
Colonial Encounters in Postcolonial Contexts

Patenting Indigenous DNA and the Human Genome Diversity Project

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Abstract ■ The Human Genome Diversity Project (HGDP) has raised some significant ethical and methodological issues for anthropologists, particularly in light of the recent patenting of a cell-line from a Papua New Guinea man. Through a discussion of the HGDP, this article explores the 'locatedness' of the anthropologist in light of two significant trends: the globalization of the economy (particularly in the areas of intellectual property rights and biotechnology patents) and the creation of a new global context for political activism. The article concludes by discussing the concept of 'collaboration' as a politically-embedded practice that has become critical to the pursuit of contemporary anthropological knowledge.

Keywords ■ anthropological ethics ■ ethnographic practice ■ genetic anthropology ■ globalization ■ indigenous politics ■ political economy

Introduction

That scientists might be unaware of the implications of their work does not make them any less mediators or marketeers of political ideas; for many this is a studied innocence. We need to appreciate better the contingencies of scientific knowledge, and especially what is foregone in the choice of one particular course over another. This is why the political history of science asks: Why do we know this and not that? Who gains from knowledge of this and not that? (Schiebinger, 1993: 8–9)

Straddling the boundary between the sciences and humanities, anthropology is self-consciously responsible to both intellectual traditions and to its objects of study. However intellectually schismatic the field of anthropology is today, the HGDP presents ideological concerns to all contemporary practitioners. Can the HGDP afford to undertake colonial science in a postcolonial world?

Can anthropology afford to be represented by the HGDP if it does? (Marks, 1995a)

In this article, I examine how the Human Genome Diversity Project (HGDP) – a project which aspires to document human genetic diversity by extracting and studying blood and tissue samples from indigenous populations – has raised some significant ethical, conceptual and methodological issues for anthropologists. In 1992, shortly after the commencement of the HGDP, the project became the target of vociferous opposition and was renamed by many indigenous organizations as the ‘Vampire Project’. Because several anthropologists are involved with the HGDP, the controversy surrounding the project has had implications not only for the field of anthropology in general, but also specifically for archaeologists, social-cultural anthropologists and biological anthropologists working with indigenous populations. The 14 March 1995 patenting of a cell line from a Hagahai man from Papua New Guinea not only fuelled the flames of discord between the HGDP and its opponents, but also gave the controversy new impetus.

The following pages discuss the changing nature of the anthropological encounter through a discussion of the Papua New Guinea patent and the HGDP. Specifically, I explore the political-economic context for both the PNG patent and the HGDP by briefly outlining some of the significant economic developments underlying current genetic research, namely its contemporary commercialization and globalization. I also analyze aspects of the exchange between HGDP scientists and opponents, focusing on the implications of this dialogue as an anthropological encounter. In the final section of this article, I discuss the ‘global locatedness’ of contemporary anthropological research and problematize the concept of ‘collaboration’ as both an anthropological research tool and a politically embedded practice that has become critical to the pursuit of anthropological knowledge.

Ethnographic Knowledge and Issues of Location

The enmity surrounding the Diversity Project, and its disputed connection to the recent Papua New Guinea (PNG) patent (withdrawn in 1996),¹ calls into question, yet again, the relationship between anthropological research and systems of power. Critical reflection on power and the production of ethnographic knowledge, of course, is not new to anthropology. Since at least the early 1970s, when several anthropologists began to reflect on colonialism and anthropology (Nash, 1975; Stocking, 1983), the concept of the anthropologist as a ‘located subject’ has received sustained attention in the discipline’s deconstruction of the ethnographic process.² For many anthropologists, it has been the publication of classics in this genre such as Maquet’s ‘Objectivity in Anthropology’ (1964), Asad’s *Anthropology and the Colonial Encounter* (1973) and Hymes’s *Reinventing Anthropology* (1972) that

have challenged and in many respects recast the practice of anthropological research by not only countering notions of an objective social scientist, but also, perhaps more importantly, forcing anthropologists to deconstruct their 'locatedness' in terms of political economy.

As this article intimates, however, the task of delineating the 'locatedness' of the anthropologist perdures, and anthropologists from all the sub-disciplines have continued to confront issues of locatedness within shifting configurations of political-economic power. Nowhere has this struggle with locatedness been more apparent among anthropologists than those working with indigenous populations. Virtually all anthropologists working with indigenous communities over the last 20 or so years have had to confront significant issues of locatedness: archaeologists with the repatriation of native skeletal remains and cultural artifacts and social-cultural anthropologists with access to native communities. As the Diversity Project controversy and the PNG patent reveals, biological anthropologists too are increasingly being drawn into political contexts in which the collection of biological data has become a politically embedded practice constitutive of larger relationships of power.

It is not my intention here, however, as a social-cultural anthropologist, to suggest that the Diversity Project controversy is germane only to biological anthropologists, nor to imply that HGDP's public relations problems are representative of genetic anthropology, itself a rather diverse field (see Marks, 1995b). Rather, the perspective adopted here suggests that the HGDP is an important case study relevant to all types of anthropologists, not only because it represents an opportunity to continue in the tradition of a reflexive anthropology, but also because, perhaps more importantly, it demonstrates how international economic trends are creating and cementing new global economies, and how these in turn are problematizing anthropological research vis-a-vis indigenous populations.

The contemporary political-economic context which challenges both the work and locatedness of archaeologists, social-cultural and biological anthropologists is, I suggest, characterized by two distinct trends, both of which I explore in relation to the HGDP and the PNG patent.

The first trend, the globalization of the economy (under the hegemony of a neo-liberal agenda), points to the changing context of political-economic power in which anthropological research is conducted. Global political-economic trends have significantly restructured the global flow of cultural, intellectual and natural resources, thereby reconstituting relationships between anthropologists and field subjects. While this restructuring of the global economy reflects an ongoing historical process several centuries old, new developments within global capitalism, particularly in the areas of intellectual property rights and biotechnology patents, have profound implications for the movement and control of both cultural and material knowledge. Anthropologists who collect and analyze either ethnographic knowledge or material artifacts thus find themselves ensconced in

a larger political economy directing the flow of these resources in specific ways. This article examines how global commercial trends as well as multi-lateral and bilateral trade accords cementing the new global economy (such as the GATT) have problematized not only the specific anthropological goals of the Diversity Project, but also anthropological research vis-a-vis indigenous populations in general.

A second trend is the recognition of a new political context for anthropological self-critique. While the first volumes on anthropology and the colonial encounter were produced largely through an 'internal audit,' i.e. by anthropologists themselves, and were read largely by other anthropologists, current criticism of the field has newly *politicizing* participants: namely, indigenous organizations themselves and a growing network of advocacy groups active on behalf of indigenous rights. Although some anthropologists have collaborated with indigenous groups through organizations such as Cultural Survival, the International Working Group on Indigenous Affairs, Survival International and the Anthropology Resource Center, critiques from indigenous constituencies have remained largely peripheral to the field. Indigenous groups, for example, have not traditionally participated in academic conferences, responses to anthropological research by field subjects generally have not been published, and indigenous representation in anthropology faculties remains modest to say the least. The indigenous critique of the anthropological encounter, however, has a new political context which includes novel forms of political activism. This politicization has developed largely owing to the growth of new communication technologies and the emergence of new political spaces within an international milieu. Indigenous groups now have access to both new forms of political organization and new technological resources for disseminating opinions and agendas. The ongoing critique of anthropology, then, as a 'colonial encounter' is no longer confined simply to an academic arena. Anthropologists now find themselves negotiating not only the goals and execution of their studies, but also their own political identities with increasingly sophisticated, politicized and internationalized 'research subjects'.

I explore these issues below by briefly recounting the development of the HGDP, the PNG patent and the ensuing response of indigenous organizations and advocacy groups to the announcement of the project. This historical material consequently forms the basis of my more substantial exploration of genetic research as not only a 'colonial encounter' but also as a new challenge to the practice of a postcolonial anthropology.

The Politicization of Genetic Research: The Human Genome Diversity Project

In 1992 the Human Genome Diversity Project was formed as a consortium of mainly molecular biologists and biological anthropologists who

proposed to study human genetic diversity by collecting DNA samples from indigenous populations around the world. The HGDP had its provenance in a letter published in the journal *Genomics* (11: 490–1). The project's principal figures – geneticists Luca Cavalli-Sforza, Mary-Claire King, Charles Cantor, R.M. Cook-Deegan, the late Allan Wilson and population geneticist Kenneth Kidd – were critical of a multi-billion dollar project launched in the United States in October 1990 called the Human Genome Project (HGP) (see Roberts, 1989, 1991b). Sponsored by the National Institute of Health (NIH) and the Department of Energy (DOE), the HGP proposed to chart the roughly 100,000 genes that make up the human genome. The authors of the letter argued that the HGP was flawed because it was confining its genetic sampling to largely white, northern populations, thereby betraying an ethnocentric bias by being too narrowly focused on Anglo-European populations. Seeking to correct this, the authors felt that a broader sampling of ethnic populations would not only better the project's goal to combat common human diseases, but also enable anthropological efforts to reconstruct the story of human evolution and explore issues of human adaptation (see Kidd et al., 1993). In the letter to *Genomics*, Cavalli-Sforza, Cook-Deegan and Wilson asked researchers worldwide to collect DNA samples from indigenous populations and establish a genetic database before these populations became extinct (Ross, 1993: 17). Their plan was to have researchers extract blood samples from 25 individuals in each population and have them preserved in permanent cell lines for further research and study (Lock, 1994: 603).

In the year following the *Genomics* letter, the HGDP established an International Executive Committee along with two standing committees (one on ethics and the other on informatics) and the HGDP International Executive began to encourage member countries to establish regional committees.³ The North American Executive Committee of the HGDP was among the first regional boards to form and its original 13-member directorate consisted of anthropologists, geneticists, and a law school professor and a sociologist.

One of the first tasks of the HGDP was to establish a list of ethnic populations which would make logical subjects of genetic research. Consequently, in October 1992, HGDP geneticists, anthropologists and linguists gathered at Pennsylvania State University and identified 722 indigenous populations from around the world that they believed constituted highly desirable candidates for genetic study.

Trouble, however, quickly followed the creation of this list when the HGDP released it to the Rural Advancement Foundation International (RAFI), a Canadian-based NGO which had for its 20-year history forcefully opposed the commercial exploitation of Third World plant and animal resources. RAFI's adverse reaction to the list was immediate and marked. While HGDP proponents considered the indigenous populations mentioned in the list to be 'genetically distinct', critics observed that those listed

were also peoples who had suffered any one of a number of social ills at the hands of Western colonialism. Many of the groups on the list had been colonized or enslaved, pushed off their lands and forced onto reservations. Others had been virtually wiped out by diseases introduced into their communities by Europeans. Others still had been exposed to nuclear weapons testing on their homelands by colonial powers and were, in some cases, the only surviving members of their traditional societies. In short, according to critics, the HGDP list was also an amazingly comprehensive record of victims of so-called Western 'progress'.

Information about the HGDP list, communicated largely via the Internet and through RAFI's electronic communiqués (see RAFI, 1993, 1994a, 1994b), created a stir among indigenous coalitions and NGOs dedicated to indigenous rights. Several coalitions, upon receiving the list, consequently decided that the HGDP was yet another manifestation of First World exploitation, in this case a collaboration of scientists who were intent upon 'mining' indigenous communities for raw materials which now included their DNA (see Harry, 1994). Between 1992 and 1995, RAFI and several other groups began to publicize information on patent applications developed from indigenous samples.⁴ Then, in October 1995, RAFI discovered that a patent on a cell line from an indigenous man from Papua New Guinea had been granted to the US government several months earlier.

The PNG Patent

First, how did the PNG patent come about?

In the mid-1980s a census and research team ventured into north-central Papua New Guinea to establish contact with the Hagahai, a hunter-gatherer people who had recently been reduced by disease to a group of roughly 300. Carol Jenkins, a medical anthropologist affiliated with the PNG Institute of Medical Research (IMR), a statutory body of the PNG government, joined the team and visited the Hagahai five times between 1985 and 1986 in order to investigate the causes underlying the Hagahai's decline and document the consequences of outside contact for their biological and cultural survival (Jenkins, 1987: 413). Jenkins, funded by the US National Geographic Society, collected ethnographic, demographic, linguistic and nutritional information on the Hagahai, and had blood samples drawn from roughly 25 Hagahai individuals. Her research revealed some alarming health trends among the Hagahai who showed pronounced incidences of *tinea imbricata*, upper respiratory infections, malaria, splenomegally, ulcers, severe otitis media, scabies, dysentery, conjunctivitis and chronic colds (Jenkins, 1987: 418–19). Moreover, Jenkins discovered that a high number of Hagahai were infected carriers of hepatitis – a discovery that did not bode well for the future of the Hagahai. She concluded her research with a compelling and compassionate summary of the Hagahai's prospects and her hopes for an improved future:

The Hagahai appear to be in the process of demographic decline often seen in the early contact period and documented here before in Papua New Guinea. . . . Whether the Hagahai decline is reversible depends a great deal on the quality of health care made available to them, including the administration of the currently very expensive hepatitis B vaccine. In addition, psychosocial responses to rapid deculturation are likely to play a part in their ultimate survival. The author's intention to monitor and promote improvement in their health status will, hopefully, alter the course of their future and aid their adaptation to the inevitable modernization of their biology and culture. (Jenkins, 1987: 428)

During a 1987 laboratory analysis of the blood samples in Australia, however, it became evident that the Hagahai were not only a culturally isolated people suffering the devastating consequences of cultural contact, but also possessed some genetically distinct traits: researchers discovered that the Hagahai were among a small group of indigenous groups infected with a variant of a T-cell leukemia lymphoma virus (called HTLV-1). (Usually the virus produces a severe form of leukemia, but the variant virus in the Hagahai is benign.) Consequently, the thymus lymphocytes (T-cells) were separated from the blood, maintained in a culture and sent to NIH labs near Washington, DC where they offered scientists a chance to better understand how the human body generates an immune response to leukemia-associated diseases.

On 24 August 1990, however, the research on the Hagahai samples took a commercial direction when the US government filed for a patent on a cell line derived from a healthy, 20-year-old Hagahai male. The incentive for the patent, it appears, was the commercial possibility (potentially millions of dollars) of developing HTLV-related diagnostic tests as well as vaccines. Then, on 14 March 1995, the US government obtained a patent on the cell line.⁵

When the public became aware of the PNG patent several months later, indigenous groups, political activists, religious leaders and academics from different disciplines began to condemn it. While for some groups the condemnation included a denunciation of the patenting of human biological products in general, for others it reflected special concern over the possible exploitation of indigenous populations in genetic research – especially those groups designated as 'genetically unique' or 'genetically endangered' (i.e. susceptible to extinction or genetic assimilation). The Hagahai patent, compounding the concerns of those critical of the HGDP, seemed to be confirmation of the new form of colonialism so many human rights activists feared – a colonialism in which wealthy corporate interests (aligned with powerful national governments) sought to control the very molecular basis of life by exploiting the most vulnerable and poorest members of the human family.

Molecular biologists, the US government (as the holder of the PNG patent) and northern pharmaceutical companies soon became targets of

this protest (see RAFI, 1996a) – but they were not the only ones. The role of a medical anthropologist in the Hagahai research and patent – Jenkins was one of the inventors listed on the PNG patent – engendered a kind of controversy around the discipline of anthropology that, although not new to the field, evoked some serious concerns. Consequently, indigenous groups have not only raised questions about the humanitarian objectives of the Hagahai project, but also more serious queries about the discipline of anthropology itself and the connection of biological anthropologists to the commercialization of indigenous DNA.⁶

While the blood samples involved in the PNG patent were not drawn under the auspices of the HGDP, at least one prominent biological anthropologist, also active in Papua New Guinea and the Solomons, had a connection to the HGDP. While director of the Physical Program at the National Science Foundation, Jonathan Friedlaender had strongly supported the formation of the HGDP. For groups opposed to the HGDP, Friedlaender became the ‘missing link’, as it were, between the HGDP and the patenting of indigenous DNA for commercial profit.⁷ HGDP scientists, particularly those who had spearheaded the project, thus found themselves in the midst of an ugly political controversy in which opponents had connected them to exploitative pharmaceutical and biotech interests.⁸

The Controversy within Anthropology

Indigenous groups and NGOs were not, however, the only ones disturbed by the creation of the HGDP and the increasing role indigenous populations were assuming in commercial genetic research (see Roberts, 1992a, 1992b). While the scientific objectives and methodology of the project received criticism from several anthropologists (see, for example, Marks, 1995a), other anthropologists were concerned about the ‘colonial’ flavor of the endeavor (Goodman, 1996; Lock, 1997: 231–4).⁹

First, HGDP scientists seemed concerned that the listed populations were rapidly going extinct and that the time for obtaining blood samples was limited. They did not, however, express any explicit concern over why these populations were going extinct or what might be done to prevent this. Such an attitude suggested that the HGDP, despite its scientific merits, was nevertheless based in an acquisitive ideology that objectified the ‘primitive’ as an exotic and rare source of knowledge that had to be quickly tapped before it vanished.

Second, several anthropologists – many of them influenced by social-cultural critiques of colonialism – felt uncomfortable with the more subtle implication in HGDP discourse that indigenous populations somehow held the key to understanding human evolution. Again, the indigenous populations named by the Diversity Project were treated too much like the 19th-century anthropological ‘primitive’, who, envisioned as vestiges of an

earlier moment in human history, represented a mirror on to the past. The HGDP seemed ideologically founded on attitudes that implied indigenous populations were a last chance for 'modern man' to see 'himself' in a former manifestation – an opportunity, as Adam Kuper has commented in his work on the creation of primitive society, to take a glimpse into the human past in order understand who the human was in the present (Kuper, 1988: 5). For several anthropologists, then, HGDP statements about using indigenous genetic samples to reconstruct human history smacked uncomfortably of the tradition of primitivism in anthropology (Lock, 1997: 233).

While several biological anthropologists assumed critical postures vis-à-vis the HGDP, questions about the HGDP also found a foothold in sub-disciplinary divides. When HGDP founder Cavalli-Sforza commented, for example, that critics of the project were largely cultural types, who were not 'real' scientists but more like 'philosophers or social critics' (Gutin, 1994: 74), he was not only incorrect in the light of the biological critique but also exacerbated the troublesome schism between biological and social anthropologists (see Holden, 1993). Needless to say, such dismissals of HGDP critics as simply 'anti-science' or 'soft' intellectuals did little to foster cross-disciplinary dialogue.

The Commercialization of Genetic Research

Between the dispersal of the Diversity list in 1992 and the discovery of the PNG patent by RAFI in 1995, relations between indigenous groups and the HGDP rapidly worsened. Native L set up an electronic discussion group to keep the lines of communication open, but opposition to the project mounted steadily.¹⁰ Internationally as well, the HGDP suffered considerable setbacks owing to its troubled image and lack of clear guidelines for conducting research. In September 1995, for example, Cavalli-Sforza attended UNESCO's International Bioethics Committee to raise support for the project, but UNESCO's working group on population genetics, after representatives from indigenous coalitions spoke against the project, distanced itself from the HGDP (see Butler, 1995: 37).

Yet, despite the deepening conflict engulfing the HGDP, there were some who continued to ask, so why all the fuss? The practice of taking blood samples from field subjects, after all, was not something new to anthropology (Gutin, 1994: 72). Moreover, the HGDP had, particularly in its North American Model Ethical Protocol, acknowledged that sensitivity to the sampled populations had to be shown. (No indigenous groups, however, were invited to or consulted about the project during its planning stages [Marks, 1995a].)

Perhaps one of the most significant factors to take into consideration when attempting to explain what engendered such a vociferous response to the HGDP is the project's relationship to the trajectory of biological

imperialism. While distinctive in terms of its scope, the HGDP proposes to draw blood and tissue samples from indigenous populations from under the shadow of at least two (some would argue considerably more) centuries of what might be termed ecological colonization. Indeed, the linkage between natural history, botany and the expansion of empire is not new to the late 20th century, and indeed the terms 'biocolonialism' and 'biopiracy' are equally suited to the last century as they are to the current one. The controversy over the commercialization of human biology generated by the HGDP and PNG patent, then, clearly has historical precedents.¹¹ And yet there are some significant differences about current biocolonial practices which are linked to the notion that humanity is entering into a new 'Age of Biology', a phrase used by both proponents and critics of biotechnology to distinguish the 21st century as an era in which products made from chemicals and metals are to be replaced by those made from biological materials (Khor, 1995: 1–2). In this new context, biological products, molecular research and geneticists have all assumed a novel economic identity and importance – indeed the term 'scientist-entrepreneur' has acquired a new currency in light of these developments. As sociologist Dorothy Nelkin has recently observed, the contemporary commercialization of biology has already radically redefined the nature of contemporary science and the role of the scientist:

[S]cientists are increasingly supported – and influenced – by corporate interests. As federal research becomes more unreliable, many scientists are shifting their priorities to commercially profitable research devoted to the solution of short-term problems, with immediate applications, such as the development of genetic tests for common diseases and the creation of bioengineered agricultural products. This is especially true in molecular biology, where university-based scientists often serve as officers and consultants in biotechnology firms. The image of science as driven by pure intellectual curiosity has been clouded, leaving the public with the impression that scientific information is less a public resource (the assumption on which scientific autonomy has rested since World War II) than a private commodity to fill the coffers of companies and commercial laboratories. (1996: A52)

While Nelkin's comments note that the lack of funding from governments has nudged scientists into the commercial realm, governments themselves have not remained above and beyond the influence of commercial trends. In the United States, for example, institutes such as the NIH, the major US funder and developer of genetic research, have increasingly collaborated over the past two decades with private biotech and pharmaceutical firms (see, for example, Kimbrell, 1993: 151–7).¹²

The growing connection between governments and commercial interests has been well-illustrated in the case of the aforementioned Human Genome Project (HGP, the group whose ethnocentric bias inspired the formation of the HGDP). While HGP literature has underscored the humanitarian goals and merits of the project – the project claims that it will 'help

us to understand and eventually treat many of the more than 4000 genetic diseases that afflict mankind, as well as the many multifactorial diseases in which genetic predisposition plays an important role'¹³ – the HGP has developed significant ties to commercial enterprises.

On 20 June 1991, for example, the HGP took an explicit commercial direction when it edged its way into the global marketplace. Craig Venter, then an NIH researcher, filed patents applications with the US Patent and Trademarks Office (PTO) for 337 gene sequences from the human brain (Roberts, 1991a).¹⁴ At the time, Venter, a US-government employee, submitted the patents on behalf of the US government. While the PTO office eventually denied his claims in 1992, Venter's applications raised a storm of protest about the commercialization of genome research and the involvement of government agencies in commercializing genetic research (see Anderson, 1991: 485; Gorman, 1993: 57; Marshall, 1994: 25; Roberts, 1991a: 11).¹⁵

Venter's patent claims sparked a kind of 'gene fever' among organizations working on the human genome.¹⁶ Government-affiliated institutes such as INSERM in France and the MRC in Britain, which had hoped to keep the project free of commercial interests, quickly condemned the patent applications but nevertheless felt pressure not to be 'edged out' by aggressive US interests. In August 1992, for example, England's Medical Research Council (MRC) staged a 'counter attack' by filing for 1100 patents on its gene sequences (Aldhous, 1991: 785). Indeed, the push to patent genes has led some critics of biotechnology to speculate that the entire human genome will have been patented by governments, and biotech and pharmaceutical companies by the year 2000 (Rifkin, 1993: viii).

Since Venter's applications, the HGP has charted a distinctive course toward commercialization. By January 1993, over 30 prominent genomic scientists were in the process of negotiating business relationships with private firms, including one of the most vociferous opponents to Venter's original patent applications, James Watson (Anderson, 1993: 300; Erickson, 1991: 112). Critics of the linkage between business and genetics have cited potential conflict of interest scenarios for scientists, while defenders have argued that no genetic research can succeed without venture capitalism (see Anderson, 1993; Erickson, 1991: 112; Wadman, 1996).

The rapidly blurring lines between government and commercial research, between independent university and corporate pharmaceutical research, has raised some serious questions about how genetic research and its medical products will be distributed to 'mankind'. Who will benefit from gene therapies? How much are gene therapies going to cost? And finally, are gene therapies likely to benefit all populations equally or will only wealthier nations be able to afford them?

Perhaps even more controversial, however, is the prospect that genetic research itself is being increasingly controlled by commercial interests. The very character of genetic research – the way in which data is collected,

accessed, stored, analyzed and released to the public – is now profoundly structured by commercial institutions. Many independent genetic firms, for example, as well as some government organizations (such as the MRC), have issued 'terms of access' to their gene banks,¹⁷ restrictions which reflect the commercial turn that genetic research has taken. Under these access conditions, scientists, if they wish to use a genetic database, must agree to an 'option agreement' under which the company owning the data bank retains exclusive rights to patents arising from research using their databases (see Dickson, 1994; Marshall, 1991; *Nature*, 1991). One possible impact of such restrictions, of course, is monopoly control over molecular research – through access conditions companies can favor those institutions and individuals who will comply with its commercial restrictions and shun those who may be committed to non-commercial but nevertheless valuable genetic research. The development of these access conditions, then, could effectively exclude any scientist or institution opposed to, or critical of, the commercialization of human DNA.

While the HGDP has declared itself a non-commercial enterprise, it does not oppose the patenting of human biological materials (such as DNA). There are, then, some serious questions to be asked about how its scientists – or indeed any genetic scientist – can remain 'politically correct' in such a context. Can the HGDP guarantee, for example, that the research institutions and researchers with whom it is affiliated will eschew the commercial exploitation of indigenous populations? Genetic research recently conducted in Colombia, for example, has already created difficulties for the HGDP. In this particular case, blood samples were collected from remote indigenous groups across Colombia under the auspices of the Genetics Institute of the University of Javeriana, Bogota. The project, called 'The Great Human Expedition', received funding from a number of public institutions as well as several large biotech firms (including Hoechst and Pfizer). The Institute, however, is also a leading player in the implementation of the HGDP in Colombia. To make matters worse for the HGDP, a British filmmaker produced a documentary on the project in 1995 which showed scientists from the Bogota-based Genetics Institute collaborating with scientists from the pharmaceutical giant Hoffman-La Roche as they draw blood from the Asario Indians of Colombia. The scientists take blood samples without informing the Asario of either the nature of their research or possible scientific and/or commercial uses of the samples. In fact, the subjects who give blood are told that they are being tested for diabetes as part of a medical effort.¹⁸

The North–South Dynamic

As the above example suggests, the commercialization of biological research, while significantly altering the nature of scientific research and

the role of the scientist, is also embedded in a specific North–South economic dynamic. To be added to the litany of queries raised above, then, are important questions about where biological products originate, who ‘discovers’ them, and who acquires profits emerging from their development.¹⁹

The most coveted ‘artifacts’ – ranging from soil micro-organisms to animals and human DNA – desired by biotech and pharmaceutical companies have become the biological resources from the Third World, especially given that tropical rainforests (which contain over 50 percent of the world’s plant species) are rapidly being destroyed through development (Kimbrell, 1996a).²⁰ As Andrew Kimbrell notes, the profits to be gained from products developed from these biological resources are considerable: it has been estimated that First World pharmaceutical and biotechnology industries acquire in excess of \$30 billion per year through the use of medicinal plants and microbial material from southern countries.²¹ Moreover, a US consulting firm, Frost and Sullivan, has estimated that cell lines and tissue cultures yielded US \$427.6 million in 1996 (*Businesswire* 28 May 1996).

The trend to use indigenous blood samples in commercial genetic research has also become a significant variable in this north–south dynamic. Just after the Hagahai patent was issued, for example, RAFI reported that scientists from Sequana Therapeutics (a California-based ‘genomic’ company) in conjunction with scientists from the Samuel Lunenfeld Research Institute of Canada (affiliated with the University of Toronto), collected blood samples from the people of Tristan da Cunha, a tiny island of just under 300 inhabitants located halfway between Brazil and South Africa. The inhabitants, who are all descendants of the island’s original seven families, exhibit one of the world’s highest incidences of asthma (30 percent of the population suffer from asthma and 20 percent are carriers). In 1995, Sequana indicated that it had the information necessary to identify and eventually patent the gene or genes which predispose people to asthma. Sequana subsequently sold the licensing rights to a diagnostic test for asthma to a German firm (Boehringer Ingelheim) for \$70 million. In another recent case, RAFI documented that scientists from the Rockefeller Institute in New York, who, in conjunction with their research on obesity genes in lab mice, extracted blood samples from the inhabitants of Kosrae, an island in the Federated States of Micronesia in the South Pacific where obesity has a high incidence. Aiming to identify the obesity gene in humans in order to understand how the amount of fat stored in the body is regulated, the project’s sponsor, Rockefeller University, was offered \$20 million by Amgen, a California-based pharmaceutical company, for licensing rights to the obesity gene and was promised additional payments of up to \$90 million (see Leff, 1994; RAFI, 1993, 1994a, 1994b, 1995). The substantial profits to be gained from the use of these samples, then, has made indigenous DNA a potentially valuable commodity within the biotech industry (see Calestous, 1995; Shiva, 1991, 1993).

Significantly, while the profits derived from biological development are

in and of themselves substantial, biotech and pharmaceutical companies are frustrated with the lack of universal patenting laws and enforcements. The Chemical Manufacturers Association, for example, has claimed annual losses of US \$6 billion owing to lax patent laws; the Pharmaceutical Manufacturers Association losses of US \$4 billion; and US drug companies have argued that they annually lose US \$150 million owing to Brazil's failure to enforce copyrights (ECEJ, 1993: 6). The solution, for many of these companies, has been not only to push for the universalization of patent legislation that makes all life forms patentable, but also to create tough sanctioning measures to ensure that the patents are respected. Because 99 percent of all patents are currently held by northern companies, it is clear that large pharmaceutical and biotech firms stand the most to gain financially from a stringently enforced and uniform system of patent laws.

Patenting Biology on a Global Scale

Traditionally, intellectual property rights (IPRs) have been handled by national governments and monitored by a few international agencies such as The World Intellectual Property Organization (WIPO). While previous IPR treaties have tended to promote a balance between the owners of patents and the general public, the emphasis has recently shifted to protecting the rights and royalty entitlements of patent holders on a global scale (ECEJ, 1993: 5–6). As a result, IPRs buttressing private capital have become a critical item on the agendas of world trade treaties such as the General Agreement on Trade and Tariffs (GATT) and its associated World Trade Organization (WTO). The Trade-Related Intellectual Property Rights (TRIPs) of the Uruguay Round of the GATT, for example, have extended patent rights over pharmaceutical products (the majority of which have been developed by US, European and Japanese companies) and have made the patentability of micro-organisms mandatory. In addition, the GATT has increased the duration of patent protection to 20 years from the date of application and has strengthened the rights of patent-holders by instituting tough reprisal measures for countries who do not adhere to the TRIPs guidelines (Correa, 1995). The GATT, however, does not strictly obligate signatories to allow for the patenting of animals, plants and human materials although the ambiguity of the TRIPs statement on the patenting of life forms does not preclude this development. It is clear, however, and based on the lobbying efforts of organizations such as the Pharmaceutical Manufacturing Association (PMA) and the Industrial Biotechnological Association (IBA, which represents over 80 percent of private US corporations investing in biotechnology), that international patent laws protecting private research and development have become, and will remain, an important issue in future trade agreements.

While the GATT and WTO intellectual property protections remain

inconclusive as far as the patentability of plant, animal and human life forms is concerned, more stringent patent laws and measures for enforcement have been established between the US and several nations. Bilateral agreements and regional accords (such as the North American Free Trade Agreement) have been established between the United States and countries such as Canada, China, Mexico, Jamaica, Trinidad and Tobago, and Ecuador. These treaties hold signatories to stricter protections for patent holders and seek to expand what technologies and products can be patented. Significantly, they also indicate that the US government's position on biotech patents parallels that of private biotech and pharmaceutical corporations.²²

Resistance to Biological Patents on a Global Scale

For critics of the biotech and pharmaceutical lobbies, the main point of contention has been who and what interests control biological resources and who benefits economically from biotech research and development. As indicated above, there is a marked North–South dichotomy currently undergirding the practice of extracting biological resources from Third World countries, and many opponents of the biotech lobby fear that trade-related IPRs which protect private firms will lead to a monopoly over biology. The individuals who stand to lose the most in this scenario are largely poor farmers and indigenous persons.

Consequently, opposition to the biotech industry has been widespread and has encompassed a variety of constituencies. In September 1995, for example, over 200 organizations from 35 different countries gathered in Washington, DC, to file a petition at the US Patent and Trademark Office to protest a patent that had been granted for a pesticide extract drawn from the neem tree, a native plant of India (see Shiva, 1996: 90–1). (In India, the neem extract has been used by millions of farmers for several generations and, according to critics of the patent, the US firms which have developed the pesticide have not only stolen local knowledge and transformed it into a commodity but are planning to sell it back to the farmers as a patented product.)

Indigenous groups have also held regional meetings and produced statements opposing the granting of patents to companies: in 1993, for example, shortly after the HGDP list was publicized, several indigenous groups met in Aotearoa, New Zealand for the First International Conference on the Intellectual and Cultural Property Rights of Indigenous Peoples and condemned the patenting of life forms. More recently, 118 indigenous groups from 27 countries gathered at the Women's Conference in Beijing and signed a declaration denouncing the patenting of life forms.²³ Religious coalitions have also formed a significant part of the opposition to biotech patents: in May 1995, the leaders of 80 faiths and

denominations held a press conference to publicize their opposition to the patenting of genetically engineered animals and human DNA (see Cole-Turner, 1995: 52). Finally, several environmental groups have also aggressively lobbied against the patenting of life forms.

The lobby against the monopolization of biotech patents, then, exemplified in the examples above, has, like its counterpart among the biotech and pharmaceutical companies, a distinctly global character (see Khor, 1996: 91–2).

The Case against the HGDP

As organized resistance to the biotechnology industry intimates, transformations within the nature of late 20th-century political practice and organization have had significant impact on the HGDP. The transformations I am referring to here mainly encompass the rise and spread of independent coalitions and international non-governmental organizations (NGOs), of which there are currently some 23,000 (Ghils, 1992: 419). These political organizations, largely independent of any explicit state alignment, have created a new social context for political practice, a milieu referred to by some political scientists as 'global civil society' (see Lipschutz, 1992). The focus of many of these groups, as I have already suggested, has been in the areas of the environment and development, human rights and indigenous peoples, the last category now encompassing a substantial network of organizations active on behalf of indigenous rights. This internationalization of indigenous politics and the new set of technological resources available to these groups has established a different model of political conflict.

When the HGDP became the object of criticism from RAFI, it was not simply the target of a specific, isolated group but an organization connected to a network of activists whose opposition could be rapidly mobilized through electronic media. One of these networks was the anti-biotechnology circuit. At the core of this resistance movement were several NGOs (such as RAFI) which focused specifically on biotech information, keeping the public aware of developments within biotechnology, and mobilizing opposition to the agenda of large biotech and pharmaceutical companies. RAFI, however, was not simply an information source within a sprawling network of resistance organizations but more of a central node within a diverse network of groups capable of intersecting at critical junctures. The biotechnology lobby, broadly connecting as it were ethics and economics, gave groups such as RAFI an important location within the structure of resistance movements: RAFI was a rallying point for organizations who, although not specifically focused on patents and biotech regulations, were involved in related sectors of activism: human rights, indigenous communities, economic justice and environmental protection, a list which practically encompassed the entire network of progressive transnational social

movements. The speed with which opposition was enlisted and the sheer volume of protest that the HGDP encountered after the release of its list took many HGDP advocates by surprise. RAFI was thus able to politicize the project in ways that its organizers clearly did not anticipate.

The HGDP's ability to manipulate its own identity within this new political context was also severely limited, partly owing to the de-politicized attitude of some HGDP organizers (Gutin, 1994: 75), but also owing to the novelty of the political milieu in which the project found itself. As tensions with RAFI mounted, for example, some HGDP proponents attempted to distance themselves specifically from RAFI, missing the point that they were not really dealing with *one* group critical of their project but an entire political structure that, although rooted in a flexible network paradigm, could quickly secure broad-based dissent.

Finally, HGDP organizers were eventually compelled to recognize that the 'public relations' problems characterizing the HGDP were not occurring in a conventional context. RAFI, as a node within a larger network of political activists, not only had considerably more access to many of the groups the HGDP was 'targeting' for research, but had substantial control over representing the HGDP to these groups even before the HGDP established contact with them. The very model implied in HGDP proposals, then, that of negotiating deals with local groups who might participate in the project, was somewhat anachronistic in light of the structure of representation within this new global political context.

The main issue confronting the HGDP within this global context of resistance and commercialization was their location vis-a-vis the scope, meaning and economic direction of genetic research. In the framework proposed by organizations such as RAFI, the drawing of blood from an indigenous community had become a highly political act enmeshed in a specific structure of power. The emergence of the Human Genome Diversity Project and its disastrous encounter with indigenous coalitions and NGOs, is, in many respects, a conflict about the legitimacy of this politicized framework, a framework generated in the context of a new global political culture and rooted in a political-economic analysis of the commercialism/colonialism of genetic research. At the heart of the HGDP controversy, then, is the 'locatedness' of the scientist within the global political economy.

The nature and character of the debate between HGDP and its critics as an 'anthropological' and 'colonial' encounter is conveyed in a series of texts that were posted on the Internet in the fall of 1995. Below, I examine several excerpts from these texts to explore the conflict between RAFI and HGDP regarding the 'locatedness' of the scientist. I do this by examining the HGDP/RAFI encounter as (1) a conflict over adopting a particular political-economic framework; and (2) a failure, on the part of the HGDP, to understand the new political context in which their discord with indigenous groups was taking place.

The Struggle to Define Location: The RAFI/HGDP Exchange

When the HGDP released its list of indigenous populations to the RAFI, it became the target of vociferous opposition and critique, and several members of the North American committee (and in particular, Henry Greely, a law professor at Stanford and chair of the North American subcommittee on ethics) made a concerted effort to respond to the opposition and to clarify what were, in the HGDP's opinion, some serious misconceptions about the project. The HGDP produced a home page titled 'Answers to Frequently Asked Questions about the Human Genome Diversity Project' and eventually posted (in 1996 after the PNG patent) a circulating draft of an ethics protocol. The creation of the home page was a kind of political act in and of itself since it gave the HGDP an identity within the electronic network and also, perhaps more importantly, established an informational counterpoint to the material being generated by HGDP opponents. Several efforts were also made to contact indigenous organizations: in 1993, for example, Greely went to Quetzaltenango, Guatemala to meet with the World Council of Indigenous Peoples (WCIP) – a meeting which Greely subsequently described as 'not fun' and a 'failure' (Kahn, 1994).

Although RAFI and the HGDP dialogued for several months, they eventually ceased corresponding as a result of friction. Then in early October 1995, after the discovery of the PNG patent, tensions again flared when RAFI released a press statement in which they underscored themes of US imperialism and exploitation of indigenous peoples. Significantly, RAFI also established an explicit link in their release between the PNG patent and the Human Genome Diversity Project. The text of the press release identified Diversity scientists as the genetic 'hit men' of acquisitive northern (namely US) companies. The thug and gangster imagery implicit in the press release was also continued in the suggestion that the HGDP was simply a front for corporate interests, whose 'thin veneer' had finally been penetrated:²⁴

**FOR IMMEDIATE RELEASE
INDIGENOUS PERSON FROM PAPUA NEW GUINEA CLAIMED IN US
GOVERNMENT PATENT . . .**

In an unprecedented move, the United States Government has issued itself a patent on a foreign citizen. On March 14, 1995, an indigenous man of the Hagahai people from Papua New Guinea's remote highlands ceased to own his genetic material. While the rest of the world is seeking to protect the knowledge and resources of indigenous people, the National Institutes of Health (NIH) is patenting them. 'This patent is another major step down the road to the commodification of life. In the days of colonialism, researchers went after indigenous people's resources and studied their social organizations and customs. But now, in biocolonial times, they are going after the people themselves' says Pat Roe Mooney, RAFI's Executive Director, who is at The Hague investigating prospects for a World Court challenge to the patenting of human

genetic material. . . . The Hagahai, who number a scant 260 persons and only came into consistent contact with the outside world in 1984, now find their genetic material – the very core of their physical identity – the property of the United States Government. The same patent application is pending in 19 other countries. Though one of the ‘inventors,’ resident in Papua New Guinea, apparently signed an agreement giving a percentage of any royalties to the Hagahai, the patent makes no concrete provision for the Hagahai to receive any compensation for becoming the property of the US Government. Indeed, the Hagahai are likely to continue to suffer threats to their very survival from disease and other health problems brought by outsiders. . . .

Linked to the ‘Vampire Project’?

The first-ever patent of an indigenous person comes as an international group of scientists are embarking on the Human Genome Diversity Project (HGDP), which aims to draw blood and tissue samples from as many indigenous groups in the world as possible. While the Hagahai are not specifically mentioned in the draft ‘hit list’ of the HGDP – dubbed the ‘vampire project’ by its opponents worldwide – it has targeted over 700 indigenous groups, including 41 from Papua New Guinea, for ‘sampling’ by researchers. . . . ‘The thin veneer of the HGDP as an academic, non-commercial exercise has been shattered by the US government patenting an indigenous person from Papua New Guinea,’ said Edward Hammond, Program Officer with RAFI-USA in North Carolina. . . . RAFI believes that this is only the beginning of a dangerous trend toward the commodification of humanity and the knowledge of indigenous people. Whether human genetic material or medicinal plants are the target, there is scarcely a remote rural group in the world that is not being visited by predatory researchers. Indigenous people, whose unique identity is in part reflected in their genes, are prime targets of gene hunters. Says Leonora Zalabata of the Arhuaco people of Colombia: ‘This could be another form of exploitation, only this time they are using us as raw materials’. . . .

While the underlying themes of the RAFI press release located HGDP scientists within a broader, exploitative political economy, the response of the HGDP – crafted by Henry Greely – focused more on the issue of ‘credibility’. In his response, Greely chose to stress the non-commercial nature of the HGDP and its policy of ‘fair sharing’ with indigenous populations. Like RAFI, however, Greely’s response also ‘located’ the scientist, namely through the rhetorical tactic of presenting ‘facts’. By listing ‘facts’, Greely implicitly reasserted the knowledge-hegemony of the scientist by portraying him or her as, although somewhat politically sympathetic, an objective individual. This response, too, took its own ‘bites’ at RAFI by implying, again through the strategy of listing facts, that RAFI activists and researchers (unlike ‘real’ scientists) were not adequately informed on the issues and were unscrupulously misleading readers about the HGDP:

Papua New Guinea Patents, the Human Genome Diversity Project, and RAFI

As a member of the North American Committee of the Human Genome Diversity Program, I share RAFI’s concern about the patenting of a cell-line derived from a cell-line of a member of the Hagahai population, or from anyone else, indigenous or non-indigenous, who may not have given fully informed consent

to such use of his tissues or who may otherwise have been treated unfairly. But I am also concerned that the Human Genome Diversity Project not be treated unfairly by RAFI. Its press release contained such a host of misrepresentations and lies about that Project that I am compelled to respond. **Fact** – The Human Genome Diversity Project had nothing to do with the collection, analysis, or patenting of the cell line from Papua New Guinea or with the patenting of any other cell lines, indigenous or otherwise. **Fact** – The Human Genome Diversity Project is a regionally organized project. For most of the world, including the Pacific and the Americas, it remains entirely in the planning stage. Europe and China are the only regions where researchers may be collecting samples that could end up being part of the Project. **Fact** – The Human Genome Diversity Project has stated, over and over, that should any samples it collects have any commercial value, a) the Project will not try to capture that value, through patenting or in any other methods, and b) the Project will seek to ensure that a fair share of that value returns to the sampled population. . . . **Fact** – There is not, and never has been, an HGD Project list of populations to be sampled. In October 1992, a planning workshop for the Project created a set of tables showing examples of the kinds of populations that would be of particular interest for studying the genetic diversity, and hence the genetic history, of humanity. The Project gave a draft copy of those tables to RAFI, which has proceeded for several years to refer to them as showing ‘targeted populations’ and now as being ‘a hit list.’ The drafts were never completed and the idea of even discussing specific populations as examples was abandoned more than two years ago because of the way it was being misinterpreted. . . . **Fact** – All the facts stated above are known to RAFI and have been for some time. It may well be useful for RAFI in getting publicity and funding to have a frightening sounding ‘Human Genome Diversity Project’ or, better yet, ‘Vampire Project,’ to attack. But ‘useful’ is not the same as ‘fair.’ Or ‘honest.’ RAFI says it opposes ‘bio-piracy,’ the theft of valuable genetic information from indigenous populations. So does the HGD Project. The Project, in fact, sees its open, international, non-commercial and non-governmental structure as a solution to bio-piracy. RAFI apparently doesn’t. We have areas of agreement and areas of disagreement. It is well past time, however, for RAFI to deal honestly with both the areas of agreement and disagreement. It is well past time for RAFI to stop lying about the Human Genome Diversity Project. . . .

The second half of Greely’s response more explicitly underscored issues of credibility by providing a detailed critique of RAFI’s statements regarding the patent.

. . . RAFI, which purports to know something about patents, has grossly misstated the nature of this patent. The patent was not, of course, on ‘a person.’ Nor was it even on the information contained in the person’s genetic material. Instead, the patent is on a cell-line that is infected with a particular variant of a virus called HTLV-1 and on the possible uses of that cell-line in developing diagnostic tests. No patent right was claimed in the human genetic information whatsoever; that material is present in the cell-line because it is present in human cells and the virus needs a human cellular host. . . . The patent is, thus, on the infected cell-line, preparations of pure virus made from the cell-line, and various ways of detecting infection with this virus using the cell line. Patenting human genetic information is certainly troubling, but that didn’t happen in this case. So, RAFI’s press release was grossly wrong about the (non-existent)

role of the Human Genome Diversity Project in this patent, was grossly wrong about the roles of the National Institutes of Health and the government and peoples of Papua New Guinea in this patent, and was even grossly wrong about the nature of the (publicly available) patent itself. RAFI owes apologies to a lot of people, but, based on its past actions, I will not hold my breath waiting for them.

While aspects of the original press release of RAFI's as well as Greely's response 'personalized' the debate through indirect accusations of misrepresentation, avarice and incompetence, the position adopted in these texts, as I have already suggested, conveyed two fundamentally different images of the scientist. In RAFI's statements, HGDP scientists had become 'biopirates', agents of large, northern corporations intent upon continuing their exploitation of Third World resources. Such an interpretation was based on an emphasis on a political economy that left no room for a politically neutral or politically disengaged scientist – i.e. there were sides to be taken in the battle against biotech imperialism. RAFI's critique therefore was based in a demand that the HGDP adopt a specific political 'tag' vis-a-vis the political economy they had identified.

The HGDP response, as the selections reveal, was not entirely devoid of a political tag. Greely's response to RAFI's press release reflected a political 'sympathy' to RAFI concerns and an explicit denunciation of exploiting Third World resources – the HGDP too abhorred biopiracy. Yet, the HGDP's proposal for enacting its political position vis-a-vis the patenting of indigenous DNA posed some significant problems. RAFI essentially had challenged the HGDP to clarify its position on the commercialization and patenting of indigenous DNA. By 1993 the HGDP had done so: it rejected neither in principal, but rather proposed the role of genetic 'broker' for the HGDP as an 'open, international, non-commercial, and non-governmental' enterprise that could ensure that a 'fair share' of any profits arising from HGDP research would go to indigenous donors:

[T]he Project does not intend to patent the samples or any products made from them. The Project is not a commercial enterprise. It seeks knowledge, not profit. At its international congress in September 1993, the Project decided that it would not profit from the samples or the data developed from them. It further decided that it would try to guarantee that, if any products were developed as a result of samples obtained from sample repositories or data banks operated by the Project, some reasonable financial benefits would flow back to the sampled populations.

Significantly the statement on commercial profits was expanded after the October 1995 press release to include the following:

The developing world believes that the seed and drug companies from the developed world have long exploited their plant genetic resources. These companies, they believe, freely gathered plants from the developing world – often variants that had been domesticated, developed, and maintained by generations of indigenous farmers. Without paying anything to the farmers or their country, the companies used those resources to create patented products that

were then sold back to the developing world at high prices for large profits – with none of the profits returning to the plants' original users. Some in the developed world would dispute whether this belief is entirely accurate, but all agree it has some validity. . . .

Some advocates for indigenous peoples or the developing world have been concerned that the Project will be a human version of these plant-collecting expeditions. It will not be.

First, it is not clear whether any commercial products are likely to emerge from its samples or data. More important, even if commercial products were created using the Project's samples, the HGD Project is committed to two propositions: (1) that financial benefits should not go to the Project and (2) that an adequate part of the financial gains, if any, must go back to the sampled populations. The best ways to implement those commitments are not yet entirely clear. Implementation depends on some complex issues of patent and contract law that have not been entirely resolved, as well as on some decisions by the sampled populations or their representatives on how best to proceed. The Project plans to make those implementation decisions after consultation with such representatives. But, whatever method ends up being chosen to implement the Project's commitments, the commitments themselves are firm. The HGD Project will not profit from the samples and it will do its best to make sure that financial profits, if any, return to the sampled populations.

This proposal for dealing with financial gains, however, was also critiqued by HGDP opponents for its implicit political economy. First, although the statement established that the HGDP was itself a non-commercial enterprise, the proposal of becoming a 'middleman' between corporate interests and indigenous populations was met with considerable skepticism. While there were several practical critiques raised of this proposal – e.g. which individuals (or legal structures) would represent indigenous groups given that cultural understanding and representations of power might vary widely from Western models – the role of middle person was rejected as a viable one. 'Middlemen', opponents of the HGDP argued, are not politically neutral players but often come into a specific context as 'loaded' agents, i.e. as individuals who have the power, influence and resources to restructure political cultures to meet their own objectives. (The history of colonialism, after all, is rife with the presence of cultural brokers.) Second, HGDP critics also felt that the role of genetic broker also reflected a structure of dominance in which northern scientists would determine the 'fair rules' of exchange between corporations (often funding their research) and indigenous groups. Not only were there inherent conflict of interest issues in this arrangement, but also an implicit rejection of the privileged position of the scientist as a neutral 'filter' of social reality.

Conclusion: From Conflict to Collaboration

At the time of this writing, the HGDP's status with indigenous rights groups is tenuous to say the least.²⁵ Moreover, it is not clear whether or not the research will proceed and under what conditions. The implications of the controversy, for anthropology, have not been salutary and have done little

to foster positive working relationships between anthropologists and indigenous groups.

This account of the HGDP, however, represents more than simply an anatomy of a conflict among scientists, anthropologists, indigenous groups and human rights activists. There are, perhaps, some broader insights to be gained from the HGDP experience for anthropologists in general. As I suggested in my introduction to this article, the HGDP has raised important questions in two areas: (1) how global economic trends are structuring the practice of anthropology and (2) how the locatedness of the anthropologist is shifting vis-a-vis these trends.

There are of course no simple answers to or single models for these issues. While it seems that many anthropologists do not feel that questions of global political economy are relevant to their particular research, as the HGDP indicates, they are questions that can emerge without provocation. Perhaps the first 'lesson' to be drawn from the HGDP controversy, then, is a recognition of, and an openness to, the importance of the global political economy and its shaping role on the flow of cultural and material knowledge. As 'conductors' of these two 'commodities', anthropologists are inextricably embedded in these larger relations of power and cannot afford to ignore questions of their own global locatedness.

The context in which anthropologists grapple with the global political economy, however, is not an isolated one: as already suggested there are newly politicized partners in this pursuit. The technological resources available to groups such as RAFI, and their connection to a vast and burgeoning political network of human rights activists, profoundly shaped the identity-making process for HGDP representatives and has severely crippled the project's ability to proceed. Lesson number two, then, is that anthropologists working with indigenous populations do not control the tools and avenues of representation and therefore cannot afford to eschew issues of their own political identity and practice in relationship to their research constituencies.

Both of these lessons, as I have loosely termed them, point to a different kind of anthropological fieldwork – one involving 'collaboration'. I do not mean here a traditional kind of collaboration in which a project is designed and then implemented with the consultation of a research constituency. The collaboration which I mention here makes the scope, design, goals, methods of implementation and access to research results all negotiable items. Empirical researchers, in particular, whose objectives and methods are said to be governed by acontextual laws and procedures, will find this kind of collaboration particularly difficult since it challenges the very epistemological basis of scientific knowledge. Such collaboration suggests that just as valuable to any project's scientific objectives is the formation of a viable relationship with research subjects. This 'social hermeneutic' indicates that the object of research is not simply 'information' (a knowledge commodity than can be acquired and controlled by one party) but 'insight', a relational kind of knowledge that can be developed only through the negotiation of two engaged parties.

The formation of this relational knowledge (or what I have termed a social hermeneutic) will obviously entail considerable input from research subjects about the nature of power and the production of knowledge. To date, the concept of informed consent frames the nature of researcher–research subject relationships and, indeed, much of the ethical discourse surrounding the HGDP revolves around the notion of informed consent. This concept, however, is again based in a specific structure of power in which consent is commodity given to the researcher based on pre-existing guidelines (usually determined by university ethics committees prior to the initiation of research). While informed consent is an important advance in the history of data collection, it does not fully capture the kind of negotiated process that collaboration suggests since collaboration itself would entail discussion of what ‘informed’ and what ‘consent’ might mean in a specific context.

Moreover, this process of collaboration will also seriously challenge the way in which research is conducted among academics, especially in terms of current funding structures. The HGDP was awarded funding (and seeks funding) on the basis of its ‘scientific’ merits, i.e. its ability to produce knowledge commodities such as unique genes, cell lines or information on human evolution. Yet as the history of this controversy indicates, the scientific goals of the project are contingent upon establishing relational forms of knowledge, i.e. appropriate forums for dialogue, mutually agreed upon methodologies and negotiated applications of the research. Yet how many granting agencies – especially in the sciences – would be willing to fund projects whose goals and methods were so fundamentally contingent upon the negotiation of research methodologies and results?

Finally, this is also a collaboration which problematizes ‘objectivity’ and ‘critical distance’ in important ways. As the HGDP controversy intimates, collaboration as a field methodology may involve (1) negotiating one’s political identity within a new global political context; (2) developing a political practice vis-a-vis research subjects; and (3) at the very least, adopting a politicized perspective in relation to Third World concerns.

These points, as well as concerns regarding strategies of collaboration, of course, are not unfamiliar issues to anthropologists. These issues too have historical precedents. But, in the ‘Age of Biology’, they are perhaps presenting themselves in uniquely challenging and significant ways to biological anthropologists.

Notes

I am grateful to Jonathan Marks, Alan Goodman, Marc Edelman, James McKenna, Stephen Scharper and Dennis van Gerven for their thoughtful editorial suggestions and help in clarifying the arguments of this paper.

- 1 On 24 October 1996, the National Institutes of Health (NIH), the holder of the PNG patent, filed paperwork to disclaim the patent. See RAFI (1996b).

- 2 See also George Stocking Jr's 'Introduction' in *Colonial Situations* (1991) for further bibliographic references.
- 3 In its literature, the HGDP specifies that it is not part of the Human Genome Project (HGP). As of January 1994 it officially came under the auspices of the Human Genome Organization (HUGO), a non-profit, non-governmental group of scientists who play an advisory role in coordinating international human genetic research. HUGO has stated that it does not oppose the patenting of life forms but objects to the patenting of partial DNA sequencing technologies that are 'increasingly mechanical and straightforward'.
- 4 In addition to the Papua New Guinea patent application, these included patents that the United States filed on a cell line of a 26-year-old Guaymi Indian woman from Panama (withdrawn); a patent for the human T-cell line of a 40-year-old woman from Morovo Lagoon in Western Province and a 58-year-old man from Guadalcanal, both of the Solomon Islands.
- 5 See <http://www.rafi.ca/patent.txt> for a copy of the text of the patent application (which also lists the inventors).
- 6 See RAFI (1997) for a recent, rather disturbing report on this topic. The communiqué offers details on an anthropological database (containing information on indigenous genetic material) and its connections to commercial biotech firms.
- 7 Friedlaender was also accused by RAFI of misleading the Solomons Ambassador in another patent case involving indigenous DNA (see RAFI, 1995). For Friedlaender's response to these and other accusations see his postings (particularly 25, 27 and 31 October 1995) at <http://bioc09.uthscsa.edu/natnet/archive/nl/9510/0331.html>.
- 8 Although they would be extremely useful to an analysis of this patent as a 'colonial encounter', the specific details of the negotiations among Jenkins, the IMR and the Hagahai remain unclear. Defenders of the patent have claimed that informed consent was obtained from the Hagahai and that an agreement (specifying that 50 percent of all profits arising from the patent would go to the Hagahai) was signed. To date, however, no documents showing a record of informed consent or this financial agreement have been released to the public. See also Ibeji and Korowai (1996), Taubes (1995).
- 9 For other anthropological responses to the HGDP see postings on NativeL (<http://bioc09.uthscsa.edu/natnet/archive/nl/hgdp.html>).
- 10 This is not to suggest that all indigenous groups respond negatively to the possible uses of their blood samples. See Liloquala (1996) and Mead (1996).
- 11 As one reviewer of this article noted, 'The human genome project is, in many respects, the product of imperial institutions [much] like Kew Gardens (e.g. its proposed total cryogenic archive of plant seeds for the next millennium).' On this topic see Baker (1978), Brockway (1979), Crosby (1986), Jardine et. al. (1996) and Philip (1996).
- 12 See also Anderson (1991: 485–6), Aldhous (1991: 785), *Nature* (1991: 171), and Wuethrich (1993: 154–7).
- 13 Human Genome Homepage (1996: 1).
- 14 Venter's applications eventually included requests for 6122 patents on human brain sequences.
- 15 Venter eventually left the NIH to start his own multi-million dollar company, Human Genome Sciences, Inc., which established profitable links with a major pharmaceutical firm, Smithkline Beecham.
- 16 What has made the commercial nature of genetic research ever more chaotic, however, has been the nature of Venter's first patent applications. Venter's applications were for DNA sequences whose function was unknown, a move

- that has led to a kind of 'gene prospecting' whereby companies apply for patents without really knowing what the scientific value of the DNA is. As some scientists critical of this practice have remarked, this 'speculative patenting' is equivalent to the kind of gold prospecting that went on in the last century whereby prospectors bought claims to mineral deposits beneath land they had never seen, let alone tested for gold.
- 17 Craig Venter's company, for example, issued the terms under which university-based scientists have to work if they want to study the sequences produced by Venter's Institute of Genomic Research (TIGR). These terms give Venter's company the power to retain control over the commercial applications of all knowledge derived from their DNA sequences, as well as any discoveries of new genes arising from research on the sequences (see Dickson, 1994: 463; Marshall, 1994: 25).
 - 18 The film was released by Films for the Humanities as *The Gene Hunters* (1995) and includes interviews with geneticist Alberto Gomez, George Annas, Professor of Medical Ethics at the Massachusetts Institute of Technology, and Leonora Zalabata, Spokeswoman for the Arhuaco of northern Colombia. *The Gene Hunters* was originally broadcast in the UK on 26 February 1995.
 - 19 For an alternative analysis of how biotechnology can assist Third World countries see Calestous (1995).
 - 20 In the mid-1980s, for example, in the face of high rates of extinction among tropical rainforest specimens, analysts warned pharmaceutical companies that plant loss could 'cost' drug firms possible sales of US \$200 million (see also Shiva, 1996).
 - 21 As an example: two drugs derived from the rosy periwinkle – vincristine and vinblastine – a plant indigenous to Madagascar's rainforest, earn Eli Lilly roughly US \$100 million annually. Madagascar has received no payment for the use of the plant (Kimbrell, 1996b).
 - 22 President George Bush, for example, refused to sign the Convention on Biological Diversity in June 1992 largely because the convention placed too much emphasis on the protection of indigenous resources and community access to biodiversity, but did not include strong IPR protections for private biotechnological research and development. While President Bill Clinton signed the convention in the first year of his administration, an interpretive document released by the White House in conjunction with the signing indicated that protection of private biotech industries (particularly in the area of intellectual property rights) was of paramount importance to the government and that the US signing of the convention did not mitigate this commitment.
 - 23 One of the first workshops on indigenous communities and DNA patenting was held in Santa Cruz de la Sierra, Bolivia in September 1994 and included 35 indigenous leaders from 12 countries. A second workshop was held in Tambuan, Sabah, East Malaysia and included 35 representatives from 12 Asian countries; and a third workshop was held in Suva, Fiji and involved 25 indigenous groups from 14 countries.
 - 24 The full text of all the excerpts reprinted here can be obtained through the igc Web address (<http://www.igc.apc.org/info/>).
 - 25 Statements condemning the HGDP have been issued by several indigenous groups and NGOs including the South and Meso American Indian Information Center (SAIIC); the Indigenous Environmental Network (IEN); the World Council of Indigenous Peoples (WCIP); the Central Australian Aboriginal Congress (CAAC); the Onondaga Council of Chiefs; the Cordillera People's

Alliance (CPA), this last group an alliance of 120 indigenous groups in the Cordillera region of northern Philippines. A call to halt the HGDP was also issued by the European Greens in October 1993. See also Harry (1994) and the Declaration of Indigenous Peoples of the Western Hemisphere regarding the HGDP. This last document which 'particularly opposes' the HGDP was signed by 17 organizations in Phoenix, Arizona on 19 February 1995.

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