sections provide a meaningful overview both textually, and in terms of the IPC classifications assigned or the scope of the patent. The 'Claims' section details exactly what about the subject area is claimed as the intellectual property of the assignee. The combination of these three sections captures the overwhelming majority of empirically interesting patents.

After limiting the scope of the Query to only the 'Title', 'Abstract' and 'Claims' sections (**TAC scores**), the numbers of patents dropped dramatically. It is beyond the scope of this research to determine the lexical and semantic context of these references. These scores still include duplicate documents - that is - they can contain multiple versions of the same patent. In order to be presented with only one unique record of the patents of interest, I used the 'de-duplicating' function in Vantage Point®. Furthermore, it is extremely likely that any patent document relevant to issues of biopiracy will be found in the IPC sections listed in Table Five.

It is necessary to conduct patent searches by focusing on the uses of biodiversity which are empirically interesting. To illustrate, identifying the use of coffee in a coffee mill (e.g. IPC Code A47) does not indicate an interesting connection between a plant embodying traditional knowledge and a patent document. In this case the 'invention' would be over the mill itself, and is not connected - in any meaningful way - to the use of traditional knowledge about coffee plants. Oldham (2006:7) states that by combing a Query with the an IPC formula, the researcher can be assured of capturing between 77 and 99% of all results (raw scores). Consequently, I will focus the search for patents upon specific areas of the patent system, hence the formula below was constructed at the sub-class level and resembles a formula proposed by Oldham(2006:7).

("A01H" or "A01N" or "A23L" or "A61K" or "B82B" or "C07C" or "C07D" or "C07H" or "C07K" or "C08H" or "C08L" or "C09B" or "C09D" or "C09F" or "C09H" or "C09J" or "C09K" or "C11B" or "C11C" or "C11D" or "C12N" or "C12P" or "C12Q" or "C12R" or "C40B" or "G01N" or "G06F").

4.8 Level Two Data: Biodiversity Patents

The first level of data is presented in Annexe Five, in order that the reader can get a sense of the numbers of patent documents that must be filtered down before meaningful analysis can be made. I also present the data in order to demonstrate the scale of documents to which the use of biodiversity - and traditional knowledge - can *appear* to relate in the patent system. This is an important step in illustrating the seemingly endless connections which can be traced through the patent system in conducting research which sets out to identify patents which utilise TK. Limiting the search to reflect documents which contain references to the search terms in only the Title, Abstract and Claims sections removes 83.64% of all documents. This shows that when the names of plants and animals are used in patent documents, it is vastly more common that they are used in supporting sections of text - rather than the principal subject of the invention. Despite this dramatic reduction, 21,906 documents remain. In order to generate meaningful results, **Biodiversity Patents** (Level Two data) were generated by reducing data.

In order to do this, the data was searched using Vantage Point© software, in order to locate those documents in which the scientific names sought appear in the *Claims* section of the document.[54] The 'Claims' section was uniquely selected as it is the section of the document to which the legal protections conferred in patent protection relate, and examining this section should enable the research to focus upon those documents which actually make legal claims over the plants and animals of interest. Documents that do not contain claims sections are not verifiable as documents which make claims for IPR-protection. It is important to note the kinds of omissions caused by this empirical step.

[54] Including known derivatives: annatto, arrowroot, harmaline, harmine, and tetrahydraharmine.

The decision to focus purely on documents that contain patent claims information, means that a large number of documents have been omitted from further analysis. Patents which contain no claims information are particular interest to research that seeks to investigate the connections made in 'biopiracy work', as the omission of this information does not indicate that claims do not exist. This occurs when the documents originate from the Japanese Patent Office, hence translations of the claims fields do not exist, or when for other reasons the documents are not available using Thompson Innovation Database©. Similar problems with Japanese patents are noted in a document submitted by Peru to WIPO (IGC, 2007:10).

Patents were excluded if they represent instances of references to an unrelated semantic context – such as 'MACA' in computer coding for example.[55] Such 'false correspondences' are much more common in the use of the list of 'common names' rather than in the use of scientific names.[56] For this reason, data which fell outside the IPC search formula was only briefly re-searched to highlight any instances where scientific names were indicated in the claims section. A small number of patents were added to Table Eight as a result of this action.

Certain plant names generate hundreds of patent documents because of the commonality of the species, or name in question. For this reason six search terms (which returned the most patent documents) have been excluded from the research, on the basis of their vague connection to the species concerned. These search terms appear in the right hand column of Table Nine below and correspond to the terms shown in italics in Table Eight (below). The left hand column of Table Nine lists other plants and animals that generated a huge number of patent documents, and almost certainly related to the species in question, but where

[55] Further research is indicated, which examines all the specific instances of common name references in documents which fall in areas of the patent system not covered by the patent formula, however it is beyond the scope of this research.
[56] Oldham (2006) notes that common terms commonly generate false results.

establishing the nature of the claim in relation to biopiracy would require further information. For example *Solanum tuberosum* and *Zea mays* refer to scores of distinct *varieties* of corn and potato - which are among the widest used plants on the planet. Without further information relating to varieties, ascertaining if a patent was or was not an example of biopiracy was effectively impossible. For this reason results for five species are given in Annexe Eight & Nine in the form of pie charts showing IPC class or subclass and priority country respectively. Correspondingly, they appear in Table Eight in italics and are reflected in totals at the base of the table, but were not represented in Level Three data. I will now summarise the results of the patent search.

4.9 Results

Table Eight shows a summary of Level Two, Three and Four data. The far left hand column gives the number of **Biodiversity Patents** by species. The central column gives the number of **Relevant Patents** by species. Finally, the left hand column gives the number of **Selected Patents**, again by species. Table Nine lists the exceptions detailed above which are not represented in Level Three or Four data (**Relevant Patents** or **Selected Patents**).

Table Eight: Level Two, Three, & Four Data[57]

Common name	Biodiversity Patents	Relevant Patents	Selected Patents
ACHIOTE (d)	44	1	1
ACHIRA	7	2	0
AGUAYMANTO	11	5	0
AJÍ (b) (d)	*348*	*n/a*	*n/a*
CAIGUA	1	0	0
CAMOTE (a)(b)	*179*	*n/a*	*n/a*
CAMOTE (c)	1675	n/a	n/a
CAMU CAMU	31	18	5
CAÑIHUA	2	1	1
CASCARILLA	26	0	0
FAIQUE	2	0	0
FRIJOL NUÑA	303	11	11
HUACATAY	14	1	1
KIWICHA	23	13	0
YACÓN	116	78	(22)*
LOCHE (a)	70	1	1
LOCHE (c)	1293	n/a	n/a
MACA	193	24	24
MAÍZ MORADO/MAÍZ GIGANTE (b)	*1068*	*n/a*	*n/a*
MAÍZ MORADO/MAÍZ GIGANTE (c)	48	3	3
OCA (a) (d)	1	1	0
PAICO	29	11	4
PAPA COMÚN	*427*	*n/a*	*n/a*
PAPA AMARILLA	2	1	1
PAPA FUREJA	6	4	4
PAPA PATIQUIÑA	1	1	1
QUINOA	330	108	5
ROCOTO	5	0	0
SACHA INCHI	18	2	2
SACHA OCA (d)	7	0	0
TUNA	97	11	9
UÑA DE GATO	128	5	5
YUCA (a)	89	0	0
YUCA (b)	*1248*	*n/a*	*n/a*
ZINNIA	169	0	0
AYAHUASCA	45	29	1
SANGRE DE GRADO	41	3	3
CHINCHILLA	28	1	1

[57] Letters correspond to the following (a) – scientific name only; (b) shown in Annexe Eight & Nine only; (c) common name only, and (d) result after controlling for problematic terms.

Common name	**Biodiversity Patents**	**Relevant Patents**	**Selected Patents**
GUANACO	5	0	0
MAJAZ	1	1	1
VICUÑA	28	1	1
TARUCA	1	1	1
AGOUTI	*42*	*n/a*	*n/a*
Total (discrete patents)	**1923**	**338**	**108**
Total (Including Table Nine)	8203		

Table Nine: Exceptions

Excluded	**Pie Chart IPC only**
Annatto	Agouti
Yellow pepper/Cayenne pepper	Capsicum baccatum & Capsicum annum
Camote	Ipomoea batatas
Sweet potato	Cassava &Manioc
Pumpkin	Papa Común
Arrowroot	Zea Mays

Charts One & Two (Annexe Six & Seven) show the IPC codes which are listed in the results of **Biodiversity Patents**, as well as depicting the results by individual species. They are intended to give the reader insight into the most popular areas of technology in which the plants and animals listed in this chapter are utilised, and into the distribution of results per individual species. After focusing this data more specifically in terms of 'biopiracy work' and as depicted in Table Eight above, I generated three classes of data. Those plants and animals over which it was not practical, or possible to ascertain the claims of patents - because the nomenclature was too vague - appear in Table Nine. I show the distribution of IPC classes or subclasses, and the filing country locations to which the uses of plants and animals in these documents relate (by individual species or common name).[58]

The remaining two lists of data are interesting for different reasons. Chart 15 (Annexe Ten) is a bar chart of 341 **Relevant Patents**, by individual species names. This refers to patents which *did* relate to interesting uses of biodiversity, but which would not be likely to be considered as biopiracy, if it is narrowly defined (as applied in the 'biopiracy work' of Chapter Three). In Chart 16 below, **Selected Patents** are portrayed (by individual species names). Table 11 (Annexe 12) gives the publication numbers, dates, titles, assignees, inventors, country, and IPC Subclasses of all **Selected Patents**.

To provide a graphical summary of the methodological decisions taken in negotiating **Selected Patents** or **Relevant Patents** (those not considered as potential cases of biopiracy), Table Ten (Annexe 11) is a table summarising the reasons for not selecting patents which *have been* included as **Relevant Patents** (in Annexe Ten), but *not* as **Selected Patents** in Table 11 (Annexe 12). I have detailed the reasons why these patents could not be selected for further analysis in four ways in the left hand column of Table Ten. 'Genus' means that

[58] See Annexes Eight and Nine. I will briefly comment on Annexes Eight & Nine later in this section.

only vague claims were made over uses of the plants and animals in question - claims relate to the genus, rather than the species concerned. 'Compound' means that the claims relate to the organism concerned but only in combination with other ingredients - the claim made is over the combination of several artefacts rather than over the organism in question *per se*. 'List' means that the claims relate to the organism in question but as one of a large list of alternative ingredients. Lastly, 'Other' means that the reference is uncertain for other reasons, such as an inappropriate patent context. I return to discuss these exclusions, and the consequences they have for biopiracy (in terms of the connections which are erased) and the subsequent understandings of biopiracy mobilised in the last section.

In the penultimate section of this chapter, I will comment upon examples from the **Selected Patent** results. I do this in order to make the assumptions - about the relationship of different knowledges to plants and animals conveyed in patent documents - made in 'biopiracy work' clear, and to show the kinds of documents to which biopiracy forges connections. In the final section of this chapter I will then comment upon those same assumptions in order to assess the kinds of documents (and bundles of human-knowledge-artefact relationships) that 'biopiracy work' forgets, or forgoes.

Table 11 (Annexe 12) gives a list of **Selected Patents** which are cases of 'potential biopiracy' in the patent system. This information is depicted in Chart 16 below, which shows the **Selected Patents** by common name of the plant or animal. I will then discuss the reasons for interest in the particular patents outlined in the Table 11, and the particular nuances such claims about the uses of the plants and animals offer for understandings of biopiracy.

4.10 Relevant Patents in Annexe Eight & Nine

I will briefly comment on the technology and country trends depicted in Annexes Eight and Nine respectively. It is notable that in terms of patent grant or applications, the US is the first or second most frequently cited country in respect to all six plants and animals. The PCT is second most common route for patent applications or grants in the case of *cassava, papa común, agouti* and *Zea mays*. A surprising result is that Korea is the most popular filing country for patent grants or applications for inventions concerning the use of ají and *camote*. China figures three behind the US (and behind the PCT route) for patent grants and applications relating to cassava. These trends are consistent with the arguments I present in Chapter One which point out the ethnocentricity of patenting in relation to biodiversity, and posit the US as a locus of activity. The overwhelming percentages of patent grants and applications originating from Korea in relation to ají (63%) and camote (59%) is interesting, perhaps suggesting a national significance for these two species in Korea.

In relation to technology area, the only animal name of the six (*agouti*) is also the only species to not count C12 (biochemistry) or C12N (genetic engineering) amongst its highest three IPC codes. This may reflect the different classificatory position of animal derivatives *vis-á-vis* plant derivatives. Regrettably there is a lack of significant data about other animals with which to compare this result, however further research might establish the different patenting patterns of plants and animals in relation to biodiversity. Significant in the results of camote, cassava and ají was IPC code A23/A23L (Foodstuffs) which when correlated with the country result reveal that Korean patents largely concern food or food production techniques. Although the appropriation of traditional knowledge in foodstuffs is indeed 'global', such uses of plants are likely to represent colonial-era appropriation rather than biopiracy *per se.* The continuing relevance of colonial and present day appropriation of traditional knowledge and resources, described in Chapter One, seems more vivid in the light of such results. However, deploying a nuanced understanding of biopiracy - as a specific form of appropriation (in 'biopiracy work') - shows the connections to patents documents which are *left out* of concepts of biopiracy.

A61K (preparations for medical, dental or hygiene purposes) is a significant IPC code in all the six species. Although some of the patents contained in this category may indeed be examples of biopiracy, the global popularity of substances like chilli, corn, cassava, camote and potato mean that the references are highly likely to be made in the context of a compound or a list of ingredients. In addition, the difficulty in ascertaining the exact nature of the reference renders such large scale research impractical. This occurs, for example where a species name is not present, or in the case of papa común, ají and Zea mays, where the species name itself is not specific enough to tie down geographic origins.

A01H (New plant cultures/techniques) is among the most significant classification in terms of the use of biodiversity *and* accusations of biopiracy. However, with the exception of agouti and ají, the remaining four species are all listed as part of the International Treaty on Plant Genetic Resources for Food and Agriculture. The extent of patenting concerning these species in relation to A01H, (and also of biotechnology - C12N) suggests that the criticisms regarding the appropriation of resources held in 'custodianship' in International Agricultural Research Centres noted in Chapter One are indeed valid. Again, however, such patents are likely to represent the historic appropriation of germplasm rather than cases of biopiracy *per se*. I will now return to consider **Selected Patents**.

Thus far, the data obtained has been summarised in many formats, at various levels of analysis. This has been undertaken in order to demonstrate with maximum transparency, the difficult, limited, way in which cases of 'biopiracy' are generated and located in the patent system. It has been fruitful to know something of how the system is organised, the type of data it privileges. Moreover it has been necessary to portray something of the character of references to particular plants and animals which appear in patent documents: How many are they? To what area of technology do they relate? And which species are more represented?

However, one further analysis of the data remains to be made, and this cannot be made by making decisions over the IPC code, or deciding simply if a patent is relevant or irrelevant. These decisions have been made thus far in order to provide quantitative evidence of the scale of the use of selected plants and animals. It now remains to show exactly what is being claimed, where and by whom. I present below the results of those **Selected Patents** - potential cases of biopiracy - in Chart 16, and move on to discuss the most significant findings as depicted in Table 11 (Annexe 12).

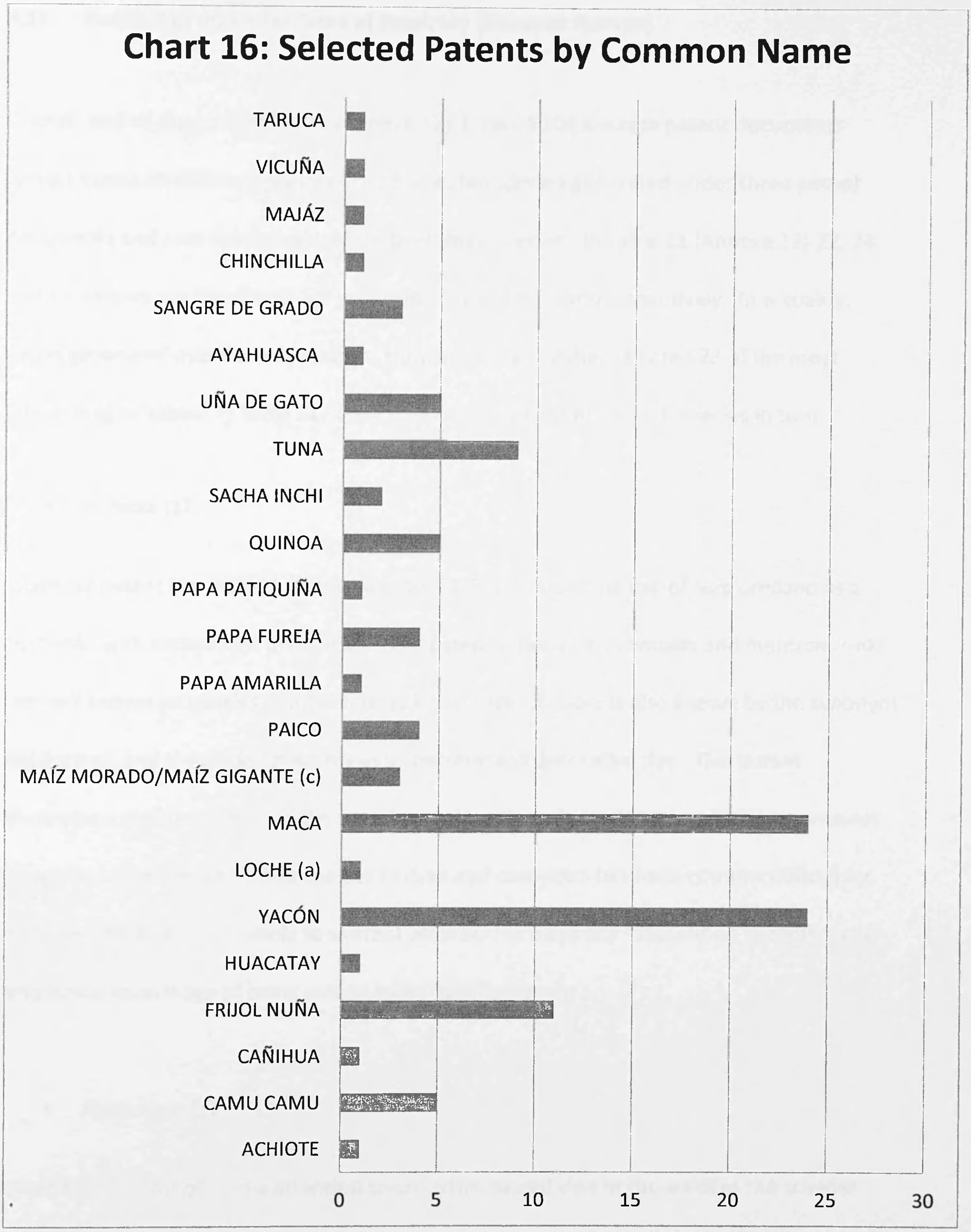


Chart 16: Selected Patents by Common Name
TARUCA
VICUÑA
MAJÁZ
CHINCHILLA
SANGRE DE GRADO
AYAHUASCA
UÑA DE GATO
TUNA
SACHA INCHI
QUINOA
PAPA PATIQUIÑA
PAPA FUREJA
PAPA AMARILLA
PAICO
MAÍZ MORADO/MAÍZ GIGANTE (c)
MACA
LOCHE (a)
YACÓN
HUACATAY
FRIJOL NUÑA
CAÑIHUA
CAMU CAMU
ACHIOTE
0
5
10
15
20
25
30

4.11 Analysis of Potential Cases of Biopiracy (Selected Patents)

Overall, and as shown in Table 11 (Annexe 12), I traced 108 discrete patent documents spread across 19 different species.[59] Of these, ten species generated under three patent documents and nine species generated over three species. In Table 11 (Annexe 12) 22, 24 and 11 patents are listed each for *yacón,* maca and *frijol nuña* respectively. In actuality, yacón generated over seventy results. However I have further selected 22 of the most interesting to appear in Table 11. I will now briefly comment on each species in turn.

- Achiote (1)

Japanese patent No. 082561 (Ushijima *et al,* 2005) mentions the use of *Bixa orellana* as a cosmetic, with antioxidant properties. The patent is fairly non-complex and mentions only the well known properties of antioxidants in skincare. *Achiote* is also known by the synonym lipsticktree, and is used in Amazonia as a cosmetic and decorative dye. This patent illustrates a classic example of the use of traditional knowledge in an appropriative manner. However, since the use of Bixa species as dyes and cosmetics has been commercialised for decades, the patent is unlikely to warrant attention as biopiracy. This shows the effects on traditional knowledge of being placed in the 'public domain'.

- Ayahuasca (1)

Given the amount of media attention given to this sacred vine in the wake of the scandal caused following Amazonian peoples' outrage at the patent granted over a 'new' variety of *Banisteriopsis caapi*, it is hardly surprising that results should indicate the US plant patent 5751 (Miller, 1986) - which is now expired. However, I will digress a little from the **Selected Patent** results here in order to point to the relative lack of attention which has been

[59] Some patents mentioned more than one species name.

afforded to the use of harmaline (or indeed harmine and tetrahydraharmine). Oldham, (2006) notes the use of ayahuasca derivatives such as harmaline in imaging technologies amongst other uses. The **Relevant Patent** results however indicate the use of these derivatives in diverse areas of medicine such as the use of harmaline in identifying neurotransmitter activity (Carrara *et al*, 2007), or in treating depression (Sheldon, 2005) and also in treating tumours or cancer (Jossang *et* al, 2007).

Examining patents such as those which relate to harmaline for example, it is important to note the difficulties of establishing traditional knowledge as 'prior art'. The use of derivatives negates the connection between such patents, and the whole organisms they make use of - often severing the connection between derivatives and the TK they embody. Nine of the **Relevant Patents** mention the use of harmine or harmaline for therapeutic interventions such as mood disorders, treatment of addiction and other mental health issues. However, the relationship of such derivatives - extracted via scientific techniques and (re) classified according to scientific nomenclature - to original plant sources is obscured.

The charismatic claims of biopiracy cannot easily transcend restrictions on the trajectories of knowledge that are established in these ways. The treatment of mental (and physical or spiritual) health through ayahuasca has been practiced by indigenous peoples since time immemorial, and even the specific use of ayahuasca to treat depression has been documented (McKenna, 2004). However, because the latter two therapies involve the use of whole plant extracts (and not derivatives) the intellectual property attached to each claim is classified differently - and biopiracy can not easily mobilise these documents.

- Cañihua (1)

One French patent grant (Paufique, 2008) claims the use of *cañihua* as a face cream. It is beyond the scope of this thesis to consider the extent of existing traditional knowledge concerning the use of this plant, however it is probable that its cosmetic uses have been previously known. This limitation of the research also highlights the substantial wealth of information which must be amassed in support of a biopiracy claim. Not only must research be carried out on the claims made in patent documents themselves, but also on the scientific knowledge (terminology, procedures) that such claims embody, on the legal implications of these claims, *and* on the extent of existing traditional knowledge documented in literature. The juxtaposition of the (relative) ease at which patent applications may be lodged is indicative of the unequal relationships that commercial organisations and indigenous peoples share in access to knowledge.

- Camu Camu (5)

Of the five patents relating to *Myrciaria dubia*, two patent applications claim the use of camu camu as a foodstuff, whilst one patent grant, and one patent application, claim the use of camu camu as a whitener, or as an anti-fading agent. One patent application claims the use both as a foodstuff and a whitening agent. What the existence of these patents shows effectively, is that the commodification of camu camu as a foodstuff continues despite the success of the 'biopiracy work' mentioned in Chapter Three, and given in Table Two (Annexe Two). In addition, the use of vitamin 'C' as a whitening agent or a colour stabiliser is hardly a revelation, but the inclusion of a new exotic fruit species in claiming the use of techniques which are substantially similar to existing methods may be allowed to stand for the creation of a new 'invention'. Such patent grants or applications call into question the level of 'inventive step' involved in the claim (or its 'non-obvious' nature) and highlight the concerns raised in Chapter Three about quality of patent claims themselves.

- Chinchilla, Majaz, Taruca & Vicuña (2)

The patents relating to animals were both fewer in number than those relating to plants, and much less relevant as a whole - hence there are only two patents which appear in Table 11 (Annexe 12). The first patent grant (Lawson, 1983) relates to use of chinchilla thymus gland to treat immune related diseases and reticulo-endothelial related diseases in animals. Dating from 1983, this is the oldest patent selected for close analysis. It has been selected because of the light which it sheds upon the trajectories of genetic or biochemical derivatives, and the subsequent influence that even a single patent claiming use of an chemical extract (of a thymus gland for example) can have. Once substances have been described in a way which obfuscates their connection with integral whole organisms, and as such subsequent appropriation (through intellectual property claims) may be enabled through mere references to *earlier* (expired) patents. This provides an effective route via which claims over TK are disentangled from the biological materials which appear in later patent documents.

An example of exactly this is provided in the second patent application, which relates to the 'monomeric VHH domain derived from camelid antibodies': the application relates to camelids such as *vicuña* and *majaz* (Surrey *et al*, 2009). The in-vitro culture of these biomaterials, (or, the commodification of encoding of genetic information without direct relation to material substance) creates intellectual property in fragments of organisms. By encoding information thus, 'biological proxies' (Parry, 2004: 142) are imbued with value, whilst the traditional knowledge embodied in the 'host' organism is cast aside as claims to knowledge ownership are established.

- Huacatay (1)

One US patent grant relating to *huacatay* presented in Table 11, claims the use of *Tagetes minuta* to kill worms and other insect pests (Okioga & Rajamanan, 1997). The patent is interesting as an example of patents which are no longer legally in force, since it has *lapsed*. This occurs when renewal fees are not paid by the assignee, and means that the patent will expire before the fulfilment of the protection period. Generally, expired patents are much less interesting for research into biopiracy, because the claims made within such patent documents are no longer upheld in law. However the consideration of such documents affords two insights in relation to biopiracy.

The first is that not all published patents actually demonstrate commercial viability, and are thus allowed to lapse (either permanently or for part of the term). The implications of lapsed patents such as these challenge the nature of the 'biodiversity patent' as a protection on an innovation *per se*. It may be that such patents do not indicate the existence of a composite product (Agrawal, 2002). Further research is indicated to assess the extent to which biopiracy patents are actually commercially utilised. However, lapsed patents do still represent a lucrative source of information for would-be patentees of other specific technologies, since they remain in the patent system. This has implications for the kinds of information indigenous peoples may wish to control access over, even if legal protections over plants and animals are not in place. The connections that such patents make - as information rather than as commercial ventures - outlast the period of intellectual property claims made by the 'original' assignee.

- Loche (1)

Of the multitude of patents relating to pumpkin that appear in the earlier tables of results, few relate specifically to *Cucurbita moschata*. Of these, one patent application is listed in Annexe 12 (Sato, 2006). This patent claims the use of *Cucurbita moschata* to, 'treat prostatic hypertrophy and acne'.

- Maca (24)

Maca has been the subject of a great deal of controversy in Peru, as we have seen in Chapter Three. A selection of the patents which have been filed since the outset of the work of the NCAB (or which have been filed as a result of the international attention given to maca as a result of this work) are commented upon here. Some claims made in the twenty-four patents shown in Table 11 relate to the use of maca in the management of obesity (Yazawa, 2007), or as an agent to improve blood flow to combat complaints such as chilblains (Leclerc, 2006), as a treatment for stress (Watanabe & Kishi, 2007), and most recently, as a remedy for ameliorating a hangover (Yamada, 2009). Ten of the remaining patents establish claims about the use of maca in altering fertility or hormonal levels. Such patents indicate that the use of maca for a wide variety of nutraceutical and medicinal, as well as cosmetic purposes is continuing, despite the international attention received, and despite the successes of the NCAB (see Annexe Two).

However, another patent application establishes claims over the use of *both* maca and yacón (Gonzales Rengifo *et al*, 2009). The patent claims the use of atomized or lyophilized *Lepidium meyenii* or *Smallanthus sonchifolius* in the treatment of benign prostatic hyperplasia, osteoporosis, hyperglycaemia, male infertility, improving memory and learning and reducing the likelihood of miscarriages. Aside from the number of uses and inclusion of two separate, named species of interest, this patent application is interesting because of its geographical origin. This patent is one of only two in the above table which originate in Lima, Peru. Despite being filed with the USPTO, an examination of the document itself reveals that the inventors had assigned the patent application to the *Universidad Peruana Cayetano Heredia.*

Patents such as these are somewhat of a rarity in the patent system. As a patent originating from within a country who is internationally pursuing an anti-biopiracy agenda, this patent highlights an under explored area of biodiversity patents. The uneasy alliances between indigenous peoples' interests and those of Peruvian exporters and commercial enterprises (-bridged so contentiously in biopiracy work), how would the NCAB renegotiate the trajectory of analysing cases of biopiracy that might arise from *domestic*, rather than foreign patentees? Such conundrums create questions about INDECOPI's abilities to act in both the defence of the intellectual property claims of the assignee, and (potentially) of the traditional knowledge holders. It remains to be seen whether Peruvian authorities may act, or fail to act, in the interests of indigenous communities when the identified 'biopirate' is a fellow citizen.

- Frijol Nuña (11)

After yacón and maca, Frijol nuña was the plant that generated most **Selected Patents**. Of the 11 patent results, only two patents did not seek to establish claims over new *Phaseolus vulgaris* varieties. Of these two patent applications, one made claims over the, 'common bean DNA' (Kelly & Melotto, 2002). The remaining patent claims the use of extracts of *Phaseolus vulgaris* (Bombardelli *et al*, 2007). The latter patent is particularly interesting as it lists the use of ethanol in producing *Phaselous vulgaris* extracts. The combination of vegetable matter and alcohol is hardly groundbreaking science, and given the availability of alcohol it is probable that indigenous peoples have developed traditional methods of extracting materials thus. The existence of similarly obvious claims in patent documents relating to the use of maca is also noted in a Peruvian submission to the Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore (IGC, 2003). However, examination of a patent claim would depend on for what *specific* purpose the maca is extracted, and not necessarily the means of extraction *per se.*

One patent application, concerns, 'Bean-nut popping beans' (Ehlers & Sterner, 1999) and has been the subject of a deal of controversy (ETC Group, 2001a). The claims of this application, based on US patent grant, relate to hybrid variety of bean - a cross of different Andean varieties. Such varieties have been used and bred for centuries in the Andean Region, including in Peru, where the bean provides an important source of nutrition (and because of the non-resource intensive way it is cooked). It appears that the patent is still in existence, nine years after allegations of biopiracy emerged. A similar situation concerns US patent 5894079 - 'A field bean cultivar named Enola' (Proctor, 1999).

After considerable controversy, the US Patent and Trademark Office rejected the claims made in this patent in April 2008 (Wilson, 2008). However, the patent enjoyed nine years of existence before it was quashed. This patent and others like it, give an important insight into the difficulty of contesting a patent, even on very solid legal grounds, and within the narrow definitions of 'biopiracy' permissible in intellectual property law. In this respect, it seems the patent system is orchestrated in a way which effectively places the emphasis on indigenous communities to 'prove' their knowledge, rather than on biopirates or would-be assignees to 'prove' the novelty of their inventions.

- Paico (4)

One European patent application details the use of extract of *Chenopodium ambrosioides L* in the treatment of gastric problems such as *Helicobacter Pylori* infection (Wei *et al,* 2008). A US patent application (Hall, 2003) claims the use of *Chenopodium ambrosioides* as a treatment for uterine fibroids and cancer. The remaining two patent applications concern the use of *paico* as a pesticide.

- Papa Fureja, Amarilla and Patiquiña (4)

Given the symbolic and practical importance of the potato to Andean peoples, and its importance as an international foodstuff, I was surprised to find few patents relating to the specific varieties of potato, many of which have superior nutritional qualities to the common potato. That said, one patent application made mention of the scientific names of all three varieties above in relation to providing a crossed variety of 'mini-potato' (Hosaka *et al,* 1995). The patent is somewhat unusual in that it makes mention of the Andean origin of such potatoes. More usually, the patent makes no mention of the indigenous people whose traditional knowledge is embodied in such varieties. Interestingly, the patent has lapsed due to non-payment of renewal fees. The remaining patent applications claim the use of *Solanum phureja* as a dye (Oda *et al*, 2003), as an anti-cancer compound (Himaari *et al,* 2006), and as useful in the treatment of liver disease (Noda *et al*, 2006).

- Purple Corn and Zea Mays (3)

In searching for patents which relate to the use of *maíz morado* or *maíz gigante* in the patent system, the kind of relatively more reliable referent which was provided for other species in the use of the scientific nomenclature was not in place for *Zea mays*. This one term refers to a massive number of varieties of corn. The sole PCT patent application claims the use of *Zea mays* in the treatment of obesity and diabetes (Tsuda, 2003). One US patent grant is an example of the encoding of genetic information related to *Zea mays* (an area of massive patent activity) (Helentjaris, 2008). Yet another interesting patent grant (Baylor College Medicine, 1999) relates to the use of corn as a contraceptive, as well as in the treatment of multiple cancers. Though it is unclear if this patent is a case of biopiracy. And this patent has now expired, it does seem that in Africa, corn may have been used as a contraceptive in traditional medicines (Babola, 2009). Given the popularity of corn in Peru this may well indicate an area of existing traditional knowledge. The confusion surrounding *what* traditional or indigenous uses are is both a vital means of protection of traditional knowledge against biopiracy (remaining out of the reach of would be patentees), *and* an obstacle in providing 'prior art' with which to refute the claims of patents. This double-bind is a major mobilising factor in the creation of National Registers of Collective Knowledge for use in prior art searches. However, as we have seen in Chapter Three, the reified TK that is contained in such registers also effectively erases the need for extensive contact with indigenous communities.

- Quinoa (5)

A patent application by Ward & Johnson (1993) has been the subject of international accusations of 'biopiracy', particularly from Bolivia (ETC Group, n.d). Quinoa is a plant found throughout the Andean region - including in Peru. The patent - which relates to Apelawa quinoa cytoplasm - has long expired (due to a failure to pay fees). It is unclear from patent records whether the expiration was heralded by claims of biopiracy or by a simple lack of revenues available from the patent. It is interesting to contrast the 'life' of this patent with the similarly contested patents on yacón, and on frijol nuña, for example, both of which are 'live' despite being the subject of similar moral outrage. Such examples show the impact of particular cases on emerging conceptions of biopiracy in the patent system. The remaining patent applications relate to the use of quinoa milk (Giacometi *et al,* 1989), to quinoa as a nutraceutical or cosmetic slimming agent (Garcia & Stolz, 2008), and to quinoa proteins (Scanlin *et al,* 2009). A final patent application is perhaps the most interesting for biopiracy research as it claims the use of (quinoa) saponins - foaming chemicals - in treating high blood pressure (Estrada *et al,* 1996). It is yet another example of the fracture between whole organisms and derivatives which is facilitated by intellectual property standards and scientific technologies.

- Sacha Inchi (2)

The case of sacha inchi was addressed at length in the previous chapter as an example of biopiracy which involved the Peruvian Patent Office (INDECOPI), transnational corporations and the French government. The two patents presented in Table 11 are also those discussed in this chapter.

- Sangre de Grado (3)

Three patents claim medicinal uses of *Croton lechleri*. One US patent grant relates to the use of *Croton lechleri* extract to ameliorate disease, but the claims relate specifically to the process of extraction rather than the use of the species (Borowski, 2007). The patent is notable for its concentration on the methods of acquiring, rather than the applications of the use of this species. The patent reminds us that biopiracy also has the potential to forge connections that highlight the appropriation of traditional *methods* of acquiring resources themselves, as well as challenging the appropriation of traditional knowledge about the *uses* of plants (medicinal or nutritional).

The two remaining patents were originally assigned to the now defunct 'Shaman Pharmaceuticals', whose bioprospecting agreement with the "Aguaruna people" was outlined in Chapter Two. This organisation has been the subject of much international interest (Greene, 2004). The two patents in presented in Annexe 12 are US patent grant No. 7323195 (Rozon *et al,* 2008), and WIPO patent application WO/1992/006695 (Tempesta, 1992) have now been reassigned to ' Napo Pharmaceuticals' and 'PS Pharmaceuticals' respectively. They relate to the use of sangre de grado as an antiviral and anti-diarrheal treatment agent respectively. Both patents show signs of continued expansion into new designated countries, the most recent activity being in April 2010. Despite the widely acknowledged collapse of a major bioprospecting corporation - and commercial failure this has been thought to imply - it appears the portfolio remains commercially attractive.

The reassignment of intellectual property rights of course, does not mean the new organisation is obliged to honour any benefit-sharing agreements Shaman Pharmaceuticals may have entered into. Indeed, even where this is not the case, the lengthy process for examination of patents means that even where they are not commercially successful *per se,* chemical synthesis of plant extracts may be achieved before the grant process is complete. As Dorsey (2003) writes, throughout the 'sustainable' field operations Shaman Pharmaceuticals undertook relating to sangre de grado, the company was also consciously trying to isolate and chemically manufacture the active compounds (in order to eliminate its dependence on local suppliers).

It is highly likely that these resulting patents will grow in value due to the proximity of the end of the clinical trial phase of US Food and Drug Administration testing for two drugs developed from sangre de grado (Crofelemer and Provirir). As we have seen in Chapter Two, the raw materials for these trials were sought from Aguaruna communities in Peru, but the drugs themselves will generate no royalties for the communities concerned. This scenario is a pertinent reminder of the, 'business as usual' (Wynberg, 2005: 853) Janus-face of benefit-sharing agreements argued in Chapter One.

- Tuna (9)

Nine patents appear in Annex 12. Three patents refer to the use of *Opuntia ficus-indica* in foodstuffs, of which one patent application also claims nutraceutical benefits. Another patent grant (Jee *et al*, 2008) claims the use of *Opuntia ficus-indica* as a anti-pathogenic compound for fish. Two patents applications relate to the use of *Opuntia ficus-indica* in the treatment of cranial nerve, cerebrovascular diseases and cardiovascular diseases (Jin *et al*, 2008 & ,Jin *et al* 2008a). Two other applications claim it as a cosmetic agent, one of which calls the substance, 'proline' (Grimaud *et al*, 2009). Another patent application claims the use of *Opuntia ficus-indica* as a treatment for hepatoxic disease (Jin *et al*, 2010). It is interesting to note that in the academic references of each patent - though not in the claims - the variety mentioned is '*Saboten*' which appears to indicate that the cactus is a variety associated with Korea, where it used in traditional medicine (Oh & Kym, 2006).

The aforementioned patent provides an example of the taxonomic confusion and difficulties which surround the use of plants and animals in the patent system. Where a variety is not specified, the species can appear to 'come from nowhere'. As we have seen in Chapter One, affixing scientific denominations to knowledge can legitimate or inscribe upon it a superior status, through the appeal of scientific classification systems. Through the fracture produced between (scientifically improved) 'varieties' and their 'wild' cousins, scientific taxonomies also generate asymmetrical relations between traditional and scientific expertise and technologies.

- Uña de Gato (5)

There were a considerable number of patents which involved the use of *Uncaria tomentosa,* which proved to generate many more patent results than *Uncaria guianensis*. However many patents simply listed the plant alongside tens or even hundreds of other botanical ingredients. Of the five **Selected Patents**, one patent relates to the use of *Uncaria tomentosa* as an oral care agent to combat gingivitis (Marshall *et al*, 2008). The assignee is Mars UK Ltd, and the interest of such a large confectionary corporation in botanical remedies indicates well the wide spectrum of research interests in patents relating to the plants and animals of interest.

Regarding the other uses claimed, one patent simply refers to *'cat's claw'* as a functional foodstuff for weight loss (Ogawa, 2005). A French patent also concerns claims about the use of *Uncaria tomentosa* for weight reduction (Rival *et al*, 2002). Another patent application claims the use of *Uncaria tomentosa* as acytostatic, contraceptive and anti-inflammatory agent (Keplinger, 1982). Lastly, a PCT patent application filed with the EPO lists the use of oxindole alkaloids, in the maintenance of a healthy immune system (Wagner & Kreutzcamp, 1987). This patent application has now expired, but was granted in several countries. The proliferation of uses of this species - spanning over 20 years of intellectual property claims - shows the difficulties of establishing biopiracy claims over a species whose medicinal use has already been patented, and thus the knowledge described therein is classed as in the public domain. As we have seen in Chapter Three, the 'bargain' made by society and industry means that upon expiration, inventions are regarded as in the public domain - despite the appropriation of traditional knowledge which such patented uses may represent.

- Yacón (22)

Finally, of the seventy-eight patents or patent applications relating to yacón that were identified as potential cases of biopiracy, twenty-two of the most interesting appear in Table 11 of **Selected Patents** (Annexe 12). All of the patents in Table 11 date from 2003 onwards. Of these fourteen are Japanese in origin, four are Chinese, three are Korean, and the remaining patent application is described under the maca subheading above. The claims made by these twenty-two patents are diverse - relating for instance to the treatment of cancer (Tamura *et al*, 2007), and the use of diterpenoids in diabetes (Dou *et al* , 2008; Kim, 2009), as well as to skincare preparations (Osumi *et al*, 2006). Although undoubtedly interesting, such patents or patent applications are perhaps most significant to biopiracy research because of the events which preceded their filing.

The proliferation of patenting with regard to yacón began in 2002, following an infamous transfer of germplasm from Peru to Japan in 2001. A political scandal erupted in 2001, it concerned the (legal) plunder, by employees of the National Institute of Natural Resources (INRENA), of a large international gene bank held by the International Potato Centre (CIP) that had taken place two years earlier (ETC Group, 2001). Subsequently, yacón tubers were delivered to the Japanese government through a network of private interests closely aligned to the Fujimori Government (ETC Group, 2001). Such scandals indicate the vulnerability of both genetic resources, and of associated indigenous or traditional knowledges, which are held 'in trust'. Although legally protected, such collections remain vulnerable to political exploitation.

Having established the particular claims of patent documents that relate to potential cases of biopiracy, I will now return to examine the kinds of omissions made in the presentation of this data. What kinds of relationships have been erased in the 'biopiracy work' above?

4.12 Biodiversity Patents (Level One & Two Data)

The methodological descriptions above, go some way to describing the process of cutting down data to meaningfully chart the existence and mobility of global biopiracy, as it is engaged in the patent system. We have seen that in relation to sixty plants and animals, biodiversity is being extensively used (Level One data). We have seen that claims are being made over the uses of of such biodiversity in relation to specific technology areas, and in relation to specific species - particularly those in IARC collections (Level Two data). However these results are not what it meant by cases of biopiracy, when 'global' biopiracy is engaged according to the principles of 'biopiracy work'. I turn now to reflect upon the meaning of the 'gaps' (Tsing, 2005:175) into which fall hundreds of patent documents. What nuances of biopiracy - a global concept acting in and mediated by the world - are revealed by the failure of certain patents to convince us that they are examples of biopiracy?

To borrow from a camera metaphor - I have attempted throughout this chapter to outline the 'lenses' I used (the methodological steps I took) - to adapt to the changing terrain of the corners of the patent system which I travelled into. The 'terrain' also affected the glimpses of the patent system offered by the production of the quantitative conclusions of this chapter. The tension between the drive to 'discover' biopiracy in the patent system and the limitations of my ability to negotiate the terms of my encounter with it (and the global standards of knowledge classification it embodies), set the criteria for which patents count. The 'bridges' offered up by the use of software, scientific taxonomies and International Patent Classifications also go on to define which patents *matter*.

Another metaphor, that of the mining machine, is perhaps very apt to use to describe the 'hacking away' at data that I have undertaken here. The irritations and frustrations of 'mining' a 'terrain' whose surface is so vast that one begins by considering over one hundred and thirty three thousand documents, is obvious. But such frustrations pale in significance to those encountered in exploring the other dimensions of that 'terrain'. Going 'deep' into the data is necessary to produce the 'extracts' wanted (the patents that *'matter'*): but it also reveals obstacles and different objects which call into question the 'purity' of the knowledge retrieved. As a researcher I could never be sure that I had retrieved everything of interest, nor that I had made the correct decision about what really *mattered*. Such insecurities and difficulties detract from the charisma of the connections biopiracy makes with specific patent documents here.

The conclusions I draw about biopiracy, as it is produced in doing the research presented in this chapter, are thus products of encounters between global biopiracy and the particular understanding of it I have mobilised here. This requires an understanding of biopiracy that is engaged in a way so as to view traditional knowledge as *embodied* in plants and animals, and resists the strict separation of traditional knowledge from biological resources. In so doing, I question the types of relationships between knowledge, artefacts and people which are implicit in scientific taxonomies and intellectual property standards.

As we have seen in Chapter Two, the products of global-local encounters are always unstable (Tsing, 2005). This means that different patents (artefacts) could be found by traversing the obstacles presented in the international patent system in another – different - manner. In categorising the levels of data I have presented, I am articulating the factors which influenced my decisions over the inclusion and exclusion of patent documents from this analysis. I do this in order to highlight the existence of other possible connections (to patent documents which claim property in the use of biodiversity), which might be mobilised in alternative research into the appropriation of traditional knowledge. These then, are decisions which resist extraction from the bedrock of the *doing* of patent research to say, a list of tight rules and corresponding logic, (i.e. bakery goods are 'out' and medicines are 'in').

The scale and number of obstacles faced in conducting searches on the uses of plants and animals - the 'indeterminacy' of interpreting search results - mean that no *strict* methodology was developed which might avoid compliance with scientific taxonomy and intellectual property standards. The 'terrain' was simply too vast, too unknown to go 'off-road' so to speak. This vastness only became navigable through the assistance offered by global classification systems such as the IPC and scientific taxonomy. A constant problem was the issue knowing what a patent is 'about'. I was faced with a proliferating field of subject matter - concerning genetics, organic chemistry, pharmacology or physics for example. This questioned my own ability to 'read' the documents I had gathered. Some patents fell off the list of **Relevant Patents**, or **Selected Patents,** because they were simply unintelligible to the lay reader. The areas into which biopiracy can be mobilised are stifled by this un-readability.

However, indeterminacy is not a condition that can be entirely remedied by knowledge of technology areas. The complexities of the classes created by the IPC codes themselves obfuscate the question of what a patent is about : *several* classes can apply to the same patent - if the claims relate to different methods and uses of a thing. If it is not primarily the 'biovalue' (Waldby, 2002:310) of a substance over which a patent claim is made which concerns the researcher, but the organism to which the patent refers, such categories are less helpful. International Patent Classification categories also create an 'axiom of unity' (Tsing, 2005:89) between scientific taxonomies and intellectual property standards. For example all toothpastes will have similar codes, whether or not they use herbal compositions. In this way it is not the knowledge which propagated or created an organism which is made visible, but the knowledge that appropriated the organism to serve some commercial function.

As IPC codes narrow down the focus on specific technologies, they replicate the claims to knowledge production made on behalf of the scientific knowledge which created such technologies, *and* obscure the knowledge and technologies embodied in plants and animals (materials which are essential to ensuring the utility of such technology). For example the IPC is not divided into sections which reflect the geographical origins of a plant, which might tell us a lot about where the knowledge claimed as property came from. Instead it is organised by the area of science, or the use to which the thing can be put. The areas into which biopiracy can travel - in order to make connections with the knowledge described in patent documents - are also rendered unreachable by the application of categories in this way.

A number of factors were encountered which relate to the 'slipperiness' of nomenclature and its effect in producing 'indeterminacy' in the patent documents I encountered. One of the plants which I was looking for in the patent system (*'loche'* or *'Curcurbita moschata'*) appears in some documents to be a synonym for the same organism as does 'pumpkin', and in other documents so does 'butternut squash'. In some of these documents the name *Curcurbita moschata* appears next to the word pumpkin, but in others pumpkin appears next to another name such as *'Curcurbita pepo'*. In yet other documents only 'butternut squash' is present, or only 'pumpkin'.

Hence, decisions over which documents to include - based on ascertaining what the patent refers to - are a constant feature of working with patents, particularly concerning common names. As a result of this slipperiness, my patent search came to rely on the charisma of scientific nomenclature - which offered more convincing connections between terms than did other names. By accepting the bridges offered by scientific taxon, biopiracy - engaged in the patent system - is generated through its complicity with the reification of traditional knowledge as pre-codified data. The origins of materials thus become validated in relationship to scientific taxon , for example by recognising similarity by species or variety only . This undermines recognition of the existence of traditional knowledge which cannot be codified.

The above paragraphs are examples of how a 'pre-established unity' (Tsing, 2005: 89) between scientific taxonomy and scientific knowledge in general work to direct the spaces into which biopiracy can move. From the outset, patent searches must grapple with the kinds of help, or hindrance offered by the organisation of knowledge in this way. This means that significant limitations result, which reduce the types of connections with patents that (engaged) biopiracy can make. For these reasons I have provided level One & Two data, in an attempt to highlight the existence of, 'roads not taken' (Frost, 1995).

4.13 Relevant Patents (Level Three Data)

I faced more fundamental problems of indeterminacy. This was particularly evident in areas of genetic technologies. If a patent, for example, speaks of splicing a gene from a tomato into a potato, and then back into a tomato (after the gene has become modified in relation to non-susceptibility to a virus): What exactly *is* the 'object' that the patent is describing? Moreover, how do I make sense of that object, in relation to the plants and animals I am interested in? On the one hand, the patent claims mention potato, one of the names I am researching, but on the other hand the plant that is described as modified by the gene splicing is the tomato, which is not a species of interest here.

More fundamentally (in terms of assessing if the patent *matters*): Does it matter for issues of biopiracy that the potato was used thus? Such patents are an example of intellectual property claims over plants, which are significant for indigenous communities in Peru. Yet, they do not fit with the narrow definitions of biopiracy generated by the 'biopiracy work' described in Chapter Three. The establishment of '*a priori* unity' (Tsing, 2005:89) is achieved in patent searches between principles of intellectual property law which separate knowledge and tangible resources, and the creation of categories of patent which do, and do not, indicate biopiracy. This is vital because it restricts the definition of biopiracy to include very specific fragments of traditional knowledge, and thus leaves fundamental issues over the treatment of TK unchallenged. This means that the potato in this example is not considered a case of biopiracy, since the intangible elements of traditional knowledge (embodied in the tuber) have been separated from the vegetable itself according to the standards produced by intellectual property law.

In other words: the patent system is a near impossible terrain to negotiate, unless research engages universals such as the use of scientific nomenclature, International Patent Classification codes, and intellectual property standards. This makes the search for biopiracy in the patent system a kind of *fait accompli*. The restrictions placed on search parameters and meaningful results reveal the power of hegemony in global concepts that are engaged through global-local encounters. The essential 'un-readability' of the system without engaging these universals is a crucial obstacle in the trajectory of a biopiracy that could maintain a representative connection with (non reified) traditional knowledge.

4.14 'Roads not taken' - Level Three Data

Examples of 'roads not taken' in research are represented in decisions over where to 'stop' along the path of elaborating nomenclature and of decisions over technology areas that should be included(or excluded). The possible list of names which could relate to the plants and animals researched was seemingly endless. The problem of slippery taxonomy followed me here, but I was able to expand the list of names for a given plant or animal to try to capture the largest amount of 'interesting' data. However whereas some plants - such as ayahuasca and achiote - were searched for along with some derivatives identified, other derivatives of this plant (and others), unbeknown at the outset, were thus not looked for. The work of identifying derivatives and names which generate interesting results from the patent system requires de-codifying multiple levels of naming (which obscure the origins of plants). It also requires unpacking the jargon of developments in multiple scientific technologies and taxonomies - of scientific knowledge - which convincingly facilitate the separation of extracts (or derivatives thereof), from whole organisms.

In the presentation of 'relevant' results I have excluded patents where the plant or animal in question is mentioned, but is included in a compound. In addition I have excluded 'unreadable' areas such as in chemistry or in genetics, where the plant or animal is mentioned in relation to some previously named genetic component or as a chemical in a baffling compound. On the one hand these patents are significant 'biological proxies' (Parry, 2004: 142) representing organisms. As such they encapsulate the generalisation and commodification of traditional knowledge embodied in plants and animals *par excellence*.

On the other hand, they are embodiments of the hegemonic power of scientific classifications to create 'discoveries' in living things. However such patents are highly unlikely to convince the National Commission Against Biopiracy that they have a connection to biopiracy, because the *combination* of several different ingredients in a compound. This means that - even if the principal active agent has also been used by indigenous people for generations - the act of combining substances with previously documented efficacy can itself equate to an 'invention'. The degree to which patents over compounds represent non-obvious technological developments is a highly contested matter, and also highlights the asymmetrical treatment of scientific and other knowledge systems.

To illustrate, the types of patents described above concern the use of traditional knowledge - embodied in the plant material or use thereof - and so become **Relevant Patents** in this research. However, patents claiming the use of compounds have generally not been included in the list of **Selected Patents** as the 'Claims' section of these patents refer to the species of interest as either a composition, or one 'option' in a lengthy list of given plants or derivatives. Patents have not been included in **Selected Patents** if - in the context of the patent's claims - the plant or animal of interest appeared to be not the *main* subject of the patent, for instance because it was used as one genetic component amongst others, or because the plant or animal in question was part of an expansive list. For example a patent claiming use of 'quinoa sprouts' also mentions the following:

> '1. A phytonutrient composition comprising [...] at least one botanical constituent selected from the group consisting of:
> barley grass juice powder, spirulina, chlorella, blueberry, green tea extract, grape seed extract, cranberry, raspberry, tart cherry, pine bark extract, broccoli, tomato, bilberry, elderberry, pomegranate, blackberry, rutin (50/50), raspberry extract, apple, carrot, mango, sweet potato, lemon, parsley, peach, kale, broccoli, spinach, leek, beet, cranberry (quinic-acid 6%), acerola cherry powder, rice bran, aloe vera powder extract, green tea, white tea, poygonum cuspidatum, oar beta glucan, cinnamon extract, cinnamon bark powder, milk thistle, marigold extract, dunaliella salina, alpha amylase, bromelain, cellulose, galactosidase, glucoamylase, hemicellulase, lipase, papain, lecithin, cabbage, lycopene extract, lemon peel powder, quinoa sprout, artichoke extract, and atlantic kelp powder.'
> (Vikhrieva, 2009)

This means effectively ,that producing an expansive, vague, or combinatory claim that involves a specific plant or animal is unlikely to be considered to be an act of biopiracy (as it is engaged in 'biopiracy work'). The connections made between multiple substances in the same document, work to obfuscate the appropriation of traditional knowledge: as it is *embodied* in organisms, and as it reflected in the uses of organisms. Simply, by listing masses of ingredients, the particular function of a single organism is hidden. Sometimes this obfuscation is less complex: for example in one patent concerning the use of sacha inchi with *Cynara scolymus* leaves (Golz-Berner & Zastrow, 2008). Other times, the combination is intricate enough to almost entirely obscure the connection between the patent claim and the whole plant or animal used. In either case however, the connection made between claims about particular (intellectual) property rights in the use of plants and animals, and the traditional knowledge they embody is not rendered strong enough to convince patent examiners (or the NCAB) that these connections constitute biopiracy.

The 'magic' of patent claims stories - where a plant or an animal 'appears out of thin air' - is such that it cuts the organism out of the social, cultural, economic, ecological and political relationships that make possible its *ipso facto* existence outside of the patent system. In this magic, or perhaps, 'witchery' plants and animals appear to come from 'nowhere' to simply exist in a laboratory, or factory (Kloppenburg, 2000:516). This is reminiscent of the colonial appropriation of traditional knowledge described in Chapter One. Such omissions are more than incidental: separations of this kind are quintessentially important in easing the transition of 'thing' to commodity. Oldham (2006) also notes the tendency of patent documents to circumvent the problematic issues which arise over access to and the sharing of the benefits of biodiversity, by omitting to disclose the origins of bio-materials.

4.15 Conclusion

This chapter has attempted to answer a number of separate but related questions concerning the relationship of biopiracy to the patent system in relation to a specific list of plants and animals. I have done this by searching for four levels of data that illustrate: the uses of biodiversity, claims over the uses of biodiversity, **Relevant Patents** that are 'not' cases of biopiracy, and **Selected Patents** that are potential cases of biopiracy. The research has indicated a number of particularly interesting patents, presented in the penultimate section. In addition, individual species and areas of technology have been graphically presented, providing information on the main geographical and temporal trends in the patenting of biodiversity and in relation to biopiracy. What can such patents reveal about biopiracy? This question has proved extremely complex to address, due to the difficulties in obtaining reliable information from patents, and not to mention the sheer volume of patents involved. The semantic context of references to plants and animals often means that decisions over which patents *could be* 'biopiracy patents' is a very complex matter.

The previous chapter has documented my experiences with 'biopiracy work' in the National Commission Against Biopiracy and described the 'engaged universal' (Tsing, 2005:8) of biopiracy which such work produces. The trajectory of biopiracy I followed - from my arrival at INDECOPI - became bound up with patents. In this chapter the drift towards global or universal concepts - like intellectual property standards and scientific taxonomy - have been followed, to produce a set of **Selected Patents**. However, those concepts have also been explored and examined, in order to highlight the limitations of the connections they encourage (and disavow) in the tracing of biopiracy in the patent system.

In this way, I have also engaged global biopiracy in a manner which avoids the unwitting reification of traditional knowledge, and which could provide space for examining alternative ways of establishing relationships to knowledge, artefacts, and people - allowing different understandings of biopiracy to emerge. The difficulties and constraints imposed by hegemonic classificatory systems and standards, produce powerful convergences (Tsing, 2005:89) in the difficult process of conducting patent searches that are based on a search for the use of traditional knowledge. This restricts the congeries of biopiracy produced to reify traditional knowledge. There *is* evidence of biopiracy in the patent system, as demonstrated in the examples analysed. However, the terrain of the patent system prevents an exhaustive examination of the theft or appropriation of traditional knowledge, allowing us to track biopiracy in only limited ways.

PART THREE

Chapter Five

Does Biopiracy Matter to Indigenous Communities?:

Notes from an Amazonian Village

'Our categories and discriminations always produce zones of "boredom" and unreadability; powerful projects of categorization, including development and conservation [...] produce persistently uninteresting, invisible and sometimes illegitimate zones – which I call 'gaps'.' (Tsing, 2005:172)

5.0 Introduction

I have followed the trajectory of biopiracy from the 'global', international stage, to chart its engagement in the 'biopiracy work' of the National Commission Against Biopiracy (that itself generates a different, hybrid understanding of biopiracy). This biopiracy is the result of the generative potential of 'friction' (Tsing, 2005), which allows the reification of traditional knowledge, and makes representations of indigenous peoples' interests: forming uneasy alliances, and working to exclude connections with indigenous communities. I have traced the use of selected plants and animals in the patent system, and found that the use of traditional knowledge is difficult to follow there. The hybrid concept of biopiracy generated in this quantitative research, highlights further 'gaps' and 'convergences' (Tsing, 2005:175, 89) in biopiracy, and these determine the meaning of the use and 'theft' of traditional knowledge. These 'global-local encounters' are examples of processes through which biopiracy must continually negotiate its 'universal aspirations' (Tsing, 2005:1). The different, but related, understandings of biopiracy at these three levels begin to force consideration of multiple 'biopiracies' - as biopiracy struggles to remain singular throughout its travels.

In this chapter, I consider traditional knowledge and its connection to biopiracy. In doing so I (re)acquaint myself with an indigenous community, the persons who also form such an integral part of 'My Biopiracy Story' as told in Chapter Two. In so doing, I am researching two major 'gaps' - unreadable areas (Tsing, 2005:175) - in the 'biopiracy work' of INDECOPI, those which reify traditional knowledge and speak for indigenous peoples interests. To open my ears, and eyes, to indigenous peoples' perspectives on the manifold issues brought together in the 'biopiracies' I have described in the last two chapters, I travelled to Amazonia. I sought some community-level responses to the following - necessarily broad - questions.

How do indigenous peoples conceive of their relationship to plants and traditional knowledge? What does 'biopiracy' mean to them? This chapter addresses the encounters I had in San Francisco de Yarinacocha, and is divided into seven consecutive sections as follows: Researching in San Francisco, Plants in San Francisco, Plants and Medicine, Traditional Knowledge and Biopiracy, Traditional Knowledge and Agroproduction, Plants and Shamanism, and Loss and Rhetorics of Loss. I conclude by arguing that (yet) another hybrid biopiracy is generated by considering the concerns that this indigenous community have over the use of their traditional knowledge.

- <u>Section One: Researching in San Francisco de Yarinacocha</u>

5.1 San Francisco

The village of San Francisco de Yarinacocha[60] is a collection of mainly wood and Plantain leaf dwellings, which stand alongside motorbikes and the occasional battered looking car roughly organised into a sort of grid shaped settlement. The village is navigated via four principal

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[60] Hereafter San Francisco.

north-south parallel dirt roads and four intersecting east-west roads. The village is located to the north end of Lake Yarinacocha, approximately eight kilometres from the port of Yarinacocha. Yarinacocha lies approximately nine kilometres from the principal Amazonian town of Pucallpa, in the province of Coronel Portillo, Department of Ucayali, in the Centre-North West of Peru. The town of Pucallpa can be reached by air or overland from Lima, or by inland river travel from Iquitos. In the 'dry' months (June-November) the village is reachable by *colectivo* (shared taxi), which takes around forty minutes. However, in the 'rainy' season (December-April), the only means of transport is by *peque-peque* (motorboat). Figure Eight is a map of the area.

Figure Eight - Map Locating Pucallpa[61]

[61] (Wikipedia Commons, n.d.).

The community is home to approximately 1428 residents, who form part of over 250 families in an officially recognised territory approximately 1900 hectares wide and 7000 hectares in length. The community was officially recognised in 1957.[62] San Francisco residents are overwhelmingly of *Shipibo-Konibo* ethnicity, though a minority of other permanent residents include mestizo, other Peruvian, European, American and other nationalities. The majority of Shipibo-Konibo communities are based along the River Ucayali and its tributaries, which are thought to house up to 40,000 persons (Tournon & Cauper 1994).

A member of the Panoan linguistic family, the Shipibo peoples are one of the most populous indigenous groups in the Peruvian Amazon region (Tacelotsky, 2001). Though the Shipibo-Konibo peoples include many denominations, the communities described in this thesis all used the shorter denomination *Shipibo* meaning 'little monkey people' (Bradfield & Lauriault 1961). Many members of the community are fully bilingual in Peruvian Spanish and Shipibo, although pre-pubescent children and older adults (particularly women) are frequently uncomfortable communicating in Spanish. The majority of adults over fifty communicate almost entirely in Shipibo.

The community is large by comparison to other Shipibo communities, and its proximity to more urban areas - as well as frequent interactions with neighbouring mestizo communities - mean that the residents are anything but isolated in geographic terms. The main economic activities involve the sale of *artesania* (jewellery, ceramics, textiles and wooden goods such as rattles and arrows), agriculture (mainly in association with specific commercial agreements, or to a much lesser degree, sale of swidden garden produce), fishing (small-scale motor boats that increasingly travel downriver to make a catch), and 'ayahuasca tourism'. Ayahuasca tourism refers to international visitors who flock to places like San

[62] (Francini Bardales, 2008).

Francisco (and indeed the Amazon region), in order to consume ayahuasca in shamanic ceremonies and receive healing or experience powerful hallucinations ('visions').
A small minority of community members work for the municipal government, or are employed as teachers, or enrolled in adult education. Almost exclusively, the main residence of the aforementioned persons is in Yarinacocha, in Lima, or elsewhere outside of the territory of the community.

Members of the community frequently travel to and from Yarinacocha and Pucallpa, to sell goods, or to make purchases in the markets, upon which the community is increasingly reliant for subsistence goods such as fish, rice, and plantain [*platano, paranta, Musa spp.*]. Although it is not uncommon to see men, and especially women and children, going to work in the *chacra* [garden], or to hear that the men have brought in a catch, the scale of resource extraction in the immediate area coupled with the changing nature of community life mean that (in the words of Florinda Saldaña Inuma), *"Acá se come con plata"* ["Here, you eat with cash"].[63]

I first travelled to San Francisco by road (from Lima) in May 2008. Spread over several visits, I spent around seven months in San Francisco, finally leaving in August 2009. I remain in contact with my 'hosts', whom I consider close friends. Upon arrival I was welcomed into a the Saldaña-Inuma family residence and was often greeted by other community members as one of a long line of *'Gringo'* tourists/students, with whom the community continue to have economic and personal relationships. The family told me they had numerous *'amigos extranjeros'* [foreign friends] who stayed and occasionally returned. Most had bought *artesania* from family, including a German couple who return annually to purchase *artesania*

[63] Saldaña-Inuma, (2010) Personal communication. Florinda is the matriarch of the family with whom I stayed.

for wholesale. On the strength of one such relationship, which formed between myself and a young Shipibo woman in Lima, I arrived in her family home.

5.2 Shipibo-Konibo Peoples

Shipibo-Konibo peoples have been widely researched in academic literature. Regrettably, there is not space here to account for the wealth of literature produced concerning the Shipibo-Konibo peoples. However, in the coming subsection I venture an inexhaustive summary. Existing literature spans the following areas: ecology and subsistence, linguistic expression, art, design and symbolism, and myths or shamanic beliefs.

From an ecological standpoint, Bergman (1974,1982) was amongst the first to highlight the subsistence patterns and scant material accumulation amongst the Shipibo peoples. Putsch (2000:133), notes that Shipibo-Konibo subsistence was traditionally based on swidden horticulture, fishing, and hunting - in settlements made up of extended family households. Shipibo society is argued to be egalitarian, organised around principles of bilateral kinship which can often follow matrilocal residence patterns. Shipibo families may practice polygyny, particularly sororal polygyny (Hern, 1992:5).[64]

Since the 1970's, the area of land allocated to agriculture within the territory of San Francisco has dramatically increased, leading to a decline in both the amount of forest available for use by the community and the quality of soils around San Francisco (Putsch, 2000:139). This has increased the reliance of the community on tourism for subsistence (Putsch, 2000:139). Behrens (1986:368) has argued that the move in Shipibo dietary patterns, based on an emerging reliance on cash-cropping, has led families to substitute

[64] I personally know of only two families in San Francisco who could be so described.

traditional protein sources - such as wild meat - with domesticated varieties. This was ostensibly the case in San Francisco, where by far the most commonly consumed animal was *gallina [Gallus gallus]*.

The Summer Institute of Linguistics (SIL) has had a major influence on the transliteration of Shipibo language, myth and customs to the public domain, as well as in the organisation of Shipibo people in permanent settlement patterns (Follér, 1989:812). The Institute continues to have strong links with the area, maintaining a library in Yarinacocha. A Shipibo-Konibo dictionary (Loriot *et al*, 1993) is available online, as well as a list of all publications relating to the Shipibo-Konibo language, including a number of myths. Bardales (1979) gives an account in the Shipibo language of a myth concerning the relationship of the Shipibo ancestors to the Incan peoples. Eakin (1980) has published short biography of a Shipibo *profesor* [teacher], that details the historically practiced ceremony of *Ani Shëati,* and the practice of strapping cloth and balsa wood to the foreheads of babies to shape the forehead - known as *baquë vetánetti* (Eakin, 1980:4).[65] These traditions were no longer practiced in San Francisco.

Shipibo women produce intricate ceramics, fabric designs, embroidery, weaving, jewellery, and other art such as 'shamanic' rattles and pipes. Women also wear and embroider *chitonti* skirts, sing, and on ceremonial occasions, dance. Gow (1999) notes that *Piro* art can convey deeply meaningful perspectives on beauty and individual women's life trajectories. By producing the intricate adornments of herself and others, Piro women celebrate the achievements of their own lives. The production of designs is also integral to Shipibo womanhood. For example through placing *kenë wäste [piripiri* for designs, *Ciperacea spp.]*

[65] *Ani Shëati* is a clitoridectomy puberty rite for girls.

on female infants umbilical chords, so that they might dream of and know to how make designs (Valenzuela & Rojas, 2004:81).

Peter Roe has published extensively on the subject of Shipibo cultural Arts, I list but some of his contributions here. Roe (1980) notes the combination of creative artistic expressions of Shipibo women, who combine tradition and original art in geometric designs. Conversely, the figures used in Shipibo designs are a product of the influence of the *Mëraya*, the highest class of shaman (Roe, 2004:236). Both geometric designs and dream-like figures are combined to produce a, 'gendered ethnoaesthetics' of artistic expression and spatial organisation in Shipibo cultural life (Roe, 2006:236).

In 'The cosmic zygote' (1982), Roe provides a collection of sixteen Shipibo myths which describe the 'basal cosmology [...] of animals and other natural symbols' of the Shipibo people. He argues that the myths yield up a set of principles, which give mythological significance to the cultural life of Shipibo people - for instance the Shipibo people posit themselves as materially poor due to the choice made by a male ancestor to marry an ordinary woman instead of the daughter of an Inca (Roe, 1982:51). Tales of trickery abound, and Shipibo cosmology is replete with myths of the seduction of humans by animals (Roe, 1990). Shipibo cosmology shows belief in a:

> '[K]ind of cosmic zygote that postulates existence as a continual and self-generating process of different, antagonistic, but complementary forces embodied in the drama of mortality-death yielding up life and life surrendering to death. [...] This cosmology is both a reflection of and a justification for the pervasive sexual division of labour that sustains the social organization.'
>
> (Roe, 1982:5)

Gebhart-Sayer (1986) argues that shamans communicate the unintelligible parts of the cosmos into culturally appropriate terms. She sees the shaman's role as that of a mediator - negotiating knowledge and perception in a specific way - so that the, 'inconceivable is put into well-known categories so as to be manageable' (Gebhart-Sayer, 1986:814). The practice of shamanism in San Francisco is strongly bound up with the use of ayahuasca *[nishi, oni]*. Dobkin de Rios & Rumerrill (2008) note the use of the brew by Shipibo shamans to perform a variety of tasks relating to healing – channelling the power of plant or animal spirits known as *'Joshin rao'* (Dobkin de Rios & Rumerrill, 2008:55). In a description based on the work of Tournon (2002) they note two classes of shaman: the more powerful Mëraya (those who 'see'), and less powerful Onaya - those who 'know' (Dobkin de Rios & Rumerrill, 2008:55). In San Francisco there were no Mëraya.[66] Interestingly, for the discussion of shamanism in this chapter, the authors also gave an account of an interview with Guillermo Arévalo, an urban shaman.

Guillermo states that in Pucallpa and its environs, two separate types of shamanism are being practiced, 'folkloric shamanism' (which is proffered to tourists for money), and 'traditional shamanism' - which is instead concerned with deep spiritual practice (in Dobkin de Rios & Rumerrill, 2008:47). This hints at a layer at which 'shamanic knowledge' may be being constructed as it vies for the lucrative attentions of tourists. Though most shamans in San Francisco were male, some female shamans were also practising. Gonzalez (2002) gives an interesting account of interviews with a female shaman. Amongst the plethora of *Onaya* in San Francisco, I heard of only one female *Onaya* however Herbert (2010:2) notes at least six.

[66] (Inuma Bardales, 2009).

Overing & Passes (2000) have stressed the importance of informal, convivial, and everyday relationships between people in Amazonian societies, as well as the particular importance of maintaining good relationships with others (and of avoiding the destruction of these relationships). Alternatively, Viveiros de Castro (1998) has described the 'perspectival' quality of Amazonian perspectives – where, 'the world is inhabited by different sorts of subjects or persons, human and non-human, which apprehend reality from distinct points of view' (Viveiros de Castro, 1998:469). This view of Amazonian cosmology is imbued with a kind of slippery subjectivity where corporeal form (e.g. from animal to human), and one's perception of others, are both subject to change: animals, under some conditions see themselves as humans for example (Viveiros de Castro, 1998:472-3).

Understanding the deep significance of shamanic practice - and of relationships to spirits, plants, and animals - is an appropriate perspective from which to begin to appreciate Shipibo life. San Francisco is an example of particular community within a region that shares much similarity, and fascinating complexity. Many Amazonian societies are after all, made up of those who,

> '[D]o not see the supernatural as a level of reality separate from nature, for all of natures beings have some features in common with mankind and the laws they go by are more or less the same as those governing civil society.'
>
> (Descola, 1996:98)

5.3 Asking about Biopiracy and Traditional Knowledge

Entering this hive of (for me) unfamiliar human activity, I became entranced by the enormity of the task which I had set out to begin. It felt strange and not a little awkward to try to form questions in my not-too-fluent Spanish, all the time hearing the intriguing and bewildering rhythm of Shipibo conversations, and feeling frustrated at my inability to converse in this new tongue. I wanted to understand the relationships that people in San Francisco had to local plants, and also the relationships, and context, in which their knowledge of the uses and importance of plants was situated.

In San Francisco I set out to trace the trajectories, connections and relationships which draw people, plants and knowledge together in relation to what might stand for 'traditional knowledge' in the context of biopiracy. In so doing I hope to enliven the connections between the fragments of traditional knowledge held in the National Registers of Collective Knowledge (see Chapter Three) and indigenous communities. I hoped to do this in a way which reflected the priorities of people in communities themselves, using the fragments I gained from my experiences in Amazonia. I sought to understand what a concept of biopiracy that might appeal to the priorities of people in San Francisco might look like. I wanted to explore what kind of understanding of biopiracy might be generated by bringing my encounters with indigenous peoples themselves to the fore - negotiating the use/theft of 'traditional knowledge in terms of the agendas suggested in San Francisco. How was traditional knowledge being 'used' in San Francisco? What would happen when biopiracy travelled to San Francisco and back?

The practice of asking these questions was daunting. "Biopiracy" is not an everyday subject in San Francisco, if it is in any rural village. I began asking vague questions about plants. What was the name of *that* plant? Who knew the most about plants? I ventured questions about *'conocimientos ancestrales',* [ancestral knowledge]. Ultimately, conversations did little to advance the mutual exchange of understanding until I began to proffer examples - using local names of plants – and to imagine their involvement in stories modelled on the one I had told myself about biopiracy in Chapter Two. The 'simple' story travelled well -

unlike stories about intellectual property rights, and overturning patent claims. So I modified this story - about plants, multinational corporations, researchers and dispossessed indigenous peoples - to form questions such as:

- Do you have experience of businesspeople or foreigners that come and they take away your knowledge of plants without permission?[67]

I also asked other, more general questions like:

- Do you know anything about ancestral (traditional) knowledge?[68]
- How is it that you know how to use plants?[69]
- Where does plant knowledge come from?[70]

The stories subsequently told to me, began in earnest the conversations I had about what I thought of as 'traditional knowledge' about plants, and then of biopiracy, as they emerged in San Francisco. I shall go on to mention some of the significant stories, and experiences that were brought about by asking the types of questions given above in the Six Sections to follow.

5.4 A Note on Movement & Representation

I want to stipulate from the outset, that I do not intend the short analysis of the perspectives of the community of San Francisco - and their relationships to the 'biopiracies - which I attempt to provide here, to be any kind of comprehensive account of the 'Shipibo perspective'. As discussed in Chapter Two, traditional knowledge is not a monolithic entity,

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[67] *¿Tiene experiencia de comerciantes o extranjeros que vienen y los sacaban sus conocimientos de las plantas sin permiso?*
[68] *¿Usted conoce algo sobre conocimientos ancestrales?*
[69] *¿Cómo es que ustedes saben cómo usar las plantas?*
[70] *¿De Dónde vienen los conocimientos de las plantas?*

but a form of knowledge alike to all other forms (including scientific knowledge). Far from positing a univocal perspective of 'Shipibo knowledge', this chapter will instead stress the plurivocality of all knowledge, and the, 'multiple domains and types of knowledges, with differing logics and epistemologies' that abound the world (Agrawal, 1995:433). People didn't talk about 'biopiracy' or about 'traditional knowledge', until I began to *negotiate* its meaning with them - though I am unlikely to be the first to arrive with an interest in traditional knowledge of some class or another.[71]

The perspectives represented in anecdotes here, are the result of multi-directional traffic between existing and former community residents and visitors: and thus, the anecdotes themselves are results of the contested and negotiated trajectories of the global into the local and back. Illuminating some of this traffic can help us to assess the claims universals such as biopiracy make in a context which better accommodates the interests of local communities (which easily fall off global agendas). Indeed, 'claims of universality make it hard for us to see just who can imagine themselves inside, and who is out' (Tsing, 2005: 112). This chapter will try to address the question of whom, and what, is left out of the 'engaged universals' (Tsing, 2005; 8) of traditional knowledge and 'biopiracy' that I have elucidated in Chapters Three and Four.

This chapter will assess the relevance that the kinds of relationships and connections which have configured biopiracy up to this stage in the thesis have for indigenous communities themselves, and is consistent with the personal-political motivations outlined in Chapter Two. Furthermore, examining the current uses to which traditional knowledge is put - and the kinds of relationships which develop therein (as well considering the concerns that

[71] Many other anthropologists, researchers, and tourists have come to ask questions about traditional knowledge and about plants. Indeed during one stay in May, I counted six other non-governmental organisation project workers or research students asking questions related to traditional knowledge (four individuals) and plants (two individuals).

people in San Francisco have about the use and abuse of traditional knowledge) - will enable us to place global biopiracy in context. This context is one which enables us to see not only the kinds of relationships to plants and plant knowledge that are privileged in global accounts of biopiracy, but also those which are suppressed. This enables us to highlight the abstraction and appropriation of traditional knowledge that occurs through different renditions of biopiracy. The next sections examine the ways in which plants and animals come to matter in San Francisco, by focusing on the stories of a handful of plants and their uses.

- Section Two: Plants in San Francisco

5.5 The Importance of Plants

Plants in San Francisco provide the bass line to the rhythm of daily life. From the rustle of leaves in the early morning, to *paranta* and *atsa ['yuca', cassava, or Manihot esculenta]* breakfasts, to afternoon rest under the *bolaina [Guazuma crinita]* leaf huts, soothing insect bites before bed with *piñon negro [Jatropha gossypifolia]*, and shamanic ceremonies in the night, plants are constant companions. On an allegorical level then, so is traditional knowledge about the uses and significance of plants. To elucidate the significance of plants and traditional knowledge about plants in San Francisco is - correspondingly - a seemingly endless task. In what follows, I will draw upon some poignant characteristics of plant-related traditional knowledge in San Francisco - those that concern the agency and the power of plants.

Plants in San Francisco have a somewhat parallel agency to that which the West recognises exists for human beings. This affects the relationships which can be formed between 'us' and 'them'. Plants can come to know a person, both in kind and as singular plants. To illustrate, I was told it was dangerous for me to approach an *acancheri* [*toé, Brugmansia, suaveolens*] plant in general - such a plant could cause grave sickness, especially if I approached whilst menstruating. However, it was not so very dangerous to pass next to the one at the back of the house that I slept in, as the plant had familiarised itself to me over the time I spent there.[72] Practical, physical experience with plants is vital in establishing beneficial relationships with plants, or rather in order that *they* may be convinced to establish good relations with people. Familiar relationships can also be brought about in a more direct manner.

Persons who have *dieted* with a particular plant have a special relationship to all plants of that name.[73] Plants are male or female [*macho y hembra*] and the males and females of each group of plant have different curative and other properties to each other, relative to the gender and status of the person who seeks to use them. To say this is not to allude to a statement like, 'all men use male plants' however, but is more of a general quality. It is a statement about the potential particular plants - as well as particular people - have to form specific relationships. As Anastasia (translated from Shipibo) clarifies:

> 'If I make medicine to drink, I always use this plant, if I prepare it for my nephew I use the other male [jóni] - the short one - because he doesn't know a lot about plants. For my husband, when he was alive, [I used the] big male [huëtsa ani]. My husband also knew a lot about plants'.[74]

[72] (Sanchez, 2009).
[73] Here the diet is decided upon by the shaman [*Onaya*] for the purpose of learning associated with ayahuasca consumption.
[74] 'Si hago mi medicina para chupar, siempre uso esta plantíta, si lo preparo para mi nieto uso el otro, macho - el chato - porque él no sabe mucho de las plantas. Para mi marido, cuando él estaba vivo, [yo usaba] el [macho] grande. Mi marido también sobé mucho de las plantas' (Panshinita, 2009). I am extremely grateful to my 'translation assistant' Ada Saldaña Inuma.

Plants 'call' to particular human beings, either through the medium of dreams or through 'visions' seen whilst drinking ayahuasca. Plants can choose upon whom they bestow knowledge, and the knowledge they bestow is not monolithic, but it varies from person to person. Over time it is possible to learn more and more about a plant and its uses, as one might an old acquaintance. This is done both by forming a relationship not only with the physical plant - as in the example above - and with the plant spirit-owner *[Joshin rao, Ibobo, dueño]*. *Joshin* also refers to the spirits of animals, however the spirits of recently dead humans are referred to as *caya*. *'Ibo'* in Shipibo refers to owner and *'Joshin'* to spirit (Loriot *et al,* 1993:194). Both words can be used to describe what I term, 'plant spirit owner' since they refer to different categories of relation rather than different 'subjects'(of being an 'owner' of or a 'spirit') of a specific plant.

Rao denotes *vegetalismo,* or herbal plant knowledge (Loriot *et al*, 1993:358). It also corresponds to 'medicine', and can be coupled with words to denote people, knowledge of plants, and the plants themselves.[75] *Ibobo* means, 'the people of' or the 'owner of' when used with the name of a plant.[76] Roe (1991:26) writes that the Ibobo are literally the owners of the sky, the 'Sky Spirits'. Valenzuela & Valera (2004:182) note that there are also *Ibobo* of the entire Ucayali region [*Paro Ibobo*]. The relationship of plant spirits to shamanism is discussed in Section Five. However, plants do not only call to humans in shamanic contexts: a principle route of acquiring plant knowledge thus is through making oneself more 'attractive' to the plant (and plant spirit-owner) in question. In practical terms, the plant is indistinguishable from its spirit owner *[Ibobo]*, and in conversation they are always referred to together.[77] Making oneself 'attractive' means not only the avoidance of emitting

[75](Saldaña Inuma [F], 2009)

[76] (Saldaña Inuma [F], 2009)

[77] It is possible that I was not able to reach the level of linguistic competence required to converse in abstract terms about the difference between a plant and its owner, however in practical terms they were inseparable.

'unattractive' substances when approaching plants - menstrual blood, semen, and some meats for example - but also immersing oneself in 'attractive' substances. Florinda explains:

> 'The plants don't like bad odours. Like us, we don't like bad odours either. If you want to get close to some plants - take care to bathe yourself before. If you want to dream and talk to the plant, with the owner of the plant, you have to bathe yourself in various flowers the night before - so that the plant is going to like your smell.'[78]

Descola (1996) notes the intimate relationship between plants, personhood and creative power among the *Achuar*. The cultivation of plants, of 'plant children', is likened to the birthing of children and is imbued with female consanguineal potential (Descola, 1996:328). Indeed, Achuar women crave imported seeds and plants that allow them to experiment - under difficult conditions - with the, 'symbolic power potential that underpins all horticultural activity' (Descola, 1996:328). However, the raising of plant children is fraught with competitive tension: as the plant children thrive, the human offspring falter (Descola, 1996:204). Maintaining good relations with ones children - whether plant or human - is an integral part of motherhood, *and* the proper power relations in Achuar society. Relationships to plants in San Francisco are also integral to community life in terms of gaining the power to practice important elements of (social) life.

5.6 Plants & Power

In San Francisco, I was repeatedly told of the relationship of plants to human (spiritual and physical) strength, or power. The most pertinent exemplar of how plants can bestow power concerns ayahuasca, discussed in Section Six. First, I want to highlight aspects of other

[78] 'Las plantas no les gustan olores feos. Como nosotros, no gustamos los olores feos tampoco. Si quieres acercarse a algunas plantitas - tome cuidado que has bañaste antes. Si quieres sonar y hablar con la planta, con el dueño de la planta, tienes que bañarse en varios flores el noche anterior – para que la planta va gustar tu olor'. (Saldaña Inuma [F], 2009).

plants in relation to power. *Yuchi* [ají, Chilli pepper, *Capsicum spp.*] can make one ready for war, or be diligent in embroidery. Andrés tells me about the practices of his grandparents:

> 'My granddad when he lived, took chilli through his nose - like this - if there was a party the next morning with other Shipibo from other villages. He took it to prepare himself to fight, to be strong. Or if there will be a fight between neighbours, he took it to not sleep, to be vigilant. My grandma took it to not sleep, to embroider in the early morning, to not be lazy.'[79]

The excerpt shows that yuchi can be used to bestow various qualities of strength upon the user. For men in some circumstances it was used to accentuate or create feelings of aggression and physical prowess.[80] For both sexes the fruit has an anti-soporific effect: though for men it increases vigilance needed to protect against assault, for women, it is used to increase concentration. It is interesting that yuchi is not taken to *not be* lazy. The implication here is that without plant help people will be lazy. Without plant aid, it is thought that the mental wellbeing of Shipibo people can be affected causing them to become weak or lazy. This sentiment was borne out in another conversation, when I asked why the family were all using a hot beverage, consisting of a mixture of plants, to vomit:

[79] 'Me abuelito, cuando él vivía, tomaban ají por su nariz - así - [demonstrates a sniffing motion] si había una fiesta en la mañana siguiente con otros Shipibos de otras aldeas. Lo tomaba para prepararse a pelear, para ser fuerte. O si habrá una pelea entre vecinos, lo tomaba para no dormir, para ser vigilante. Mi abuelita tomaba para no dormir, para bordar en la madrugada, para no ser floja'. (Inuma Garcia [A], 2008).

[80] There were no inter-village parties during my stay, or physical disputes with neighbours, however I did not witness chilli used in this way during my time there.

'To be powerful we have to get rid of the bad inside. For this, we vomit, to get rid - to make yourself healthy and to not be lazy. If we don't get rid of the bad, with time we are feeble/lazy.'[81]

I was told that I was strong because I was a vegetarian, or more accurately, *'Eres fuerte porque comes pura verduras'* [you are strong because you purely eat vegetables].[82] This suggests a general relationship of plants to power. Plants are integral to ideas about strength, proper personhood, as well as physical and mental wellbeing. They are an important defence against other people's aggressive acts, laziness, and general weakness. A consideration of the importance of plants could exhaust the space here. Instead, I emphasise that the power that plants *embody* resists description in any simple manner: thus it will have to suffice here to suggest two aspects of the properties of plants - power and agency. Stressing the active participation of plants and plant spirits, in relationships which govern the generation and transmission of traditional knowledge is central in understanding the importance of traditional knowledge in San Francisco - and also of understanding the ways in which global accounts of traditional knowledge are inadequate to describe the complexities (or even existence) of such relationships. I will now move on to discuss six more plants and their relationship to traditional knowledge in San Francisco.

- <u>Section Three: Plants and Medicine</u>

5.7 Ojé & Sangre de Grado

Plants are vital foodstuffs and commodities in many ways in San Francisco. There is not space here to list them all much less assess the relationship of each to traditional

[81] 'Para ser poderosos tenemos que botar lo malo a dentro. Por eso vomitarnos, para botar - para sanarse y para no ser flojo. Si no botamos lo malo con el tiempo estaremos flojeras'. (Saldaña Inuma [A], 2009).
[82](Inuma Bardales, personal communication).

knowledge. Briefly, however, I will mention some everyday plants of importance, before going on to consider two medicinal plants of interest. *Atsa* provides a vital carbohydrate staple of most mealtimes, although rice bought from Yarinacocha is equally a staple food in San Francisco. Some families dine using atsa only from the chacra, but many combine garden produce with further supplies bought in Yarinacocha owing to the scarcity of roots in such a populous community. There are three known varieties of atsa: yellow [*atsa panshin*], *and* white [*atsa josho*], and pink-yellow [*kikin panshin atsa*]. Another staple is paranta for which over seventeen varieties were known.[83]

A mixture of grated *paranta joshin* (mature plantain), and *paranta sho* (green plantain) is required to make *pororoka* - a traditional drink which is an important skill for a woman. When I had mastered it to the taste of the family, Florinda remarked I was now a *'tita'* [mother]. Seeds of many plant varieties - perhaps most commonly *[huayruro, Ormosia coccinea]* - are used for necklaces and other *artesania*. The sale of huayruro seeds brings money in more securely than does the placing of them in wallets (for good fortune).

Ojé [shome, Ficus insipida] is known in San Francisco as a tree useful in the treatment of intestinal parasites. The milky-white sap is cooked often with sugar or *aguardiente* [sugarcane rum] until clear (sometimes with other plants). It is then ingested in specific quantities - depending upon the severity of the infestation and the number of related complaints, as well as on the overall health and age of the drinker. The use of ojé in this manner is widely known throughout Amazonia (Castner *et al*, 1998:54). Upon taking river journeys to and from the community - and especially those in the opposite direction to Yarinacocha - I was repeatedly shown the location of ojé, which did not grow in the village

[83] (Saldaña Inuma [F], 2009)

San Francisco itself. Twice, I witnessed Florinda prescribe ojé, once to her adult daughter and again to her 15 year old niece.

On both occasions, the source of the medicine was not from any ojé trees nearby, but was administered from the same 15 *soles* [£3.50] bottle bought from one of the handful of sellers of medicinal plants in Pucallpa market. On the occasion of the purchase of this bottle which my friend Ada (eldest daughter of Florinda) and I acquired, she was asked by the mestizo vendor if she knew how to take it. The woman was slightly reluctant to make the sale as (I assume) she thought us both too young to have experience with it, or to be unfamiliar with it because of our non-local accents and dress.

To this my friend replied simply, *"Si mi mama sabe, ella es una que sabe mucho de las plantas"* ["Yes my mum knows, she is one who knows much about plants"]. This was the first time I had heard this phrase - one who knows much about plants - and I often heard it used to describe Florinda (and selected other females over the age of about forty years old). Sometimes the phrase was used interchangeably with the description of a person as a *masajera* [*masseuse, a woman who cures with massage amongst other techniques*], and sometimes it was used to describe a woman who drank ayahuasca. Follér notes the use of the term *'raomis'* to describe these persons, as well as the existence of *'parteras empíricas'* [practical midwives] (Follér, 1989:814).

Sangre de grado [mosho, dragon's blood, Croton lechleri] sap, or latex, is obtained from making an incision into the tree bark, which is named after its 'bloodlike' appearance. To the rear of the house a fine example of the tree prospered, alone among the fruit-bearing trees of the immediate chacra. On occasion, in the *madrugada* [dark, early morning] and particularly on a full-moon, the tree would be tapped in order to collect the sap and sell it in

Yarinacocha. Florinda informed me that it would fetch about 5-8 *soles* for a small vial.[84] The latex was known as a *cicatrizante* (wound healing agent) when topically applied, or taken internally as a hot drink to stop internal bleeds, such as in douche form (for post-partum care). It is also known as an anti-parasitic purgative, or a treatment for diarrhoea.[85]

5.8 Markets & Gardens

Both ojé and sangre de grado are bought and sold in local markets, as well as being taken directly from the forest for curative purposes. The depletion of secondary forest close to San Francisco, means that demand in the community outstrips supply more often than the contrary. This forces the necessity of making purchases of the goods in local markets. However, the sale of medicinal extracts does, on occasion, provide supplementary income. The sale and purchase of these and other plants then, throws light on a number of important relationships - between mestizo traders and Shipibo shoppers, and between plants and currency.

Although the description, 'one who knows much about plants' was conferred upon both men and women, the vast majority of people it described were female. In Amazonia in general, the close relationship of women to plants, through gardening, is often noted. For example, Descola notes that amongst the Achuar a division of labour commonly assign women the responsibility for (amongst other things) chacra cultivation, whereas knowledge of the cultivation of 'a few particular cultigens' (as well as garden clearing) are 'male' domains of activity (1996:146). Correspondingly, Achuar women have a greater knowledge of the qualities of many plants (Descola, 1996:165). Such tendencies in the division of labour and cultural production, were broadly evident in the majority of households in San

[84] Approximately £1.20-£2.
[85] The use of sangre de grado is currently the subject of at least six patents relating to the use of proanthocyanidins in antidiarrhoeal or antiviral preparations, as noted in Chapter Four.

Francisco. In tending chacras, men assisted primarily with the work of clearing jungle, part of a *minga,* (collective work party).

Relationships exist between local markets and chacras, because of plant transactions, and also exist between non-chacra forest and markets. The non-chacra forest provides an important source of both plant materials for chacras, and of plant commodification in local (and other) markets. Local markets are important sources of revenue, both for Shipibo people in San Francisco, and for would-be drug developers and other commercial factions who trade in plant extracts (and knowledge). The sourcing of plant knowledge from markets also serves to somewhat obscure the origins of 'traditional knowledge associated with plants.

Hayden (2003a) notes that:

> '[I]nitial mining of plants and knowledge culled from urban marketplaces, rather than from "communities" creates a powerful breach in the bioprospecting imaginary both disrupting and reinscribing some of the fundamental shaping this kind of enterprise - most notably the idea that plants and knowledge "come with" identifiable authors/claimants/stewards attached'.
>
> (Hayden, 2003a: 127).

The relationships which operate in and through markets are important sources of revenue for residents of San Francisco, but they are also places which enable the ready appropriation of traditional knowledge about plants. Mobilising Western conceptions of the rights of property owners and emphasising the finality of economic transactions; the purchasing of plants (and embodied plant knowledge) extricates plant knowledge from the chains of persons who generate and contribute to its existence. In ethnobotanical research, the appeal of purchase as a means to appropriate plant materials (and knowledge) is combined with a mobilisation of the market space as *public* space, or part of the freely accessible public domain (Hayden, 2003a: 134).

This has the effect of making plant knowledge and plant materials which flow through market places seem *'already authored commodities'* - pre-owned - and hence devoid of any moral claim which might travel with the plants (Hayden, 2003a: 135). Or in other terms, if the relationship between plants-for-sale and the seller is merely configured as distributive rather than creative - and the plants and knowledge purchased were publicly obtained - the thorny issue of recompense for the 'authors' of the knowledge is sidestepped whilst appropriation is enabled. The mass of materials, persons and knowledge that circulate in markets also mean they are a, 'convenient jumping-off point for investigating complex flows of plants, knowledge, money, and persons' (Hayden, 2003a: 126).

The use of plants in healing can be argued to shed light on an aspect of the relationships between plants and humans, specifically between plant knowledge and status, or gender. It is not everybody in San Francisco who is referred to as, 'one who knows much about plants' but three women with whom I had most conversations - Florinda Inuma Saldaña, Alegría Reátegui, and Anastasia Panshinita - all warranted this term. They were all reliant on their adjoining chacras, or the sale of artesania for subsistence goods.

Alegría Reátegui is an expert weaver and potter, one of only three in San Francisco, and she learnt about plants from her mother and her second husband (who was an *Onaya*).[86] Anastasia was a widow, who took pride in showing me her well-kept chacra. She hadn't drunk ayahuasca for many years, but she had frequent dreams where she spoke to plants.

[86] (Reátegui Garcia, 2009).

Florinda drank ayahuasca whilst her husband was alive , and this was the source of some of her plant knowledge, whilst other plant knowledge had reached her through dreams:

> 'In my dreams, from the plants themselves, and my grandmother, she taught me.'[87]

In this way the use of the healing properties of sangre de grado, or the purchase of ojé does not only represent the conversion into commodity of so called 'phytochemicals', or the useful application of local knowledge in human health. The splinter of knowledge that the use of a particular plant can come to represent is - to borrow from Geertz (1973) - held in a, 'web of significance' that it itself has spun (Geertz, 1973:5). In San Francisco, plants have agency: not just as phytochemical agents, but in terms of the capability to enact human-plant and human-human relationships . The plant comes to be regarded as useful for a purpose, but alternate purposes can also be created from its use. Ojé and sangre de grado were known by the ancestors to help with diarrhoea, but they have also become commodities.

Similarly, traditional knowledge of the plant's use - or rather the relationship one has to plants - is important in the formation of human identities (especially in relation to gender and status). Lastly, the relationships that Shipibo people have to plants extend beyond the waking world, through dreams and ayahuasca visions. Consideration of such diverse forms and types of relationships is vital in establishing what is being missed out of global biopiracy.

[87] *"En mis sueños, de las plantas mismas, y mi abuelita, me ensenaron."* (Saldaña Inuma [F], 2009).

- Section Four: Traditional Knowledge and Biopiracy

5.9 Tales & *Talleres* :The Workshop

In this section, I have selected two events - which took place as a result of the kinds of conversations I had following responses to questions about the use of plants and traditional knowledge in San Francisco. The first is a community *taller* (workshop) that I organised early in May 2008 during my first visit to San Francisco. This meeting formed the basis of a communal decision to send a community representative to the 11th International Congress of Ethnobiology, held in Cusco in June 2008. I wanted to enable a representative of the community to attend this event as a means of offering something back for the empirically valuable knowledge I asked them to share with me. The conference was also intended to be a space where the representative could share concerns about many themes - from 'Climate Change', to 'Food Sovereignty', and 'Indigenous Livelihoods' - with representatives of other indigenous peoples from around the globe.[88] I was self-consciously trying to offer the representative a ticket to a place where possibilities for thinking globally abound, 'global dream space' (Tsing, 2005:85). Aspects of this conference form the second event I will describe in this section.

The 'Biopiracy and Traditional Knowledge Workshop' I organised, was announced several times on the community loudspeakers situated on major corners of the roads of San Francisco, as well as publicised person to person by myself and by the Saldaña Inuma family. I had intended to hold the workshop in an informal, participative manner in an open-sided leaf hut near the school building, to begin to broach the themes of traditional knowledge and biopiracy. However, the lack of space, and the presence of a not inconsiderable

[88] *XI International Congress of Ethnobiology on Collective Biocultural Heritage and Local Livelihoods*, (2009) Cusco, Peru 25-30th June.

quantity of *isula [Paraponera clavata]* ants around the wooden supports of the hut dictated that we relocate inside a classroom. Needless to say, the desk and chalkboard setting did nothing to make the workshop feel less like a discussion than a lecture, at least at the beginning. In the sweltering heat, and nervously, I began to talk to 31 members of the community, mainly men, about Peruvian Law 27811 (the Biopiracy Law) and of the National Commission against Biopiracy and the Registers of Collective Knowledge in Lima. I was trying to ascertain if people in San Francisco had heard of the existence of such legislation and indeed of 'protecting' traditional knowledge in this manner.

I provided anecdotes to illustrate the (perceived) need to protect traditional knowledge, the most lengthy of which was an account of the ayahuasca controversy. Also, in the workshop I outlined the main features of the Biopiracy Law as it relates to Collective Knowledge: focusing on patents, on plant knowledge, and on knowledge registers.[89] I felt the session become rather monologue until the subject of patents was broached, when Sr. Agustin, a teacher at the National Intercultural University of Amazonia [*Universidad Nacional Intercultural de Amazonía*] in Yarinacocha, raised an important question:

> 'Why can't we, the entire community, obtain our own patents and protect our designs, dances and medicinal plants?'[90]

The question roused murmurs of interest in the room, but it also somewhat dashed my - admittedly naïve - hopes that the community would share my political viewpoint (about the inappropriate nature of patents which make property claims over traditional knowledge). The discussion also flagged up an apparent misunderstanding about *what* patents can make property of. The discussion moved on to a consideration of what a patent *is*. Knowing I had

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[89] See Chapter Two and Three for a discussion of Law 27811.
[90] '¿Por qué no podemos, la comunidad entera, obtener nuestras propias patentes y proteger nuestros conocimientos – nuestros diseños, bailles y plantas medicinales?' (Agustín, 2008).

veered into a territory that would be a likely source of confusion for us both, I became confounded by the enormity of the task underway.

I found myself grappling with ever deeper layers of knowledge: that of the ownership of different forms of property, and that of tangible and intangible entities as they relate to such property. These all came to the fore in the negotiation of mutually meaningful dialogue. The encounter highlighted the limitations of the claims to 'universality' which such concepts make. The logic that separates 'knowledge' from 'things' - or TK from plants - suddenly seemed more shaky than ever.

5.10 Property & Traditional Knowledge

Trying to explain the differences between copyright, patents and other property, I came up against comments like:

> 'If yuca grows in my garden, I the one who sows, my grandfathers also having been, how is it that businesses in the United States could be the owners?'[91]

It was not easy to answer questions like this, not least as I personally agreed with the sentiment. My answer was too long to reproduce here, but a fragmented version is:

> 'You have a point. But the laws treat knowledges differently to plants. About patents: they say that the plants that are patented are different - new - and they are not the same plants that you all know of. Or maybe they patent drinks, foods or medicines that use your plants

[91] '¿Si es que la yuca se crece en mi chacra, yo el sembrador, mis abuelitos también sembradores, como es que los negocios en los estados unidos podrian ser sus dueños?' (Inuma Sanchez, 2008).

> and knowledges, but in a different form, so they say that it is not the same thing of which you all have knowledge.'[92]

I was caught in the act of trying to engage 'universals'. I was trying to make 'global' concepts such as property and patents travel to San Francisco - even as I was seeking alternative perspectives through which to understand 'traditional knowledge'. In this discussion I was reminded that, 'the intellectual is complicit in the persistent constitution of Other as the Self's shadow' (Spivak, 1988:24). In other words, I was in danger of ending up reproducing the assumptions about traditional knowledge and biopiracy that I had set out with - either by reifying traditional knowledge as the inversion of global accounts or by constructing narratives entirely through comparison with them.

In order to escape this prognosis, I began to reconsider the role of 'property' as a whole in movement of and transactions concerning knowledge. At least in a Western sense, there is no clear definition of property (Hahn, 1988:5). Limited (capitalist) notions of property emphasise the exclusive relationship between a property-owner and their possession, or the rights which exist in the possession *per se*. These notions of property are not useful to a consideration to the relationships which make ownership possible. Property, in an expanded sense, is in essence a form of exchange. The acquisition of property is inherently about the exchange - or creation - of value from one set of social relations into another set. In anthropology, property has long been seen as concerning social relations rather than alienable rights, though the emphasis on property (social) relations has often been directed to non-Western societies. Gluckman (1969) argues:

[92] 'Usted tiene razón. Pero es que las leyes se tratan conocimientos como diferente a la plantas. Sobre patentes: dicen que las plantas que son patentizadas son diferentes - nuevas - y no son las mismas plantas de que ustedes conocían. O de repente los patentan bebidas, comidas o medicinas que usan sus plantas y los conocimientos de ustedes, pero en diferente forma, entonces les dicen que no es la misma cosa de que ustedes tienen sabiduría.' (Chapell, 2008).

> 'Property law for tribal society defines not so much the rights of persons over things, as obligations owed between persons in respect of things.'
>
> (Gluckman, 1969:46)

However, even English law is imbued with a relational aspect (Hahn, 1998:37). Vermeylen & van der Horst (2007) argue that property does not equate to *rights over* things - but to *relations to* things - not in terms of the relationship between owner and thing but between the owner and other people. Not merely collapsible into social relations *per se,* property is best seen as kind of magnet to which cultural, social, symbolic as well as material meanings and contexts are attracted, and which is instrumental in negotiating personal and collective identities (Hahn, 1998:5; Vermeylen & Horst, 2007:177). It is often the emphasis on the rights that come with property, and relative paucity of attention to obligations or the responsibilities of property ownership which most keenly distinguishes property relations in Northern or Western societies from indigenous societies (Vermeylen & Horst, 2007:180). Such skewed emphasis has also led to a proliferation of rights claims by indigenous societies, which carries the risk of leaving that imbalance unchallenged. As Brown (2003) notes:

> 'It is in the nature of rights to seek absolutes. Rights have a finality that silences debate and possibilities for negotiation.'
>
> (Brown, 2003:231)

A consideration of property in terms of the types of social relations which accompany (or enable) it, as well as a consideration of the types of rights and responsibilities which are mobilised with property claims, is hence a vital lens through which to consider the different understandings of property in global biopiracy (and in conversations about traditional knowledge in San Francisco). Considering property in this expanded sense enables us to better understand the particular forms of relationships, and connections between people, plants, and knowledge which become mobilised, and which are erased in the generation of biopiracy.

However, a particular type of property - the commodity - is very relevant to the aims of this thesis, because of the emphasis which it places on the *movement* of artefacts. A commodity is a thing desired or valued a means to acquire other artefacts, rather than because possession of the thing itself is coveted. Appadurai (1986) posits the term 'commodity situation' to describe result of a process where a thing's, 'exchangeability (past, present, or future) for some other thing' becomes its 'socially relevant feature' (Appadurai, 1986:13). In other words, commodities are produced when the primary prestige, or worth, of a thing becomes its potential to enable the acquisition of some other artefact. Using traditional knowledge as the artefact, in crude terms, commodification is what occurs when the use of ayahuasca is no longer primarily worth knowing, but *is* worth selling.

The 'misunderstandings' and tensions which are revealed in the probing questions with which I began this subsection then, are not indicative of confusion in San Francisco over legal terminology. They reflect the active contestation, or negotiation, of the forms of social relations that govern the use of traditional knowledge and plants - from a local perspective. By examining property in terms of the ideological, cultural, and social meaning it conveys - through particular sets of relations - the encounter between global and local conceptions of biopiracy becomes visible. I had wandered into an encounter, in which I was trying to engage the 'universal' social relations which define property in law in terms of common, private, open access or collective property - essentially in terms of individual *versus* collective property (Vermeylen & Horst, 2007:180). I had become entangled in this, even as I sought to find alternative perspectives on the relationship between property and plant knowledge. The questions I had been asked were indicative of the kinds of 'friction' (Tsing,

2005) which were brought about by this encounter: where traditional knowledge, as it was posited by the members of the community, collided with my attempts to engage 'universal', global concepts such as intellectual property standards.

The community were interested to know what justification could exist for the way these standards treated different kinds of people, and their knowledge - but they were engaging such global debates in terms which made sense from a local perspective. In this workshop, traditional knowledge was not *merely* evoked from a local perspective, and I began to see the trajectories of 'globals' as well as the intricacies of the local perspectives I was hearing. As Descola notes:

> '[A] global cosmovision emerges; but this takes on coherence only when looked at through the prism of the observers eyes.'
>
> (1996:62)

Discussing traditional knowledge in this (contrived) setting, and in relation to 'global' concepts, is an attempt by both myself and the community to engage 'global' biopiracy in a locally appropriate manner. The question (regarding *yuca*), engaged a hybrid traditional knowledge through asking about the relationship people have to plants and plant knowledge - in terms which reached out to understand global concepts of 'intellectual property law' *and* 'traditional knowledge'. The contrast between local and 'global' concepts, is indicated in focus of the question. This focus was not concerned with understanding abstract definitions, legislation, or even the Biopiracy Law *per se*, but rather on reconciling intellectual property law and traditional knowledge with plant-human relationships, and ideas about belonging (derived from the traditional knowledges of people in San Francisco). In showing their interest thus the community were also trying to engage 'globals', but on appropriate terms which reflected *their* priorities.

Negotiations, easing the trajectory of biopiracy into San Francisco took place by grappling with the underlying (predetermined) epistemological continuities that concept assumes, and which are reflected in intellectual property standards. If both I and members of the community were reaching to global biopiracy from the same schoolhouse then, we were doing so according to different priorities. I was concerned with understanding traditional knowledge in relation to biopiracy, whereas the community were more concerned with discussing the use of plants and plant knowledge by different 'biopirates', and with the equality of these relationships. The community members present asked questions to reflect their concerns - in connection with practical experience, identity, and ownership. These concerns over relationships to knowledge and plants can be imagined (across difference) to create the impression of similarities between global property law, and Shipibo customary law - in respect to ownership of traditional knowledge relating to plants. Conversely, they can also be imagined to demonstrate crucial differences.

A yuca [atsa, cassava, *Manihot esculenta*] plant growing in a garden is regarded as the property of the garden-owner in most circumstances in international law.[93] It is also recognised as belonging to the garden-owner in San Francisco, and some plants can even form relationships to that garden owner (as discussed earlier in this chapter). Neither outside or inside San Francisco, is it considered proper behaviour to take fruit or produce from another person's garden. This does not mean, however, that garden fruit in San Francisco is the property of the owner in any way that would permanently exclude the community. Each strip of family land in San Francisco is - in the first instance - community property. The *authoridades* [authorities or community leaders] ultimately hold sway over who settles where subject to the agreement of the community.

[93]The subject is more complicated than this - Dutfield (2004:4) notes that the principle of 'common heritage' and 'sovereignty' mean that the plant type or genetic resources belong to the international community *and* to nation states.

5.11 Customary Law

This essentially egalitarian community structure - where power is shared and individual coercive power is checked by appeal to the community as a whole – is not hospitable to ideas of property which assert individual rights at the expense of communal responsibilities. Without reifying San Francisco as a kind of utopia, the traditional structures which underpin the distribution of resources there negate unjust appropriation on any *significant scale*. Although fights frequently break out between villagers, notions of the collective good are as frequently invoked to quash them.

For example, the angrily reported 'theft' of fruit from a wealthy neighbour's *capirona [Calycophyllum spruceanum]* tree by another neighbours children was ridiculed by onlookers. The size of the complainants house, and his high fence – indicators of wealth - were heavily criticised. Notably, so was his care of the tree in question, they asked: If he was hungry like the children were, then why had he not eaten its fruit before? In this practical, everyday way, community responsibilities are asserted as a counter to individual rights - when the latter run contrary to notions of what is morally correct in terms of relationships with other people. The importance of the, 'moral economy of intimacy' in other Amazonian Societies is argued convincingly by Overing & Passes (2000:25).

People in San Francisco say there are but three *Leyes Shipibo* [Shipibo laws]:

> 'Ser respetuoso, no ser mentiroso y no ser perezoso' [Be respectful, don't be a liar and don't be lazy].'[94]

[94] (Francini Bardales, 2008; Agustín, 2009).

The inversion of the two prohibitions creates the image of the ideal Shipibo person - one who is respectful, honest and hardworking. In San Francisco, law itself - customary law - is not a set of conditions abstracted from the social reality of those who adhere to it . This is unlike intellectual property regimes for example, customary law here is a reflection of the necessity of being a 'good' person (to others).

Tobin & Taylor (2009) note that customary laws often share three principles: reciprocity (duty to give back everything in equal measure), duality (complimentarily, selfish needs must be balanced with opposite needs of others), and most importantly, equilibrium - the fundamental harmony between all living things (Tobin & Taylor, 2009:9). Such ideologies do not sit well with the postulates of international intellectual property law, which speak of the rights of individuals over things, or of the rights of individuals to limit access to things for others. Customary law was defined in 2006 during a consultation with indigenous groups as,

> '[L]ocally recognised principles, and more specific norms or rules, which are orally held and transmitted and applied by community institutions to internally govern or guide all aspects of life.'
>
> (International Institute for Environment & Development, 2006)

As we can see from the contrasting priorities of this (limited) discussion of important differences between customary and international law, property (in the sense of the types of relationships it privileges) is a locus of contention in the smooth trajectory of global concepts of biopiracy. If even the theft of traditional knowledge itself cannot be established with parity (because of the corollaries of possession and repossession which an emphasis on rights enables), the unanimity of biopiracy is more troubling still. The absence of contingent concepts of property indicates vital differences in the relationships governing plant knowledge - between people and property - in Amazonia and in international law (Moeller, 2010).

The bundles of relationships to people, plants, and property through which conceptions of traditional knowledge and biopiracy travel are first described in Chapter Three. However the bundles of relationships in which traditional knowledge is situated in San Francisco are notably different. The question I was asked about gardens and property in plants reflects a concern with both the practical, spatial, and generational aspects of traditional knowledge and plants. It also expresses concern over the individual identities of plant (and plant-knowledge) owners. These types of concern are largely absent in the traditional knowledge reified in the biopiracy work of INDECOPI.

If biopiracy and traditional knowledge were somewhat unfamiliar to those with whom I shared this workshop, this was not the case when talk about the 'theft' of traditional knowledge was allowed to stand for 'biopiracy' - in a context which did not depend on the patent as the instrument *par excellence* of the unjust commodification of such knowledge. Stories began to emerge detailing resentments about the 'theft' of traditional knowledge, and these involved parties not accounted for in the story of biopiracy (I had set out with), or in the 'biopiracies' which travelled with me from the Peruvian Patent Office. Stories about the subject of designs, traditional dress and songs were also forthcoming, but for brevity have not been reproduced here. Instead, I reproduce (from Spanish) one of the stories below to provide an example of the kinds of meanings attached to the 'theft' of traditional knowledge in San Francisco.

> 'These laws don't help the community prevent people stealing our knowledge, some sons and daughters of San Francisco know *gringos* and mestizos and people from Lima - they

> come and [...] It's like my mother she taught a gringo, an American, what she knows about the plants, he dieted with her, he saw visions, heard her *Icaros* [shamanic songs] gave her a bit of cash [*poco plata*] and said he would come back always. He went back to his country, and he never more returned. He makes a lot of cash [*un montón de dinero*], he has his business, drinking ayahuasca with other foreigners, charging them for it. I don't know where he gets the plants from [...] And my mother? She got nothing. And the community? Nothing. Now she doesn't speak about what she knows.'[95]

These types of stories speak of the biopirates not as corporate agents, but as tourists, and would-be students of traditional knowledge. Some tourists may not get the 'real deal' - they may only experience the 'folkloric' aspects of shamanism described by Guillermo Arévalo earlier in this chapter (in Dobkin de Rios & Rumerrill, 2008:27). However, the line between the appropriation of 'folkloric' and 'traditional' aspects of shamanism is not clearly drawn. The story above encompasses familiar moral resentments with what in other terms can be understood as the 'plunder of nature and knowledge' (Shiva 1997). Clear resentment is expressed in terms of the theft of economic advantage, and the movement of knowledge and plant materials across international borders - to places where its dissemination and consumption is uncontrolled. The key resentment seems to be over the exploitation that this theft constitutes, not *per se,* but in terms of the unequal relationship which characterises the exchange. Indeed, such inequalities may even *violate* customary norms.

It seems such stories have a lot to do with biopiracy. They also convey with a whole host of other concerns: those related to the division of material wealth in the community, the

[95]'Estas leyes no ayudan la comunidad a prevenir gente robando nuestras conocimientos, algunos hijos de San Francisco conocían gringos y mestizos y gente de Lima, ellos vinieron y [...] Es como mi madre ella enseñaba un gringo, un Americano, lo que ella sabe sobre las plantas, él dietaba con ella, lo había visto visiones, escuchaba sus Icaras [Icaros] lo di un poco plata y decía que siempre va a regresar. El se fui a su país y nunca mas volvió. El ganaba un montón de dinero tenía su negocio tomando ayahuasca con otros extranjeros, cobrando. No se de dónde lo busca la planta [...] ¿Y mi madre? Ella no ganaba nada. ¿Y la comunidad? Nada. Entonces ahora ella no habla sobre su conocimientos' (Agustín, 2008).

unequal exchange of money and knowledge along colonial lines of exploitation, the stemming of knowledge exchange, the movement of people, and the discontinuities of relationships. Such concerns are part of the rhetoric against which the cause of traditional knowledge 'protection' rallies, the kinds of claims which give prominence to biopiracy on moral grounds.

The kinds of 'thieves'(and 'theft'), which such stories describe do not involve laws about the protection of Collective Knowledge, patents, or National Registers of Collective Knowledge. 'Theft', or unauthorised use of TK via the tourist, or the shaman's 'apprentice', is not the subject proper of biopiracy as it has been discussed in preceding chapters. Yet these concerns about the theft or unauthorised use of TK are also stories about ways of extracting traditional knowledge and practices from the human and non-human communities which have created them. The 'theft' is also carried out by other kinds of colonial, or neo-colonial exploitative practices (such as tourism, ethnographic writing and commercial trafficking of forest produce). However, this is not what is 'fought' in the 'biopiracy work' of INDECOPI, or what is found in the patent system: to accommodate these concerns, biopiracy must make other kinds of global connections.

5.12 The International Congress of Ethnobiology

The second event which I shall reproduce here, is not a discrete temporal or spatial event - like the schoolroom workshop I have described – it is the result of several conversations held with Sr. Andres Inuma-Garcia: the community's representative, chosen to participate in the aforementioned Congress in Cusco. I proposed the trip in an attempt to avoid the worst excesses of the unequal (post)colonial power differentials that pervaded our conversations, and hampered the creation of meaningful dialogue between the members of the community and myself on the subject of 'biopiracy'. I wanted to avoid a one-sided discussion, where global biopiracy was entirely channelled through my words.

During the trip, Sr. Garcia and I both pursued our own agendas, attending a diverse range of workshops. In the course of these, it became clear that certain themes of the Congress were much more of interest for Sr. Garcia than others. One theme, 'Indigenous Peoples, Climate Change and Adaptation', was the primary interest of Sr. Garcia. Frustratingly, attempts at discussing another of the themes (which was closely related to the topic of the unauthorised use of traditional knowledge), were short-lived. The differing priorities of Sr. Garcia were reflected better by the issues discussed under the banner of 'Climate Change' (itself a kind of global/universal). Andrés explains:

> 'Climate Change is very important for us - us indigenous – us Shipibos. We are very worried about the loss of our trees, fish, plants and the drying out of our rivers and soil. Traditional knowledge is very valuable but what we need now is action to avoid Climate Change more than anything.'[96]

I argue that this fragment, evidence of a kind of gravitation toward the concerns communicated in discourses about Climate Change, is more than mere happenstance. It can be seen to reflect the different types of connections, of relationships, that discussions about Climate Change can bring to the fore (but which discussions about traditional knowledge in the context of biopiracy can exclude). Debating Climate Change, in the context of the sessions in Cusco, enabled the expression of a wide variety of concerns. These concerns *centred* around the relationship of indigenous peoples to their livelihoods, rather than restricting discussions to the 'theft' or 'loss' of traditional knowledge (and leaving aside

[96] 'El Cambio Climático es muy importante para nosotros - como indígenas - como Shipibos. Estamos muy preocupados sobre la perdida de nuestros árboles, peces, plantas y la seca de nuestros ríos y suelo. Conocimientos ancestrales son valioso pero lo que necesitamos ahora es acción para evitar el Cambio Climático más que nada.' (Inuma Garcia, 2008a).

discussions about the 'theft' or 'loss' of the plants and animals themselves). In the language of biopiracy, the 'resources' to which the knowledge relates can gain prominence. Fragments such as this can be very revealing, indeed, 'fragments need not reduce analysis to simply noticing idiosyncrasy and happenstance' (Tsing, 2005:271).

Such discussions, with their focus on human-human relationships (i.e. between indigenous communities and extractive industries) and also on human-non human relationships (i.e. the depletion of the environment and changing subsistence needs) may be better suited to expressing the concerns of some indigenous peoples. Hence, they can be made to correlate better with concerns which arise from local knowledge. The closer relationship of 'Climate Change talk' to its tangible referents - plants - meant that this theme was a better forum in which to consider Andrés' concerns. The negotiation of biopiracy as an 'engaged universal' (Tsing, 2005:8) in such talk meant that speaking of the 'thing' to which knowledge relates is not easy, if one wants to avoid replicating the problematic separation of plant knowledge and plants themselves.

Perhaps it is fitting that Sr. Garcia travelled outside of San Francisco to a location which was alien to us both. This provided the opportunity to articulate concerns, about global or universal concepts other than biopiracy, and shed light on the inconsistencies between local and global knowledge which are *peculiar to biopiracy itself*. It may be that the selection of different thematic interests at the congress can tell a story of sorts about the discordance between local and global perspectives of the importance and relevance of biopiracy as a vehicle for forwarding indigenous communities concerns. This is an interesting premise for further research, beyond the scope of this thesis, which will now move on to consider agroproduction and traditional knowledge.

- Section Five: Traditional Knowledge and Agroproduction –

5.13 Camu Camu

Arriving by road into San Francisco, it is possible to see large signs detailing the devotion of large swathes of land to the agricultural production of *camu camu [Myrciaria dubia].* These signs also advertise the involvement of the Peruvian Regional Government of Ucayali. An interview with one of the community 'authorities' *[autoridades]* confirmed that around one hundred and fifty hectares were given over to the more or less exclusive cultivation of *camu camu,* much of which was sold to an American corporation called 'AmazonHerb Co.'.[97] The crop was sold on the basis of a *compra normal* [sold in a usual commercial manner]. Following enquiries, I received no further information about activities of this corporation in the community.[98] The corporation has an impressive website that gives details of its 'empowerment activities' (AmazonHerb Co., 2010). It also quotes a letter of thanks from the Regional Government of Ucayali, on behalf of 'the Shipibo-Konibo people', in which benefits given to several communities including San Francisco are listed (AmazonHerb Co., 2010).[99]

No one I asked knew 'Amazon John', the founder of the Corporation, but his contacts with nearby Shipibo persons or perhaps communities are clear - at the first Shipibo-Konibo Conference in Yarinacocha last year, he arrived to address the conference along with his wife Olivia Newton John.[100] The Shipibo representative at this conference, Glorioso Castro Martinez, lives in Yarinacocha, and is regarded by at least some of the community as an

[97] (Francini-Bardales, 2008)
[98] I do not definitively proclaim there had been no involvement with AmazonHerb Co., however no immediate signs of projects or initiatives were evident in the community, nor did any of those I asked benefit from any. Admittedly, I was unable to speak to those men most directly involved in the cultivation brokering.
[99] The benefits were given as follows, 'obtaining the official recognition of the communal territory (LAND RIGHTS), health, fluvial transport (BOATS), acquisition of communication equipment, sponsoring indigenous radio programming, as well as the commercialization of natural products' (AmazonHerb Co. 2010).
[100] (Saldaña Inuma [a], personal communication).

'interesado' (one who looks after his own interests).[101] The two products which the company advertise both list camu camu and sangre de grado as ingredients.[102] Here I shall concentrate on Zamu™, a nutraceutical product which relies heavily upon the properties of camu camu for the benefits to health it claims to have. For example the website mentions the, 'uniquely balanced chemistry of naturally occurring nutrients found in organic camu camu,[...] pure, Rainforest ingredients at their finest' (AmazonHerb Co., 2010a).

The case of Zamu™ sheds light on interesting questions about the role of patents in the 'protection' of traditional knowledge, and the resulting characterizations of 'biopiracies' that result from it. In San Francisco, I have been told a story which involve many of the characters of the 'biopiracy story' I had told myself in the introductory chapter. It is the kind of story that is also told by others in Lima and beyond, and involves indigenous people, traditional knowledge, a corporate organisation, intellectual property, and an unclear distribution of benefits to the communities involved. Yet, this story it is not of major interest to the National Commission Against Biopiracy, and has the apparent commendation of the regional government of Ucayali. At least some Shipibo persons, those involved with The Regional Institute for the Development of Native Communities [*Instituto Regional de Desarrollo de las Comunidades Nativas*] for instance, have welcomed the farming and sale of camu camu to AmazonHerb Co. However - as far as I am able to ascertain - the project did not involve the majority of people who live in San Francisco, nor did the benefits derived from it reach anyone with whom I spoke.

Zamu™ is sold in the US under the standard United States of America Food and Drug Administration disclaimer, which makes clear that the claims it makes are not medically endorsed (AmazonHerb Co., 2010b). It is sold according to the intellectual property rights

[101] (Saldaña Inuma [a], personal communication).
[102] Zamu™ and Lluvia™

protection afforded to a trademark, and AmazonHerb Co. is a sufficiently profitable venture that it is able to operate internationally. Although the products' unique selling point - as well as any health related benefits the product may deliver - are the direct result of the combination of rainforest plants that it contains; because no claims are being made over the ownership of such plants on an *intangible* level (such as in a patent for example), Zamu™ and like products are not considered the subject proper of the 'biopiracies' that motivate and organise work in the NCAB. This type of commercial venture falls outside the global-local congeries of encounters (Tsing, 2005: 3) which can generate traditional knowledge and engage biopiracy in 'biopiracy work'. This is because no claims are made over traditional knowledge directly, as may be the case in patent protection. In San Francisco the arrangement is regarded as an example of a private business arrangement involving communal land, which does not benefit the entire community.

5.14 Piñon Blanco

The export of piñon blanco [*Jatropha curcas*] was in 2008 a relatively new venture for San Francisco.[103] For around eight months piñon blanco had been agreed to be sold on a guaranteed purchase basis, following the supply of, 'free seeds and technical assistance' by a German biofuels company (Eneropex GmbH., 2008). The crop is cultivated on around twenty-five hectares of *tierra comunal* [communal land] by men from a handful of families in San Francisco. Each worker received one-hundred dollars at the beginning of the agreement, and half of the revenue from the overseas sale of the plant components is set to return to the farmer, the prices of this sale fixed for ten years. At the time of my departure I

[103] (Francini-Bardales, 2008).

was unable to ascertain if this agreement had come to fruition.[104] Certainly the majority of community members to whom I addressed the issue were unconcerned about Eneropex GmbH., and the cultivation of piñon blanco in this way, probably as no sales had resulted to date.

Eneropex GmbH., 'produces, processes and merchandises[its] own bio fuel' as well as conducting research into biofuels related specifically to plants of the Jatropha genus (Eneropex GmbH., 2008). The company website states a commitment to acting ethically, 'economically, ecologically and socially' (Eneropex GmbH., 2008a). It is unclear more than this scant information as to what the exact nature of the production or research that Eneropex GmbH. is involved in could be, but it is logical to assume that the company could seek to develop a patent portfolio, should any of its research result in a commercially attractive fuel formula, or method of creating such for instance.[105] Whether or not this kind of venture could thus result in allegations of biopiracy by the National Commission Against Biopiracy, it is certainly an example of the unacknowledged flow of traditional knowledge out of communities.

The sale of camu camu to organisations like AmazonHerb Co., and the sale of piñon blanco to Eneropex GmbH., may both be the same *kind* of transaction as the sale of say, sangre de grado and camu camu in Yarinacocha - but they are not of the same *scale*. Selling camu camu in Yarinacocha, a family is limited to the quantity of fruit which they can sow, gather and consequently of the benefits which they can reap. When communal land is given over

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[104] The families involved were either unwilling to speak to me about the project, or were considered as enemies of the extended family with whom I was accommodated, which made lengthy conversations extremely difficult.

[105] It is by no means certain that such success will *actually* result from research and development activities - which are notoriously risky business investment activities. Indeed it is not certain that even should a patent be *granted*, that it will be utilised in the commercial development of a product (see Chapter Four).

to the cultivation of piñon blanco, and only certain families benefit, this sets the stage for the fostering of inequality within the community, which can undermine the maintenance of forms of social relations mentioned earlier in this chapter, those that provide continued co-existence. If the ventures are successful, this may come to be a prime concern for members of the community. In the light of legislative measures by the current Peruvian government to encourage the privatisation of communal lands, without the consent of the majority of community members, this is a pertinent concern (Council on Hemispheric Affairs, 2008).

In relation to biopiracy however, I argue that this form of sale also potentially involves the transfer of future rights over the medicinal or cosmetic use of camu camu - or the use as a biofuel or combustible of piñon blanco - both uses for which San Francisco are unlikely to be adequately consulted or compensated. Piñon blanco has not been used by ancestors of the residents of San Francisco to power machines, and camu camu has not been combined with other ingredients in the way that Zamu™ is. It is thus doubtful that National Registers of Collective Knowledge, for example, could be used to ensure a share for San Francisco's residents in the benefits of the use of these plants; yet the increasing exposure of plants such as these outside of the Amazon (coupled with the research activities underway), increase the likelihood that further non-indigenous persons will make claims about the use of these and other plants. Increased mass media exposure also serves to further alienate the plant as a material from the knowledge and techniques of the peoples who propagate, and tend, the lands, and cultures, which are home to them. This complex of relationships is simply presented in terms of, 'naturally occurring nutrients'(AmazonHerb Co., 2010b). I view this as a kind of reinvention of *tierra nullius* - the idea that indigenous people's lands are empty or uncultivated - but which in 2010 includes indigenous peoples in photographs as smiling, grateful benefit-recipients to boot.

That piñon blanco is valued for curing painful throats, or to bathe in to remove negative spiritual energies [*limpiarse o sacar energías malas*] is not considered important in utilising the combustible, neither is the fact that piñon blanco, "*tiene dueño*" [has a spiritual owner].[106] What the effect of splintering local 'traditional knowledge' in this way will be in the pursuit of the commodification of economically valuable material extraction will be is unclear. Such a pattern of fragmentation: of knowledge from meaning, of people from plants and from knowledges (the issues that accompany large scale production) does not set a promising scene in the light of colonial histories.[107] The above section has shown the importance of relations - external to the community - which govern the use and abuse of traditional knowledge, as well as highlighting the extent of existing commodification of traditional knowledge (which falls outside the scope of the relationships which characterise global biopiracy). I will now move on to illustrate how relationships between people and between people, spirits, and plants, are affected by commodification *inside* the community itself. I ask: What happens when spiritual knowledge becomes economically valuable to tourists?

- Section Six: Plants and Shamanism

5.15 Ayahuasca Knowledge & Ceremonies

Ayahuasca, a Quechua name is widely used in Peru to describe both a plant [*Banisteriopsis caapi*] and an entheogenic brew (Ruck *et al*, 1979). In San Francisco this brew combines ayahuasca with chacruna [*Psychotria viridis*] as well as with many other plant combinations.[108] Ayahuasca is of incredible importance in the spiritual, cultural, social, and economic lives of many Amazonian communities (Tupper, 2006). It is an important exemplar

[106] As do many other plants. (Saldaña Inuma [F], Personal communication).
[107] See Chapter One for a discussion of colonial practices of exploitation.
[108] Throughout the following section the term 'ayahuasca' refers to the brew.

of the uptake of traditional (spiritual and plant) knowledges outside of communities (which itself is enabled by the movement and modification of these traditional knowledges). As such, some ayahuasca knowledge is becoming 'global':

> 'Ayahuasca has begun its ascendancy into popular global consciousness at a time of unprecedented interpersonal and intercultural knowledge exchange. One issue this raises is that of cultural appropriation. I would be remiss not to acknowledge humbly that ayahuasca is an exemplar of indigenous knowledge, a shamanic technology or cognitive tool that has long been what may best be described as intellectual property of the native peoples of the Amazon. Accordingly, its commodification, commercialization and secularization are concerning trends.'
>
> (Tupper, 2006:4)

In the late night ceremonies that I have witnessed (as the only non-Shipibo observer), those who will form part of the ceremony typically gather around a small lantern, or candle in a rough circle under blankets, around the Onaya. The Onaya sits in the centre of, or as part of the circle - the majority of whom do not drink the brew. Sometime after the Onaya has ingested theirs, and they begin to have visions, or feel the effects of the ayahuasca they call people to gather. The Onaya may have taken the brew an hour or more before, but for brevity the participants often gather only as the shaman or others call people to gather. If the ceremony has been asked for, a payment - in cash or in goods - will usually have been made prior to the night of the ceremony.

The shaman begins his communication by blowing and inhaling in a melodic way, as well as talking and muttering to the participants – both those visible to non-shamans and those (spiritual participants) who are not. Eventually he breaks into a series of *Icaros* (shamanic songs) which may deal with any aspect of the shaman's personal experience of visions of the event, or with an issue (such as a planned venture, an illness) that the shaman knows is affecting the participants or their loved ones. The *Icaros* also call to the particular 'lion or jaguar guardian-spirit' to which the shaman has a personal relationship.[109] The ceremony might also involve massage, and the placing of hands over the foreheads of particular persons. It often involves the spitting of *agua de flora* (a scented tincture) as well invariably being punctuated by the blowing of *mapacho* (strong black tobacco) smoke over the immediate circle and its environs. Luna (1986) also notes the prevalence of tobacco use associated with ayahuasca ceremonies.

The status of *Onaya* is conferred as a result of a long period of avoiding elements which are considered to be detrimental to the path of learning which leads up to - and beyond - the completion of the preparatory phase (of becoming Onaya) .[110] There were no *Mëraya* - master shamans - in San Francisco.[111] The extent of shamanic knowledge acquisition is contingent on practice using ayahuasca and other plants, as well as the periodical observation of food and behavioural prohibitions. One who ceases to drink loses the shamanic power.[112] Those who weakly observe prohibitions are generally not considered to be very influential ,or powerful, shamans. General prohibitions include engaging in sexual relations, salt, alcohol, and meats - especially pork. Roe (1982:125) notes the existence of similar dietary restrictions, but adds that the exclusion of pork is permanent.

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[109] I heard this spirit referred to as a, *"leon"* [lion] or a, *"tigre"* [jaguar] with all the shamans whose ceremonies I witnessed.

[110] The minimum period is not fixed, but is typically one to two years (although three months was the shortest time mentioned, I only heard this applied to non-Shipibo persons).

[111] The conversations I had about Mëraya consistently located them as being found 'elsewhere' – either in terms of living at some point in the past: "when the world was born" ("cuando naci el mundo") [Inuma Garcia, 2009]; "in the time of the grandparents" ("cuando vivia mi abuelita") [Panshaninka, 2009]; or "deeper in the forest"["por la monte"] [Inuma Bardales, personal communication].

[112] A nonagenarian elder, Martin Muñoz, was said to have previously been a powerful shaman, but for years he has been unable to drink and thus is considered to have no real power.

The particular prohibitions, the *'dieta'* of the individual would-be *Onaya* are dictated by the plants themselves (and their *dueños*) and are passed through the lips of the supervising shaman. Hence both the creative skill of the shaman in nurturing relationships with plants and plant *dueños*, and also the agency and power of plants is required in order to permit a person to receive shamanic training. In that every shaman's relationship to plants, to the spiritual world and to their student is different, every 'dieter' follows a different regime. The shaman is a vital 'bridge' between the spiritual worlds of the past and the present. One shaman, Leonardo, explains:

> 'In my visions I see the dead, animals, my lion and the faces of people here. I talk to everyone, fight with some, so that we stay well.' [113]

The matter of what *dueños* are is not easy to reconcile, especially in such a short space. However, it is important to address this, in order to shed light on the integral position that *Ibobo* share with humans in the ownership and generation of traditional knowledge. It is also important to understand the nature of *dueños* in order to illustrate the full effects of the theft or loss of traditional knowledge to Amazonian communities. Instead of defining their material or spiritual substance here, I borrow a concise description from another Amazonian ethnography, which eloquently encapsulates the outcomes of my questioning in San Francisco.

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[113] 'En mis visiones veo los muertos, animales, mi león, y las caras de persones acá. Hablo con todos, peleo con algunas, para que nosotros quedamos bien.' [Translated from Shipibo] (Inuma-Garcia, 2009)

Århem explains:

> 'In their essential aspect, human beings, (non-human) animals and plants are undifferentiated; they belong to the same ontological category of mortal beings. In shamanic discourse they are contextually classified as [...] people. In this inclusive society of mortal beings, one class of beings readily transforms into another: humans become animals, animals convert into humans, and one class of animals turn into another. The underlying idea is that the spirits of plants, animals and humans can take a variety of material shapes and thus penetrate various life worlds and manifest themselves as different classes of beings. Essence, then, reveals itself in different forms of vitality.'
>
> (1996:188)

If human-human and human-non human relationships are not exactly equivalent, they are of the same type. As plant bodies mingle with human bodies, so plant spirits can mingle with human spirits. Both human and plant agency is required to keep this separation in daily life, just as it is required to traverse it in shamanic ceremonies and dreams. The necessity of maintaining proper boundaries between humans and plants is indicated in the anecdote about avoiding toé I mentioned earlier. Descola (1996:98) also notes the phenomenon of 'anthropomorphisation' – changing form - which leads to relationships of 'intersubjectivity' between humans and non-humans in Amazonian societies.

Descola states:

> 'The anthropomorphisation of plants and animals can be seen then as just as much the manifestation of mythical thinking as a metaphorical code that serves to translate a form of "popular knowledge".
>
> (Descola, 1996:98)

5.16 Small-Scale & Large-Scale Shamans

The shamanic ceremonies above were also paid for by visitors. These ceremonies cost from twenty to three hundred soles. Typically, two or more non-shamans would consume ayahuasca as part of the ceremony. In others, an individual had arranged and paid for the position of 'apprentice' and stayed for weeks as part of this agreement, partaking many times of the brew and receiving instruction from the 'master' *Onaya.* These ceremonies were arranged *ad-hoc* - often on a one-to-one basis - the result of travellers who had met with family members of the shaman in Pucallpa (often women selling *artesania*), or who had simply arrived hoping to meet a shaman. The (usually foreign) visitors lodge with the family of the shaman or his kin, sometimes paying for food or lodging. Within the extended family with whom I stayed, there was intense competition over who would 'host' visitors; because of the expected financial rewards, as well as because of the enviable status of being able to demonstrate hospitality. I call these ceremonies 'small-scale'.

I also met over forty non-indigenous participants of other ayahuasca ceremonies, organised by shamans whose principal, (and often very lucrative) economic activity was to bring in groups of tourists to drink and 'diet' for periods of a few days to a few weeks. These visitors stayed in terrain slightly outside the main thoroughfare of the village. The best known of these men - whom I term 'large-scale' shamans - was a Sr. Mateo Arévalo. According to Znamenski (2007:160), Sr. Arévalo charges around two-hundred dollars a month for apprentices, or thirty dollars per drinking session (as well as being involved with the ownership of several jungle retreats). A kinsman of Sr. Arévalo, Sr. Antonio Muñoz, is also a proponent of a different form of the commercialisation of shamanic knowledge. As one half of a Lima-based practice, Sr. Muñoz is concerned with paving new collaborations between psychological and traditional healing-based approaches to mental health (Znamenski, 2007:160). Needless to say, the uptake of such cutting-edge therapies is beyond the reach (and wallets) of most Sr. Muñoz's birth community.

To illustrate the relative economic inequalities between small-scale and large-scale shamans, I reproduce one account of the monthly village General Assembly. As part of one village *Asemblea General* [General Assembly] which I observed in February 2009, a planned 'bilingual education conference' event was the main subject of discussion. In the passing of time since then, that event did not transpire. However, on that rainy morning it was fully expected that the event would take place San Francisco, and that it would host in the region of three hundred delegates, who were likely to be considerably more disposed to spend their currency than the average backpacker visitor. I heard Sr. Arévalo speak and propose the construction of a kind of *'ayahuasca maloca'* [large, traditional style long house] where all shamanic ceremonies would be conducted. Interesting, that the next speaker on that issue would be Sr. Antonio Muñoz, who was noticeable as the only person in a business suit. He added that if such a house were to be constructed it should only be filled with *licensed* Onaya. He reminded the meeting of his credentials, as an accepted member of a Peruvian Medical Federation [*Federacíon Medica Peruana*].

The proposals stirred a great deal of murmuring, gesturing, and what I perceived as general discontent - though there were no formal declarations of any kind. Loida Garcia Reátegui (who accompanied me to the meeting), explained that the community thought they were worrying. This was because it would mean preventing (what I referred to as) the 'small scale' shamans from competing for ceremonies. I have mentioned this meeting in order to highlight the different kinds of economically-driven relationships in which shamans are involved in the commercialisation of traditional knowledge. Not only do such relationships create economic inequalities between shamans and non-shamans in San Francisco, but they increasingly separate the practices of 'small-scale' and 'large-scale' shamans.

The concerns that community members, and some shamans, have about the regulation and concentration of shamanic knowledge and practice (to particular forms and persons) is not merely a simple matter of status or resource envy. It is also an articulation of fears over the loss of modes of transmission and generation in the light of the unprecedented scale of commodification of shamanic knowledge. Negotiating *who* can have access to the lucrative livelihood that can be gained from the commodification of traditional knowledge in shamanic ceremonies, re-configures relationships between community members towards inequality.

This change in human relationships also redefines the relationship of shamans to *Ibobo*. Instead of (or at least as well as) the plant-human relationship - developed through dieting, conversation and familiarity - assuming prime importance in the distribution of traditional knowledge and associated status, new human-human relationships begin to take precedence. As the commodification of shamanic knowledge becomes more lucrative, the commodity value of this knowledge begins to take precedence over its inherent value. A shaman's relationship to wealthy foreign visitors, to the medical profession, or to commercial contacts, may come to constrain, as well as to offer access to the lucrative commercialisation of traditional (shamanic) knowledge. Of course, envy and competition amongst shamans itself is not a new thing in San Francisco, but the legitimating of status in this way is.[114]

[114] I was told many stories about animosity between shamans, and envy of other shamans towards the family. For example, once, during a ceremony with Miguel Valera Sanchez, I was told that the shaman was attacked after I left, as the neighbouring shaman resented the (perceived) wealth I had brought to the family.

Negotiating licenses for access to traditional knowledge in this way is also a means of appropriating traditional knowledge. Redefining relationships to traditional knowledge, in terms of who is included and excluded from the benefits of 'ownership', is at stake in the conflicts between large and small scale shamans. These are issues that resonate with biopiracy - concerns about 'theft' and the 'theft of economic opportunity'. These arise from the commodification of traditional knowledge, and through the creation of relations of ownership in/of it. Clearly, the issue at stake in San Francisco does not directly concern intellectual property (as it is crafted in legal terms). What is being negotiated, through conflict, is access to the lucrative commercial potential of traditional knowledge.

Such divisions create a good deal of resentment and relative disempowerment in the community itself. They also threaten the future generation, cultivation and transmission of shamanic knowledges, both in economic and in cultural terms. The creation of 'classes' of shaman (other than the traditional *Onaya* or *Mëraya*) do not reflect the strength of a shaman's relationship with *Ibobo* as much as they reflect the success of individual shamans in the market economy. Without proposing that shamans who are successful businessmen should not benefit from their knowledge, or denying the dynamic character of traditional knowledge, the potential for larger-scale forms of commodification to imperil community relations - and the equality of consuetudinary governance of traditional knowledge and associated resources - should not be overlooked. Perhaps the immediacy of the 'theft' of traditional knowledge is felt also betwixt members of the community. Should this be considered a type of biopiracy from within the community? Or, is traditional knowledge being *lost*? If so what does this reveal about the types of relationships to plants and plant knowledge that are excluded from global biopiracy?

- <u>Section Seven: Loss and Rhetorics of Loss</u>

5.17 Loss

To address the question of the *loss* of traditional knowledge I will return to discuss the 'Biopiracy and Traditional Knowledge Workshop' mentioned at the beginning of Section Four. Other insights developed from the kinds of dialogue that occurred in the workshop concern the 'loss' [*perdida*] of traditional knowledge. The subject of the loss of traditional knowledge again mobilises rhetoric familiar in international documents which relate to the 'protection' of 'traditional' knowledges and lifestyles in the service of biodiversity, such as the Convention on Biological Diversity.[115] The rhetoric of 'loss' is mobilised alongside the 'theft' of traditional knowledge in providing a crucial justification for the necessity of the, 'protection, preservation, wider application and development' of TK undertaken by INDECOPI.

However, the 'biopiracy work' of the National Commission Against Biopiracy - if it does not erase the connection of biopiracy with traditional knowledge – marginalises it by reifying TK from the public domain. Stories about the 'loss' of traditional knowledge involve a greater number of biopirates than even those referred to in Chapter Two. Extractive industries, forestry developers, displaced peasant farmers, large scale agriculturalists, organised religious missions, and educators all pose significant threats to the continued survival of traditional knowledge (Tobin & Taylor, 2009:4). However, the effects of these types of relationships on the loss of traditional knowledge are glossed over when emphasis is placed on (limited) notions of theft.

[115] See Chapter One.

Persons who could equally be considered biopirates, because the threat they represent to TK, are both directly referred to and are also implicit in stories about resource depletion. These are all condensed terms collating factors which concerned members of the community who attended the workshop, and with whom I spoke otherwise, but which are not addressed in the 'biopiracies of theft' which have dominated previous chapters. The following excerpt is an example:

> 'I remember when I was a boy. I travelled with my granddad in a canoe, searching for fish: *paiche [Arapaima gigas], gambitana [Colossoma brachypomus]*, turtle [...] now I can't go with my boys because we have to travel too far – to the deep forest – to search for big fish and hunt wild animals. This is why my son, Samuel, doesn't hunt well. He can fish, but he doesn't know anything about *paiche*. How can we teach our grandchildren if there aren't any big fish in San Francisco?'[116]

Shown in the except above, discussions about traditional knowledge and plants commonly mentioned the widespread loss of forest, and of forest plants and the reduction in the quantities and varieties of fish available to catch. Overfishing and water pollution contribute to this loss. At the outset, this loss may appear to be unrelated to biopiracy. After all there is no 'pirate' in this tale - no theft - and no obvious commercial gain. However , when viewed from a local perspective, the relationship of 'loss' to 'theft' is closer than the global biopiracy would convince us it is.

The causes of this loss are clearly articulated. Extractive industries contribute significantly to these problems, because they profit from the sale of biodiversity - often illegally - without compensating communities. In San Francisco, biopiracy's attempt to separate loss from

[116] 'Recuerdo cuando yo era un niño. Viajo con mi abuelito en la canoa, buscando peces: paiche, gambitana, charapita (...) ahora no puedo ir con mis niños porque tendremos que viajar tan lejos – del monte – para buscar peces grandes y cazar animales silvestres. Eso es porque mi hijo, Samuel, no casan bien. El es pescador, pero él no sabe nada del paiche. ¿Como podemos ensenar nuestros nietos si no hay peces grandes en San Francisco?' (Inuma Garcia, 2008).

theft - via the (prior) separation of knowledge from the organisms to which such knowledge relates - was not convincing. In order to mobilise people in San Francisco to discuss biopiracy, the related rhetoric of loss – and the exploitative relationships which underlie it - must also be rallied. In the contested process of negotiating biopiracy's travels to San Francisco, the bridges offered by the establishment of *'a priori* unity'(Tsing, 2005:89) between rhetorics of loss and the theft of traditional knowledge are crucial. This is because stories about the theft *and* loss of traditional knowledge, are also stories about the breakdown of proper relationships with others. I now will tell a brief story about loss, which I believe also highlights the dynamic, creative, character of both traditional knowledge, and of the connections it can make with other knowledges.

5.18 Loss & Generation

In late December 2008, Eyley, youngest daughter of the Saldaña Inuma family, had fallen ill. Her little (8 year old) body was very swollen and her eyes showed her discomfort, she had fever and little appetite. Her mother Florinda and I set out to find several plants with which to make a concoction to cure the girl: *clavillia [Mirabillis jalapa],* another plant I did not know, and ojé. We went early in the morning to the port to see if an acquaintance of the family might be passing and could carry us a short way downriver to where the ojé trees can be spotted from the shoreline. We had no luck. After searching for the remaining plants at the shoreline and along scrub and patches of forest along the road which joins the community to other communities (such as Panaillo) our luck did not increase.[117] We returned with only a small quantity of a plant I believe was clavilla, and none of the mystery plant. The ojé would have to be bought from Yarinacocha, I was told, but the other mystery

[117] A nearby Shipibo community located several kilometres further away from Yarinacocha.

plant could not grow in the dry soil of San Francisco's nearby chacras, and the last remaining patch at the entrance to the family chacra had been eaten by a *sajino* [*Tayassu tajacu*].[118]

Because of the failure of our gathering expedition, I accompanied her older daughter to Yarinacocha. Having decided upon what to purchase, and as ojé was thought too expensive, Florinda decided to follow her daughter Erika's recommendation of combining Andrews Antacid™ tablets with red soda drink, and to send for *'Abuelita'* Rosita to perform a massage. I was intrigued at the source of this new medicine. Erika Saldaña explains:

> 'One day I was bad, vomiting and had bloody diarrhoea, many times I have been like this. But this time my mum sent me to vomit, I vomited (probably through using *yerba luisa*)and I heard the voice of my Grandmother and I knew then how to make myself better.'[119]

That a deceased grandmother would recommend pharmaceutical drugs which are not recommended for children (according to the label) and the use of red soda seemed more than a little strange to me. Ethnocentric as a judgement or not, it somehow did not 'fit' that knowledge that comes from the knowledge of traditional purgatives, and the voice of an ancestor, should concern the use of pharmaceutical treatments such as antacids. That such hybrid claims of traditional knowledge were not able to convince me (and I doubt they would convince many Westerners) of their value, throws light on the constructions of traditional knowledge which take place in biopiracy.

That traditional modes of knowledge transmission and acquisition are effective to instruct upon the use of pharmaceutical and commercial products, could be seen as testimony to the creative and generative capacity of traditional knowledge. It is pertinent here to recall the

[118] The family chacra lies some two kilometres outside in San Francisco.
[119] *'Un día estaba mal con sangramento y botando todo, muchas veces he estado así. Mas este vez mi mama me mandaba a vomitar, vomito y escucho la voz de mi abuelita y ya supe cómo sanarme.'* (Saldaña Inuma [E], 2009).

critique of traditional knowledge *vis-à-vis* other forms of knowledge I set out in Chapter One. Instead of a symbiosis of TK and scientific knowledge, it becomes possible to see the emergence of knowledge in particular, *situated* places. It is also a fitting reminder that in the face of the theft of traditional knowledge and of concerns about its loss, traditional knowledge has the ability to 'borrow from' Western or scientific knowledge and materials, in order to create new knowledge and things. In this story, the 'friction' (Tsing, 2005) generated between traditional knowledge and scientific knowledge has led to the formation of hybrid, *locally appropriate,* healing knowledge in the condition of scarcity of plants (at least for the Saldaña-Inuma family). This is a pertinent example of the way in which local knowledges are, 'highly situated ways of knowing, that have been subjected to multiple forms of domination and hybridization' (Nygren, 1999:270).

However the story above also tells of the immediacy of the threat of the loss of traditional knowledge to the healer-plant relationships - an important element of Shipibo identities and economies. The fact that vital curative ingredients were unavailable, meant that the healing process became heavily dependent on both a cash economy, and on pharmaceutical knowledge. To obtain ojé, one must not only know where to look, but also afford the passage, or pay for the sap. To cultivate the unnamed plant, Florinda would need to tend her distant chacra regularly, but because the land is poor and dusty in the centre of San Francisco (a product of local deforestation and declining chacra cultivation), she cannot live close to her garden and do so.

The garden is around an hour's walk from the homestead, but she can rarely go there more than twice a week because she must pay for electricity, water, rice, medicines, and school materials - and to pay these she must sell *artesania* (for which she must gather the seeds elsewhere). After gathering these seeds, she must carry out the craftwork needed and pace all day in Pucallpa waiting for a few sales that will cover her passage and earn a small profit. In poorly tended *chacras* the jungle animals destroy the plants, and cures must be bought instead of found.

The encounter between local expertise (massage), traditional knowledge (of plants), and global scientific knowledge (contained in pharmaceuticals), generates 'friction' (Tsing, 2005) meaning that new knowledge is created. This knowledge managed to convince Florinda of its charismatic abilities to heal (at least under conditions of scarcity). It does this by appeal to the spirit world (through the grandmothers voice); thus it constructs bridges between traditional and other modes of knowledge generation, which afford credence to the claims the combination makes. These claims also fails to convince others (or, at least *me*) of its charisma, because of my belief about the value of scientific knowledge: I am convinced that this pharmacy drug is bad for children.

Belief or disbelief in forms of knowledge appropriation (such as the implicit appropriation of scientific knowledge in this story) are negotiated, as they are in the claims that nutraceuticals or even pharmaceuticals make from appropriating traditional knowledge . But Erika's preparation is both unlikely to convince consumers in developed nations of the claims it makes, and extremely unlikely to succeed in convincing regulatory bodies that the remedy is safe or effective, unless a scientific basis for such claims can be proffered. The inequalities of relationships to knowledge in such a comparison are clear.

In this way, the story of Eyley's illness casts a familiar shadow - of economic dependency through material deprivation - upon the embryo of the red soda-antacid-massage knowledge combination. In relation to traditional knowledge, another shadow is cast, which interrupts the relationship between healers and the plant materials (and spirits) of their craft. With the loss of suitable habitat for particular plants to grow, Florinda is not able to practice with the materials she has knowledge of. This means she cannot demonstrate the craft to others, and the so knowledge is not passed on to younger men and women. In addition because she is unable to bathe, ingest or communicate - to dream and to talk - with particular plants and their *dueños*, she is also unable to gain further knowledge of the uses and potential of the same. The generative relationship between plants, people and *Ibobos* is threatened.

The rhetoric of loss is also pervasive and can be argued to 'freeze' traditional knowledge in a historical moment. Tourists, legislators and commercialists alike seek to reap the benefits of San Francisco's cultural heritage, rather than reap the developments to established pharmacopeia which may be generated in the collision of elements of traditional knowledge and other knowledges in this community. It is doubtful whether the sale of Erika's mixture would be as attractive to tourists as the use of sangre de grado is in Zamu™, despite neither product having been approved by the FDA. Global biopiracy, understood as the theft of traditional knowledge, may serve to erase generative aspects of collisions between traditional knowledge and scientific knowledge - even as places such as San Francisco grapple with the expanse of commerce. Rhetorics of loss give credence to understandings of biopiracy, both in San Francisco and, as we have seen in Chapter One, to global biopiracy (and hence to the work of the NCAB).

Loss of traditional knowledge is a real *fear* in San Francisco, a community who is very aware of the issue of 'wealth' in terms of natural resources, or of the opportunities brought by tourists who are attracted to exotic plants and animals (and the commercial potential for the sale of such resources). San Francisco is not able to avail itself of the opportunities available to other communities (who have not so extensively depleted the forest around and underneath them). This makes the 'trade in knowledge' much more vital to their economic prosperity. As Juan Agustin notes, 'In San Francisco, we are not rich in resources, we are rich in knowledge'.[120]

The loss of traditional knowledge, outlined in my story about Eyley, does not easily translate into most stories of biopiracy, because the 'biopirates' are not easily identifiable. Pharmaceutical companies - for example - appear to be the *providers* of knowledge in this tale. However, contrasting the tale of sangre de grado to that of Eyley's cure, the inequalities of knowledge acquisition become apparent. The loss of traditional knowledge is very much associated with the involvement of indigenous communities like San Francisco with capitalist economies. This occurs whether the supply of electricity, and the subsequent need to sell artesania means that sajinos get fed (but people in San Francisco go sick and hungry), or old cures are 'stolen' by corporations or extractive industries, or even when new cures are sought from the purchase of pharmaceutical products. However the unequal exchange of knowledge which leads to the development of these relationships is not called 'biopiracy - despite the connections these stories make to the exploitation, theft ,and loss of traditional knowledge.

5.19 Traditional Knowledge & Biopiracies in San Francisco

Finally, I return to a story told by Juan Agustin - about his mother's experience with a would-be 'apprentice' – the same one mentioned at the outset of this chapter. It epitomises a 'lens', one through which I have tried to characterise the concerns and meanings of biopiracy as it relates to traditional knowledge and plants in San Francisco. This lens is

[120]'En San Francisco no somos ricos en recursos, somos ricos en conocimientos.' (Agustín, 2009).

absent in discourse about 'biopiracies' emerging from the work of the NCAB and beyond. This lens is the consideration of *relationships*.

Most explicitly with the type of relationship mentioned in Juan Agustin's story, the failure of the 'apprentice' to act with good intent, and to show consideration for the contributions and wishes of his 'teacher', is of the greatest offence. Whether between shaman and shaman, community member and corporation, or between human and *Ibobo* - the role of relationship breakdowns in creating, or articulating concerns over the theft or loss of traditional knowledge is paramount. This is the product of more widespread, colonial injustices which have marginalised and disinherited indigenous peoples for over 500 years, and have also been the backbone of the exchange of plants and plant knowledge which has so benefited non-indigenous persons and knowledges.

The conspicuous 'ignorance' concerning the continuation of such relationships - which fall outside the remit of existing efforts in the NCAB to address 'biopiracies' – is perhaps unsurprising, given the stakes involved. Assessing the categories of relations that are mobilised in global conceptions of intellectual property (or even of property in artefacts - in terms of not only these, but other types of social relations which can create and bestow value - is essential if the importance of traditional knowledge to indigenous communities is to be properly understood.

If the equality and the commensurateness of relationships, rather than the pursuit of rights (and benefit-sharing according to rights), became the loci of activities intended to protect the moral interests of indigenous peoples in their knowledges, the ramifications for non-indigenous persons could be immense. From the mestizo trader who charges too much for what they may not help to cultivate, to 'Amazon John', or the Regional Government of

Pucallpa, the urban ayahuasca patient, or the shaman's (tourist) 'apprentice', and up to myself: all involved in the use of traditional knowledge for personal gain could be required to examine the moral appropriateness of their use of TK. Such examinations should include considerations of economic justice and the opinions of the communities who have generated - and who continue to generate - this knowledge.

If biopiracy *is* appropriate as a lens to assess indigenous peoples' concerns over the use of their knowledges, it must do so not only in terms of considering the myriad types of theft that can and do occur, but also by addressing the relationships between theft and loss of traditional knowledge, and the effects of the loss of traditional knowledge. These are relationships in an expanded sense - between people, animals, plants and spirits or *Ibobo*. Biopiracy has a global appeal because it mobilises myriad concerns about unequal, exploitative relationships to knowledge and resources, and conjures the spectre of the indigenous community to articulate them. However, by restricting the kinds of relationships are important in selecting examples of biopiracy, and positing theft as of (reified) traditional knowledge instead of knowledge in/of the plants and animals concerned, the inequalities of relationships that most concern indigenous communities are often erased.

5.20 Conclusion

Throughout the sections above I have tried to highlight the many different shapes that the use and meaning of 'traditional knowledge' about plants in San Francisco (and the relationships which govern TK) can take. I have tried to portray a picture of a complex, diverse community of people in a particular place and time, and to show the many ways in which an expanded understanding of the concepts of loss and theft which can permeate 'biopiracies' can be recognised, or crafted in an Amazonian community. Biopiracy formed into 'biopiracies' (which focus on the inequalities of relationships involved in the exchange and use of traditional knowledge) does indeed matter to indigenous people in San Francisco, as does loss and the rhetoric of loss. I have shown that the concerns indigenous people have in San Francisco about the use of their traditional knowledge do not 'fit' into the more restricted understandings of 'biopiracy' at work in the NCAB. The next chapter will examine what happens to biopiracy and traditional knowledge in an encounter between another indigenous community and INDECOPI.

Chapter Six

Biopiracies, Traditional Knowledge and Registers: Callería

'Friction changes everyone's trajectory.'

(Tsing, 2005:14)

6.0 Introduction

In this chapter I will explore the collaborations which involved another Shipibo community - Callería - in a project to register their knowledge. I shall go on to describe the transformations of knowledge which result from the 'friction' (Tsing, 2005) of the collision of 'global' concepts of 'Collective (traditional) Knowledge', and local traditional knowledge about plants. I describe these transformations under the terms, 'registry-ready' knowledge, and 'registry-recorded' knowledge. I use examples of particular plants to highlight the characteristics of 'biopiracies' that emerge - through the negotiations over configurations of relationships - to knowledge, plants, spirits and people- from these transformations. I describe these 'biopiracies', which are contingent with those described in earlier chapters, as 'biopiracies of theft' and 'biopiracies of economic opportunity'.

In July 2008, staff from the Office of Inventions and New Technologies (OINT) arrived in the community of Callería, a Shipibo community approximately six hours by *peque-peque* from San Francisco. As we have seen in Chapter Three, the OINT are responsible for the administration and maintenance of two National Registers of the Collective Knowledge of Indigenous Peoples in Peru. Their arrival, was the result of previous negotiations - over the possibilities of including some of the community's traditional knowledge about plants in the National Registers of Collective Knowledge (NRCC) - between the Confederation of

Amazonian Nationalities of Peru [*Confederación de Nacionalidades Amazónicas del Perú*, CONAP], the OINT, and the community of Callería.

The registration of traditional knowledge in NRCC is counted via single entries for individual species. As of August 2009, INDECOPI had received one hundred and forty-two requests for the registration of 'Collective Knowledge' from indigenous and *campesino* communities in Peru, though since the creation of the NRCC, only thirty-six registrations of individual species have been accepted by INDECOPI (thirty-two of these since the beginning of 2008).[121] Two Shipibo-Konibo communities had formed part of these registrations: Callería (twelve) and Caco Macaya (two). Twenty-seven requests for the registration of particular TK were received from Shipibo-Konibo communities, of which only the aforementioned fourteen have been accepted into the registers (OINT, 2009). Since the community of Callería had agreed to disclose elements of their traditional knowledge in this way, and given that registered TK from Callería amounts to one-third of all the registered TK acknowledged by INDECOPI; a visit to Callería represented an ideal opportunity to delve into the actual processes of collaboration and registration of TK.

In summer 2009, it seemed imperative to visit this community, who were ostensibly so concerned about biopiracy that they had made the decision to allow aspects of their traditional knowledge of plants to be 'protected' by the OINT, as part of NRCC. I address the following questions in sequence in this chapter:

[121] Also see Chapter Two, Box Four.

1) Why had this community come to register their knowledge?

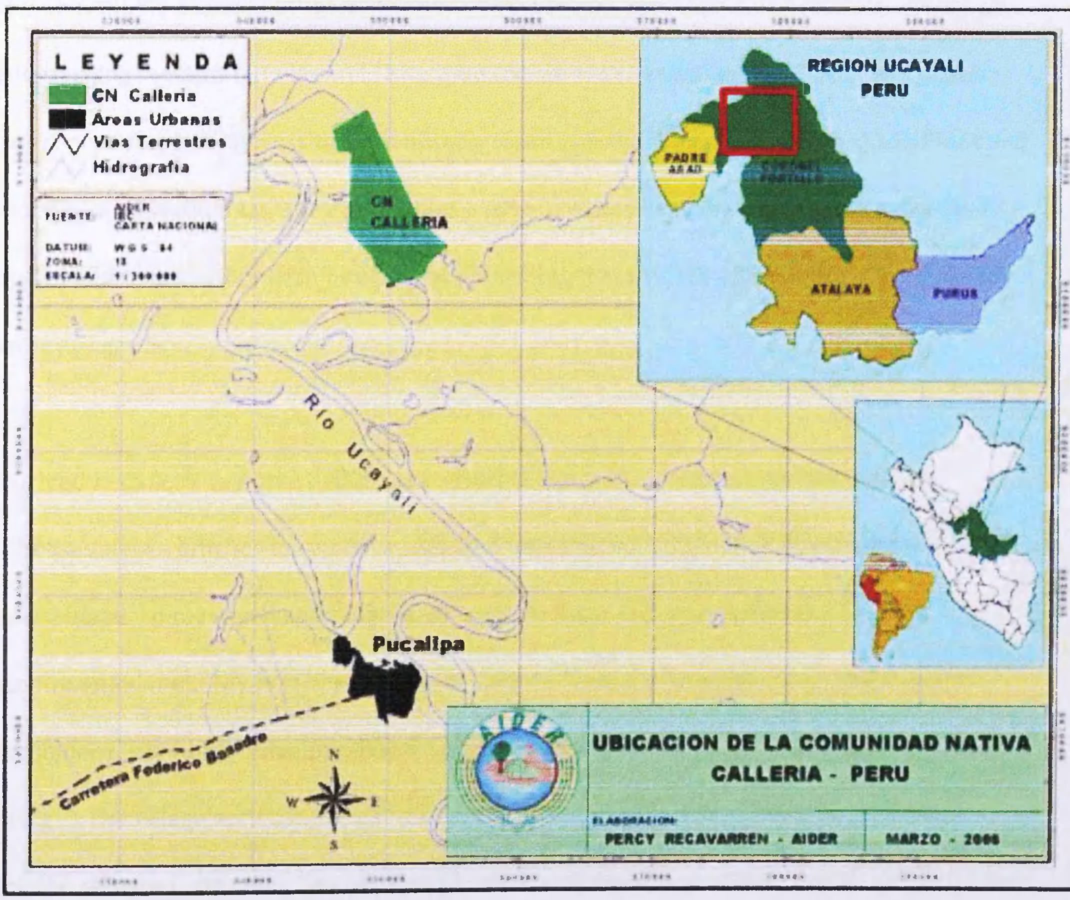
2) What was chosen to be registered?

3) Why was traditional knowledge not registered?

4) What understandings of biopiracy emerge through the registering of 'traditional knowledge' in Callería?

6.1 Callería

Figure Nine - Map of Callería[122]



[122] (Recavarren, 2006)

The Shipibo community of Callería is located some 6 to 8 hours from San Francisco de Yarinacocha - depending on water levels and choice of boat transportation - and it is founded on the bank of the River Callería. Access is entirely fluvial, by passing from the lake of Yarinacocha to join the Ucayali River, and then onto the River Callería. Along the single-track 'avenue' that is home to the community of Callería, I counted 60 houses, housing a larger number of families, who are all related to each other. The community is surrounded by a considerable amount of primary forest, which is a source of game; and non-timber forest products, as well as a significant amount of secondary forest, are used by the community to manage of timber resources.[123]

The community also use other non-timber forest plants, and tend small chacras. Although encroaching mestizo families and fishermen threaten the balance of both fish stocks and forest produce, both necessities are notably more abundant in Callería than in San Francisco. As a direct consequence, the community is able to depend more on gathered, grown and caught resources rather than bought goods (although two small shops supply the demand for these goods).

I arrived in Callería in August 2009, as a result of the skilful watercourse navigation of Alfredo Valera - brother-in law to my friend Andrés Inuma Garcia, and *illpa* (maternal uncle by marriage) to my much appreciated *ad hoc* translator Ada Inuma Saldaña (who all accompanied me). My first impressions of Callería from the boat were of a small, quiet settlement, seemingly enveloped by a lush green canopy of lowland Amazonian river-basin foliage. The village architecture and daily activities resembled San Francisco ,and other Shipibo villages I had seen, though absent was the music, the vehicles , the tin roofs and the

[123] The community manages its timber resources with certification granted by the FSC (Forest Stewardship Council) as the result of a project initiated with Association for Integrated Research and Development (*Asociación para la Investigación y Desarrollo Integral*, AIDER) in 2005.

gaudy paint of the easier-to-reach settlements. In its place only *pona [Iriartea deltoidea]* houses and the sound of macaws or outboard motors pierced the tranquillity of the river scene. The village does have a telephone, a health post, two schools and an evangelical church - the latter of which has a large following in the community. At the time of the visits, we four from San Francisco were the only non-residents there.

Upon disembarking from the hired *peque-peque,* I arranged a meeting with the *autoridades* (authorities) to explain the purpose of my visit. Following discussions, in which I handed over a letter introducing my research, I was given a list of the people most involved with the registering of TK. The following morning - after an announcement via loudspeaker summoning the specific men to be at home - I began interviewing. This chapter is largely a result of these (and the later) interviews, conducted over a period of several days and during two visits. The second visit was intended to both confirm the consistency of the initial statements, and to check details of the responses that were unclear. I interviewed seven people in Callería in a semi-structured format. I now consider their responses.

6.2 Why had this Community Come to Register their Knowledge?

It seems curious at the outset, that this community of around 300 (a hamlet in comparison to San Francisco for example) should come to provide the vast majority of all plants and animals registered in the name of Shipibo-Konibo people in Peru. Certainly the territory of the community is home to a vast array of different plants and animals, but why should it be that other communities did not come to register their knowledges? Why did neighbouring Saposoa - a mere half hour by boat, and closer to the main fluvial routes - not come to register aspects of their traditional knowledge?

The stories I was told brought to light a significant number of connections and collaborations, which were forged both prior to and during the pursuit of the registration of traditional knowledge. These connections and collaborations form an important part of the conditions which led to the specific participation of Callería in the NRCC. I reproduce the story in the words of Herlin Ahuanari, who was chief of the community [*Jefe de la comunidad*] when discussions began in 2007:

> 'My uncle, he came here one time - he lived here – because he is a son of Callería. He worked in, I think it was CONAP. He had come here, had a meeting with us, and after – he and other organisations that he had worked with - they came here. [Because] he is from here, he had gone straight to his people (village), to his community, and he shared with us this idea about medicinal plants. He organised a meeting, and the population decided- made an agreement- accepted it all - he explained everything of this objective to us, his proposal. Afterwards, they came another time, that's when we formed the commission, and they [INDECOPI] asked us which medicinal plants we were going to pick. That's when there were twenty-four or twenty-seven plants [...] there were thirty-three, but they only approved twenty-four, so there were twenty-four, twenty-four plants.'[124]

The uncle to which he refers is a Sr. Oseas Barbaran, who is the current president of CONAP, an organisation which is based in a few small offices in an inexpensive area of Lima. This excerpt - which is echoed in the other interviews I conducted - it is clear that the connection of Sr. Barbaran to the community of his birth (as well as to a national indigenous peoples'

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[124] ['Mi tío, él vino acá una vez - él vivía acá - y justamente porque él es hijo de Callería, trabaja en creo que era CONAP. Él había venido acá, nos hecho una reunión, y después también con otros organizaciones con que lo ha trabajado, vino acá. Él es de acá, entonces ha avanzado por su pueblo, no, por su comunidad, y nos compartía, este idea (...).sobre las plantas medicinales. Nos convoca una reunión y, la población se decida, no - hecho un acuerdo - aceptado todo, nos explicaba toda de este objetivo no, lo que era de su propuesta. Después, vinieron otra vez, allí es lo que forma la comisión, y nos preguntaron, cuáles de las plantas medicinales vamos a seleccionar, y de allí fueron las veintiseite plantas (...) era treinta y tres, pero ellos solamente probaban las veinticuatro, veinticuatro era entonces, veinticuatro plantas'] (Ahuanari, [H], 2010).

organisation) was paramount in the inclusion of Callería in the process of registering traditional knowledge with OINT. It is also clear that the community members with whom I spoke viewed the involvement of Sr. Barbaran as conveying allegiance to his *comuneros* [villagers]. The *belonging* of - or connection between - Sr. Barbaran and Callería is repeated three times in this short statement alone and is consistent with other interviews.

Implicit in this story is the personal history of Sr. Barbaran, in terms of his previous connections and collaborations. Though only CONAP and INDECOPI were explicitly referred to, 'other organisations' are also mentioned. In another interview, another man - Polycarpo Sanchez - is mentioned as a significant member of the project.[125] Sr. Sanchez was working for AIDER at the time of the first discussions of the registering project. A previous (and continuing) collaboration with AIDER was another crucial factor in the story of how registering traditional knowledge came to matter in Callería. AIDER were responsible for the community's forest 'Management Plan', which informed and organised the community's desire to protect the plants and animals of their territory.[126]

These collaborations had been historically established: the involvement of Callería with AIDER, CONAP, and other organisations like the FSC (Forest Stewardship Council) were a vital precursor to their involvement with OINT. Seminal in this collaboration was the, 'Plan de Manejo' ['Management Plan']. Jose Reátegui, lieutenant governor *[teniente gobernador]* of Callería in 2000, explains:

[125] (Pangoza, 2009).
[126] Manejo de los bosques comunales certificados (AIDER, n.d.). Here 'Management Plan' or 'Plan de Manejo'.

> 'The forest is our hospital, or gold, our mother. With the help of AIDER, in Ucayali we are five communities that are managing our forest and for the good management of our forest: the competent organism [the FSC] has certified us. In our forest there are many trees – artisanal, medicinal, timber – like there are medicinal plants. So we were interested in making applications of medicinal plants. Following Law 27811, with this guarantee, we proceed. I advise [tell] you that within our work plan, our management plan, our life plan - all the plants that we have, we have to insure them. Since 1987 we had thought to protect our territory, our resources, but it was very costly. In 2000, with the help of AIDER we started to [do] work, that doesn't only include forests, also plants.'[127]

The above excerpt is very revealing. It shows that the collaboration of the community of Callería with INDECOPI (more correctly the OINT), and with CONAP, was not simply the result of a coming together of these organisations, or the individuals mentioned. These collaborations are themselves part of a history of collaborations and connections which date back at least to the 1980's.

Moreover, the excerpt reveals an engagement with global universal concepts of biodiversity, intellectual property, and certification, as well as with management or development plans. The statement about the forest being hospital and mother is common in conservationist rhetoric (e.g. Baltodano *et al*, 2008; Earth Action, 1998). Even in asking about the *local* story of how Callería came to be involved in the registration of aspects of their traditional

[127] 'El bosque es nuestro hospital, nuestro oro, nuestra madre. Con la ayuda de AIDER, en el Ucayali, somos 5 comunidades que estamos manejando nuestra bosque y por el buen manejo de nuestro bosque, el organismo competente nos han certificado. En nuestro bosque hay muchas arboles - artesanales, medicinales, maderables - como también las plantas medicinales, hay bastante. Entonces la comunidad nos interesan en haciendo los aplicaciones de las plantas medicinales. Según Ley 27811 - con este garantía, procedernos. Te aviso que dentro de nuestro plan de trabajo, plan de manejo, plan de desarrollo, plan de vida, todas de estas plantas que contamos, tenemos que asegurarlos. Desde 1987 hemos pensando en protegiendo nuestro territorio, nuestros recursos, pero era muy costoso. En 2000 con la ayuda de AIDER empezamos a [hacer] trabajo que no solo incluído los bosques, sino las plantas.' (Reátegui, 2009).

knowledge, the presence of global concepts is evident, as is the importance of particular histories of collaboration and connections in this community.

This history of previous (and continuing)connections and collaborations, is arguably as important to understanding the participation of Callería in the NRCC, as is the story of the community's involvement with OINT specifically. Or, the movement of knowledge, plants and people that took place as a result of the participation in the NRCC, is itself part of, and propelled in motion by, a rich history of movements of other knowledge (such as that of the 'importance of biodiversity'). It is also propelled by the movement of plants - such as timber as part of the FSC certification scheme. In addition, it is enabled and encouraged by the movement of a diverse range of actors into Callería, and the movement of specific individuals from Callería - who travel to and from the community.

As such the complex, and historically situated bundles of people, plants, and knowledges that brought together the participation of Callería as a community in the NRCC is both a product of a particular place and time and is contingent with other histories of connection. Familiarity with global biodiversity was an important prerequisite to the introduction of plans for both the 'preservation' of forest, and later, of medicinal plants. There were a number of factors which are specific – local - to Callería, which were not present in other nearby Shipibo communities.

Sr. Barbaran and Sr. Sanchez were born in Callería, but left to pursue careers in indigenous peoples' organisations, and consequently returned to present opportunities in their home (rather than in another) community. The implementation of previously successful projects, (such as the Management Plan) meant that the community were receptive to new initiatives, especially brought by former residents. The charismatic appeal of ex-residents, themselves complicit in the movement of the global in to otherwise hard-to-reach areas, adds credence to the importance of (re)categorizing knowledge. Their own charisma thus enables them to act as 'go betweens', bridging the path of the global *into* Callería.

Collective Knowledge from Callería is thus a collection of artefacts imbued with complex entanglements with place, people, plants *and* perspectives about plants and plant knowledge. As such, the story of the involvement of Callería in the NRCC is a product of the encounter between 'global' and 'local' perspectives on the uses (and abuses) of knowledge. As we have seen in Chapter Two, 'friction inflects historical trajectories, enabling, excluding and particularising' (Tsing, 2005:6). It is a metaphor that can begin to describe the engagement of traditional knowledge with global concepts of biopiracy, in the 'sticky materiality' (Tsing, 2005:3) of traditional knowledge registration in Callería.

As Tsing (2005:89) notes, 'convergences add charisma to nascent categories'. The resulting stories of this engagement are stories of 'convergences' (Tsing, 2005:89). These are bridges generated between different, incommensurable knowledges. The stories are both about the generalisation of traditional knowledge, and of discord and the fragmentation of it (depending on which elements of the encounter are focused upon). The 'convergences' (Tsing, 2005:89) forged between local and global knowledge may *seem* complete – after all local traditional knowledge *was* put into a list organised by global logic and biological taxonomy as registered TK. However, unstable aspects of encounters in Callería themselves remind us: it is part of the charisma of global universals (such as biopiracy) to convince us they are able to make claims without the need for particular, local encounters (as we have seen in Chapter Three).

Traditional knowledge registers also appear as complete classification systems, a charismatic appeal that enables them to appear universal and to travel easily. However 'friction' (Tsing, 2005) reminds us that the appearance of 'bridges', unity, and resulting generalisations to the 'global' (from the particular), are part of the agency of global concepts. Thus, as we have also seen in Chapters Four & Five, it is important to highlight 'gaps', that is, 'unreadable or uninteresting places', places where universal claims and concepts, 'do not travel well' (Tsing, 2005:175). Doing so again in this chapter will enable us to better understand the generation of biopiracy, or as we shall see - 'biopiracies' - in Callería and beyond. I now address the question of how local knowledge was selected to be registered.

6.3 What was Chosen to be Registered ?

I have coined the term 'registry-ready', to describe elements of the knowledge that persons in Callería hold about particular plants, and specifically those plants which the community deemed suitable to include in the project of registering TK. As I indicate in the preceding section, 'registry-ready' knowledge definitively *does not* equate to either local knowledge about plants in Callería, *or* the hybrid form of knowledge that (in the NRCC) makes up, 'TK from Callería'. Multiple, 'congeries of local/global interaction' (Tsing, 2005:3) mediate the negotiations involved in the commencement and execution of the registering project. Coupled with the collision of different perspectives about plants and plant knowledge, these congeries mean that knowledge - and the relationships it 'comes with' - are included and excluded at significant points from what comes to stand for the traditional knowledge of Callería. I will now elucidate these processes of negotiation, in my description of the course that TK took *en route* to becoming 'registry-recorded'.

6.4 'Registry-Ready' Knowledge

Augusto Mori, one of the eldest members of the community, explained the process of list formation in his native Shipibo.[128] I reproduce here an excerpt from the interview in English, which itself is the product of a three-way conversation that Ada Saldaña Inuma translated into Spanish. I first asked him what, (in his words), was 'traditional knowledge'.

> "Traditional knowledge comes from the ancestors, our grandfathers and grandmothers taught me - I don't want to lose it. [It is] knowledge of how to cure, to teach our children and grandchildren how to do plants - knowledge of how to prepare plants. But sometimes we don't know how to prepare them, this is what we lose every day and it is important for me [...] and the plants are important for the community, for us all too.' [129]

The excerpt shows the 'embeddedness' of plant knowledge in Callería: instead of merely stressing the practical and historic transmission of TK, the statement firmly situates TK in a context of past, present and future *relationships*. It stresses both the practical (how to prepare or to *use* plants), and generational (from grandparents to grandchildren), importance of plant knowledge. It speaks of the relationship of plants and plant knowledge to past, living, and future Shipibo-Konibo persons. Alfonso also speaks clearly of the fear of the loss of this knowledge, which as we have seen, is crucial to the understanding of biopiracy that I have described in Chapter Five.

[128] (Mori [A], 2009).

[129] 'Conocimientos ancestrales vinieron de los ancestros, los abuelitos me ensenaron - no quiero perderlas. Conocimientos como curar y ensenar los hijos, nietos [***nonkon bacabo***] como hacer las plantas - conocimientos como preparar las plantas. Pero as veces no lo sabemos cómo prepararlas, este es lo que perdimos cada día y es importante para mi [...] y las plantas son importantes para la comunidad, para todos también.' (Mori [A], 2009).

I then went on to ask him about how it was decided which plants to register:

> 'There are many plants that we know how to see. What we really don't know - about the plants that aren't registered - is how to prepare them, what part you use. So we selected the plants that are very well known – used – by us, not because there is a big market for them or because the plant has more force [power].'[130]

This second excerpt details how the prioritisation of particular fragments of TK took place in preparation for inclusion in the registering project. It is echoed in all the other interviews I conducted in Callería. It tells of several junctures by which plant knowledge came to be fragmented, in order to produce the list of 'registry ready' names and uses of plants. Firstly, there was a requirement for *sufficient* knowledge to be held about how to use the particular plant. Secondly, the plant in question should be *well known*. To satisfy both these criteria, the plants selected must be *familiar*, in the double sense of a noun and an adjective.

6.5 Familiar & Other Expertise

When defined as an adjective, 'familiar' describes relationships which hold the qualities of closeness, normalcy, intimacy and recognition, whereas as a noun it relates to an associate or friend. A third reading of familiar as a noun relates it to ideas of animal spirits (The New Oxford Dictionary of English, 1998). Given the importance of spirits in the transmission of TK - the relevance of animal and plant *Joshin and Ibobo* to shamanic knowledge - this third definition is oddly apt. Combining all these senses of the word then, as both a description of the quality of plant-human relationships, and as a means of recognising the agency and

[130] 'Hay muchas plantas de lo que sabemos cómo verlos, lo que realmente no sabemos - sobre las plantas que no son registradas - es como te prepara, que parte usas. Entonces seleccionábamos las plantas que son muy conocidas – usados – por nosotros, no porque hay gran mercado o la planta tiene más fuerza.' (Mori [A], 2009).

spiritual power of plants (that we have seen in Chapter Five), *'familiar'* is an appropriate word to describe the relationships that people in Callería prioritise in the consideration of the preparation of plant knowledge (for inclusion in NRCC). At the outset of the preparation of TK for participation in the NRCC then, the (local) relationships people in Callería have to plants are paramount.

These relationships are privileged over the involvement of plants and plant knowledge in 'global' relationships. Taken from a local perspective, both the spiritual domain of *Ibobo* relations in Shipibo TK, and the economic domain of Peruvian commerce, appear global. However these are not the relationships governing local knowledge registration which are considered most important to persons in Callería. The relationship of plants to non- Shipibo persons through commodification is considered, as is the relationship of plants to plant spirits (the 'power' of particular plants). However, whilst these are factors for consideration, neither the power, nor the economic value, of a plant is the most important in deciding the list of plant names and uses - *familiarity* is. This is a notable feature of local decision making, which aligns local knowledge more closely with the type of knowledge described as *métis* in Chapter One than with reified accounts of 'indigenous knowledge'.

> 'They [INDECOPI] came only one time, to take the samples. They didn't come with any lists. The others [Oseas Barbaran, of CONAP, Jose Reátegui and Pablo Silvano] they met some times amongst themselves, and twice with the community. The first time was when they presented the idea to register plants, it was the medicinal plants - from here came the idea. The second time they asked us - primarily those who know a lot about plants - about the plants and we selected some to be registered'. [131]

[131] 'Ellos [INDECOPI] han venido una sola vez, para sacar las muestras. No han venido con ninguna listado. Los otros [Oseas Barbaran of CONAP, José Reátegui and Pablo Silvano] se han reunido algunas veces entre ellos, y dos veces con la comunidad. La primera vez fue cuando los presentaba la idea de registrar las plantas, era de las plantas medicinales - de allí sale la idea. La segunda vez ellos

The third excerpt above describes the decision-making process in Callería. In this - and in the previous excerpts - three key individuals are posited as 'experts' in the new knowledge. Also, three key encounters during which decisions took place are indicated. The first community meeting was where the decision to register some plant knowledge was taken. The second meeting was undertaken to decide what plant knowledge would be registered, and the third meeting took place with the inclusion of OINT employees, and involved the collection of materials and fragments of 'registry ready' plant knowledge.

The excerpt offers up insight into the creation and participation of two different kinds of knowledge 'experts', those who called the meeting in order to introduce new concepts and ideas, and those who know most about plants. The village General Assembly *[Asemblea General]* facilitated the most significant encounter of these two kinds of experts. It is also the forum in which the legitimacy of knowledge exchange - in the name of the community - was decided upon, between these two kinds of brokers. The production of 'registry-ready' plant knowledge was legitimated within the community assemblies, but was negotiated in the knowledge exchange: between members of the community who hold the most plant knowledge, and those ex-residents who hold the most knowledge about the registration of plant knowledge.

As knowledge 'experts' then, the trio of men who posited the idea of the registration of knowledge in Callería are themselves involved in a process of negotiation: traversing the discourses of biodiversity, 'Intellectual property' and biopiracy they communicate a proposal to their birth communities. As the proposal becomes understood by those who hold the most plant knowledge (the second type of expert), the suitability of different plants and their applications becomes negotiated. Some plants 'make it' – those that are well known,

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han preguntado nosotros - primeramente los que saben mucho de las plantas - sobre las plantas y hemos seleccionado algunas para ser registrados.' (Ahuanari, H, 2009).

or about which sufficient knowledge is known – and others don't, even if they are commercially important or spiritually powerful. In the list of plants and plant knowledge to be presented for inclusion in NRCC, the prioritisation of certain plants takes place not only according to the *familiarity* of relationships to the plant, but also according to the (imagined) priorities of National Registers of Collective Knowledge. Local perspectives and priorities about the 'protection' of traditional knowledge encounter global counterparts in the work of preparing knowledge for NRCC in Callería.

To illustrate, some plants are not well known to Callería as they do not grow in the fluvial soils of the community. They are not well-known in the sense that use is infrequent and the plants are difficult to obtain. However knowledge of how to prepare them, and of their uses *may* be well-known. For example *canachiari* [*toé, Brugmansia suaveolens*]:

> 'Canachiari doesn't grow here because the water [the swell of the river water] kills it. We know how to use it to cure a cough and [...] it is very good, but because it doesn't grow here, we didn't think to register it.' [132]

Similarly, other plants are known to be 'good' for specific ailments but the techniques for preparing and using them are not well known. These plants also did not 'make it' into the list of plants (that I have called 'registry ready'):

> 'I know the names of plants that are strong; my grandmother told me that they are good for the kidneys. Her mother cured her with them when she was a child, but she didn't remember how to make the juices.' [133]

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[132] 'La canachiari no crecen por aquí porque el agua lo mata. Sabemos cómo usarlo para curar la toz y [...] es muy bueno, pero como no tenemos acá, no hemos pensado a registrarlo.' (Mori [R], 2009).
[133] 'Conozco los nombres de las plantas que tienen fuerza, tienen poder; mi abuelita me dijo que son bueno para los riñones. La mama de ella la curaba cuando era una niña. Mas ella olvidaba como hacer sus jugos.' (Mori, [H], 2009).

Aside from the inclusion (or exclusion) of particular plants in the list - those which came to be thought of as the proper knowledge to offer up for registration - the excerpts above reveal other areas of contestation between the two sets of knowledge 'experts'. They reveal conflict, on a conceptual level, between the global-universal knowledge which allowed Sr. Barbaran, Sr. Reátegui ,and Sr. Silvano to become experts in the knowledge 'of registering, and the local knowledge which allowed persons like Augusto Mori and Alfonso Ahuanari, (who have extensive knowledge of plants) to become experts in the negotiations over which plant knowledge would be presented as 'registry ready'.

Far from revealing an easy 'insider-outsider' distinction in rhetoric - which would enable us to locate the 'local' perspective and to separate it from the 'global' ('invading') concepts - the stories tell about this middle ground, both global, local, and dynamic. They do not do this by pointing to areas of conflict *per se* (as in statements which would pit the expectations of the community directly against the expectations of different 'experts' for example). They do so more by offering hints, and indicating omissions of other dimensions of plant-related knowledge which are excluded.

The stories from Callería show that *in situ* material availability is not a pre-requisite for the development of a familiarity with certain plants (canachiari is well known despite not growing locally). They also show that knowledge of a plant is considered important, even when the technique for using it is not recalled. But the plant examples, which might highlight the differing priorities and conceptions of TK of people in Callería and OINT, are 'smoothed over' to present a picture of TK that strives to be consistent with global categories and rhetoric. In so far as this is achieved, TK in 'registry-ready' knowledge leaves categorical assumptions about the connection between TK and *in-situ* conservation unchallenged.

This in turn makes organising knowledge according to 'global' concepts seem all the more logical or inevitable. The excerpts show the creation and reification of TK in 'convergences' (Tsing, 2005: 89) with global-universal concepts. The fact that knowledge about plants that do not grow in Callería may be registered, questions the idea that plants simply 'come with' knowledge and with communities. Thus the, 'idioms of inclusion' (Hayden, 2007:359) which accompany allegations of biopiracy are left unchallenged - as is the link between preserving knowledge and preserving plants as organisms. This underlies the logic of registering - an essential mobilising, heuristic device which propels the biopiracy generated in 'biopiracy work' (as we have seen in Chapter Three).

One particularly important dimension of plant knowledge, that has been discussed in Chapter Five, relates to *Joshin, or Ibobo* (the plant spirit owners of plants). I asked Augusto Mori if removing plants affected their spiritual 'owners' [*Ibobo*]: at first he replied that it did not, but upon more varied questioning about the proper behaviour concerning the use of plants he explained:

> 'All the plants have *dueños,* so you have to ask the plants, and give something in exchange to be able to take their leaf. They are like chacruna, toé [canachiari], oni [ayahuasca] and also piripiri *[Cyperus spp].* It is they that have most power (...) You have to give them something - it could be a sweet, or a cigarette - at the base of the plant and *then* you can take the leaf. All plants have *dueños*, but the three, they are those that have most power, so you have to give something so that nothing bad happens to you.'[134]

[134] 'Todas las plantas tienen dueños – *Ibobo* - entonces de las plantas tiene que pedir, y da las plantas algo para poder sacar la hoja. Son la chacruna, canachiari - toe - y ayahuasca – oni y también piripiri– es ellos que tienen má poder.(...) Hay que dar ellos algo – puede ser un dulce, un cigarro – a base de la planta y **recién** puedes sacar la hoja. Todas las plantas tienen dueños, pero las tres, son las

The excerpt above hints at the complex network of human-non human relationships in which the knowledge and use of plants in Callería is situated (much like we have seen in Chapter Five). Plant knowledge, in Callería as in San Francisco, 'comes from the plants themselves, from their spirits [*Joshin*] or owners [*dueños, Ibobo*].[135] In this context, two parallel relationships: between plants as material things and plants as spiritual entities; and between humans as embodied persons and humans as spirits, become relevant. Conversations with plants - via plant spirit owners - do not take place via the ears of the human in question but via the capacity of humans as spirits to 'listen' in other ways. Chapter Five describes some of these - for example in shamanic ceremonies and in dreams. This has important ramifications for the TK that becomes registered. Erasing the intersubjectivity of TK generation effectively silences the non-human owners of plants. It presents a static, monolithic picture of TK since the mode of generation of TK is alienated from the 'global-local hybrid' expressions of it (which become registered TK).

This is also the case when one considers the relationship between the provision of knowledge about the use of a plant, and the physical preparation of plant materials for use. This former type of information was consciously omitted in the formation of 'registry-ready' plant knowledge by the plant-knowledge 'experts'. All the interviewees confirmed this omission, by clarifying the type of knowledge they had prepared in advance of the OINT visits as:

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que tienen más poder, tienen que darlas algo para no te pasa nada'. [Mori [A], 2009, Original emphasis].

135 (Huanari [A], 2009).

> 'About the plant, about its use, like as medicine. Its name, its diet, where it grows. How you cut it, what part you use, how you prepare it and what you use it for, what it's good for.' [136]

'Registry-ready' knowledge is 'local' plant knowledge cleansed of, or freed from its entanglement in human- plant-spirit bundles of relationships (see Chapter Five). Complex, rich, and socioculturally significant dimensions of understanding about plants and plant knowledge, are erased In the process of preparing knowledge for presentation to OINT. In the instructions about how to cut a plant, it is not considered necessary to impart instructions about the propriety of 'offering back' or the potential consequences of failing to do so. The excerpt reveals an *a priori* establishment of unity over *what* information is valuable between the local knowledge, and the global, reified TK (Tsing, 2005:89). This is in terms of the ideas about the 'biovalue' (Waldby, 200:310) of TK and resources and the local knowledge and perspectives which form the locus of global-local encounter with OINT staff.

The excerpt also reveals something about the relationships *between* plants, and correspondingly between plant *Ibobo* and other plants. Such thinking does not easily find itself represented in species-based registers of knowledge. As such, the decision on the part of people in Callería to omit ontologically important information about plants and plant relationships (in preparing 'registry-ready' knowledge) is a logically appropriate one. The lack of 'fit' seems to be understood and allowed for: the transformation of TK into an amenable form - the smooth operation of the project - is arranged *prior* to the actual collection of 'data' by OINT.

[136] 'Sobre la planta, como se usa, como medicina. Su nombre, su dieta, donde crece. Como te la corta, que parte lo usas, como la preparas y para qué sirve, para que es bueno' (Silvano, 2009).

As we have seen in Chapter Two, traditional knowledge in registers is transformed through the processes of 'particularisation', 'validation' and, eventually 'generalisation' (Agrawal, 2002:290-291). These qualities of 'global' categorisations were in force to shape both 'registry-ready' and 'registry-recorded' knowledge, and to wrest this knowledge from the *familiar* relationships to plants and plant-knowledge which were initial ways of deciding what would come to stand for TK in Callería. This global-local hybrid TK then becomes the subject of further negotiations, in 'registry-recorded' knowledge. The mediation (through indigenous peoples' organisations) of knowledge exchange, obscures the knowledge-generating effects of the creation of novel groups of 'knowledge experts' - of particularised traditional knowledge - in the process of preparing TK for inclusion in NRCC. This works to reinforce the logic of gathering TK in this manner. It appears that the project succeeds in gathering TK that exists *prior* to this encounter. Correspondingly, the role of OINT play is configured as one of merely *facilitating* the registration of TK at the community's request.

Areas of potential discord between traditional knowledge about plants and utility-led taxonomic plant knowledge -clashes in understandings about what of plant knowledge is 'relevant' or is the object of enquiry - are 'bridged over' before they appear to arise. It is not that this renegotiation is entirely deliberate, it is merely part of the 'work' of list-making. In Callería, the lists compiling local knowledge are self-conscious attempts to order knowledge according to pre-determined - global – criteria (such as the 'use-value' of the plant). This kind of ordering is needed in order to construct a 'bridge' between 'local' TK and registered TK - to successfully collaborate with outside agencies. The encounter serves to create a point of convergence between differing taxonomies of plant knowledge: local, Shipibo taxonomies, and global, scientific ones. This 'bridge' is about creating order where there could be chaos, in a tangled web of knowledge. As Descola notes:

'Taxonomic knowledge is just as much an instrument of pure knowledge for bringing order to the world as a practical instrument for acting effectively in it.'

(1996:82)

6.6 Why was Traditional Knowledge not Registered?

As I have shown in the previous section, making lists of 'registry-ready' knowledge is the result of people in Callería reaching out to global biopiracy, and this facilitates the registration of TK. The creation of local 'experts' - those who know most about plants - for the purpose of registering knowledge creates another parallel set of 'experts' in those persons who know most about *registering*. The creation of 'registry-ready' knowledge takes place (according to the local values and beliefs about plants and plant knowledge) by selecting *familiar* plants. It also takes place according to the hegemonic principles of 'global' biopiracy, which configures TK in particular, restricted, ways.

6.7 'Registry-Recorded' Knowledge

I shall now move on to discuss other ways in which this global-local encounter generated TK, and facilitated the movement of biopiracy into Callería. This journey I describe as the difference between the 'registry ready' plant knowledge - offered by the community of Callería for inclusion in NRCC - and the plant knowledge which was recorded and carried away from the community by OINT staff ('registry-recorded' knowledge). I shall describe the transformation of TK, by providing examples of plants and plant knowledge which were *not* carried away and recorded (at least in a strict sense of the word)by OINT staff.

A number of stories emerged in response to my asking about the OINT visits themselves. I argue that these stories reveal even more explicitly the effects upon knowledge that the activities of registering produced in Callería. The first concerned ayahuasca and *canela [Cinnamomum spp,* cinnamon]. Herlin Ahuanari explains:[137]

> 'They explained to us, without knowing what plants there are in our territory. In the end, we did it all, the thirty-three [plants]:we dropped seven, so there were twenty-four. There weren't any to show of the seven in our territory. Apart from this, ayahuasca and *uña de gato [Paotati – mosha; Uncaria tomentosa,* cat's claw], these two - we did have them - but they were already registered. Because of this we couldn't [register them]. They were already registered - not by another community[...] our medicine *[nonkon rao].* I think they were mestizos *[nawa],* or perhaps white men *[wosho jonibo].* We put a question to INDECOPI and we said; "Why can't we register canela?". Canela doesn't grow in our territory, and we want to register it, we know where it grows. Yes, there it is outside, and it's necessary to register it as well. They responded; "Yes, you can [register plants like this]". So we were thinking: why don't we register it? In the end, we decided to register, and [In future] we are going to sow it over there in the [far] forest - and therefore we will register it.'[138]

The excerpt tells of the two different means by which (already hybrid) 'registry-ready' plant knowledge was 'validated' (Agrawal, 2002:290). In the creation of this second category of knowledge, the clash of global and local perspectives created 'illegitimate zones' of

[137] (Ahuanari, [H] 2009).

[138] 'Ellos nos explicaran, sin conocer que plantas hay en nuestro territorio. Total, lo hemos hecho todo, de las treinta-tres [plantas], siete bajarnos, veinticuatro era. De las siete no había muestras acá en nuestro territorio. A parte de la ayahuasca y uña de gato, las dos - había pero ya fueron registradas - por eso no podía [registrarlos] no. Ya fueron registrados no por parte de otra comunidad [...] *nonkon rao.* Ellos, creo que era *nawa* [*mestizos*], o de repente *wosho jonibo* [white men]. Nosotros hemos hecho una pregunta de INDECOPI y nos dijeron, "¿Por qué no podemos registrar la Canela?" La Canela no crece en nuestro territorio, y queremos registrarlo, sabemos donde crece. Sí, hay la fuera es necesario a registrarlo también. Les Respondían, "Si se puede [registrarlos]". Entonces pensábamos: ¿por qué no registramos?. Finalmente, hemos decidido a registrar, y [en futuro] vamos a sembrarlo más allá en el monte - y entonces lo registrarnos.' (Ahuanari,[H], 2009).

knowledge (Tsing, 2005:172). The result is that in the negotiation of list-making with OINT staff, hybrid TK is further extricated from local plant knowledge, and two qualities of plant knowledge emerge as requirements for the creation of registered TK. Firstly. the creation of 'registry-recorded' knowledge requires that plant samples are forthcoming, and secondly, the plant can not already registered or owned. *Familiarity*, spiritual power, or even perceived market-value, are at this stage no longer the dominant influences in decisions over which knowledge can be transformed into 'registry-recorded' knowledge. Even if the plant knowledge meets all of the above conditions, when no sample is available - or someone else has already claimed something over the plant - the knowledge is cast aside from the project.

In this way, the reduction of over thirty-three plants to twenty-four reflects the hegemonic influence of scientific knowledge and intellectual property standards, those which we have also seen emerge in Chapters Three and Four. These 'universals' or global categories of knowledge, place local knowledge in a position of subjugation, even as hybrid TK is attempting to travel. At least for the purposes of registering TK, 'global' considerations - dictated by the conventions of scientific knowledge - are largely allowed to dictate which plants are cast aside. This 'squeezing out' occurs in at least three places in the narrative, when 'registry-ready' plant knowledge is left out of 'registry-recorded' plant knowledge. To elucidate this, I shall go on to discuss the seven plants for which samples were not available, as well as the case of ayahuasca and uña de gato, and the case of canela.

6.8 The 'Missing' Seven

Firstly, seven of the thirty-three plants which were proposed by the community were 'dropped' from the eventual list of twenty-four 'registry-recorded' plants.[139] They were considered unsuitable for inclusion in NRCC - because of the lack of biological materials that must accompany the oral, or written information about plants and their uses. OINT staff carry out registering in the service of the rubric of 'biopiracy work' described in Chapter Two. This rubric demands the provision of biological materials as a necessary co-requisite to other testimonies in the recording of plant knowledge. The necessity of this co-requisite - upheld to the point where potentially valuable commodities (the unlisted 'registry-ready' plants) are refused by OINT - reveals something about the 'fixity' or dominance of scientific classification systems in the registering of TK. This is because biological samples enable the application of scientific nomenclature to plants - through taxonomical identification.

As we have seen in Chapter Three, guidelines issued by the OINT expressly state that the inclusion of biological plant materials - or at least photographic proxies - are co-requisites for the acceptance of a TK in NRCC (INDECOPI, n.d.).[140] Establishing creditable scientific nomenclature is clearly crucial in carrying out the functions of NRCC, not least as it enables the identification of a plant *species*, or *variety*. Although local communities do **not** have to know the scientific name of a plant in order to register plant knowledge; the potential to trace and verify the name, or to create it, is essential. The importance of this taxonomic data to NRCC is discussed in more depth in Chapter Three.

[139] Unfortunately I was not furnished with all the names, due to the sensitive nature of my enquiries.
[140] The guidelines list amongst other things, the requirement for clear photographs and five 20cm samples of plants including descriptions and depictions of flowers, roots etc.

However, here it must suffice to emphasise the *embeddedness* of scientific names, tangled as they are in relationships that connect them with intellectual property standards and scientific classification. As we have seen in Chapter Two, ascribing species denominations to plants performs the function of validating *what* TK is about (the plant to which it refers). Without the charismatic appeal of scientific classifications, and their claim to be able to classify and describe all living things, the representations made of TK in National Registers of Collective Knowledge would be unlikely to convince patent examiners of the existence of 'prior art' concerning a resource. Notably, the lack of scientific classification does nothing to directly effect the 'preservation' of TK in indigenous communities themselves.

However, ascribing scientific nomenclature to TK transforms 'registry-ready' TK into 'registry-recorded' TK. The latter, is TK with the potential to be used by non-indigenous peoples. In this way, (re)classification bestows upon TK the potential for its 'generalisation' (Agrawal, 2002:290-291). Through registering, TK is formally linked to a particular community, yet in as much as it is bounded - as in registered TK - it takes on the quality of mobility. So long as we know the plant is of a particular species and genera, we can find examples of it in other places, and relate the TK about it to knowledge about plants in other categories. This goes some way to explaining the importance of (the potential for) arriving at a scientific denomination for the plants over which knowledge is garnered. That this is much less important for people in Callería than securing ownership over contested resources, is not considered problematic. In this regard, concern with homogeneity and classification is key, local perspectives are not: NRCC, after all are 'about' more than Callería. The knowledge of Callería is only part of a system, which involves NRCC, the international patent system and a whole host of 'globals'. In the Linnaean classification systems of plants, Tsing (2005, 94) notes, 'the system takes precedence over the plant, as well as the process by which the plant was gathered "out there"'.

At first glance, this may seem odd - the NRCC purport to gather not scientific, but *traditional knowledge*. However, the importance of the presence of scientific-taxonomic data in the registered TK becomes clear when the intended functions of the NRCC are reassessed. Classification of species is vital to negotiating the international patent system, as shown in Chapter Four. Itself a major 'library' of Intellectual property claims (including those concerning plants), the patent system represents perhaps the largest source of 'global' knowledge about the *ownership* of plants and of plant varieties – in terms of their perceived economic or utility value. Whilst this library possesses many limitations, as shown in Chapter Four, such limitations do not hinder the 'universal aspirations' (Tsing, 2005)of the international patent system - towards documenting the ownership of commercially exploitable knowledge on a 'global' level.

The relationship of biopiracy to the international patent system (see Chapters Three & Four) has similarly strengthened the connection of NRCC to the international patent system. In order to relate to this system, and establish that patents are examples of biopiracy, TK must be able to be generalised - to convince patent examiners that patent claims relate to the exact same plant species, or variety, over which TK is claimed. The *global* requisite of the inclusion of scientific nomenclature (gleaned through biological materials or photographic analysis in registered TK) have come to be requisites for inclusion in *National* Registers of Collective Knowledge.

In this way, NRCC represent another global-local encounter, and one that takes place following terms which strengthen the hegemonic influence of the global over the local. It is interesting to note: it is not a requirement that patent claims divulge scientific nomenclature for the plant used. Scientific nomenclature, is an invaluable tool for convincing patent examiners of the existence of biopiracy, but is not needed to actually commit acts of it. The inequalities fostered by this situation, have led to international pressure to require the, 'disclosure of origin' - as we have seen in Chapter Four (Dutfield, 2005). I will now return to consider what *else* is erased in the process of registration of registry-ready knowledge, or in the creation of registry-recorded knowledge. To do so, I use the examples of three plants.

6.9 Ayahuasca & Uña de Gato

OINT staff reportedly told the community of Callería that it was not possible to register their knowledges of ayahuasca and uña de gato, because the plants were already 'registered'.[141] Although conjecture, I argue that the impression was formed as a result of the major division in TK imposed by the Biopiracy Law - which classes some TK in the 'public domain', and other TK as not (Law 27811, Article 13). If specific plants, and specified uses of them, are sufficiently similar to TK that exists in the public domain it may be that OINT do not (re)register TK in connection with specific indigenous communities. For the purposes of 'protection', this traditional knowledge is already part of NRCC. In many South American countries, information about the use of ayahuasca as a entheogenic beverage is widespread (Tupper, 2006:3). The use of uña de gato to treat various complaints is very popular in Peru and beyond (De Jong *et al,* 1999). These two plants also figure as part of the list of registered plants INDECOPI show on their website.

Two separate issues about the 'exclusion' of ayahuasca and uña de gato are interesting, but firstly, I recall the importance bestowed upon ayahuasca as a 'power-plant' as described

[141] Since I was not present at the time of the meetings and visits, I am in no position to comment on the veracity of this excerpt in relation to the information communicated by OINT staff. What is clear however, is that the message understood in Callería was that ayahuasca and uña de gato were not available to become registered TK owned by Callería - they were already owned by someone else.

earlier in this chapter. The existence, in the 'public domain', of a significant amount of information concerning ayahuasca, may have led to the attribution of the status of 'already registered' (as indicated in the stories of Herlin and his *comuneros*) Therefore, this may have led to the non-inclusion of ayahuasca in the 'registry-recorded' plant knowledge of Callería. This observation has a curious resonance with the treatment of, 'already authored commodities' (Hayden, 2003a :135) that have been described as arising from markets (in Chapter Five). This is the case, despite the significance of ayahuasca as a powerful plant-spirit to which offerings are made - despite the place of ayahuasca in Shipibo-Konibo cosmologies (see Chapter Five).

This exclusion demonstrates the (assumed) universality of notions such as the 'public domain', and the privileging of 'global' discourses about the value of TK over indigenous 'local' discourses (about plant spirit owners and *familiarity),* in the praxis of registering in Callería. When NRCC are only concerned with the utility-value of plants, this means that if the use is listed, and the plant widely known, no further annotation is required. The transcendence of global-universal categories of knowledge over local ones - both prior to *and* during global-local encounters - work to classify what is relevant about TK and what can be discarded. Hence, the resulting TK, which features in 'biopiracy work', is TK that has been reified *and* that arises from Callería itself. In such encounters, the legitimacy offered by local-global interactions appear to confirm the global reach of biopiracy.

The second issue which arises from the example of ayahuasca and uña de gato, concerns *belonging.*[142] The excerpt illustrates the interviewee's confusion.[143] Clearly, it is difficult, to ascertain exactly to *whom* the TK (of ayahuasca and uña de gato) belongs, under such

[142] Belonging, when italicised is intended to refer to 'a relationship of identification rather than of possession' (Demian 2004:61).
[143] At this point in the interview, Herlin's wife and two friends, had all joined the discussion of who the registered TK belonged to, with no clear answer emerging between the group.

uncertain conditions. Confusions are understandable, given the vagaries and dispersion of potential knowledge-claims relating to these plants.[144] They also reflect local understandings of the importance of *identity*. The desire to understand *who* owns what - as depicted by the searching questions - is clear.

Similarly, the belonging of ayahuasca and uña de gato to Callería is emphasised - the phase 'our medicine' [*nonkon rao*] clarifies this. That unnamed 'spectres' might have established relations of ownership to significant plants such as these, and that these claims affect those that Callería can make over ownership of the plants, is deeply troubling to people in Callería. The understanding is that, whoever registered as the owner of ayahuasca, they cannot be the proper owner of knowledge concerning it - it does not *belong* to them. Such concerns bring to life the complexities of different relationships to property which we have seen in Chapter Five.

6.10 Canela

The example of canela, a relative of common cinnamon, that is given in Herlin's earlier account, reveals something about the relationship between territorial boundaries and the boundaries being constructed for the delimitation of 'registry-recorded' knowledge. It seems, from the perspective of the OINT (as understood by Herlin) that if a plant does **not** grow in the demarcated territorial boundaries of Callería, this is *not* an impediment to the acceptance of the knowledge of it in the form of a NRCC. However, it is Herlin's understanding that the plant must be brought and sown near to Callería if TK concerning it is to become part of the NRCC, and that samples can be provided. The (elsewhere) location in which the plant could be pre-emptively be sown in future - inland from the Callería River -

[144] Including patents, as well as other communities registered TK, and non-registered knowledge (etc).

falls outside the demarcated territory proper. This is somewhat confusing: *it* (the plant, the canela) doesn't need to grow *in* the community (understood as demarcated territory) but it must be grown *by* the community, and samples must be available.

This example raises several issues for the description of the construction of 'registry-recorded' knowledge, as it does for the creation of registered TK more generally. They surround the concept of 'community resources' - interpreted as plants, plant knowledge and 'territory'. The example of canela raises questions about what *other* work is underway in the creation of National Registers of Collective Knowledge (and in the 'protection' of TK). Transporting plants into Callería - in order to secure TK ownership claims - seems more about the reification of TK (from Callería) than about the 'preservation' of it. The charismatic appeal of the 'engaged universal' (Tsing, 2005:8) of biopiracy that I describe in Chapter Three, is somewhat inconsistent with the *creation* of TK in communities (through the process of registering).

While I do not suggest that knowledge of the *use* of canela is new in Callería, detailed knowledge of the cultivation and harvest of it *is*. These elements of TK are created in the travels of biopiracy. I argue that this example highlights an important 'gap' in the claims of global biopiracy. The claims of biopiracy - established as the 'theft' of TK and resources - are not composite in the image of knowledge which is created, along with ownership claims, expressly *through* the movement of biopiracy in global-local encounters. In the example of canela, the implicit and *in-situ* connection of TK resources and communities, which is mobilised in 'biopiracy work', is actually forged as a result of the travels of biopiracy *itself*.

The encounter thus represents the (active) creation of TK by people in Callería as a, 'local niche within a global imagining' (Tsing, 2005: 156). Unlike those attempts to 'localise' global biopiracy that we have seen in the cases of ayahuasca and uña de gato, this attempt succeeds due to its ability to establish (apparently) common principles with global biopiracy. These axioms are shared by global biopiracy - which reifies the particular configurations of people, plants and knowledge that put plants *with* plant knowledge *in* communities. However, if knowledge falls off lists when plants cannot be provided, then they can be planted to overcome this obstacle. In carrying out this task, the implicit connections in global biopiracy are left unchallenged - and the knowledge can travel out of Callería. Global biopiracy appears to do its work of connecting communities to knowledge registers, and on to biopiracy patents. Examining the fractures - produced in global-local interaction - in these connections enables us to highlight the differences which are traversed in order to mobilise TK in 'biopiracy work':

> 'Canela? Well we use it a lot, daily, it is well known to us. We have known about it for *years*. Our grandfathers knew it and they told us. It is [part of] our medicine [*nonkon rao*] our grandparents have not always lived here' [emphasis original].[145]

The inference in this excerpt is that Canela *belongs* to Callería, in the sense that it is extremely widely used (used "daily"), and in the sense that it has been known about for a great deal of time ("for years"). However, the knowledge does not *only belong* to Callería it is part of *Shipibo-Konibo* medicine: the word *'nonkon'* indicates the Shipibo-Konibo peoples as a whole, *as well as* the community of Callería more specifically. Indeed, the geographical permanence of the 'community' of Callería is also destabilised in establishing the claim to

[145] '¿De la canela? Bien, lo usamos mucho, diario, es muy conocido. Hemos sabido hace *años*. Nuestros abuelitos nos dijeron. Es nuestra medicina [nonkon rao] nuestros Abuelitos no siempre vivía acá.' (Pangoza, 2009).

this knowledge; though the present community have a link to this territory, the 'grandfathers' did not.[146]

This shows the advent of another step in the creation of 'community' – in relation to geographical boundaries. This short excerpt reveals several qualities of what is considered 'registry-ready' plant knowledge, echoed in the excerpts of previous sections. In order to be 'registry-ready' plant knowledge should be *used in* Callería and *belong* to ancestors as well as the community. However, the excerpt additionally raises another conceptual dimension to the consideration of the encounter between OINT and the community of Callería, that is, the relationship of property to territory.

6.11 Property & theft

Global biopiracy mobilises concerns about the theft or appropriation of TK by reifying TK as the object of contested ownership claims: creating TK from communities means that knowledge is exclusively allocated to an area of land and a number of persons. Knowledge of canela - if it is registered - will be owned by the unnamed inhabitants of square meters of land signified by geographical survey data, and represented by indigenous peoples' organisations according to legal dictates. In contrast, in the excerpt above, plant knowledge *belongs* to those same unnamed persons, but *also* to other unnamed persons - those who carry the identity of Shipibo-Konibo perhaps, at least those who have before.[147] The persons

[146] The term probably indicates ancestors, or older kin than the Anglo-Spanish 'grandfather' kin category.

[147] I do not argue that the distribution of plant knowledge, or claims to its ownership are universally attributable to all Shipibo-Konibo peoples, simply that the knowledge is unsuitable as the property of particular individuals, it *could belong* to anyone claiming the identity.

who transmitted the traditional knowledge did not utilise it in the soils of Callería, but nonetheless the residents today are custodians of such knowledge and claim ownership of it.

When partially wrested from the obscurity of the 'gaps' (Tsing, 2005:175) created in the encounter of global biopiracy and local knowledge in Callería, TK from Callería destabilises the (apparently) universal dichotomies of intellectual property standards. The *familiar* knowledge of canella comes from elsewhere - from another time, another territory. Similarly, it *belongs* elsewhere - to other persons and to spirits - and also *belongs* in/to Callería. Nor does it belong to everyone - it is 'our medicine', not the medicine of humanity. And yet it does not *only belong* to Callería (or indeed to human beings). The (problematic)implications of considering traditional knowledge in terms of limited notions of exclusive property are discussed in Chapter Five. They also have important ramifications for the idea of NRCC as belonging to Callería - and not to other communities, as well as for the idea of TK 'protection' (mobilised by the connection of biopiracy to theft.) Who is the proper 'victim' of this 'theft'? Could it not be argued, that Callería is thieving from other communities, even as it attempts to 'protect' itself from the 'theft' of its plant knowledge through ownership claims?

The three separate points illustrated above bring to light the hegemonic 'squeezing' out of plant knowledge, first in the hybrid form of 'registry-ready' knowledge, and then 'registry-recorded' knowledge. The points also reveal the presence of 'global' universals that portray the 'fixity' of intellectual property claims, of scientific taxonomy, and of territorial boundaries. All of these are important concepts that underpin the sense of *what should be registered* in the 'biopiracy work of the OINT staff. Relationships between plants and humans, or plants and plants, as well as between Callería and CONAP, and ultimately between CONAP and the state, all come to shape the perspectives of some community members (and their understandings of what should be included in the registering process).

Yet the terms of this encounter are not set to address the implications of such difference, rather, the task is to construct a list of plant names and details of uses. The thorny issue of what is included in the list is indeed determined by both persons in Callería and by OINT staff, but not in equal measure. If TK is seen as negotiated and created by a host of non-human and human actors, and as transformed by registering, then claims of *ex-situ* collections such as NRCC to merely 'capture' TK, are undermined. What has been left out of TK in registered TK, could just as well stand for the local knowledge of Callería as what was 'taken'. Moreover, what was carried away was at least in part created by the act of gathering. I will now move on to summarise the kinds of biopiracies created by the encounters described in this and previous chapters, by drawing on data from Callería. In so doing, I bring to life two distinct - but interrelated - types of biopiracy which emerge when global biopiracy is engaged in Peru.

6.12 What Understandings of Biopiracy Emerged in Callería?

I argue that the journeys of plants and plant knowledge into what I have termed 'registry-recorded' plant knowledge, create two distinct 'biopiracies', which are themselves global-local congeries of encounters (Tsing, 2005:3). These are characterised by distinct, but interrelated, discourses that work together to give meaning to the activities of the registration of plant knowledge in Callería and beyond. By tracing the travels of biopiracy in and out of the locations described in this thesis I have shown that biopiracy, as an 'engaged universal' (Tsing, 2005:8) comes to stand for different bundles of relationships between people, plants and plant knowledge in Peru.

We have seen how biopiracy is engaged in the 'biopiracy work' of INDECOPI, how it doesn't travel well into the patent system, and how quite different concerns over the use of TK complicate its travels to San Francisco. In Callería, examining a contested, negotiated, process - one that generates the TK in National Registers of Collective Knowledge - offers up the possibility of both examining how knowledge transformation takes place, and also of asking the local community about the *reasons* for their participation. This sheds light upon the most dazzling effects of the charisma of biopiracy: namely, its ability to convince indigenous communities of the threats and posed by the unauthorised use of TK, and that NRCC have the ability to protect or preserve it.

6.13 'Biopiracies of Theft'

The following is an excerpt from an Interview with Herlin Ahuanari:

> 'Well, one of the things is that we worry that with time, the plants will run out, and we couldn't use them. What's more, we couldn't cure with our medicine. Callería has to register them so that we don't lose them. If we hadn't registered, another community can do their project and register them and we are left without plants, without being the owners of the plants.'[148]

[148]'Bueno, uno de las cosas es que nos preocupa que con el tiempo, se va a acabar las plantitas, y no nos podamos usarlas - Además, no podamos curar con nuestra medicina. Callería tiene que registrarlas para no perderlas. Si no hubiéramos registrado, la otra comunidad puede hacer su proyecto y los registran y nosotros quedamos sin plantas, sin ser dueños de las plantas.' (Ahuanari [H], 2009).

The excerpt shows the presence of several fears about the theft of plant knowledge, as well as the theft and loss of the plants themselves. The fears are multi-faceted; the worry is that plants will disappear, and with them the medicines valued by the community, or perhaps another community will take the plants, or become owners of the plants. Even such a short statement reveals much about the close relationship between plants, and the knowledge of their use.

For example, being left without plants and not being the *owners* of plants are mentioned in the same sentence without pause, as if the two things were synonymous. The absence of plant organisms is conflated with the absence of a titular recognition of a property relationship to named plants and their uses. The knowledge of the *uses* of particular plants is conflated with the *presence* of the plants themselves. These conflations sharply contrast with the recognition, in Peruvian law, that knowledge of plants *belongs* to particular communities, whereas genetic or natural resources *belong* to the State - though not exclusively (Dutfield, 2004:4). The loss of plants and plant knowledge, as well as the theft of it are closely associated in concerns over the use of traditional knowledge (as we have seen in Chapter Five). However, in the discourse of intellectual property, there is little room for using 'knowledge' and 'material' interchangeably in describing relations of ownership.

The second important characteristic in Herlin's articulation of his fears shows regard for what may happen in other communities - in a competitive manner. The implication is almost that if registering TK was overlooked in Callería, the community would either lose plants, or would forfeit the right to be considered 'owners' of those plants. These are perhaps particularly fertile fears in an Amazonian context - where knowledge of the particular liaisons other communities may have with outside agencies, or of the agreements they may have entered into, is difficult to amass. Considering there are tens of thousands of Shipibo-

Konibo persons in many communities, and allowing that 'other communities' also signifies other ethnicities - the impact of this fear cannot be underestimated.

The presence of these fears coincided with the travels of biopiracy itself - through the potential threat posed by the existence of NRCC themselves. Fearing that another community will register (shared) TK arises alongside the acquisition of an understanding of what 'it is' to register - to own knowledge in this way. In a context where the categories of knowledge that underpin intellectual property standards (and which separate knowledge from organisms) do not travel well, the conflation of ownership and physical possession is enticing. Correspondingly the conflation of non-ownership with theft is extremely potent - it mobilizes fears about shifting relationships to plants and plant knowledge. The following excerpt illustrates the fear of 'being cheated' or stolen from at the hands of other communities:

> 'Perhaps we could all be owners of the plants, like we are all Shipibos' [...] but what worried us is that another community they are going to cheat [beat] us. If we don't register and they want to register, they are going to do their register and we will remain as non-owners. We are owners- but with the state we're not. So we worried and we thought that we wanted to register our medicinal plants'.[149]

The statement shows another type of dual relationship - between Callería and (imagined) other communities. Plants both *belong* to all Shipibo-Konibo peoples, and to Callería or other communities separately. The respondent does not consider that persons in Callería equate to being 'exclusive' owners of the medicinal plants: this is sensible given the

[149]'Quizás podamos todas ser dueños de las plantas, como somos Shipibos, [...] pero lo que nos preocupaba es que otra comunidad se van a engañarnos. Si no registramos y ellos quieren registrar, ellos van a hacer su registro, y nosotros quedamos sin ser dueños. Somos los dueños - pero con el estado, no somos. Entonces nos preocupaban y pensábamos que queremos registrar nuestras plantas medicinales.' (Mori, [R], 2009)

testimonies above which tell that plants and plant knowledge belong similarly to plant-spirits *[Ibobo]*, ancestors, and to Shipibo-Konibo persons living in other territories. However, he does consider that people in Callería are the proper owners of them *in the context of state-community relations*.

Ownership and *belonging* correspond to different representations of the propriety of the multiple relationships people can have to plants. Local plant knowledge *belongs* to people in Callería, but *Ibobo* are plant-owners. However, after the knowledge transformations that take place through registering, ownership in TK is attributed to humans, and not to *Ibobo*. *Belonging* or *ownership,* in the context of TK, confer different rules about who is excluded, and who is included in claims over knowledge of the uses of a particular plant: property becomes aligned with identity, in terms of access to the rights that 'come with' knowledge.

Demian (2004:66) argues that property-making is essentially about limiting the number of relationships that can be involved in the reproduction of ideas, which when used as property mediate relationships between persons. Property in intangibles is created by, 'means of attaching them to persons' (Demian, 2004:64). As we have seen in Chapters Three and Four, the attachment of intellectual property to some persons (in corporations or laboratories) is enabled by the mobility and charisma of a global biopiracy. This mobility and charisma simultaneously makes its attachment to other persons (communities) problematic. Property-making is about persuading other people to see relationships that do not formerly exist. In order to create 'intellectual property' one must attach persons - which may be the *real* subject of the claims (Demian, 2004:66). Property, 'generates distinctions between things by means of distinctions between persons' (Demian, 2004:61). Generating distinctions between people is also a means of controlling relationships between them.

In particular, intellectual property creates a restricted set of relationships to non-human organisms. In the transformation of *belonging* to ownership:

> 'The property claim, initiated through legal or technological interventions (or both), can therefore count among its effects the transformation of an unlimited flow of relationships into one which is restricted to two or more – but always a finite number – of parties.' (Demian, 2004:67)

Correspondingly, the fear is that the new possibilities of ownership offered by the registration of plant knowledge will foster unfavourable relationships to plants and knowledge, by bestowing rights of ownership upon another community. The distinction is made here by the perceived effects of the activities of the NRCC (in legitimising certain claims to knowledge). It is feared that the legitimisation of another community's claims over the ownership of plants and plant knowledge will delegitimize the claims of Callería, and thus destabilise the relationship of *belonging* that members of the community have to their knowledges.

As such, it is not the theft of plant knowledge *per se,* but the theft of the status of 'plant knowledge owner' that is feared. Callería has also already benefited significantly from being a handful of 'chosen' communities to participate in development projects with AIDER, and people are keen to ensure that they benefit from the creation of NRCC. If people in Callería were previously unconcerned with securing ownership of their knowledges, that is *not* because they did not consider it as *belonging* to them. But *belonging* in a world where ownership was not at stake did not need to have the condition of exclusivity. Provided no one is deprived, TK can belong to as many people as use and know it. When legally recognised ownership is offered, the stakes change. The availability of appropriation of TK in NRCC creates ownership claims and not vice-versa. 'Biopiracies of theft' transform concerns

- about inequalities in relationships concerning plants and knowledge - into ideas about 'theft' of TK ownership. Strathern & Hirsch, (2004:3) observe that, 'ownership claims emerge in a world of owners'. In important ways, claims of 'theft' also emerge in a world of 'owners'.

However, an important clarification needs to be made. Deprivation does not only mean exhaustion of tangible goods, it also means being deprived of claims to ancestry, heritage or distinctive 'cultural forms'. As Coombe (1998: 242) has shown, uniqueness is challenged if another can replicate a thing in their own name, and authenticity is at stake if too many people, or people of a different (inappropriate) identity copy aspects of intangible property. This concern with identity is paramount in understanding the concerns of people in Callería over the replication or use of plant knowledge which, at least in the world where ownership of TK is offered, has become threatened by the use of it by other communities. This threat also extends to non-indigenous persons, as the following excerpt shows:

> 'Well, it is that they [the mestizos] are for owning the medicinal plants, we won't let them, no.'[150]

Taken in the context of concerns about uniqueness and identity, these 'new' fears about the 'theft' of plants or the ownership of plant knowledge are arguably afforded a special kind of significance. If Callería is thinking about registering their plant knowledge, it follows that other communities are (thought of as) thinking about doing the same. The act of registering becomes as much about not being 'out-manoeuvred' by other (mestizo or indigenous) communities, as it does about preventing misuse of TK by corporations. Identity is at stake, and the particularities of intellectual property standards - which separate claims about

[150] 'Pues, es que las [nawa] están para adueñar las plantas medicinales, no nos permitían, no.' (Pangoza, 2009).

knowledge from claims about resources - fall away during this encounter to produce the kinds of fears present in the above statement. Yet the different fears - about relationships to knowledge and about identity - that people in Callería have for creating TK *will not* travel back to Lima to produce different 'biopiracy work' there. Neither will the concerns over loss and equilibrium of relationships described in Chapter Five. 'Biopiracies of theft' - made intelligible through the interaction of 'new' (global) and 'existing' (local) fears - characterise understandings in Callería, but these will appear invisible outside of the community.

In Lima (as in Callería), concern with regulating the relationships people of different identities have to the use of plants and plant knowledge are evident. Regulating who has access to and control over the use of plants and plant knowledge is of prime concern, as is the equality of such relationships. By engaging (global) biopiracy, these concerns - articulated through the language of 'property' and 'theft' - become, 'biopiracies of theft'. In Callería however, theft is articulated in terms of the qualities of relationships, rather than in terms of the particular use to which plants and plant knowledge is put. Theft of identity is a concern in Callería, which is consistent with resentment over the appropriation of shamanic knowledge in San Francisco, but in Lima, unequal trade relationships are of prime concern.

6.14 'Biopiracies of Economic Opportunity'

In Chapter Three, I describe the 'biopiracy work' of the NCAB as being largely about addressing access and inequalities in the use of biological resources - for developing nations, and Peruvian corporations. The interviewees in Callería also spoke to characterise a discourse which shared identifiable features with the biopiracy engaged as it is in Lima. I call these, 'biopiracies of economic opportunity'. I do not assert that, 'biopiracies of economic opportunity' are the *same* in both Callería and in the NCAB, since the work of 'friction'

(Tsing, 2005) prevents this. However, the influence of ideas about 'biovalue' (Waldby, 2002:310) and of commerce more generally, provide a major episteme in which to consider the 'value' of plants and plant knowledge in *both* locations.

In Callería (as in Lima), the *raison d'être* for economically-motivated considerations over the necessity of plant knowledge 'protection' concerns existing experiences of *exploitative* transaction relationships with 'outsiders'. In Callería however these 'outsiders' are also Peruvian, as well as other persons and organisations. These economically-motivated considerations in Callería, as in Lima, also express concerns over *potential* exploitation. Such fears are consistent with the fears raised in San Francisco concerning the commodification of shamanic knowledge. In all three locations, there is a concern with maintaining control over plants and plant knowledge. However, different perspectives about *potential* opportunities - as well as previous experiences of exploitation - give rise to markedly different expectations, and to different 'biopiracies of economic opportunity' in each location.

Before addressing the extent of these *potential* economic opportunities, I want to consider the role of past experiences of exploitative commercial relationships in relation to the registering of plant knowledge in Callería. Following the kinds of fears portrayed in the previous section, I asked if people could remember instances where their plants, or their knowledge of plants ,were commercialised in an exploitative manner (by outsiders). The following two excerpts tell of three anecdotes which were related to me in response to this questioning:

> 'Yes, yes, like with the uña de gato. Those [nawa] from across there [indicates the river] came and began harvesting it, knowing where [outside the territory] we were taking it from.

> Now it is finished. We saw them, in boats, taking away a large quantity of it [to sell]. Our people cannot sell it now.'[151]

In this first account, both the uña de gato plants and the knowledge of where they are to be found (as well as the potential labour invested in facilitating the nearby abundance of it), are stolen from the community. The harvesting was not of plants which grow *inside* the demarcated territory of Callería, and hence it does not constitute an ordinary theft in law. However, commercial removal of whole areas of nearby plants upon which the community also depends for its prosperity is not viewed as 'fair'. Put in other terms, appropriation that occurs through the commodification of 'common' or 'non-owned' plants is conceived of as improper acquisition at the expense of the community. This is consistent with customary law as described in Chapter Five.

Importantly, this 'theft' occurs as a direct result of an abuse of the plant knowledge of the community: if the mestiz*os* did not know where to locate the uña de gato, they could not easily have appropriated it. Through the appropriation of this 'valuable' plant knowledge the commodification of plant knowledge is also mobilised. As we have seen in Chapter Five, commodification means that attention is drawn to the economic (exchange) value of what has been taken (Appadurai, 1988). The next excerpt highlights the effects of commodification in Callería:

> 'Well, we need to be the owners and to not be taken advantage of - like with the wood - before we did not know how to count [...] how to account for the prices of the wood. Before [certification of the FSC], we did not know how to count the price of the wood, but they

[151] 'Si, si como con la uña. Ellos [*nato nawa*]de allá [indicates the river] vinieron, sabiendo de donde nosotros lo sacaban. Ahora se acabo. Nosotros lo vemos, en barcos, sacando, llevando cantidad [para vender]. Ahora nosotros [*non caibo*] no podemos venderlo.' (Mori, [A], 2009).

[*nawa*] knew, so they took advantage of us. Now we are the owners, the owners, and we know accounting.'[152]

In the second account, concern is over the relationship between knowledge ownership and commerce. Although 'before' [certification] the community of Callería were legally recognised as the owners of the wood they wanted to sell, they were not in possession of the knowledge required to control the conditions of sale. In other terms, the inability of persons from Callería to negotiate proper exchange values for the materials they owned, can be viewed as a delimitation of the qualities of ownership. Ownership was not (previously) applicable to wood as a *commodity* - it was not possible to 'know' *what* one could own under these circumstances. Valuable knowledge about the theft of wood had first to be acquired - and legal recognition sought - before the economic opportunities represented in the exchange of wood could be enjoyed. These concerns - over the relationships to knowledge, plants and people - are mobilised through the positing of commodity value over the intrinsic value of traditional knowledge. There also are other uncertainties involved in commercial relations:

> 'One time a buyer he had come here and he took away one sole leaf of a little plant of *huito* [genipap, *Genipa americana*]. Buying his [huito] fruit - about 15 kilos - he had come, saying that he was going to come back to buy more [...] but taking [with him] the leaves only, not the fruit he went away -the green leaves only'.[153]

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[152] 'Bueno necesitamos ser los dueños, y no ser engañado - como con las maderables - antes no sabíamos como contar [...] como contabilizar los precios de las maderables. Antes [de la certificación] no sabíamos como contar los precios de la madera, pero ellos sabían. Entonces, ellos han engañado. Ahora, somos los dueños, los dueños y sabemos la contabilidad.' (Mori, [H], 2009).

[153] 'Una vez un comprador se ha venido acá, y lo lleva una sola hoja de una plantita del huito. Comprando su fruta - alrededor de 15 kilos - él ha venido, diciendo que va regresar para comprar más [...] pero llevando las hojas no mas, no la fruta él se fue - solo las hojas verdes.' (Silvano, 2009).

In the third story, established modes of commodification and economic exchange of a particular plant - *huito* - are subverted when the buyer fails to carry off his purchase of fruit, instead taking away only leaf samples. This transaction creates uncertainty over *what* has been exchanged: what value did the leaves have? Why the underhand nature of negotiations (which meant that the valuable fruit was left behind)? Here the details of what *might* have been stolen are of concern, and the implication is that the community have failed to exercise control over an economic opportunity.

The anecdotes above reveal fascinating insight into the previous histories of connections people in Callería have had with various known (the mestizo from across the river) vague (mestizos in general) and unknown (the mysterious 'buyer') persons. What the stories have in common is a concern for *control* over the economic opportunities presented by interacting with these persons. The unfortunate turn of events in each of the stories represents both the inability of persons in Callería to secure advantageous exchanges of plants or plant knowledge in each encounter. They also constitute failures to establish parity in important commercial relationships. The stories express concerns over the unequal nature of exchange of plants and plant knowledge - the 'theft' of economic opportunities.

As rich as the insights proffered by the above stories may be, what I want to emphasise here are two points. Firstly, the stories all relate qualities of concerns about the control of the engagement of the community in economic transactions. In each, a lack of knowledge that could have otherwise been mobilised to control the terms of the encounter resulted in the loss of economic opportunities, and of benefit to the community. Secondly, the stories all relate qualities of concerns about *who* controls the terms of exchange - *what* is exchanged, from where and for how much. I argue that each of the accounts above, are as much about the improper acquisition of plants and plant knowledge, as they are about lack of control over access to the valuable knowledge (that prejudices power relations against indigenous communities).

In the stories, either other people have *not been prevented* from exploiting the plant knowledge of people in Callería (for instance where to find uña de gato and the uses to which huito leaves can be put), or, the people of Callería have been prevented from accessing (valuable) 'other' knowledge (such as the price of wood), or plant knowledge (that which the huito buyer). This has meant that people in Callería have not been able to lucratively control the exchange of knowledge and resources. This Relationships with external groups are crucial in the constructions of these narratives, in that economic opportunities do not arise without them. However relationships with other peoples are a matter of prime concern. Concerns are articulated about relationships with mestizos and other 'outsiders' - with people who do not negotiate fairly nor behave honestly, those who do not even return to make purchases when that is promised. In this respect, the concerns expressed in Callería are consistent with the types of grievances that emerged in San Francisco - over tourists who appropriate shamanic knowledge, or large-scale shamans who possess unfair access to oligopolies in the commodification of traditional knowledge.

Past experiences of relationships governing economic opportunities are not the only source of concern in Callería. The *potential* of economic opportunities is also an area of concern, because the ways in which theft could occur in such situations are conceived of as incredibly diverse. Economic opportunities are imagined in ways which are not restricted to the receipt of a percentage of the profits of corporations which commodify specific elements of TK(such as uña de gato as an anti-wrinkle cream). These latter are the types of opportunities ("benefits") which communities can expect to receive under the Biopiracy Law (Law 27811, Articles 8, 13). To illustrate, I use the following excerpts from several interviews:

> 'They [INDECOPI] are going to come back, in the future, with their studies, their examinations. They are going to bring information for us, about uses that we do not have knowledge of now. Our idea is to have a laboratory here, in Callería, a factory, using our medicinal plants.'[154]

In the first excerpt above, the expectation of benefit arising from participation in the NRCC is that two different economic (and social) opportunities might occur. Firstly, the registration of plant knowledge might lead to the exchange of valuable plant knowledge - Callería might learn of other uses to which the plants which *belong* to them can be put and some of these may have commercial applications. This would enable the community to acquire valuable non-traditional plant knowledge and have a bigger stake in the control of the conditions of commodification. Parallels to the resolution of the unequal exchange of wood via knowledge acquisition are obvious.

Secondly, the registration might lead to the construction of a laboratory, or factory in Callería itself, that would enable lucrative commercialisation of this (existing and 'new') knowledge. Belief in the possibility of bringing new knowledge and artefacts into Callería is highly attractive, in that the removal of plants and plant knowledge can be better understood, (and controlled). The belief is that by acquiring the knowledge of new production techniques, and also the means of commodity production, new economic opportunities may present themselves in Callería. Both of these (imagined) benefits also signify increased control over the relationships concerning economic opportunities in which persons in Callería have been, or could be, involved. This is an extremely important factor in mobilising the attentions of people in Callería.

[154] 'Ellos, [INDECOPI] se van a regresar, en el futuro, con sus estudios, sus exámenes. Les van a trayer información para nosotros, sobre otros usos de que no tenemos conocimiento todavía. Nuestra idea es para tener un laboratorio acá, en Callería, una fabrica, usando nuestras plantas medicinales.' (Mori [A], 2009)

> 'Of ayahuasca, although we don't drink it here, our idea was to register it, for our children. Our idea was to be the owners of the ayahuasca, and to create a touristic community - for the tourists that want to come and drink their ayahuasca: for our children to be shamans.'[155]

The second excerpt is fascinating, in that it unites the kinds of experiences that people in San Francisco have had with the use of their plant knowledge (the commercialisation of ayahuasca 'experiences') with the objectives of the NRCC. The expectation of becoming the owners of (registered TK concerning) ayahuasca, is conflated with control over the economic opportunities presented by the movement of tourists, and resources, that accompany shamanic knowledge. Here control over the economic opportunity presented by ayahuasca tourism is added to the list of 'benefits' possible from the inclusion of plant knowledge in NRCC.

Important relationships - those which enable the use of plants and plant knowledge in economic opportunities surrounding ayahuasca - are currently outside the control of the community of Callería, and the registration of plant knowledge in NRCC is viewed as a means to secure the community's future participation in them (and the economic opportunities they bring). The following excerpt highlights the connection between registering TK and benefitting in future (unspecified) projects:

> 'If we are the owners, it is [the case] that, if somebody has an interest in one of the registered plants, they are going to come with funding, to plant, and to sow more plants here.'[156]

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[155]'De la ayahuasca, aunque no tomamos acá, nuestra idea era de registrarla, para nuestros hijos. Nuestra idea era ser dueños de la ayahuasca y criar una comunidad turística - para los turistas que quieren venir y toma su ayahuasca: para nuestros hijos a ser chamanes.' (Ahuanari, [H], 2009).
[156] 'Si somos los dueños es que, si alguien está interesado en alguna de las plantas registradas, se van a venir con fondos, para plantear y para sembrar mas plantas acá.' (Ahuanari, 2009).

The third excerpt, concerns the perception of potential for funds and plants to be brought to Callería as a result of the recognition of ownership that results from participation in the NRCC. A (perceived) link also exists between the registration of knowledge and the provision of plants and funding for their care. The community of Callería already have considerable experience of the financial and other benefits which can arise from official recognition of 'stewardship' of plants (such as in the FSC certification scheme and the 'management plan' orchestrated by AIDER). Such activities establish an, 'axiom of unity' (Tsing, 2005:89) between the previous successes of projects, and the credibility of the registration project to deliver benefits to the community. The axiom is such that the charismatic appeal of, 'biopiracies of economic opportunity' give credence to the legitimacy of registering procedures as a means, not to protect TK but to ensure continued participation in economic exchanges.

The aforementioned excerpts reveal divergent understandings and expectations - about the consequences of participation in the activities of registering and of the inclusion of knowledge in the NRCC. In turn, I argue that they reveal the constitution of, 'biopiracies of economic opportunity' that are particular instances of 'local/global congeries of interaction' (Tsing, 2005:3) in Callería. 'Biopiracies of economic opportunity' are mobile, hybrid imaginaries, informed by past experiences of troubling relationships with 'outsiders' (over access to economic opportunities), that have resulted in the theft of plant knowledge or plants. 'Biopiracies of economic opportunity' also able to mobilise concerns over *future* relationships, and *potential* theft. As a corollary, the 'promises' of registering are such that it seems to offer possibilities for the partial *reversal* of the movement of plants and plant knowledge out of Callería: it is a means to control exploitative relationships.

There are both similarities, and vital differences in the national and local (hybrid) biopiracies that are revealed in the testimony above. In Callería, the types of relationships desired all concern an inversion of existing experiences of relationships (governing economic opportunities)that have previously been characterised by exploitation: different modes of the 'theft' of plants (or plant knowledge). Plants outside the community territory, also considered as *belonging* (in terms of identity rather than of property in a strict sense), have been depleted by other persons. The valuable knowledge of where to source plants, as well as the participation of the community in commercial relations (as in the excerpt concerning uña de gato) have similarly been depleted.

Where the lack of valuable knowledge about plants has led to a lack of control over the conversion of plants and plant knowledge into commodities, the valuable knowledge and other artefacts might be brought into the community – so that control can be better exercised (as in the excerpt concerning wood). Where (as yet undetermined) plant knowledge and plant materials have been taken *elsewhere,* and economically utilised in unfamiliar ways (as in the excerpt concerning huito), this knowledge and these plants might be brought back to Callería - in order that Callería might participate in new economic opportunities that have been wrested from the places and people to which they properly *belong*.

Nationally-founded conceptions of the potential pecuniary benefits that can be gleaned from the participation of indigenous people in NRCC, are themselves hybrid transformations of global biopiracy - which travels with ideas about 'Access and Benefit-Sharing' in relation to the use of indigenous knowledge.[157] However, these are not the potential benefits imagined in Callería. The concerns of the Peruvian state in controlling these relationships - filtered

[157] See Chapters Two and Three.

through the OINT - are not the same as the concerns of the community of Callería in controlling them. The NRCC represent specific, limited, opportunities to redress the historic inequalities produced by the flow of plants and plant knowledges. These opportunities must be compatible with the patent system, with intellectual property standards, and with scientific taxonomy and global commerce. The inequalities, addressed through 'biopiracy work', are chiefly those which characterise relationships between producers and developers - between *developed and developing nations.*

The, 'biopiracies of economic opportunity' that give meaning to the activities of registering plant knowledge in Callería, extend beyond the limited framework of 'protection' or of 'benefit' offered by NRCC. As we have seen in Chapter Three, even this framework itself delivers scant or no benefits to communities in Peru. Fears about the control of knowledge, and over identities, are exemplified by experiences of past 'thefts' and concerns about the control over potential economic opportunities. The potential of registered TK to stem the flow of plants and plant knowledge *out* of Callería, and to encourage this flow *in*, is highly questionable - given the limited scope of traditional knowledge protection offered by the NRCC in terms of 'biopiracy work', and also in the light of wider Intellectual property standards).

6.15 Conclusion

In this chapter, I have shown that the transformation of TK from local to 'registry-ready' knowledge in Callería results from the 'friction' (Tsing, 2005) of the encounter between 'global' biopiracy and (local) traditional knowledge about plants. This produces two distinct 'biopiracies'. These two biopiracies share important similarities with the kinds of biopiracy described in Chapters Three, Four and Five. The project is part of a history of connections which the community has with outside agencies. In the creation of 'registry-ready' knowledge, certain qualities of TK have been prioritised - as have ideas about the importance of *familiar* plants and plant knowledge. The qualities relate strongly to ideas about the 'biovalue' (Waldby, 2002:310) of resources and knowledge. This is achieved through the 'particularisation' of TK (Agrawal, 2002: 290-291) and also via the creation of two kinds of 'experts'. The creation of 'registry-recorded' knowledge further limits the kinds of local knowledge which can be transformed into TK - through the imposition of requirements about the availability of biological materials, and intellectual property standards. These function as processes of 'validation' (Agrawal, 2002: 290-291).

In the work of creating registered TK in Callería, integral parts of the encounter between of global and local knowledge - the disavowal and collusion of knowledge, and the contested knowledge this produces - are erased. Transforming relations of *belonging* into ones of ownership reconfigures elements of the relationship people in Callería have to their TK, by excluding both spiritual and present day peoples from sharing similar relationships of *belonging* to TK. This facilitates the movement of global biopiracy into Callería, and also generates an apparent *a priori* unity (Tsing, 2005: 89) between local knowledge and the TK that is reified in the 'biopiracy work' of the OINT.

The two 'biopiracies' that I argue emerge in this thesis, have been illustrated with particular reference to Callería. These 'biopiracies' are concerned with the management and type of relationships which govern the flow of plants and plant knowledge. 'Biopiracies of theft' mobilise concerns over the unregulated, uncontrolled use of plants and knowledge outside the community. These mobilisations also generate concerns over the legal ownership of plants and plant knowledge, but in San Francisco and in Callería, they synchronically highlight the existence of other potential owners - ancestors, *Ibobo*, other communities and future generations. These nuances of *belonging* are at odds with intellectual property standards, which delimit the possibilities of relationships in terms of neo-liberal definitions of *ownership*. The desire for ownership arises in in an important way *from* the appropriative possibilities presented by NRCC.

The relationships over which control of economic opportunities are sought in Callería, in San Francisco, and in INDECOPI are not the *same*. Although it is the inversion of the flows of plants and plant knowledge - in specific relationships - which is sought in all three locations, the types of relationships which are envisioned as desirable (and possible) to invert are different in each location. This is partly a result of the particular relationships which have been experienced as exploitative in the past. In San Francisco and Callería, 'biopiracies of theft' or, 'biopiracies of economic opportunity' express fears about (and experiences of) exploitative relationships concerning plants and knowledge *per se*. In Lima, inequalities in international business practices are the chief concern.

In San Francisco and in Callería, 'biopiracies of economic opportunity' mobilise concerns about unequal relationships - about the disparities of economic exchanges. As a corollary they generate expectations about the receipt of 'benefits'. These benefits are different from those set out in Peruvian legislation, and are not likely to result from the 'biopiracy work' of the NCAB. In the final chapter, I conclude by drawing on the contingent features of the multiple, hybrid concepts of biopiracy generated in this, and also in the previous chapters of this thesis - This multiplicity makes biopiracy too complex to remain *singular*. The contingencies of different concepts of biopiracy are characterised under, 'biopiracies of theft' and, 'biopiracies of economic opportunity', as have been introduced in this chapter.

Conclusion

Theft and economic opportunity - 'Biopiracies' (& 'loss')

> "Biopiracy is about large pharmaceutical companies going into remote places like the jungle, and ripping-off local or indigenous peoples' knowledge about plants and animals, to use it to make money by making things like medicines - and not compensating communities."

I began this thesis by telling the story above, about the 'received wisdom' of biopiracy. I will begin the concluding chapter by asking how my understanding of this story has been changed in the journey represented by the chapters of this thesis. In this multi-sited ethnography (Marcus, 1995), I have addressed many questions, and I have forged and explored a plethora of connections - with a consistent concern for the perspectives of indigenous peoples. What has been revealed about the players evoked in my story about biopiracy? I conclude this thesis by examining this, before moving on to assess the, 'biopiracies of theft' and, 'biopiracies of economic opportunity' that connect the multiple understandings of biopiracy produced in the four empirical chapters of this thesis. I end in urging further research into the, 'rhetorics of loss' that are mobilised under biopiracy - but which are sidestepped in placing emphasis on (narrowly defined) misuses of traditional knowledge and resources.

In Chapter One, I have considered the meaning of traditional knowledge, 'biodiversity' and 'bioprospecting'. I have examined the relationship of this knowledge to biopiracy - which I situate in existing literature. I examined the relationships inherent in the above story through considering 'intellectual property', classification systems, and the use of biological resources. In Chapter Two, I have 'disentangled' biopiracy from the lofty heights of global discourse, and placed it in the world - through an examination of indigeneity, of biopirates, the global, and of myself as narrator of this thesis. I have shown that 'friction' (Tsing, 2005) is a useful way of describing the actions of biopiracy in-the-world.

In my travels to Peru, I have found patent documents which list the appropriation of local knowledge by multinationals in Chapters Three and Four. In Chapter Three, through an examination of 'biopiracy work', I have shown that the nation state both defends against the appropriation of local knowledge, and reifies it - aligning the interests of indigenous communities with other powerful groups who have interests in the use of biological resources. In Chapter Four, I have shown that the appropriation of TK *does* generate valuable and beneficial products, but that this is often outside the confines of restricted notions of biopiracy as an 'engaged universal' (Tsing, 2005:8).

Travelling further to remote locations, in Chapter Five I have shown that the appropriation of other expressions of local knowledge about plants and resources are concerns in one indigenous community, but that this has nothing much to do with the patent claims analysed in Chapters Three & Four. In Chapter Five, I have shown that plants in San Francisco are far from passive, that they have their own agency and power to form relationships with humans through which knowledge - neither secret nor shared - is transmitted. In Chapter Six, I have shown the role that National Registers of traditional knowledge play in the 'scientisation' (Agrawal, 2002:290-291) of TK. This led to the creation of both 'registry-ready' TK, chosen according to ideas about *familiarity*, and then to 'registry-recorded' knowledge - knowledge that can move into other locations. I have also shown that assumptions about the creation of valuable, beneficial, knowledge and products - mobilised through global concepts of biopiracy - create divergent expectations of the outcomes of knowledge registration for the staff of INDECOPI, and for people in Callería.

In this thesis, the story above has become complicated, contradictory even. The connections that biopiracy makes as it moves around different locations in Peru are not those envisaged in the 'simple' story. This is perhaps unsurprising - after all, I did not set out to 'prove' it (as I explain in Chapter Two). However, the connections that biopiracy makes in the world are neither those imagined in the legislation set out in Chapter One, or in Chapter Three. The connections that biopiracy made and erased in the 'biopiracy work' of creating National Registers of Collective Knowledge, and in hunting for patents, has meant that the interests of indigenous communities are 'spoken for' rather than represented. This occurred, even though the (marginal) involvement of such communities has proven crucial in 'mobilizing adherents' (Tsing, 2005:8) such as non-governmental organisations.

In contemporary discourse, biopiracy can be loosely understood as the theft or unauthorised use of traditional knowledge. I have examined the relationship of this knowledge to 'intellectual property' and to the use of 'biological resources'. This relationship has been extensively explored in the existing literature, as I have discussed in Chapters One and Two, and Chapter One has given a brief account of thematic concerns in debates about biopiracy. As we have seen, this follows the development of the idea of biopiracy, and sets out the key concepts that biopiracy invokes. I have considered the origins of the concept of biopiracy, in terms of the colonial exploitation of plants and plant knowledge, and with reference to the claims of classification systems. In so doing, I have defined 'biodiversity', 'bioprospecting', and I have explored its corollary - 'biopiracy'.

I have shown that two pieces of international legislation are instrumental in informing discourse about 'biodiversity' and its relationship to traditional knowledge. Specifically, the Agreement on Trade-Related Aspects of Intellectual Property Rights, and the Convention on Biological Diversity, and both frame the use of traditional knowledge in/of plants in terms of 'benefit sharing'. 'Traditional knowledge' has been demystified, and shown as a special (for its political rather than ontological uniqueness) form of 'subjugated knowledge' (Foucault, 1980). As we have seen, traditional knowledge is one of a whole host of other forms of local knowledges, or *métis* (Scott, 1980). Indeed, Chapter One shows that biopiracy is a political concept which propels a huge range of histories, actors, and rhetorics and which characterises indigenous and local peoples' knowledges in particular, important ways. Biopiracy is a political tool, and it communicates diverse concerns and subjectivities. It is the latest - but a different - moral outcry over historic and continuing subjugations of the knowledge and resources of local and indigenous peoples.

In Chapter Two, I began to place biopiracy in the 'real' world, by disentangling it from the 'global' context of Chapter One. To do so, I examine the connections and movement of knowledge between 'global' and 'local' spaces. I have examined the relationship of biopiracy - through the concept of traditional knowledge - to concepts of indigeneity and the issue of biopirates. I have charted the beginning of my own biopiracy 'story' - in relation to methodological focus of this thesis - and I have used Tsing's (2005) concept of 'friction' to explain the nuances, and the creative dimensions of the connections biopiracy makes in the world. I have also explained the directions taken in the empirical chapters of this thesis.

In Chapter Two I have provided a brief account of my methodological journey in analysing the trajectories of biopiracy. I have stressed the importance of particular configurations of relationships to 'nature', to 'biodiversity', and to 'traditional knowledge' in understanding the journeys I have taken. I have stated my commitment to a partial perspective, as well as stressing the pivotal realisation that the most appropriate means to address biopiracy as it is actually understood, deployed, and encountered in Peru involved disaggregating biopiracy as a global concept - to distinguish multiple types of biopiracy, and two particular 'biopiracies' in particular. I have also introduced the existence of rhetorics of loss in mobilisations of biopiracy in Peru.

In Chapter Three, I began analysing my empirical work, and I provided boxes to assist the reader in navigation. In the first section of this chapter, I give the legislative and historical context of the development of 'biopiracy work' undertaken by INDECOPI in Peru. The subsequent section has set out key features of 'biopiracy work' - searches of the international patent system and National Registers of Collective Knowledge . In this section I have examined cases of biopiracy (Box Five), as well as the 'biopiracy patent' in context (Box Four). I have argued that in the 'biopiracy work' of INDECOPI, indigenous peoples' interests and traditional knowledge are represented and reified in important ways - which reveal the existence of both 'convergences' and 'gaps' (Tsing, 2005:89, 175) in the understandings of biopiracy that are generated.

In Chapter Three, I have shown that both NRCC and the species names used in patent searches are essentially different forms of list, and that particular nuances of biopiracy are generated in conjunction with these two types of list. I have illuminated the important ways in which the 'biopiracy work' of INDECOPI transforms TK. As I have shown, this calls into question corresponding representations of indigenous communities' interests, and produces an 'engaged' universal of biopiracy that exists by obfuscating the particular 'convergences' and 'gaps' it creates in biopiracy work (Tsing, 2005:89, 175).

The regional and national legislation highlighted in Chapter Three, gives charisma to the biopiracy produced through the 'biopiracy work' of INDECOPI. I have shown that the work of classification systems - in the intellectual property law and in scientific taxonomy - allow 'alliances' to emerge which combine the interests of indigenous communities with other groups, and which focus the search for biopiracy. This erases the need for actual encounters with indigenous communities, and reifies traditional knowledge, constructing it from fragments in the public domain.

Chapter Four has built on my experiences with 'biopiracy work' in the National Commission Against Biopiracy, and with the engagement of global biopiracy which such work produces. Step-by-step, I have explained how patents can be found, and what information they can offer research into biopiracy. I have responded to questions concerning the 'reality' of biopiracy and the patent system, in relation to a specific list of plants and animals. I have shown that selected plants and animals *are* being patented, and shown the ways in which this is taking place, as well as discussing a number of particularly interesting patents. I have argued that the semantic context of references to plants and animals often means that making decisions over which patents *could be* 'biopiracy patents' is a very complex matter.

In Chapter Four, I have explained that trajectory of biopiracy drifts towards global or universal concepts - such as intellectual property rights and scientific taxonomy - and towards the reification of traditional knowledge of the interests of indigenous communities. The difficulties and constraints imposed by hegemonic classificatory systems and standards, produce powerful convergences (Tsing, 2005:89), that aid the negotiation of the obstacles encountered in patent searches. This restricts the connections which biopiracy - read as the theft of traditional knowledge - could produce, and instead reifies traditional knowledge. As the examples show, biopiracy does exist in the patent system, but this terrain restricts examination of the multiple routes by which the theft or appropriation of traditional knowledge take place.

In Chapter Five, I began by stating that the hybrid concept of biopiracy discussed in Chapters Three and Four highlights 'gaps' and 'convergences' (Tsing, 2005:89) produced in 'biopiracy work', which characterise the use and theft of 'traditional knowledge in particular, limited, ways. The chapters I have subsequently provided are examples of encounters and processes through which biopiracy must continually negotiate its 'universal aspirations' (Tsing, 2005:1). The different, but related understandings of biopiracy at these three levels begin to force consideration of multiple 'biopiracies' - biopiracy struggles to remain singular throughout its travels.

In Chapter Five, I considered traditional knowledge and its connection to biopiracy in an indigenous community. In showing the importance of ethnographic work at community level, I have challenged the assumptions made about indigenous communities' perspectives in 'biopiracy work' - assumptions that reify traditional knowledge and allow INDECOPI to speak for indigenous peoples' interests. I have shown that indigenous peoples in San Francisco de Yarinacocha conceive of their relationship to plants and traditional knowledge in multiple ways. I have given examples of the power and agency of plants, of the importance of traditional medicine, and of the use of traditional knowledge in agroproduction, as well as highlighting conflict and concern about the use and theft of shamanic knowledge. I have argued that a hybrid biopiracy can be generated by considering the concerns that this indigenous community have over the use of their traditional knowledge.

I have shown that biopiracy, or more specifically, 'biopiracies' (which focus on the inequalities of relationships involved in the exchange and use of traditional knowledge), *do indeed* matter to indigenous people in San Francisco, as does the *loss* of TK. In examining 'rhetorics of loss', I have argued that biopiracy has a global appeal because it is a vehicle that mobilises concerns about inequalities in relationships (which govern access and use of knowledge and resources). However, I have shown that by restricting the kinds of relationships which can and cannot be considered important as examples of biopiracy, the inequalities of relationships which most concern indigenous communities are often ignored. This is what occurs in the 'biopiracy work' of Chapters Three and Four.

In the final chapter of this thesis, I have given an account of the collaborations that worked to involve Callería in a project to register their knowledge. I have described the transformations of knowledge which result from the 'friction' (Tsing, 2005) of the collision of 'global' concepts of 'Collective Knowledge' and (local) traditional knowledge about plants. We have seen that the contested, generative, process of knowledge production that is involved in the encounter between global and local knowledge, is erased in the work of creating registered TK. I have shown that transforming relations of *belonging* into relations of ownership has reconfigured elements of the relationship people in Callería have to their TK - by excluding both spiritual and present day peoples from sharing similar relationships of *belonging* to TK.

I have argued that the movement of global biopiracy into Callería also generates an apparent, '*a priori* unity' (Tsing, 2005:89) between local knowledge and TK. I have shown that the creation of 'registry-ready' knowledge is achieved through the 'particularisation' (Agrawal, 2002:290-291) of TK. Moreover, I have argued that this is facilitated by 'experts' and I have gone on to show how the creation of 'registry-recorded' knowledge further limits the kinds of local knowledge which can be transformed into TK - through the processes of 'validation' (Agrawal, 2002:290-291).

Throughout this thesis, the importance of connections - and of relationships as a special type of connection - have both been emphasised. When global-universal biopiracy was engaged in an encounter with local knowledge in each empirical chapter, the resulting 'friction' (Tsing, 2005) produced slightly different understandings of biopiracy. These understandings forge and obfuscate connections, with the result that particular relationships become emphasised and strengthened - and others rendered invisible or fractured. In 'biopiracy work', connections to international patent offices, to exporters, and to lists of national heritage in biological resources are made paramount - whilst engagement with indigenous communities is not. In San Francisco, concerns about deforestation, and the control of shamanic knowledge, are vitally important, while patents are almost unconnected to concerns about the use of traditional knowledge.

The 'biopiracies' that I have shown emerge in Callería are concerned with the management and type of relationships that govern the flow of plants and plant knowledge. 'Biopiracies of theft' mobilise concerns over the unregulated, uncontrolled, use of plants and knowledge. In Lima, 'biopiracies of theft' target the wanton patenting of claims over the uses of biological resources which propels the hunt for patents. In the patent system, 'biopiracies of theft' create tensions that arise over deciding where control over the uses of resources should stop - that is - of assessing what counts as theft. In San Francisco, 'biopiracies of theft' target attention upon the inequalities in the lifestyles of large-scale shamans and their small-scale counterparts, or alternatively between shamans and their Northern 'apprentices'. Finally, in Callería, 'biopiracies of theft' generate concerns when relationships of *belonging* become those of *ownership,* which is created through the possibilities presented by registering knowledge.

'Biopiracies of economic opportunity' mobilise concerns about unequal relationships in terms of the disparities of economic exchanges, and as a corollary they generate expectations about the receipt of 'benefits'. In Lima, 'Biopiracies of economic opportunity' mobilise concerns the unequal access and distribution of technology and resources which characterise relationships between developed and developing nations (as exemplified in the claims sections of patent documents). In the patent system, 'biopiracies of economic opportunity' are represented by the claims of particular patent documents; these express the intent to prevent others from 'exploiting' knowledge, and convey hopes about the value and utility of the protected information. In San Francisco, 'biopiracies of economic opportunity' are expressed through the belief that San Francisco has wealth in its knowledge, and by the concerns people have over the use of shamanic knowledge. In Callería, 'biopiracies of economic opportunity' revolve around negative past experiences of economic exchange, and generate - what I suggest are - unrealistic expectations about the possible inversion of these relations.

This thesis has contributed to existing anthropological and sociological literature concerning indigenous peoples and biodiversity by illustrating and demonstrating the complexity of, and by providing nuanced understandings of, biopiracy. I have analysed the multiple, contested, meanings of biopiracy, and I have produced a typology of 'biopiracies'. Through an application of Tsing's (2005) concept of 'friction', and through an analysis of biopiracy as an empirical subject of enquiry in the patent system, I have shown that the generation of understandings of biopiracy takes place in contested, unequal, negotiations over traditional knowledge and its uses.

I conclude the thesis by emphasising the *contingent* features of the multiple - hybrid - concepts of biopiracy that have been generated in the different empirical chapters: these make biopiracy too complex to remain singular. The contingencies of different concepts of biopiracy have been characterised under the terms, 'biopiracies of theft' and, 'biopiracies of economic opportunity' which I introduced in Chapter Six. The messy negotiations of knowledge and relationships, which enable global-local interactions, mean that the contingencies are unstable - yet as I have shown in this thesis - they *have* travelled in disparate locations. Thinking of biopiracy as *plural* 'biopiracies' - of theft, or of economic opportunity - has provided a better description of the kinds of multiple concerns, expectations, and fears that have been mobilised by 'biopiracy' in the different locations I have described in Peru.

In as much as this thesis has demonstrated the peculiarities of the trajectories taken by loose definitions of biopiracy - the only kind that can hope to travel far - it has been at the expense of ignoring other concerns about traditional knowledge and resources. Specifically, it has been beyond the scope of this thesis to explore the role of rhetorics of loss in articulating the concerns of indigenous communities - although I have broached this subject in Chapter Five. This is lamentable, given the connections that might be forged through further research that connects the types of loss represented in 'biodiversity conservation', with the nostalgia that accompanies the stories that indigenous elders tell about plants and animals.

The thesis suggests promising new areas for research into the connection between 'loss' and 'theft' in discussions over the use of traditional knowledge. Similarly, it sheds light on the need for research into the multiple concerns, hopes, and fears, that are entangled in discourses on biopiracy. Further research might usefully separate economically-motivated concerns of both nation states and indigenous communities, from fears about - and past experiences of - the exploitative relationships that govern the flow of traditional knowledge. This would contribute to a better understanding of indigenous peoples' concerns over the uses of their knowledge.

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APPENDICES

Annexe One

Table One: Species Prioritised by the NCAB

No.	Common Name	Scientific Name	Priority	Consultation with SPDA	Submission WIPO 30/05/05	Results	Law 28477	Chapter Four
1	Maca	Lepidium meyenii	Y			Y	Y	Y
2	Camu Camu	Myrciaria dubia	Y	Y	Y	Y	Y	Y
3	Uña de Gato	Uncaria tomentosa/guianensis	Y				Y	Y
4	Maíz Morado	Zea mays	Y				Y	Y
5	Tara	Caesalpinia tara	Y					
6	Yacón	Smallanthus sonchifolius	Y	Y	Y		Y	Y
7	Sacha Inchi	Plukenetia volubilis	Y		Y	Y	Y	Y
8	Hercampuri	Gentianella alborosea	Y	Y	Y			
9	Caigua	Cyclanthera pedata	Y		Y		Y	Y
10	Chancapiedra	Phyllanthus niruri	Y	Y	Y			Y
11	Sangre de Grado	Croton lechleri	Y				Y	Y

No.	Common Name	Scientific Name	Priority	Consultation with SPDA	Submission WIPO 30/05/05	Results	Law 28477	Chapter Four
12	Algodón de Color	Gossypium barbadense	Y					Y
13	Lúcuma	Pouteria lucuma	Y					Y
14	Chirimoya	Annona cherimoia	Y					Y
15	Oca	Oxalis tuberosa	Y				Y	Y
16	Olluco	Ullucus tuberosus	Y				Y	Y
17	Mashua	Tropaeolum tuberosum	Y				Y	Y
18	Palo de Rosa	Aniba rosaeodora	Y					Y
19	Tarwi /Choco	Lupinus mutabilis						
20	Cañihua	Chenopodium pallidicaule					Y	Y
21	Cascarilla/quinua	Cinchona micrantha					Y	
22	Ratania/ Palo Hurón	Kraemeria officianalis						
23	Guanarpo	Jatropha weberbauri						
24	Manayupa	Desmodium spp						

No.	Common Name	Scientific Name	Priority	Consultation w/SPDA	Submission: WIPO 30/05/05	Results	Law 28477	Chapter Four
25	Pasuchaca	Geranium dielsianum						
26	Achiote	Bixa orellana					Y	Y
27	Capirona	Calcophyllum abovatum						
28	Abuta	Abuta grandiflora						
29	Chuchuhuasi	Maytenus macrocarpa/laevis						
30	Muña	Minthostachys mollis/setosa						
31	Barbasco	Lochocarpus nicou						
32	Hojas de Paico	Chenopodium ambrosoides					Y	Y
33	Hoja de Guanábana	Annona muricata						
34	Huarizo	Llama glama x Llama pacos					Y*158	Y
35	Paíche	Arapaima gigas Cuvier					Y	Y

[158] Both *Llama glama* (llama) and *Llama pacos* (alpaca) are included in Law 28477, but the hybrid *huarizo* is not, making the huarizo potentially subject to complex ownership claims.

Annexe Two

Table Two: Biopiracy Patents, Challenges Brought by NCAB and Outcomes to Date

Plant	**Country**	**Type**	**Title**	**Number**	**Patent holder**	**Defence**[159]	**Evidence**	**Result-2009**
Maca	Japan	Application	'Functional food product containing Maca'	JP/2004/000171	Towa Corp.	Novelty Inventive-Step	Scientific	Rejected
Maca	USA	Grant	'Extract of Lepidium Meyenii roots for pharmaceutical applications'	US 6267995	Pure World Botanicals Inc.	Non-Obvious Novelty	Scientific	Existing

[159] Information derived from that provided by Robinson (2010: 54 & 69).

Plant	Country	Type	Title	Number	Patent holder	Defence	Evidence	Result-2009
Maca	USA	Grant	'Compositions and methods for their preparation from Lepidium'	US 6552206	Pure World Botanicals Inc.	Non-Obvious Novelty.	Scientific	Required to resubmit (US) Refused (EU)
Maca	USA	Grant	'Treatment of sexual dysfunction with an extract of Lepidium meyenii roots'	US 6428824	Pure World Botanicals Inc.	Novelty	Scientific	Existing

Plant	Country	Type	Title	Number	Patent holder	Defence	Evidence	Result 2009
Camu Camu	Japan	Application	'Preserves of fruit of Myrciaria dubia'	JP09215475A	T Hasegawa Co. Ltd	Novelty	Publications Thesis Scientific	Rejected
Camu Camu	Japan	Application	'Dessert containing juice of Myrciaria dubia'	JP09140341A	T. Hasegawa Co. Ltd.	Novelty	Publications Thesis Scientific	Rejected

Plant	Country	Type	Title	Number	Patent holder	Defence	Evidence	Result-2009
Camu Camu	Japan	Application	'Improvement of taste and flavour of juice of fruit of Myrciaria dubia and beverage containing the juice'	JP09140357	T. Hasegawa Co. Ltd.	Non-Obvious	Publications Thesis Scientific	Rejected

Plant	**Country**	**Type**	**Title**	**Number**	**Patent holder**	**Defence**	**Evidence**	**Result-2009**
Camu Camu	Japan	Application	'Preparation of juice of fruit of 'Myrciaria dubia, improved in flavour and taste'	JP09140358	T. Hasegawa Co. Ltd.	Non-Obvious	Publications, Thesis, Scientific	Rejected

Plant	Country	Type	Title	Number	Patent holder	Defence	Evidence	Result - 2009
Sacha Inchi	France	Application	'Use of oil or proteins extracted from the seeds of Plukenetia volubilis linneo [...][160]'	FR 2880278	Greentech SA.	Novelty	Publications citing use by indigenous peoples	Renounced

[160] The title continues: 'known commonly as "inca inchi", for the preparation of an active ingredient present in the composition of cosmetic or dermatalogical products' It is an english translation of the original French title.

Plant	Country	Type	Title	Number	Patent holder	Defence	Evidence	Result - 2009
Sacha Inchi	PCT/France	Application	'An extract of a plant belonging to the genus Plukenetia volubilis and its cosmetic use'	WO/2006/048158	Cognis SAS.	Novelty	Publications citing use by indigenous peoples	Abandoned

Annexe Three

List of Plants and Animals

		List of Plants & Animals	
1	Plantae	Achiote	Bixa orellana
2	Plantae	Achira	Canna indica
3	Plantae	Aguaymanto	Physalis peruviana
4&5	Plantae	Ají Amarillo/Ají Pimentón	Capsicum baccatum/Capsicum annuum
6	Plantae	Caigua	Cyclanthera pedata
7	Plantae	Camote	Ipomoea batatas
8	Plantae	Camu Camu	Myrciaria dubia
9	Plantae	Cañihua	Chenopodium pallidicaule
10	Plantae	Cascarilla/Quinua	Cinchona officinalis/Cinchona pubescens
11	Plantae	Faique	Acacia huarango
12	Plantae	Frijol Nuña	Phaseolus vulgaris
13	Plantae	Gatupa	Passiflora pinnatistipula
14	Plantae	Huacatay	Tagetes minuta
15	Plantae	Kiwicha	Amaranthus caudatus
16	Plantae	Yacón	Smallanthus sochifolius
17	Plantae	Loche	Cucurbita moschata
18	Plantae	Maca	Lepidium meyenii
19&20	Plantae	Maíz Blanco Gigante	Zea mays
		Maíz Morado	
21	Plantae	Mashua	Tropaeolum tuberosum
22	Plantae	Mauca	Mirabilis expanda
23	Plantae	Oca	Oxalis tuberosa
24	Plantae	Olluco	Ullucus tuberosus
25	Plantae	Paico	Chenopodium ambrosioides
26	Plantae	Papa Común	Solanum tuberosum
27	Plantae	Papa Amarga	Solanum juczepczukü
28	Plantae	Papa Amarilla	Solanum goniocalyx
29	Plantae	Papa Ayanhuiri	Solanum ajanhuiri
30	Plantae	Papa Fureja	Solanum phureja
31	Plantae	Papa Huayro	Solanum x chaucha
32	Plantae	Papa Patiquiña	Solanum stenotomum
33	Plantae	Papa Rucki	Solanum curtilobum
34	Plantae	Papa Tropical	Solanum hygrothermicum
35	Plantae	Quinua	Chenopodium quinoa
36	Plantae	Rocoto	Capsicum pubescens
37	Plantae	Sacha Inchi	Plukenetia volubilis
38	Plantae	Sacha Mango	Grias peruviana

39	Plantae	Sacha Oca	Maranta arundinacea
40	Plantae	Sachapapa	Dioscorea trifida
41	Plantae	Saúco Peruano	Sambucus peruviana
42	Plantae	Tuna	Opuntia ficus-indica
43	Plantae	Uña de Gato	Uncaria tomentosa/Uncaria guianensis
44	Plantae	Yuca	Manihot esculenta
		List of Plants & Animals	
45	Plantae	Zinnia	Zinnia peruviana
46	Plantae	Ayahuasca	Banisteriopsis caapi
47	Plantae	Chakruna	Psychotria viridis
48	Plantae	Chalipanga	Diplopterys cabrerana
49	Plantae	Sangre de Grado	Croton lechleri
50	Animalia	Chinchilla	Chinchilla lanigera
51	Animalia	Guanaco	Lama guanicoe
52	Animalia	Huangana	Tayassu pecari
53	Animalia	Majáz	Agouti paca
54	Animalia	Oso de Anteojos	Tremarctos omatus
55	Animalia	Pecarí	Pecari tajacu
56	Animalia	Venado Rojo	Mazama americana
57	Animalia	Vicuña	Vicugna vicugna
58	Animalia	Viscacha	Lagidium peruanum
59	Animalia	Zorro de Sierra	Pseudalopex culpaeus
60	Animalia	Taruca	Hippocamelus antisensis

Annexe Four

Queries & Limitations

Number	Query	Query Limitations
1	(Achiote OR "Bixa orellana" OR Annatto OR lipsticktree OR roucou OR Anatta OR Annotta OR Aploppas OR Arnotta OR Arnotto OR rocou OR achote OR urucu OR bija OR bijol OR foucou OR latkhan OR sendri OR achuete OR atsuwete OR urucum)	
2	(Achira OR "Indian shot" OR "queensland arrowroot" OR "Canna Indica")	
3	("golden berry" OR "cape gooseberry" OR "giant ground cherry" OR "Peruvian groundcherry" OR "Peruvian ground cherry" OR "Peruvian cherry" OR "jam fruit" OR uchuva OR "physalis peruviana" OR "Physallis peruviana" OR "alquequenje peruano" OR capulí OR "poga poga" OR "aguaymanto")	
4&5	("aji amarillo" OR "yellow chilli pepper" OR "Capsicum annuum" "Capsicum baccatum" OR "aji pimenton" OR "Cayenne pepper")	
6	(Caigua OR "Cyclanthera pedata" OR caygua OR caihua OR cayua OR achocha OR achokcha OR "slipper gourd" OR "lady's slipper" OR "sparrow gourd" OR "stuffing cucumber" OR caihuacayua OR cayguacaihua OR "lady's slipper plant")	

Number	Query	Query Limitations
7	(camote OR "sweet potato" OR "Convolvulus batatas" OR "Convolvulus tiliaceus auct" OR "Ipomoea fastigiata" OR "Ipomoea triloba auct" OR uala OR kumara OR Süsskartoffel OR batate OR sweetpotato OR "Ipomoea batatas")	NOT ("Sweet potato chlorotic fleck virus" OR "Sweet potato chlorotic stunt virus" OR "Sweet potato feathery mottle virus" OR "Sweet potato latent virus" OR "Sweet potato leaf curl Canary virus" OR "Sweet potato leaf curl China virus" OR "Sweet potato leaf curl Georgia virus" OR "Sweet potato leaf curl Lanzarote virus" OR "Sweet potato leaf curl Spain virus" OR "Sweet potato leaf curl virus" OR "Sweet potato leaf speckling virus" OR "Sweet potato mild mottle virus" OR "Sweet potato mild speckling virus" OR "Sweet potato virus 2" OR "Sweet potato virus G" OR "Sweet potato whitefly" OR "camote del monte" OR "camote del pacifico" OR "Semicossyphus darwini" OR "Sectator ocyurus" OR "Pinguipes chilensis" OR ""Lagarto camote puro" OR "sweet potato virus")
8	(CamuCamu OR Cacari OR Camocamo OR camu camu OR "Myrciaria dubia" OR "camu camu")	
9	("Chenopodium pallidicaule" OR cañihua)	
10	(Cascarilla OR quinua OR "cinchona officianalis" OR "Cinchona pubescens" OR "Cinchona micrantha" OR "Chichona spp")	

Number	**Query**	**Query Limitations**
11	("faique" OR "huarango" OR "Acacia huarango")	
12	("Phaseolus vulgaris" OR "frijol nuna" OR "popping bean" OR "Phaseolus compessus" OR "Phaseolus nanus")	
13	(Gatupa OR "Passiflora pinnatistipula")	
14	("tagetes minuta" OR Huacatay OR "peruvian black mint" OR "muster John Henry" OR "wild marigold" OR "mexican marigold")	
15	(Kiwicha OR "Amaranthus Caudatus" OR Achita OR love-lies-bleeding OR quilete)	NOT "love-lies-bleeding delillo"
16	(llacon OR yacón OR llakuma OR aricoma OR jiquima OR "Smallanthus sochifolius" OR "Smallanthus sonchifolius")	
17	("Cucurbita moschata" OR loche OR "pepo moschata" OR "crookneck squash" OR "butternut squash" OR "pumpkin")	
18	(maca OR maca-maca OR "Lepidium meyenii" OR "Lepidium meyeni" OR "lepidium meyenii walp" OR "Pepperweed" OR "peruvian ginseng OR maino OR "ayak chichira" OR "ayak willku")	

Number	Query	Query Limitations
19&20	("maiz morado" OR "maiz gigante" OR "giant corn" OR "purple corn" OR "Zea mays" OR "purple maize" OR "giant maize" OR "maiz morado peru" OR "purple corn peru")	
21	(mashua OR "Tropaeolum tuberosum" OR mashwa OR maswallo OR mazuko OR Mascho OR anu)	
22	("Mirabilis expanda" OR "Mirabillis expanda" OR "Mirabillis expansa" OR "mirabilis expansa" OR chago OR mauca)	NOT ("chagos islands")
23	("Oxalis tuberosa" OR oca OR oka OR "oxalis tuberosa molina")	NOT ("Sciaena umbra" OR "varicella" OR "plums" OR "oka europea")
24	(olluco OR Ulluco OR Ulluma OR Melloca OR Knollenbaselle OR “papa lisa” OR ullucus tuberosus)	
25	(paico OR "Chenopodium ambrosioides" OR "Teloxys vagans" OR "Teloxys ambrosioides" OR jerusalem-tea OR mexican-tea OR epazote OR "american wormseed")	
26	("Papa comun" OR "Vitelotte Violette" OR "tetraploid potato" OR "peruvian purple potato" OR "purple congo potato" OR "solanum andigenum" OR "white potato" OR "Solanum tuberosum")	

Number	Query	Query Limitations
27	("Solanum juczepczukü" OR "Papa amarga" OR "triploid potato" OR luqui")	
28	("papa amarilla" OR "limena potato" OR "yellow potato" OR "Solanum goniocalyx" OR "papa amarilla peru")	
29	("papa ayanhuiri" OR "ayanhuiri potato" OR "Solanum ajanhuiri")	
30	("Papa fureja" OR "Solanum phureja" OR "Diploid potato" OR chaucha)	
31	("Papa Huayro" OR "Solanum x chaucha" OR chauca OR "triploid potato" OR surimana)	
32	("Papa patiquina" OR "Patiquina potato" OR "Solanum Stenotomum")	
33	("Papa rucki" OR "Solanum curtilobum" OR "pentaploid potato" OR choque-pitu)	

Number	Query	Query Limitations
34	("Papa tropical" OR "Tropical potato" OR "Solanum hygrothermicum")	
35	(Quinoa OR "Chenopodium quinoa")	
36	(Rocoto OR "Capsicum pubescens" OR locoto OR canario OR caballo OR peron OR "hairy pepper" OR "manzano chillies")	NOT ("caballo loco wine" OR "caballo blanco" OR "caballo loco" OR caballos OR "canario dog" OR "canario presa dog" OR canarios)
37	("Sacha inchi" OR "Plukenetia volubilis" OR "Sacha Inchi" OR "Sacha Peanut" OR "Mountain Peanut" OR Incan-Peanut OR "Incan peanut" OR Inca-Peanut OR "sacha inchi peru" OR "plukenetia volubilis linneo" OR "inca peanut" OR "inca peanut oil")	
38	("Sacha mango" OR "Grias peruviana" OR "Sacha managua" OR "Grias grandifolia Pilg" OR "Grias maranonensis" OR "Grias tessmannii")	
39	("Sacha oca" OR "Maranta arundinacea" OR Shimipampana OR "Maranta indica Tussac" OR "Maranta ramosissima Wall" OR "Maranta sylvatica Roscoe" OR "Maranta tessellata" OR "arrowroot")	

Number	Query	Query Limitations
40	(Sachapapa OR "Dioscorea trifida" OR "Dioscorea affinis Kunth" OR "Dioscorea angustifolia Rusby" OR "Dioscorea articulata Steud" OR "Dioscorea brasiliensis Willd" OR "Dioscorea goyazensis Griseb" OR "Dioscorea palmata Juss" OR "Dioscorea triloba Lam" OR "Dioscorea triloba Willd")	
41	("Saúco peruano" OR "Sambucus peruviana" OR Rayan OR "Peruvian elderberry")	
42	(Tuna OR "Opuntia ficus-indica" OR "Opuntia ficus indica" OR nopales OR "indian fig" OR "Cactus ficus-indica L" OR "Opuntia compressa" OR "Opuntia vulgari" OR indian-fig OR "tuna cactus" OR "nopal de castilla")	NOT ("tuna fishing" OR fish* OR fish OR "tuna fish")
43	("Uña de gato" OR "Uncaria tomentosa" OR "Uncaria guianensis" OR "cats claw" OR "cat's claw" OR vilcacora OR "Cinchona globifera Pav" OR "Nauclea aculeata" OR "Nauclea polycephala" OR "Nauclea surinamensis" OR "Nauclea tomentosa Willd" OR "Ourouparia tomentosa" OR "Uncaria surinamensis" OR "Nauclea guianensis" OR "Ourouparia guianensis" OR "Uncaria aculeata Willd" OR "Uncaria spinosa Raeusch" OR "Uruparia versicolor Raf")	

Number	Query	Query Limitations
44	(Yuca OR "Manihot esculenta" OR Cassava OR Manioc OR Mandioca OR "nipha aipi" OR "Janipha manihot" OR "Jatropha aipi" OR "Jatropha diffusa" OR "Jatropha digitiformis" OR "Jatropha dulcis" OR "Jatropha flabellifolia" OR "Jatropha glauca" OR "Jatropha manihot" OR "Jatropha mitis" OR "Jatropha paniculata" OR "Jatropha silvestris" OR "Mandioca aipi" OR "Mandioca utilissima" OR "Manihot aipi" OR "Manihot aypi Spruce" OR "Manihot cannabina Sweet" OR "Manihot cassava" OR "Manihot diffusa" OR "Manihot digitiformis" OR "Manihot dulcis" OR "Manihot edule" OR "Manihot flabellifolia" OR "Manihot loureiroi" OR "Manihot manihot" OR "Manihot melanobasis" OR "Manihot palmata" OR "Manihot sprucei Pax")	NOT (yucca OR Agavaceae)
45	("Zinnia Peruviana" OR "Zinnia multiflora" OR "Peruvian Zinnia")	(Sanvitalia OR "creeping zinnia" OR zenilla OR baccha)
46	(ayahuasca OR "Banisteriopsis caapi" OR caapi OR hoasca OR ayawaska OR ayhuasca OR "Banisteriopsis inebrians" OR "Banisteriopsis quitensi" OR banisteriopsis OR harmine OR harmaline OR tetrahydroharmine)	
47	(Chakruna OR "Psychotria viridis" OR Chacruna OR "Palicourea viridis" OR "Psychotria microdesmia Oerst" OR "Psychotria trispicata Griseb" OR "Uragoga glomerata" OR "Uragoga viridi")	

Number	Query	Query Limitations
48	(Chalipanga OR Chaliponga OR "Diplopterys cabrerana")	
49	("sangre de drago" OR "Sangre de grado" OR "Dragons blood" OR "Croton draco" OR "Oxydectes lechler" OR "sangue de drago" OR "croton draconoides" OR "Croton lechleri")	
50	(Chinchilla OR "Chinchilla lanigera")	
51	(Guanaco OR "lama guanaco")	
52	(Huangana OR "Tayassu Pecari" OR "white lipped peccary" OR "Pecari labios blancos")	
53	(Majáz OR "Agouti paca" OR Tepezcuintle)	
54	(Tremarctus omatus OR "oso de anteojos" OR "Andean bear)	

Number	Query	Query Limitations
55	(Pecarí OR "Pecarí tajacu" OR "Collared Peccary" OR "Tayassu tajacu" OR Javelina)	
56	("Mazama Americana" OR "Venado Rojo" OR "South American Deer" OR "Red Brocket")	
57	(Vicuna OR "Vicugna Vicugna")	
58	(Viscacha OR "Lagidium peruanum" OR "Peruvian guemal" OR "north Andean huemul")	
59	("Zorro de Sierra" OR "Pseudalopex culpaeus" OR "Lycalopex culpaeus" OR "Lycalopex culpaeus andinus" OR "Lycalopex culpaeus culpaeus" OR "Lycalopex culpaeus lycoides" OR "Lycalopex culpaeus magellanicus" OR "Lycalopex culpaeus reissii" OR "Lycalopex culpaeus smithersi")	
60	(Taruca OR "Hippocamelus antisensis" OR "Peruvian guemal" OR "north Andean huemul")	

Annexe Five

<u>**TAC Scores & Raw Scores**</u>

Common name	***Scientific name***	**Total number (patents)**	**Number in TAC (patents)**
Achiote	*Bixa orellana*	**4355**	**579**
Achira	*Canna indica*	**289**	**10**
Aguaymanto	*Physalis peruviana*	**283**	**117**
Ají Amarillo/Pimentón	*Capsicum baccatum/annum*	**2147**	**633**
Caigua	*Cyclanthera pedata*	96	14
Camote	*Ipomoea batatas*	17105	3995
Camu Camu	*Myrciaria dubia*	391	62
Cañihua	*Chenopodium pallidicaule*	60	3
Cascarilla	*Cinchona officinalis*	518	94
Faique	*Acacia huarango*	12	5
Frijol Nuña	*Phaseolus vulgaris*	10376	575
Gatupa	*Passiflora pinnatistipula*	0	0
Huacatay	*Tagetes minuta*	180	45
Kiwicha	*Amaranthus caudatus*	511	52
Yacón	*Smallanthus sonchifolius*	506	125
Loche	*Cucurbita moschata*	10757	2799
Maca	*Lepidium meyenii*	2087	361
Maíz Blanco/ Gigante/Morado	*Zea mays*	18195	2145
Mashua	*Tropaeolum tuberosum*	8597	2121
Mauca	*Mirabilis expanda*	200	3
Oca	*Oxalis tuberosa*	12520	1204
Olluco	*Ullucus tuberosus*	21	2
Paico	*Chenopodium ambrosioides*	241	43
Papa Común	*Solanum tuberosum*	7969	836
Papa Amarga	*Solanum juczepczukii*	3	0
Papa Amarilla	*Solanum goniocalyx*	65	9
Papa Ayanhuiri	*Solanum ajanhuiri*	0	0
Papa Fureja	*Solanum phureja*	97	14
Papa Huayro	*Solanum x chaucha*	5	0
Papa Patiquiña	*Solanum stenotomum*	1	1
Papa Rucki	*Solanum curtilobum*	0	0
Papa Tropical	*Solanum hygrothermicum*	0	0
Quinua	*Chenopodium quinoa*	**3391**	**532**
Rocoto	*Capsicum pubescens*	**1378**	**165**
Sacha inchi	*Plukenetia volubilis*	**40**	**15**
Sacha Mango	*Grias peruviana*	**1**	**0**
Sacha Oca	*Maranta arundinacea*	**10274**	**1039**
Sachapapa	*Dioscorea trifida*	**6**	**0**
Saúco Peruano	*Sambucus peruviana*	**87**	**37**

Common name	***Scientific name***	**Total number (patents)**	**Number in TCA (patents)**
Tuna	*Opuntia ficus-indica*	**3275**	**653**
Uña de Gato	*Uncaria tomentosa/guianensis*	**1020**	**355**
Yuca	*Manihot esculenta*	**11181**	**2318**
Zinnia	*Zinnia peruviana*	**1251**	**273**
Ayahuasca	*Banisteriopsis caapi*	**470**	**110**
Chakruna	*Psychotria viridis*	**0**	**0**
Chalipanga	*Diplopterys cabrerana*	**0**	**0**
Sangre de Grado	*Croton lechleri*	**618**	**150**
Chinchilla	*Chinchilla lanigera*	**2242**	**225**
Guanaco	*Lama guanicoe*	**431**	**28**
Huangana	*Tayassu pecari*	**0**	**0**
Majáz	*Agouti paca*	**1**	**0**
Oso de Anteojos	*Tremarctos omatus*	**0**	**0**
Pecarí	*Pecarí tajacu*	**0**	**0**
Venado Rojo	*Mazama americana*	**1**	**1**
Vicuña	*Vicugna vicugna*	**871**	**158**
Viscacha	*Lagidium peruanum*	**2**	**0**
Zorro de Sierra	*Pseudalopex culpaeus*	**0**	**0**
Taruca	*Hippocamelus antisensis*	**0**	**0**
TOTAL		**A - 133835**	**B - 21906**
% (A of B)		**100%**	**16.36%**

Annexe Six

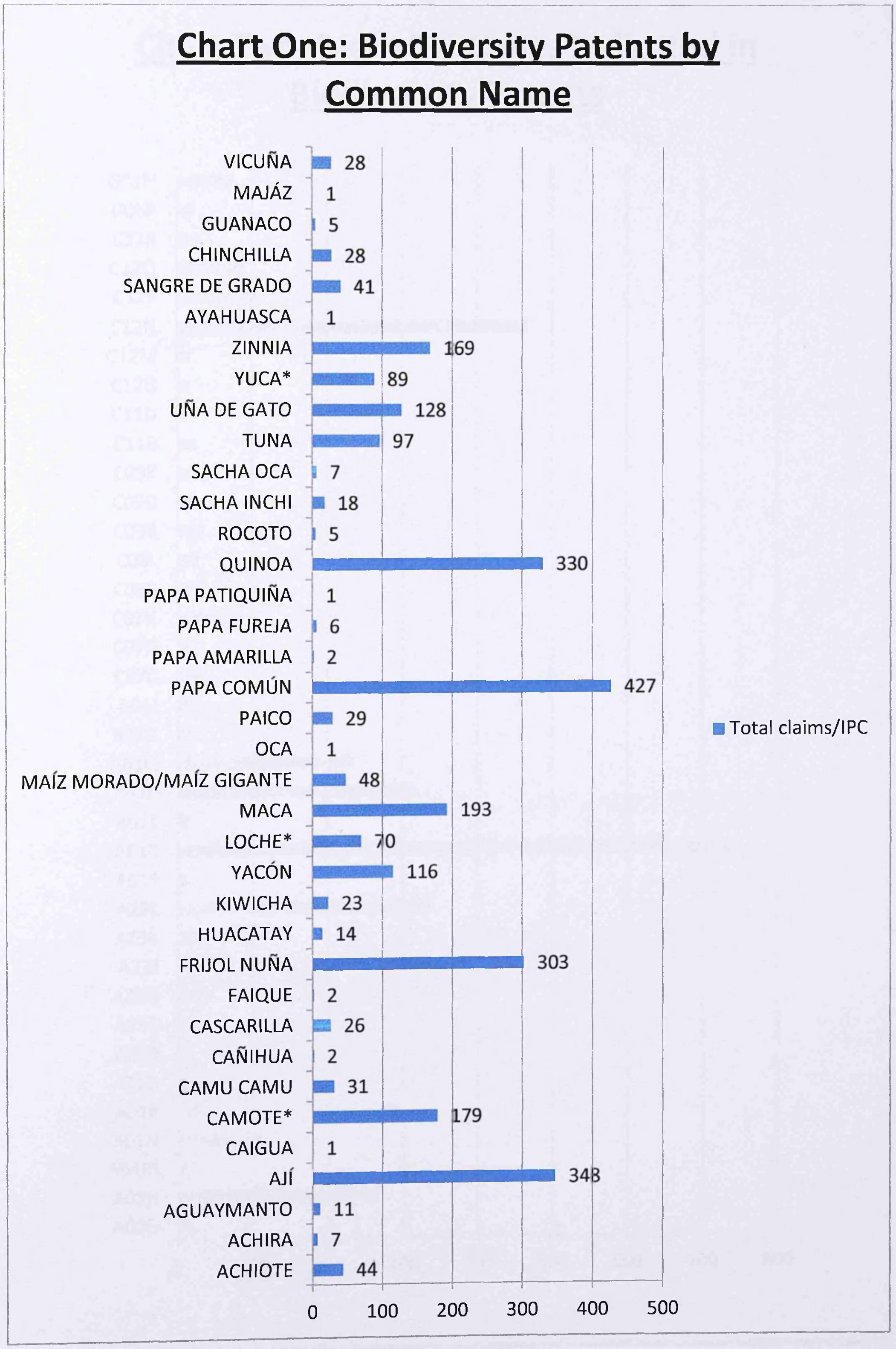


Chart One: Biodiversity Patents by Common Name
VICUÑA 28
MAJÁZ 1
GUANACO 5
CHINCHILLA 28
SANGRE DE GRADO 41
AYAHUASCA 1
ZINNIA 169
YUCA* 89
UÑA DE GATO 128
TUNA 97
SACHA OCA 7
SACHA INCHI 18
ROCOTO 5
QUINOA 330
PAPA PATIQUIÑA 1
PAPA FUREJA 6
PAPA AMARILLA 2
PAPA COMÚN 427
PAICO 29
OCA 1
MAÍZ MORADO/MAÍZ GIGANTE 48
MACA 193
LOCHE* 70
YACÓN 116
KIWICHA 23
HUACATAY 14
FRIJOL NUÑA 303
FAIQUE 2
CASCARILLA 26
CAÑIHUA 2
CAMU CAMU 31
CAMOTE* 179
CAIGUA 1
AJÍ 348
AGUAYMANTO 11
ACHIRA 7
ACHIOTE 44
0
100
200
300
400
500
Total claims/IPC

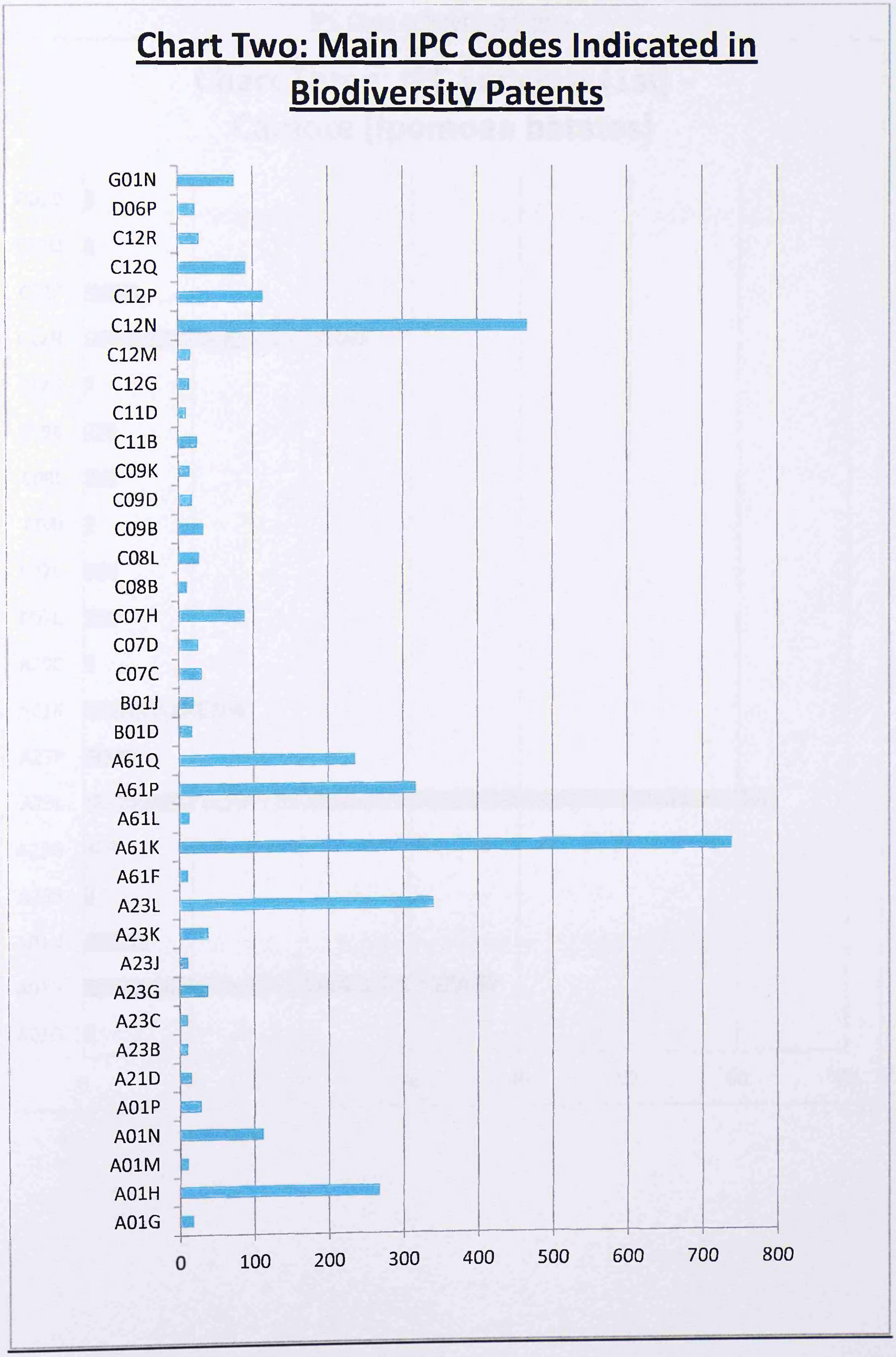
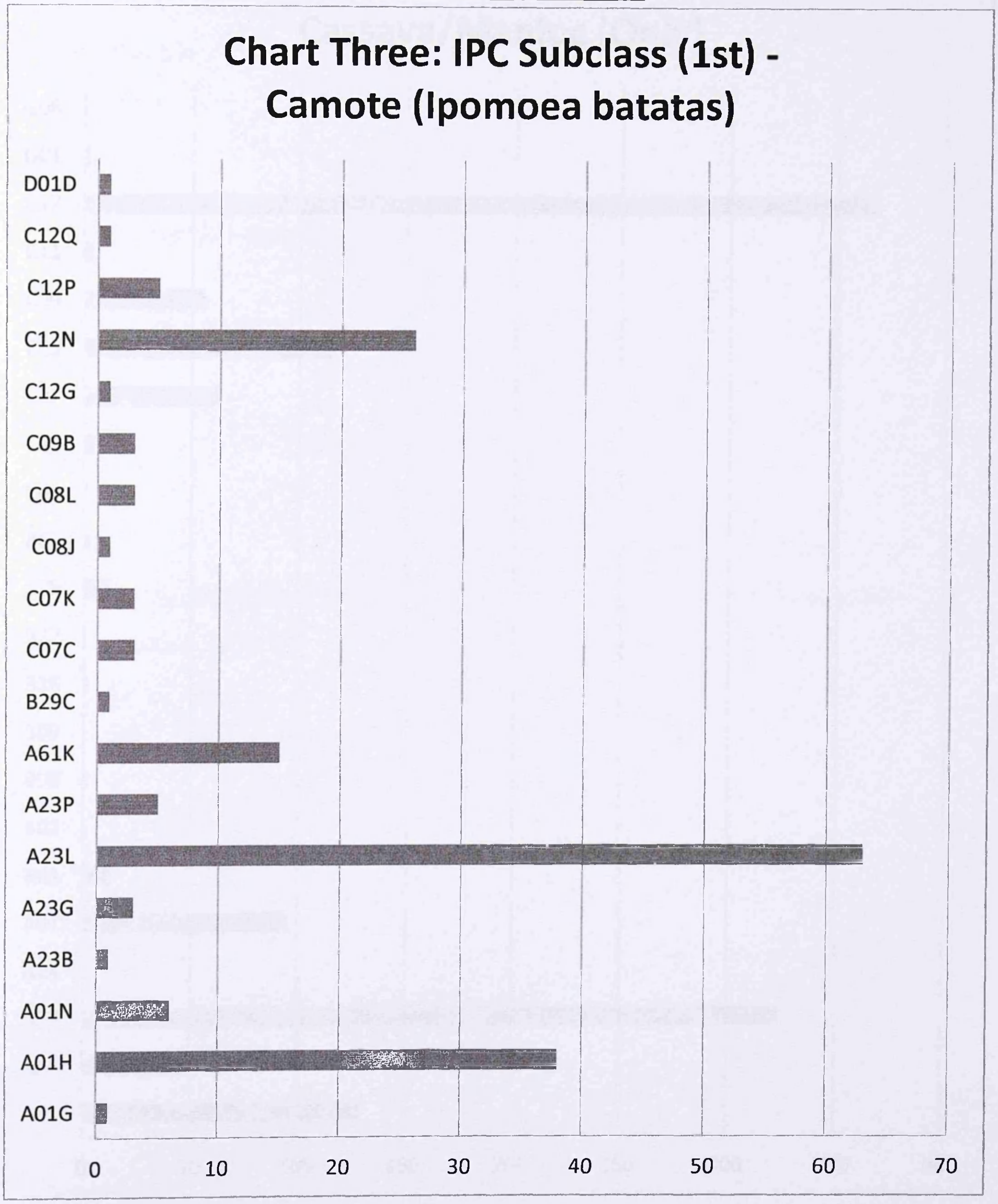


Chart Two: Main IPC Codes Indicated in Biodiversity Patents
G01N
D06P
C12R
C12Q
C12P
C12N
C12M
C12G
C11D
C11B
C09K
C09D
C09B
C08L
C08B
C07H
C07D
C07C
B01J
B01D
A61Q
A61P
A61L
A61K
A61F
A23L
A23K
A23J
A23G
A23C
A23B
A21D
A01P
A01N
A01M
A01H
A01G
0
100
200
300
400
500
600
700
800

Annexe Eight

IPC Class or Subclass Codes



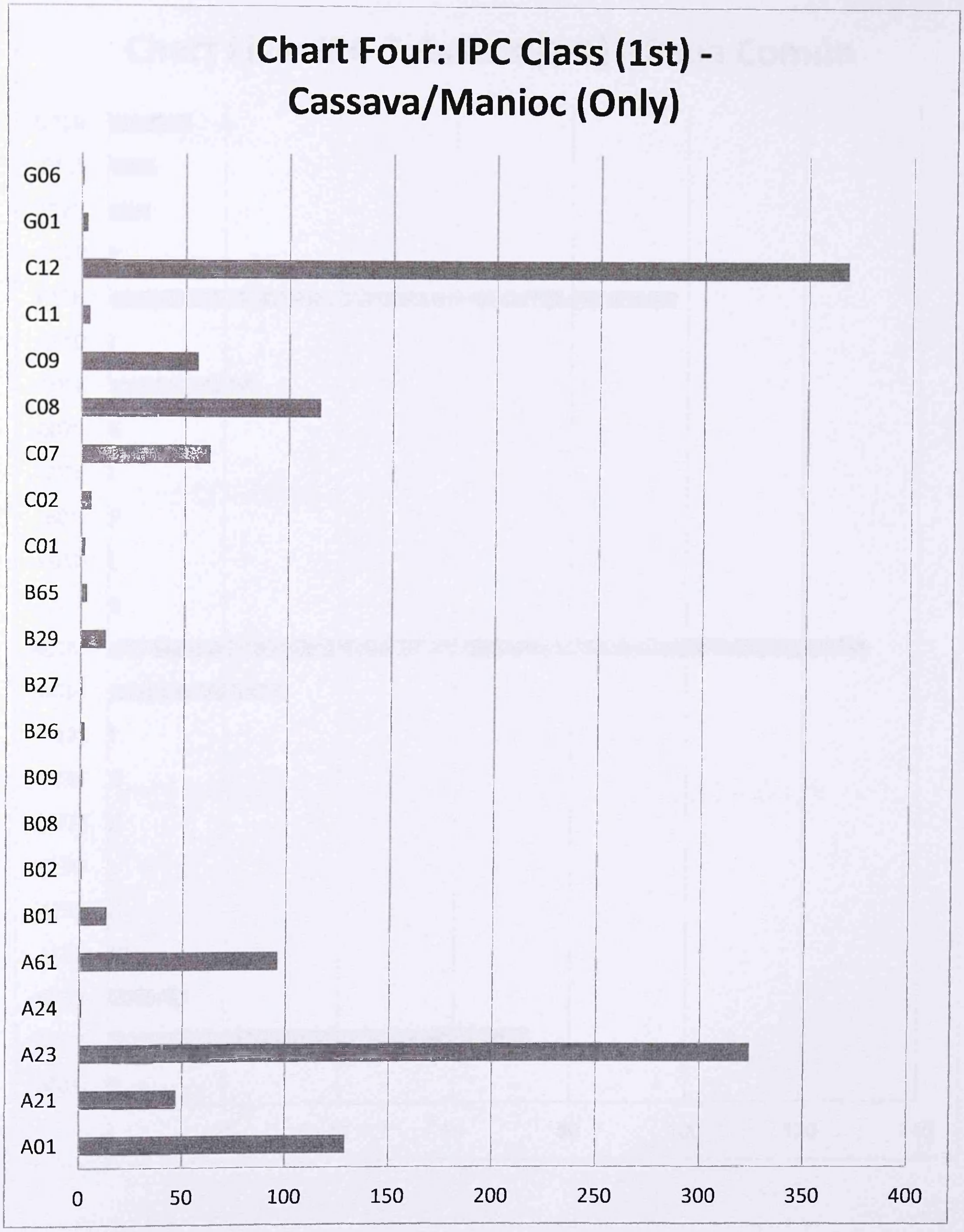


Chart Four: IPC Class (1st) - Cassava/Manioc (Only)
G06
G01
C12
C11
C09
C08
C07
C02
C01
B65
B29
B27
B26
B09
B08
B02
B01
A61
A24
A23
A21
A01
0
50
100
150
200
250
300
350
400

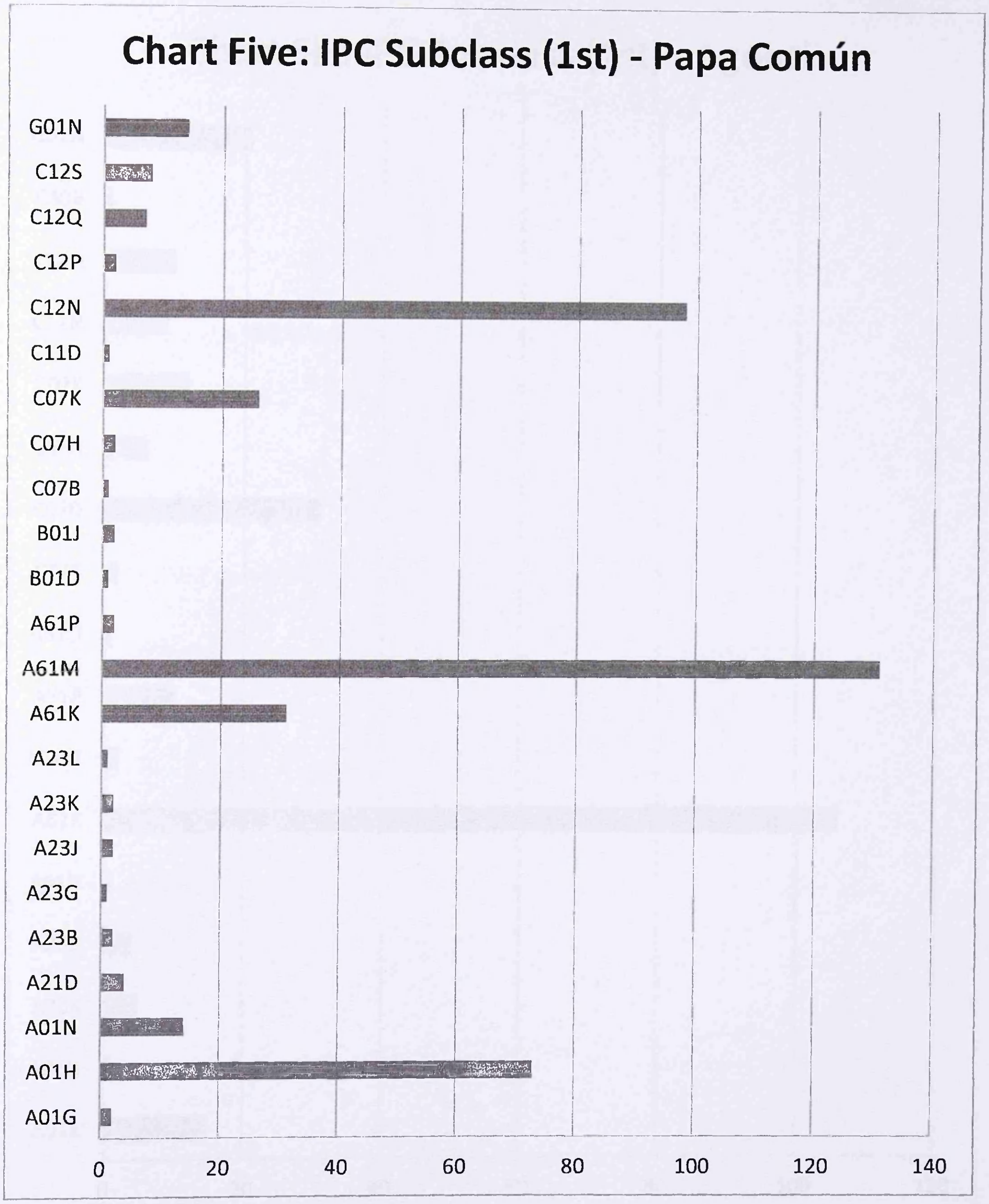
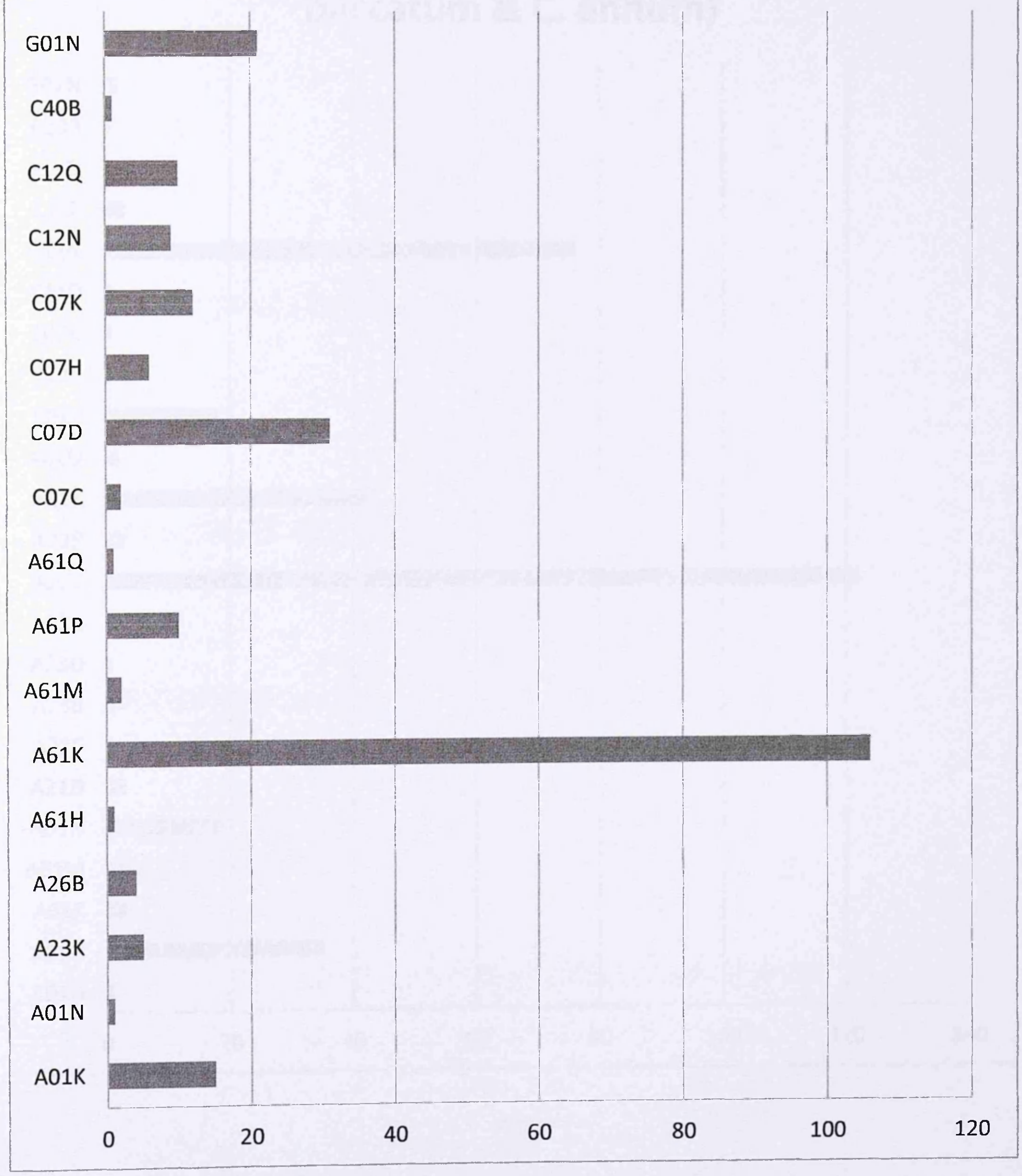


Chart Five: IPC Subclass (1st) - Papa Común
G01N
C12S
C12Q
C12P
C12N
C11D
C07K
C07H
C07B
B01J
B01D
A61P
A61M
A61K
A23L
A23K
A23J
A23G
A23B
A21D
A01N
A01H
A01G
0
20
40
60
80
100
120
140

Chart Six: IPC Subclass (1st) - Agouti



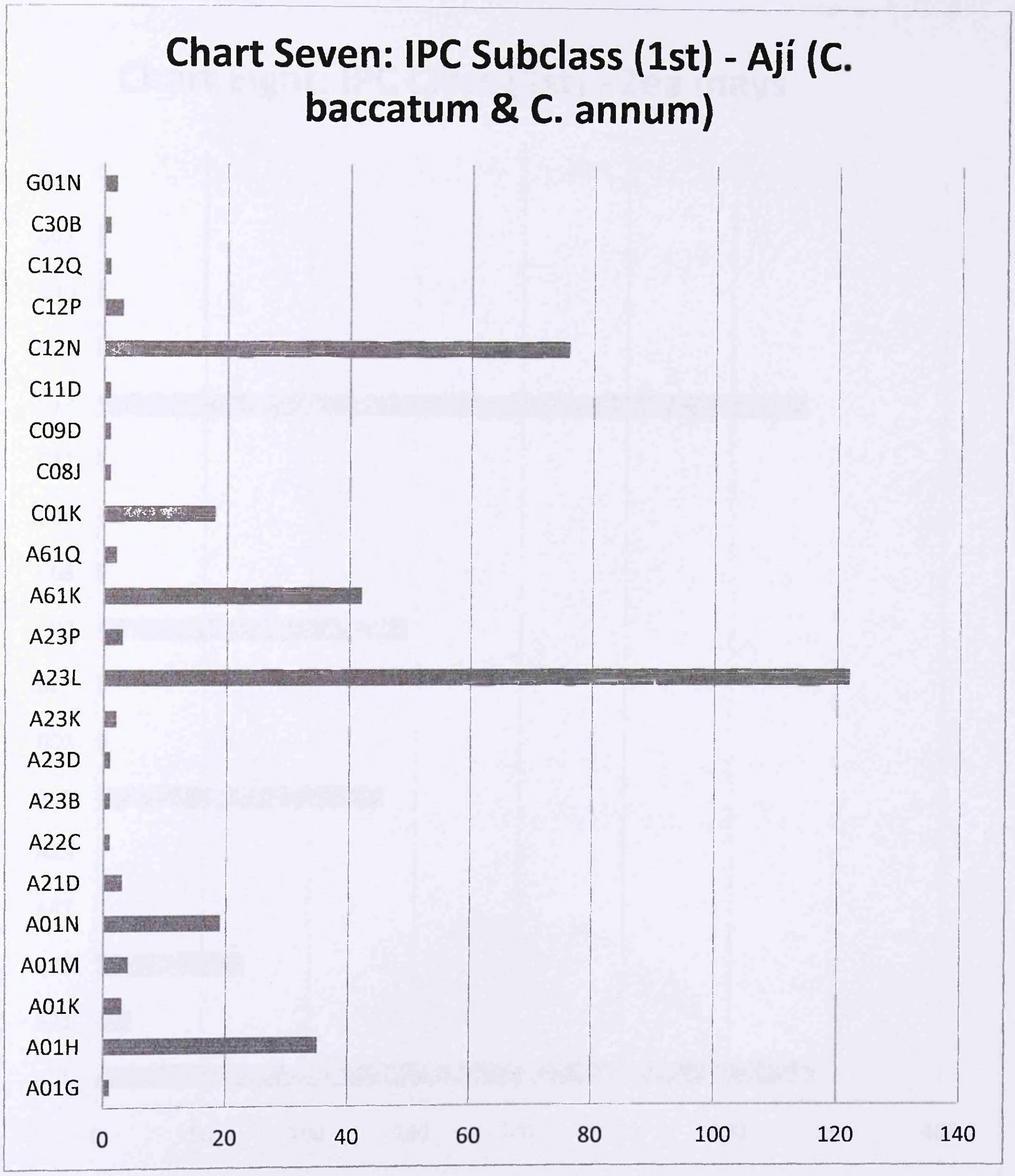


Chart Seven: IPC Subclass (1st) - Ají (C. baccatum & C. annum)
G01N
C30B
C12Q
C12P
C12N
C11D
C09D
C08J
C01K
A61Q
A61K
A23P
A23L
A23K
A23D
A23B
A22C
A21D
A01N
A01M
A01K
A01H
A01G
0
20
40
60
80
100
120
140

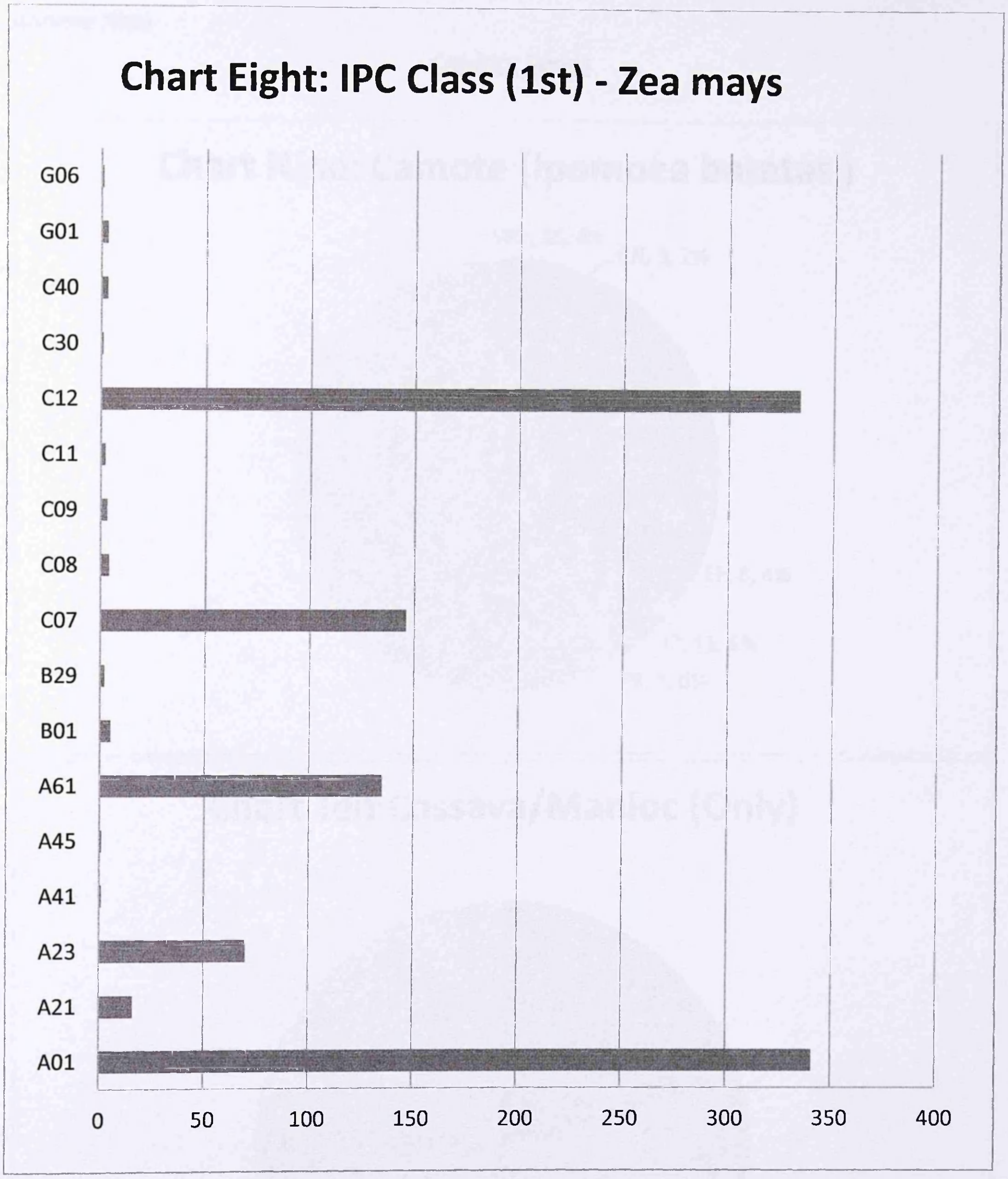


Chart Eight: IPC Class (1st) - Zea mays
G06
G01
C40
C30
C12
C11
C09
C08
C07
B29
B01
A61
A45
A41
A23
A21
A01
0
50
100
150
200
250
300
350
400

Annexe Nine

Country Codes

Chart Nine: Camote (Ipomoea batatas)

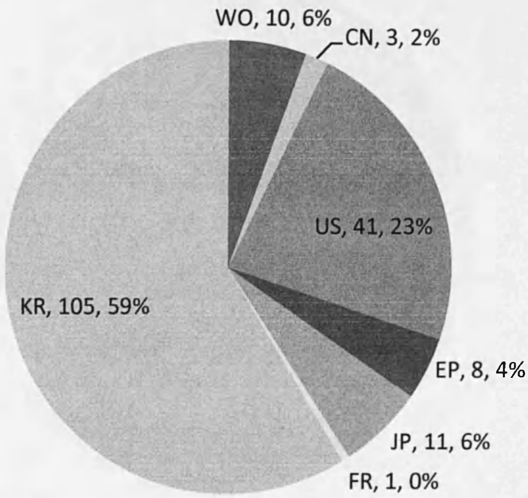
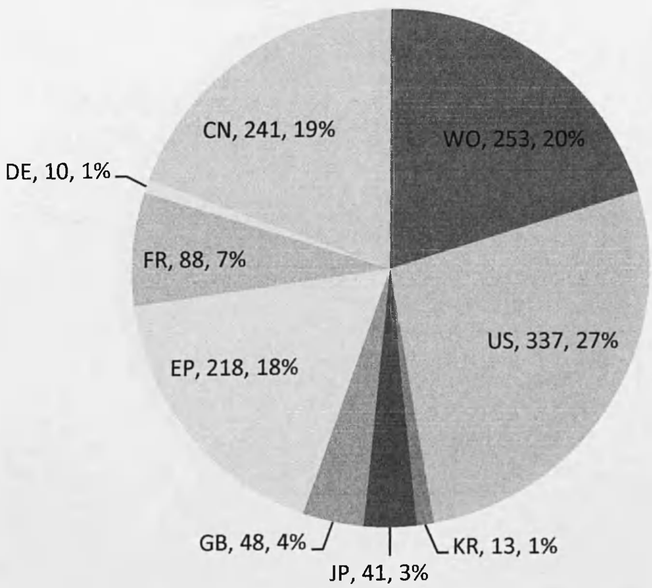


Chart Ten:Cassava/Manioc (Only)



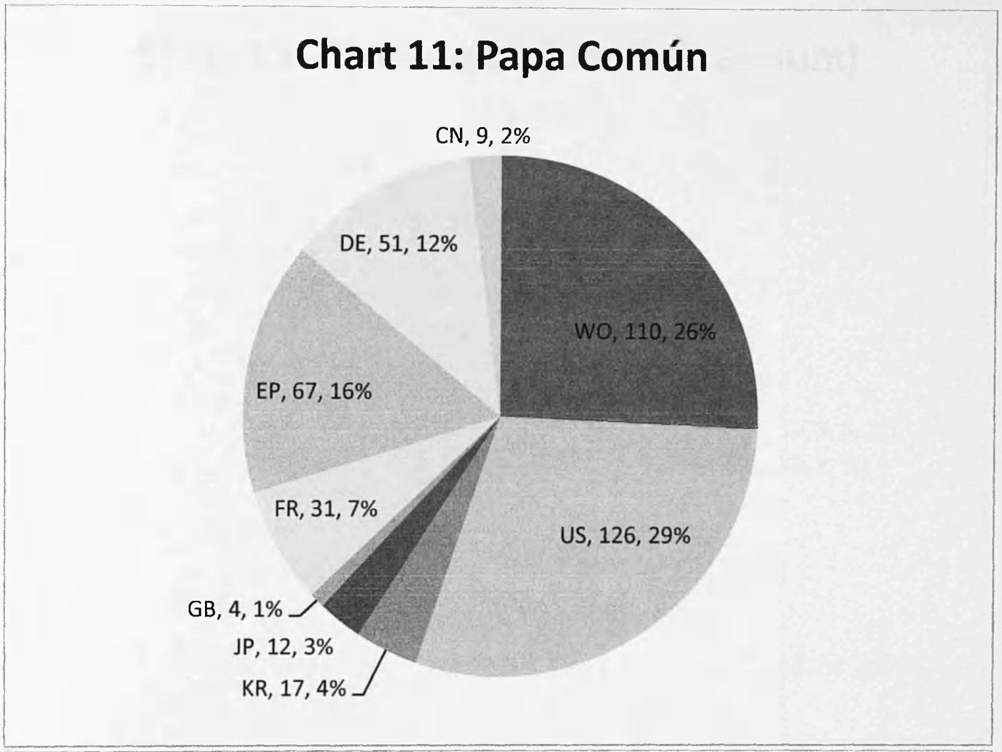


Chart 11: Papa Común
CN, 9, 2%
DE, 51, 12%
WO, 110, 26%
EP, 67, 16%
FR, 31, 7%
US, 126, 29%
GB, 4, 1%
JP, 12, 3%
KR, 17, 4%

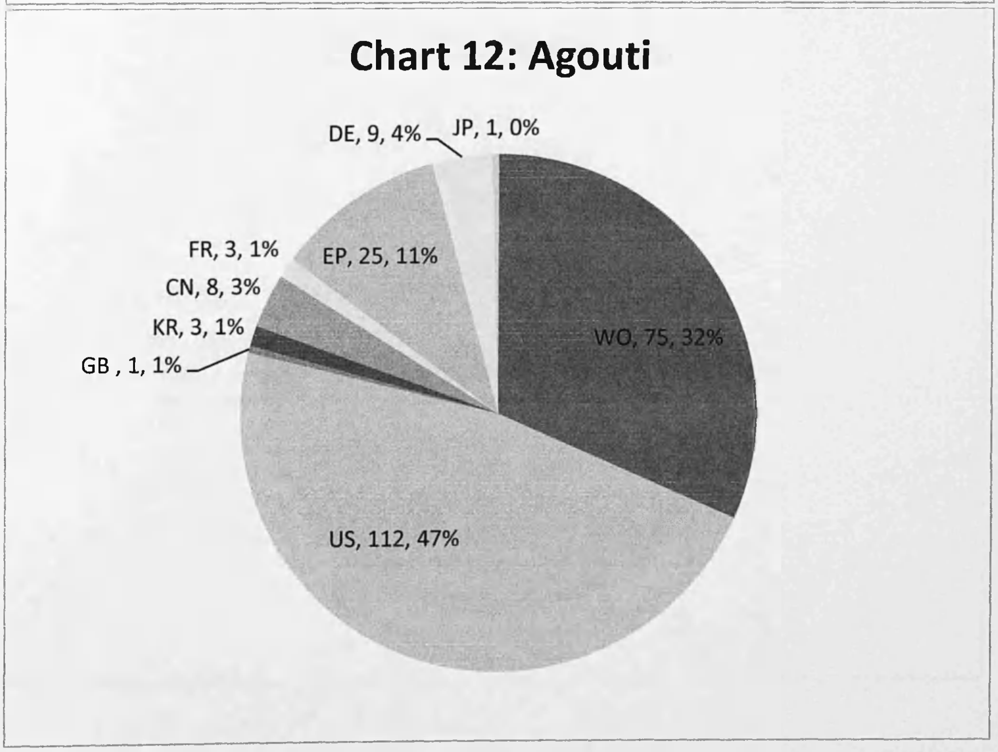


Chart 12: Agouti
DE, 9, 4%
JP, 1, 0%
FR, 3, 1%
EP, 25, 11%
CN, 8, 3%
KR, 3, 1%
WO, 75, 32%
GB , 1, 1%
US, 112, 47%

Chart 13: Ají (C. baccatum & C. annum)

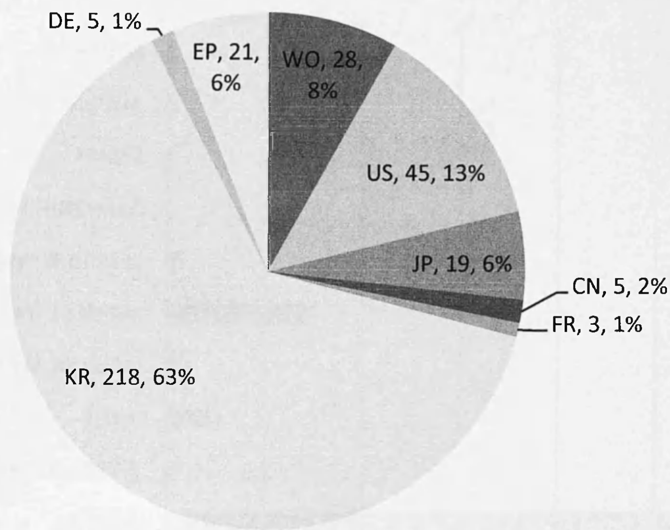
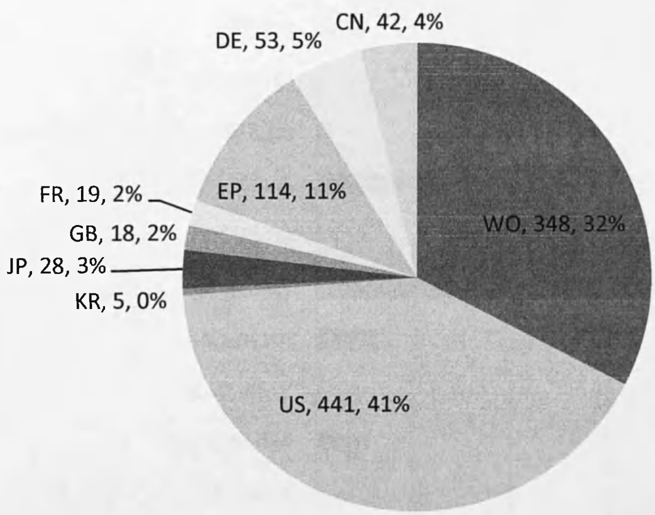


Chart 14: Zea mays



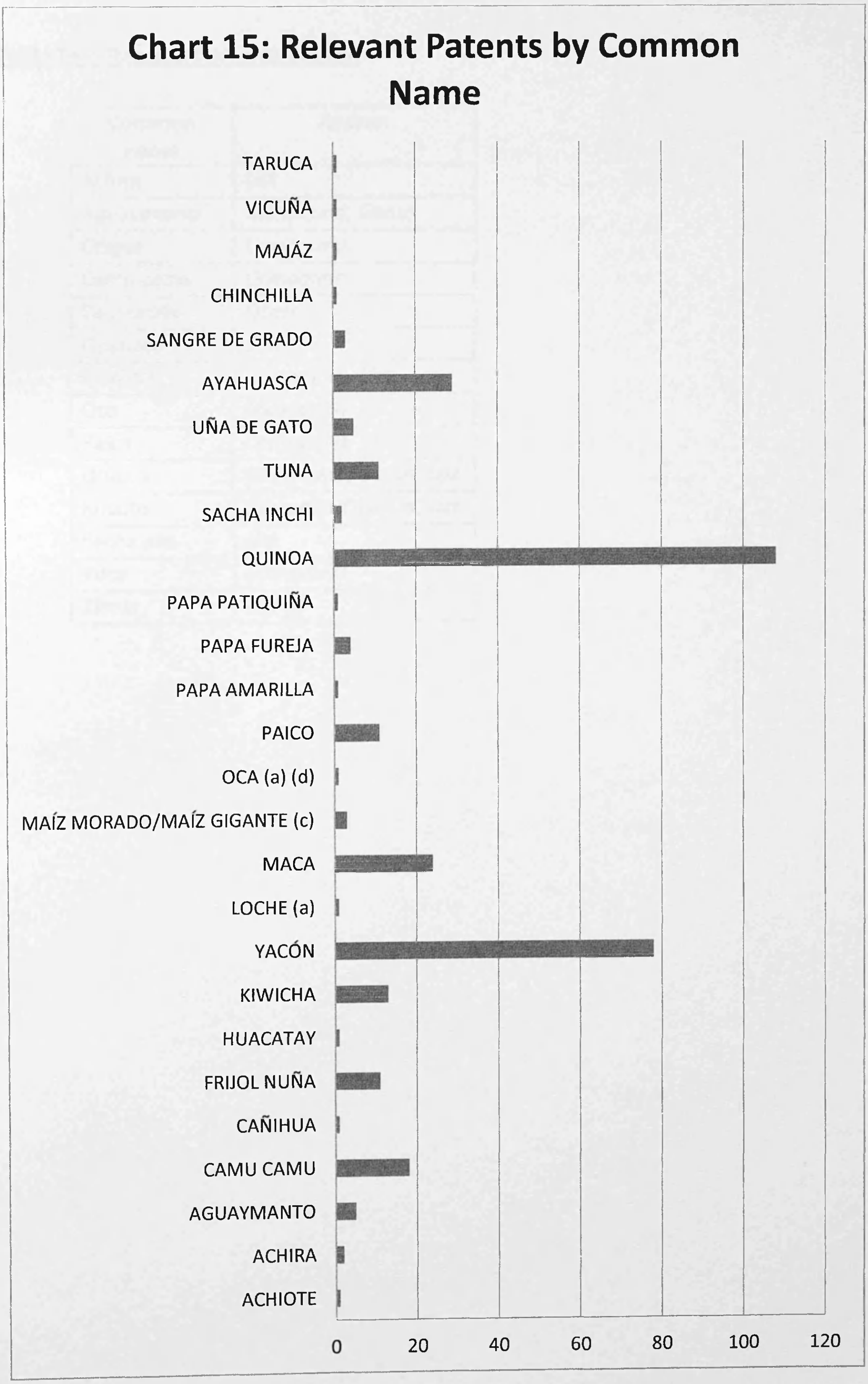


Chart 15: Relevant Patents by Common Name
TARUCA
VICUÑA
MAJÁZ
CHINCHILLA
SANGRE DE GRADO
AYAHUASCA
UÑA DE GATO
TUNA
SACHA INCHI
QUINOA
PAPA PATIQUIÑA
PAPA FUREJA
PAPA AMARILLA
PAICO
OCA (a) (d)
MAÍZ MORADO/MAÍZ GIGANTE (c)
MACA
LOCHE (a)
YACÓN
KIWICHA
HUACATAY
FRIJOL NUÑA
CAÑIHUA
CAMU CAMU
AGUAYMANTO
ACHIRA
ACHIOTE
0
20
40
60
80
100
120

Annexe 11

Table Ten: Reasons for non-Selection

Common name	*Reason*
Achira	*List*
Aguaymanto	*Compound, Genus*
Caigua	*Compound*
Camu camu	*Compound*
Casacarilla	*Other*
Guanaco	*Other*
Kiwicha	*Compound, List*
Oca	*Compound*
Paico	*Compound, List*
Quinoa	*Compound, Genus, List*
Rocoto	*Compound, Genus, List*
Sacha oca	*List*
Yuca	*Compound*
Zinnia	*Genus*

Annexe 12

Table 11: Selected Patents

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC Sub
ACHIOTE						
JP2005082561A	Cosmetic	2005-03-31	Broad KK | Tsujimo,K. Ota, T.	Ushima, H. Nitta, M. Tsujimo, I. K. Ota, T.	JP	A61K A61Q
AYAHUASCA (d)						
USPP5751P	Banisteriopsis caapi (cv) `Da Vine`	1986-06-17		Miller, L. S.	US	A01H
CANIHUA						
FR2910326B1	Utilisation in cosmetics of extract of Chenopoduim Palidicaule	2008-06-27	Societe Industrielle, Limousine d'application biologique Ditesilab Société par actions simplifiée	Paufique, J.	FR	A61K A61P A61Q
CAMU CAMU						
JP2004250375A	Compound method for producing the same and application thereof	2004-09-09	Nichrei Corp.	Nagamine, K. Hayashi, M. Yamazaki, K.	JP	A23L A61K A61P A61Q C07H C09K
JP03635081B2	A skin-whitening agent, an antioxidant, a collagenase-activity inhibitor, a hyaluronidase active inhibitor, anti-aging agent, skin external preparation, cosmetics, and food	2005-03-30	Nichirei, KK.	No Information	JP	A23L A61K A61P A61Q, C09K C12N
JP2006348013A	Composition and method for preventing fading	2006-12-28	Estate Chemical KK.	Takaoki, Y.	JP	A61K A61Q C09B C09K

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2009232718A	Packaged high brix fruit juice drink suppressed in light deterioration	2009-10-15	Ito En Ltd.	Takamiya K.K. Ito, T. Murata, E. Hama, K. I.	JP	A23L
JP2005253307A	Camu camu juice containing antioxidant for food	2005-09-22	MC Foodtech KK.	Endo, H. Ohashi, K. Ohata, K. I.	JP	A23L
CHINCHILLA						
US4548813A	Medicinal extract of thymus glands	24-01-1983	Lawson, R.L.	Lawson, R.L.	US	A61KA 61P
MAJAZ/TARUCA/ VICUNA						
WO2009016100A 1	Monomeric VHH domain derived from Anti VP6 Camelid antibodies, dimeric domain, immunisation method, rotavirus detection and composition, prevention and treatment method for rotavirus infections	2007-07-27	Inst. Nacional Technolgia Agropecuaria Algenex Alertnative Gene Expresson SL	Inst. Nacional Technolgia Agropecuari a Algenex Alertnative Gene Expresson SL	WO	C07K
HUACATAY						
US5662915A	Pesticide product derived from the plant Tagetes minuta	1997-09-02	Okioga, D. M. Rajamannan, A. H.	Okioga, D. M. Rajamannan , A. H.	US	A01N
LOCHE						
JP2009167119A	5α-Reductase inhibitor	2009-07-30	S Net KK.	Sato, H.I	JP	A61K A23L A61P
MACA						
US6267995B1	Extract of Lepidium meyenii roots for pharmaceutical applications	2001-07-31	Pure World Botanicals Inc.	Zheng, B.L. Kim, C. Hyung,C. Wolthoff, S. He, K. Rogers, L. Shao, Y Zheng, Q.Y.	US	A61K C07C

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2007230987A	Anti obestic agent	2007-09-13	Kinos KK.	Yazawa, K. Yamaguchi, K Ikeuchi, M. Takei S. Kino,T. Baba,H. Mori,C.	JP	A61K A23K A61P A23L
JP2005306754A	Testosterone increasing composition, testosterone increasing food, testosterone increasing skin care preparation for external use and testosterone increasing medicine	2005-11-04	Towa Corporation KK.	Ogawa, H. Matsuo, T.	JP	A23L A61K A61P
JP2009000039A	Method for producing dried Maca	2009-01-08	Kinos KK.	Takei, S. Kino, T. Baba, H. Mori, C.	JP	A23L A23B
WO2008153527A1	Gender specific herbal and mineral supplement drinks	2008-12-18	Supranatural LLC. Mower, C. Thomas, E. Brady, C. J.	Mower, C. Thomas, E. Brady, C .J.	WO	A23L
KR814133B1	Method for Maca Extracts with High Content of Macamide by using super critical Carbon dioxide extraction	2008-03-18	Pulmuone Holdings Co. Ltd. Naturalhouse Pulmuone Healthy Living Co. Ltd.	Lee, S.H. Kang, J.I Lee, S.Y. Byun, S.Y. Yeong, G.S.	KR	A23L
JP2004224784A	Esthetic clinic for infertility using Lepidium meyenii walp.	2004-08-12	Yamazaki, M	Yasumaki, M.	JP	A61K A61H A61P

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2008237117A	Anti-fatigue food raw material and anti-fatigue food	2008-10-09	Kinos, KK.	Gu, Z. Ikeuchi, M. Susa, T. Yazawa, K.	JP	A23L A61K A61P
US20080311253A1	Gender specific herbal and mineral drinks	2008-12-18	Sakura Prpoerties LLC	Mower, T.E. Brady, C. J.	US	A23L
US6093421A	Maca and antler for augmenting testosterone levels	2000-07-25	Biotics Research Corporation	DeLuca, D.L. Sparks, W.S. DeLuca, D.R.	US	A61K A23L A61P
EP1714635A1	Process for producing maca extract	2006-10-25	SUNTORY LIMITED	Kato, M. Suwa, Y. Fukui,Y. Sasayama, A. Matsumoto, T.	EP	A61K A23C A23G A23L A61P A61Q C12G
JP2009067763A	Agent for preventing or ameliorating hangover	2009-04-02	Tsujido, K.	Yamada, S.	JP	A61K A61P
JP2007290969A	Anti-stress composition	2007-11-08	Nippon Menaade Keshohin KK.	Watnabe, A. Kishi, M.	JP	A61K A23L A61P
JP2006206509A	Method for producing Maca extract	2006-08-10	Towa Corp. KK	Kuwababara ,H. Kanena, H.	JP	A61K A61P A23L
JP2007112782A	Estrogen increasing composition, estrogen increasing food, estrogen increasing medicament and progesterone increasing composition	2007-05-10	Towa Corp. KK.	Ogawa, H.	JP	A61K A61P A23L

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2004000171A	Functional food product containing Maca	2004-01-08	Towa Corp. KK.	Ogawa, H. Mitsunaga,T. Kawamura,Y.	JP	A23L
JP2006143664A	Improving agent of indefinite compliant accompanying with autonomic imbalance	2006-06-08	Nippon Menaade Keshohin KK.	Yamada, A. Shigeyu, Nasu, A. Iwata,Y.	JP	A61K A61P A23L
FR2885052A1	Utilisation of Maca extract to protect cutaneous microcirculation	2006-11-03	Laboratoire Nuxe Société anonyme	Leclerc, J.	FR	A61K A61P A61Q
WO2000051548A2	Compositions and methods for their preparation from Lepidium	2000-09-08	Pure World Botanicals Inc. Zheng, B. L. Kim, C. H. Wolthoff,S. He, K. Rogers, LL Shao,Y, Zheng,G. Qun, Y.	Zheng, B. L. Kim, C. H. Wolthoff, S. He, K. Rogers, LL Shao,Y, Zheng, G. Qun, Y.	WO	A61K C07C
KR2009117284A	Method for preparing Macamides using recycling preparative liquid chromatograph which can reduce used amount of organic solvent	2009-11-12	Pulmuone Holdings Co. Ltd. Naturalhouse | Pulmuone Healthy Living Co. Ltd. Natural House	Lee, S.H. Ha, H.C. Kang, J. I. Lee, S.Y.	KR	C07C C07B G01N
US20060147600A1	'Maca Blast' energy drink	2006-07-06		Gonzales, R. Pereyra, V.	US	A23L
WO2008012628A1	A preparation for infertility treatment	2008-01-31	Chieregati,A	Chieregati, A.	WO	A61K A61P

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2005281272A	Peripheral blood stream improving agent	2005-10-13	Suntory Ltd.	Koda, Y. Kiso, Y. Matsmoto, T.	JP	A61K A23G A23L A61P A61Q C12G
JP2006204210A	Composition containing Benzylglucosinolate method for improving taste and drink containing same.	2006-08-10	Towa Corp. KK.	Kuwabara, H. Kanenaga, H.	JP	A23L
FRIJOL NUÑA						
US20040154057 A1	Garden bean named '210944'	2004-08-05	Harris Moran Seed Company	Magnuson, D. S.	US	A01H
US20030163854 A1	Garden bean named '210104'	2003-08-28	Harris Moran Seed Company	Gehin, R.	US	A01H
US5894079A	Field bean cultivar named enola	1999-04-13	Proctor, L. M.	Proctor, L. M.	US	A01H
US20020056152 A1	DNA encoding for a disease resistance gene from common bean and methods of use	2002-05-09	Kelly, J.D. Melotto, Maeli, M.	Kelly, J.D. Melotto, M.	US	C07K C12N
US20020108150 A1	Garden bean named '208996'	2002-08-08	Harris Moran Seed Company	Magnuson, D. S.	US	A01H
WO2007071333 A2	Ethanol-precipitated phaseolus vulgaris extracts, their use and formulations	2009-01-07	Indena SpaA	Bombardelli ,E. Berlanda, D. Gardi, A. Bertani, M. Ponzone,C. Donzelli, F.	WO	A61K A23L
US6201170B1	Garden bean named '206999'	2001-03-13	Harris Moran Seed Company	Magnuson, D. S.	US	A01H
US6211444B1	Garden bean named '10417'	2001-04-03	Harris Moran Seed Company	Gehin, R. J.	US	A01H
US20040154058 A1	Garden bean named '211945'	2004-08-05	Harris Moran Seed Company	Magnuson, D. S.	US	A01H
US4769512A	Bean plant having low pod detachment force	1988-09-06	NPI Seed Inc.	Schulbach, R.	US	A01H

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
WO1999011115 A1	Bean-nut popping beans	1999-03-11	Appropriate Engineering and Manufacturing	Ehlers, J.D. Sterner, M.H.	WO	A01H
PAICO						
US20030091657 A1	Plant acaricidal compositions and method using same	2003-05-15	Chiasson, H.	Chiasson, H.	US	A01N A01P
CN101518251A	A pesticide synergistic agent	2009-09-02	Fujian Academy of Agricultural Sciences (Research Institute for Plant Protection)	Wei,H. Zhan, Z. Wu, W. Zhao, J. Huang,Y.	CN	A01N A01P
US20030082250 A1	Treatment for cancer	2003-05-01	Hall L.	Hall, L.	US	A23F A61K
EP1982705A1	Pharmaceutical composition containing chenopodium ambrosioides extract and its preparation, process and application	2008-10-22	Tianjin, T. Pharma. Co. Ltd.	Wei, F. Ye, Z. Gau, J. Luo, C. Li, D. Chen, J. Zhu, Y. Xiong, J. Zheng, X. Zhang,G. Zhao, Y.	EP	A61K A61P
PAPA FUREJA						
JP2003026947A	Method for simultaneous preparation of anthocyanin dye and dye - containing powder from anthocyanin dye-containing potato	2003-01-29	National Agriculture and Food Research Organisation, Wada Sugar Refining Co. Ltd., Nichinou, Kagaaku, Kogyo	Oda, Y. Yamauchi, H. Endo, C. Mori, M. Takada, A. Oka, Y. Hayashi, K. Tezuka, T. Shiina, R.	JP	C09B
JP2006169125A	Apoptosis inducing sustance contained in carotenoid-containing potato,potato raw material and processed article	2006-06-29	National Agriculture and Food Research Organisation, Wada Sugar Refining Co. Ltd.	Himaari, H. Mori, M. Kobyashi, A. Takada, A. Tsuda, S. Endo, C. Takiiga, S. Hayashi, K.	JP	A61K A23L A61P

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2006045130A	Hepatopathy inhibitor, food and drink containing the hepatopathy inhibitor, and fodder containing the same	2006-02-16	National Agriculture and Bio-oriented research Organisation, Obihiro, University of Agriculture and Veterinary Medicine	Noda, T. Takiga, S. Tsuda, S. Chiji, H. Fukushima, M. Shimada, K. Hashimoto, M. Kan, K.	JP	A61K A23K A23L A61P
PAPA FUREJA /AMARILLA/PATIQUINA						
EP913081A1	Method of producing a mini-potato	1999-05-06	President of Kobe University	Hosaka, K. Kishimoto, K. Kuge, S. Hashizume, H.	EP	A01H
MAIZES						
US6277418B1	Corn extract contraceptive	1999-05-14	Baylor College Medicine	Baylor College Medicine	US	A61P A61K
US20080155717A	Polycomb genes from Maize - MEZ1 and MEZ2	2008-01-13	University of Minesota, Wisconsin Alumini Res. Found.	Helentjaris, T.G. Springer, N.A. Kaeppler,S. M. Phillips, R.L. University of Minesota, Wisconsin Alumini Res. Found.	US	A01H
WO2003072121A1	Antiobestic or antidiabetic agent containing cyanidin 3-glucoside as active ingredient	2003-09-04	San-EI Gen F.F.I. Inc.	Tsuda, T.	WO	A61PA61K
QUINOA						
FR2628298A1	Quinoa based dietary food prods.-is milk obtd. by dispersing Quinoa flour in water	1989-09-15	Giacometi, S Soquet, E. Tareb, M.	Giacometi, S Soquet, E. Tareb, M.	FR	A21D A23B A23C A23L

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
WO1993014624 A1	Cytoplasmic male sterile Quinoa	1993-08-05	Ward, S.M. Johnson, D.L.	Ward, S.M. Johnson, D.L.	WO	A01H
FR2905861A1	Utilisation d'un extract of Quinoa comme actif preveenant la formation de nouvelles grains dans le corps humain	2008-03-21	Societe d'Exploitation de produits pour les Industries Chimiques, Seppic Société anonyme	Garcia, C. Stoltz, C.	FR	A61K A61P A61Q
WO2009042998 A1	Quinoa Protein concentrate production and functionality	2009-04-02	Colarado State University Research Foundation. Scanlin, L.A. Stone, M. B. Burnett, C.	Scanlin, L.A. Stone, M.B. Burnett, C.	WO	A23J C07K
WO1996003998 A1	Quinoa Saponin compositions and methods of use	1996-02-15	University of Saskatchewan	Estrada, A. Redmond, M.J. Laarveld, B.	WO	A61K A61P
SACHA INCHI						
FR2880278A1	Utilisation d' huile et de proteins extradites de grains de pluckenetia volubilis linneo dans des preparations cosmetiques, dermatologiques et Nutraeutiques	2006-07-07	Greentech, S.A.	Berthon, J.Y;	FR	A61K A61P A61Q

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
WO2006048158 A1	An extract of a plant belonging to the genus plukentia volubilis and its cosmetic use.	2006-05-11	Cognis, France. SA..	Moser, P. Freis, O. Gillon, V. Danoux, L.	WO	A61K A61Q
SANGRE DE GRADO						
US7208183B2	Methods and preparations of the latex from the croton species	2007-04-24	Bobrowski, P.J.	Bobrowski, P. J.	US	A61K
US7323195B2	Enteric formulations of proanthocyanidin polymer antidiarroheal compositions	2008-01-29	Napo Pharma. Inc	Rozon E. J. Khandwala, A.S. Sabouni, A.	US	C07D A61KA 61P
WO1992006695 A1	Proanthocyanidin polymers having anti viral activity and methods of obtaining same	1992-04-30	PS Pharm. Shaman Pharma. Inc.	Tempesta, M.S.	WO	A61KA 61PC0 7D
TUNA						
WO2008038849 A1	Pharmaceutical composition comprising extract from Opuntia Ficus-Indica	2008-04-03	Korea Institute of Science and Technology	Jin, C. Lee, Y. Kim, H.J. Jung, S.Y. Cho, J.	WO	A61K A61P
KR831354B1	Method for exterminating watermould and fish pathogenic bacteria in fishes	2008-05-28	Republic of Korea	Jee, B. Jung, S.H. Kim, J.W. Seo, J. S.	KR	A01N

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
KR2008029370 A	Pharmaceutical composition for preventing and treating neurological brain diseases, cerebrovascular diseases and cardiovascular diseases comprising a Butanol extract of Opuntia Ficus-Indica or an acid hydrolysate thereof	2008-04-03	Korea Institute of Science and Technology	Jin, C. Lee, Y. S. Kim, H. J. Jung, S. Y. Cho, J.	KR	A61K A61P
US20090285922 A1	Bakery products and pasta capable to reduce body weight and plasma cholesterol, lipids and glucose.	2009-11-19		Cornelli, U.	US	A61K A21D
KR951455B1	Method for manufacturing noodles containing and Opuntia Ficus-Indica having superior functionality	2010-04-07	Yim, T.I. Yang, S.B. Lee,M. Knu-Industry Co-operation Foundation.	Lee, M. Lee, H.Y. Kwoun, M.C Kim, C. Yim, T. I. Yang, S.B. Lee, M. S. Choi, Y.B.	KR	A23L
KR963643B1	Composition containing alcohol extract of Opuntia ficus-indica Var. Saboten seed or compound isolated from the extract for preventing and treating hepatotoxic	2010-06-15	Korea Institute of Science and Technology	Jin, C.B. Kim, H.J. Lee, Y.S. Jung, S.Y.	KR	A61KA 61P
JP2009263254A	Skin whitening agent	2009-11-12	Toyo Shinyaku Co. Ltd.	Nukada, Y. Adachi, N.	JP	A61K A23L A61Q

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
US20050255215 A1	Compositions containing a nopal cactus isolate and method for making same	2005-11-17		Agarwala, O. Agarwala, C. Amato, T.	US	A61K A01K A23F A23L
FR2894828A1	Nouvelles composition cometique et/ou dermatologique sa base de derives de la prolin et leurs utilisations	2007-06-22	Grimaud, J.A. Texinfine Innovat.	Grimaud, J.A. Gutierrez, G Serrar, M.	FR	A61K A61P A61Q
UÑA DE GATO						
JP2005021122A	Functional food containing Cat's-claw	2005-01-27	Towa Corp.	Ogawa. H.	JP	A23L A61K A61P
WO2008074979 A1	Oral health composition comprising Uncaria Tomentosa	2008-06-26	Mars UK. Ltd. Marshall-Jones, Z. Bailloon, M.L. Buckley, C.	Marshall-Jones, Z. Bailloon, M.L. Buckley, C.	WO	A61K A61Q
WO1982001130 A1	Composition allowing for modifying the growth of living cells, preparation and utilisation of such	1982-04-15	Keplinger, K.	Keplinger, K	WO	A61K C07G
EP219491A1	Oxindole alkaloids with properties stimulating the immune system and preparations containing them	1987-04-29	Keplinger, K.	Wagner, H. Kreutzkamp, B.	EP	C07D A61K A61P

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
FR2824270A1	Uilisation of extract of Liane uncaria tomentosa comme principe actif lipolytique ou aminicissant	2002-11-08	Coletica Société anonyme	Rival, D. De Greieve, V. Perrier, E.	FR	A61P
YACON (SELECTED)						
JP2006273755A	Testosterone-5α;-Reductase inhibitor	2006-10-12	Nippon, Menaade, Keshohin, KK.	Osumi, K. Mizutani, E.	JP	A61K A61P A61Q
JP2007230973A	Composition having anticancer activity action	2007-09-13	Kagawa University, Kagawa Industry Support Foundation, Sanuki, Engyo, KK.	Tamura, H. Armando, T.Q. Oji, K. Ishikawa, M. Takashima, K.	JP	A61K A23K A23L A61P C07D
JP2003299460A	Green yacón powder and method for producing same	2003-10-21	Mitsui Herupu KK. Sanuki Engyo KK. Ikeda Shokken KK.	Watanabe, H. Fukunaga, T. Takashim, K. Yamaguchi, S. Aoi,Y.	JP	A23L
CN101057697A	A smallanthus sonchifolius fruit vinegar and its making method	2007-10-24	Chen, J. L.	Chen, J. L.	CN	A23L C12J
JP2003299466A	Powdered drink and method of production of the same	2003-10-21	Mitsui Herupu KK.	Watanabe, Y. Fukunaga, T. Watanabe, H.	JP	A23L

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2004173684A	Yacón tuber chip and method for production of the same	2004-06-24	Ishijima, S.	Ishijima, S.	JP	A23L
KR2009074838 A	Yacón fermented drink and a preparation method thereof, capable of showing diabetes prevention	2009-07-08	Kim, K. B.	Kim, K. B.	KR	A23L
KR2009022304 A	Method for preparing a health beverage using a Yacón (polymniasonchifolia) having an effect of preventing an adult disease	2009-03-04	Da Sin Manufactured Medicine Inc.	Byeon, B.S. Kim, J.C. Hanatani, N.	KR	A23L
US20090280203 A1	Compositions of atomized or lyophilized maca (Lepidium meyenii) extracts and atomized or lyophilized yacón (Smallanthus sanchifolius) extracts as adjuvants in the treatment of different conditions	2009-11-12	Universidad Peruana Cayetana	Gonzales Rengifo, G.F. Gonzales Arimborgo, C. J.	US	A61K
CN101028026A	A preparation method of preserved yacón fruit	2007-09-05	South China Science and Technology University	Geng, Y. Li, G.	CN	A23G A23L
JP2006273756A	Ceramide synthesis accelerator, collagenase inhibitor and collagen synthesis accelarator	2006-10-12	Nippon Menaade, Keshohin KK.	Osumi, K. Tanaka, H. Okamoto, Y.	JP	A61K A61P A61Q
JP2009045032A	Smallanthus sonchifolius jam of preserve style and method for production of same.	2009-03-05	Kato, A.I.	Kato, A.I.	JP	A23L
JP2005176796A	Method for production of squeezed liquid Yacón	2005-07-07	Ishijima, S.	Ishijima, S.	JP	A23L A61K A61P C01B

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
JP2007230989A	Endurance enhancing and anti fatigue agent	2007-09-13	Kinos, KK.	Yazawa, K. Yamaguchi, K. Ihara, A. Takei, S. Kino, T. Baba, H.	JP	A61K A23K A23L A61P
JP2009089623A	Method and apparatus for producing Ethanol from Yacón.	2009-04-30	Aoto, T.	Aoto, T.	JP	C12P C12M
KR879226B1	A Functional Tea Bag Made By Yacón and Cereal	2009-01-16	Industry-Academy Cooperation Corps of Sunchon National University	Shin Dong, Y. Cho Yun, S.	KR	A23F A23L
JP2007186427A	Fat cell differentiation inhibitor	2007-07-26	Nippon Menaade, Keshohin KK	Matsumura, K. Osumi, K. Kishi, M.	JP	A61K A23L A61P
JP2003225050A	Dried Yacón and method of producing same.	2003-08-12	Mitsui, Herupu. KK.	Watanabe,H. Fukunaga,T. Hashimoto, H	JP	A23L A23B
JP2006191917A	Mixed powder given by using Cauline leaf part and tuberous root part of Yacón as raw material, method for producing the same, and pill or tablet obtained from the same	2006-07-27	Mitsui, Herupu. KK. Lee, C.H. Ko, S.	Watanabe,Y. Lee, S. Ko, S.	JP	A23L A23B
JP2006070140A	Yacón containing soap	2006-03-16	Ishiguro, M.	Ishiguro, M.	JP	C11D A61K A61Q

Publication Number	Title (Original)	Publication Date	Assignee - Original	Inventor - Original	Cou-ntry	IPC (Sub)
CN1907049A	Yacón milk and its preparing craftwork	2007-02-07	Liu, Y.	Liu, Y.	CN	A23C A61K
CN101225042A	Yacón diterpenoid acid compound, medicine composition, preparation method and application of preparing medicine for treating diabetes	2008-07-23	Zhenao Group Stock Co. Ltd.	Dou, D. Qiu, Y. Kang, T. Xiang, Z. Dong, F.	CN	C07C A61K A61P