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ABSTRACT This paper examines a sequence of investigations in parasitology, botany, pharmacology, psychometrics and ethnopsychology focused on Kenyan village children's knowledge of medicinal herbs. We follow this work of making and ordering of knowledge, showing that the different disciplinary perspectives on bodies, medicines, knowledges, children and cultures produced by this research all sought the foundation of knowledge in reference to objective reality, and that they aimed to make the world known in the specific form of distinct and comparable entities with individual properties and capacities. Based on subsequent ethnographic observations of healing in the same village, we outline a different, contrasting modality of knowing, which places ontology above epistemology. Medicinal knowledge and its transformational capacity are here not located *within* entities but *between* them; not in objective reality but in effects; 'to know' means 'to come together' with the implication of having an effect on one another. We use this ethnographic sketch of a different form of knowing as a foil against which to contrast the imaginary that had shaped our previous research. Beyond the stark contrast between herbal village healing and pharmacological laboratory analysis, we expand our argument by moving from natural science to social science, from studies of plants and substances to those of humans, minds and cultures; from laboratories to ethno-psychological tests, cultural models, and eventually econometrics. We suggest that by reiterating a particular scientific imaginary, remaking humans (and non-human beings) as known things, a specific notion of man and a related political economy of knowledge is naturalized. Looking back at our involvement with this sequence of research, we realize that, contrary to our intentions, our inclusion as 'social scientists' into a multidisciplinary scientific project may have exacerbated rather than mitigated its potentially problematic effects.

Keywords Africa, botany, ethnography, Kenya, medicine, parasitology, pharmacology, psychology

Active Compounds and Atoms of Society:

Plants, Bodies, Minds and Cultures in the Work of Kenyan Ethnobotanical Knowledge

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In this essay we reflect on a series of scientific field studies that we took part in 10 years ago in the village of Uhero,[1] western Kenya, and in research institutes in Copenhagen and Oxford (UK). The interdisciplinary Medical Knowledge Study (MKS) combined medical parasitology, cognitive

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psychology and social research. The scientific context of the time was the 'nutrition–infection–cognition hypothesis' (see Nokes et al., 1996): parasitic infection, common among African children, diminishes their physical and mental development; in turn, anti-parasitic medicinal interventions improve cognitive abilities; strong, bright individuals produce more and improve their world; the aggregate effect of healthy minds in healthy bodies will be wealthier society; this will eventually reduce the conditions of infection and malnutrition (for example, Strauss & Thomas, 1998). Thus, the key to breaking the cycle of poverty and ill-health, which for so long has framed Western visions of Africa – the key to her modernization – are individual bodies, containers of minds and atoms of society. To demonstrate the effect of anti-parasitic treatment on child development one needs psychometric tests. While many trials of the impact of health on cognition use standard tests of intelligence, some psychologists advocate tests that are adapted to the local cultural, ecological and economic context (for example, Serpell, 1993). The MKS produced such a culturally appropriate instrument, measuring cognitive capacity in terms of local herbal medicinal knowledge.

The study's wider context was the 1990s re-run of the old psychometric controversy between those who regard the different cognitive test performances of black and white US Americans as expressions of different amounts of general intelligence, and those who explain such differences by reference to the variability and multiplicity of intelligence(s) (Herrnstein & Murray, 1994; Sternberg, 1998). While the nature, or otherwise, of 'intelligence' and its adaptive function is contested among biologists and psychologists (see for example, Gould, 1981; Lewontin, 1981) the psychometric approach tends to retain the idea that intelligence can and should be captured by appropriate instruments and statistics. Attention is here focused on knowing reality rather than the effects of knowing; the ontic status of the entity in question, intelligence, is unchallenged and remains dissociated from deontology.

The insistence upon intelligence as measurable reality is perhaps most surprising on the progressive side of this political debate about mind and difference, among those who uphold the values of equality and human possibility. The MKS was designed by liberal, relativist academics to identify an 'other' form of intelligence – different but as good as 'academic intelligence' – variously referred to as 'practical intelligence' or 'tacit knowledge' (Sternberg et al., 2000). The terminology assumes that knowing and knowledge-ability are universal faculties, which individuals possess to varying degrees. They may be 'implicit', 'tacit' or 'practical', but they can be made known. Whether tacit or explicit, practical or academic, 'knowledge' is the bridge between mind and world. Our argument, below, suggests that this epistemological stance is not the only way of relating humans to their human and non-human world. Instead of assuming a neat separation between fact, knowledge (about fact), and action (upon fact) or effect, our subsequent work in Uhero led us to understand reality as an effect of the

work of knowing it, emergent from being in the world rather than the objective precondition of being. Even the allegedly pure, objective scientific inquiry has unintentional effects that form part of the knowledge it produces. The value of knowledge can be assessed not only with reference to reality, but also in relation to its effects; and, we will argue, the effects of knowing change when operations of knowing are moved between contexts.

Different Imaginaries of Difference

While we engaged in the work for the MKS, we already had doubts about what we were doing, but these led only to occasional embarrassed, or complicit, laughter with local assistants and informants. At the time, the pleasure we took in our life in Uhero prevented us from pursuing these doubts further; and if we had tried, it would not have been easy to understand the disjuncture that we experienced while applying and developing instruments of scientific knowledge in a western Kenyan village. The gap between our science and the reality in which we lived was wide, and, more importantly, our efforts to move closer to our objects seemed fruitless, as the things we looked at changed with our own movements. The tension between our being in the field and how we were trying to make it known brought us to studying social anthropology. We then returned to the field with a different focus, moving from medicines and minds to relatedness and everyday practice, political economy and memory; and we used different, ethnographic, methods, relying on shared presence rather than data collection, being visitors rather than observers (Prince & Geissler, 2009). Here, we approach our first joint work with the benefit of hindsight. Yet, our aim is not just to *add* another disciplinary perspective to this multi-disciplinary study but to anthropologically examine the entire study's peculiar way of seeing, as it appears to us now, and to follow its effects through different levels of scale.

Our argument is shaped by our life and work in Uhero, but also by our readings of Marilyn Strathern, Helen Watson Verran and Bruno Latour on the nature of difference in different ways of knowing. Challenging Euro-American understandings of knowledge in terms of different 'perspectives' onto the same reality,[2] Strathern doubts whether one 'can rely on knowledge' as a universal datum, and whether there indeed might be 'people who do not invest in epistemology', for whom differences instead are ontological (2009). In Strathern's ethnographic examples – Melanesian kinship, Aboriginal ancestors and African bodies – difference is generative, opening possibilities, acknowledging what Verran (2001: 37) aptly referred to as 'realness as emergent': what is 'real' is not the factual foundation of perspectives and representations. Instead, it emerges continuously from collective engagements among a multitude of beings – humans and non-humans that are intertwined in creative engagements rather than leading separate existences. Knowledge does not derive from its object but is a creative capacity that brings the object into being; it does not stem from facts, but implies effects. Such knowledge is not the appropriation and representation

of the other by the one – of the thing by the person, of nature by society – but it is the relation, a movement from one to the other that transforms both, and that has unintentional effects.

Implicit and Explicit Emergence

We have elsewhere discussed this interdependence of relations and effects, with particular reference to the Luo imaginary[3] of sociality and time, as a pulsating movement between 'merging and emergence' (Geissler & Prince, 2004; Prince & Geissler, 2009): momentary encounters, resulting from beings' movements among and towards each other, engender 'growth'. These relations are substantial, and yet ephemeral, like flows. As we shall see, in Luo herbal medicinal practice, herbs, bodies, healing and cure are all implied in such movements of knowing; momentary relations that make bodies grow. In the MKS, by contrast, knowledge is envisaged – through systematic struggles with the materiality of the field – as stable representation of entities: plants, plant constituents, diagnostic conditions, causal links, cognitive items, cognitive capacity and cultures. Such knowledge is cast as different *perspectives* on a single reality, underscoring the hegemony of epistemology.

In this essay we contrast modes of knowing: one investing in knowledge, the other in being; epistemology vs. ontology. However, as Strathern (1988) reminded us, such 'radical disjunctions' should be regarded as 'convenient fictions'. They are not tied to particular other places, such as Melanesia or Luoland vs. Euro-America. Ontological implication is also part of 'Euro-American' ways of knowing, including science (see for example, Mol, 2002). Realness emergent from relations is found also where the scientific imaginary claims a foundation of distinct facts (Latour, 1999). However, this aspect of scientific creativity is less emphasized, indeed often silenced, in Euro-American practices, excluded from knowledge or made un-known. The difference between explicit and implicit emergence – one openly engaged in the creative possibilities of fluid relations, the other one investing in the separations and stability of representational knowledge – is important: conjuring up ancestral spiritual force in a plant is not the same as the unintended and unacknowledged emergence of recalcitrant hybrids in a spectrophotometer. As Strathern's (2009) case of controversy about aboriginal remains in British museums indicates, these differences have political implications.

The political importance of making modalities and effects of knowing explicit, of showing creative connections across scientific separations, has also been stressed by Latour. Starting from a California laboratory rather than the vales of Strathern's Mount Hagen, his tales of unachieved, lost modernity attend to the implicit, hidden creativity, underneath the purified surfaces of science (Latour, 1993; Latour & Woolgar, 1986): objects are really quasi-objects (and subjects mere quasi-subjects), facts have secret lives as 'factishes', and what we handle as things are really 'actants' who handle each

other and us. The dichotomy of knower and world gives way to 'collectives' and 'networks'. Latour's work restores to our senses the open, generative capacities of beings in relations, even and especially in the realm of 'laboratory life'. He encourages us to turn our attention to the hybrid, relational beings that proliferate in the gaps between modern separations: to name them, address them, and to engage responsibly with them. This helps us to re-conceptualize the late modern predicament and its dangers and hopes.

Yet, if one comes from a place where all knowing is already recognized as *being* – and the East African hearth, below, is one of many such places – and moves from there into a laboratory or another self-consciously modern site, as we do in this essay, what is astonishing is less that facts are factishes, but the persistent denial of this: the effort to renounce being in favour of a fiction of thingness that can be exhausted by knowing, and the desire to turn beings (and things that are beings) into things. One wonders about the consequences and potential uses – varying between different situations – of this peculiar way of knowing. This is then the aim of our paper: to share our retrospective astonishment and to trace the effects of our own work on different levels of scale – from plants to atoms and from minds to cultures. Aware of the vanity of the efforts at scientific separation and purification that the 'modern constitution' proclaims, and conscious of the unrecognized progeny of hybrids that besieges the scientific enterprise, our aim here is not to examine these in detail, or to document, again, that we have never been modern. Instead, we merely attend to the considerable effort invested in upholding a specific modern imaginary, across scientific disciplines at a particular historical juncture.

Part 1: Eliciting Capacity

We begin our account by examining a moment of healing, involving children and women in an African kitchen-hut. The conventional ethnographic narrative of African village life serves a double purpose: it outlines a particular way of knowing and relating knowledge to effects; and it introduces a way of studying this process, ethnography, suggesting some analogy between the work of knowing that we describe, and our own work towards this description. Ethnography can attend to temporary engagements, creative relations, and their underlying imaginaries of emergence in a different way from scientific representations that attempt to fix entities and patterns. This is not because ethnography provides another, better perspective on things, but because it creates its own imaginary of emergence. Deriving from encounters with unpredictable outcomes – not from 'data collection' – it opens ways rather than surveying a territory, produces stories and itineraries rather than maps and figures. Therefore, ethnography can measure up to ways of knowing other than science, including the unacknowledged effects of scientific knowing. We stress this methodological subtext to our argument, because our involvement in the MKS had begun with the work of 'social science', which we now realize is rather different from ethnography: collecting what

we referred to as 'data' we had aimed to add an 'emic' perspective to an 'etic' scientific study, embracing and embraced by scientific epistemology; scientific and 'social science' perspectives performed the same labour of entification, trying to fix reality from yet another angle; Luo medicine was stable, while the viewer's position changed.

After this introductory 'classic' ethnographic sketch, we move on to ethnographic observations of other ways of eliciting knowledge as they were successively deployed in the MKS. First, we collected medical knowledge and herbs and attempted to prove their medicinal efficacy in vitro to confirm that Luo medical knowledge is adaptive. Second, we cast the medicinal knowledge into cognitive items on which children were tested, along with other psychometric tests, to identify different components of intelligence. Finally, this other intelligence was validated by elicitation and measurement of a Luo cultural theory of intelligence. In this last step, the objective reality of medicines and minds was overlaid and confirmed with the equally objective reality of 'local cultural knowledge' about these entities. At each step, knowledge meant correspondence to real things. In the process of making differences – different medicines, different knowledges, different intelligences and different cultures – an order of disaggregated entities was made, which subsequently was aggregated into larger entities. A likeness of our own order of knowing was produced, in which every unit on 'our' side has an equivalent on 'theirs' – different but equal. In this essay we proceed in a different direction: instead of subjecting different objects one-by-one to our epistemological lenses, we follow our engagement with plants and children in the wider network of the MKS. We do not ask whether the resulting knowledges were more or less truthful or valid, but what effects different ways of knowing and making difference have, what sort of world they help us to make. We do not claim that traditional localized ethnography, being 'closest' to African realities, can best represent them, but that ethnographies of knowledge-making can draw attention to its unacknowledged effects and propose a political debate.

Shared Bodies

In 1994, before the MKS, Wenzel had participated in a randomized controlled trial of worm-treatment among school children in and around Uhero. The trial aimed to show that worms subtract nutrients from children's bodies, making them grow less and sustain less cognitive capacity, and that vitamin tablets and deworming counteract these effects by adding substance or reducing loss. Once, after stool-specimen collection, some children brought Wenzel medicinal plants for intestinal illnesses, and invited him to see their grandmother, Mary, who had showed them the herbs. During the following years Mary and her family taught us about relations between bodies, persons and plants, and knowledge and effects of medicines. Herbal medicines are mainly used against common children's illnesses: 'children teach you medicines'. As the terms *yath nyaluo* (Luo daughter's medicine) and *yath agulu* (clay pot medicine) suggest, medicine

is part of women's lives – associated with domestic and inter-generational relations. Women engage daily in treatment and discussions about medicines. Characteristically, they describe this work as 'trying' (*temo*), not as in trial-and-error but in the sense of Sisyphus' labours: a struggle without victory. Trying to restore life and facilitate growth, women draw upon contacts with others – people, medicines and unseen forces within and around the body – acknowledging *contingency* in the word's double sense of 'accidental or uncontrolled' and 'touching and relating'. Trying to harness contingency implicates another relation between person, tool and task than rational choice; a more careful way to designate aims and enlist things in one's pursuits than the execution of an individual will (see Whyte, 1997: 23). The following description of healing illustrates this.

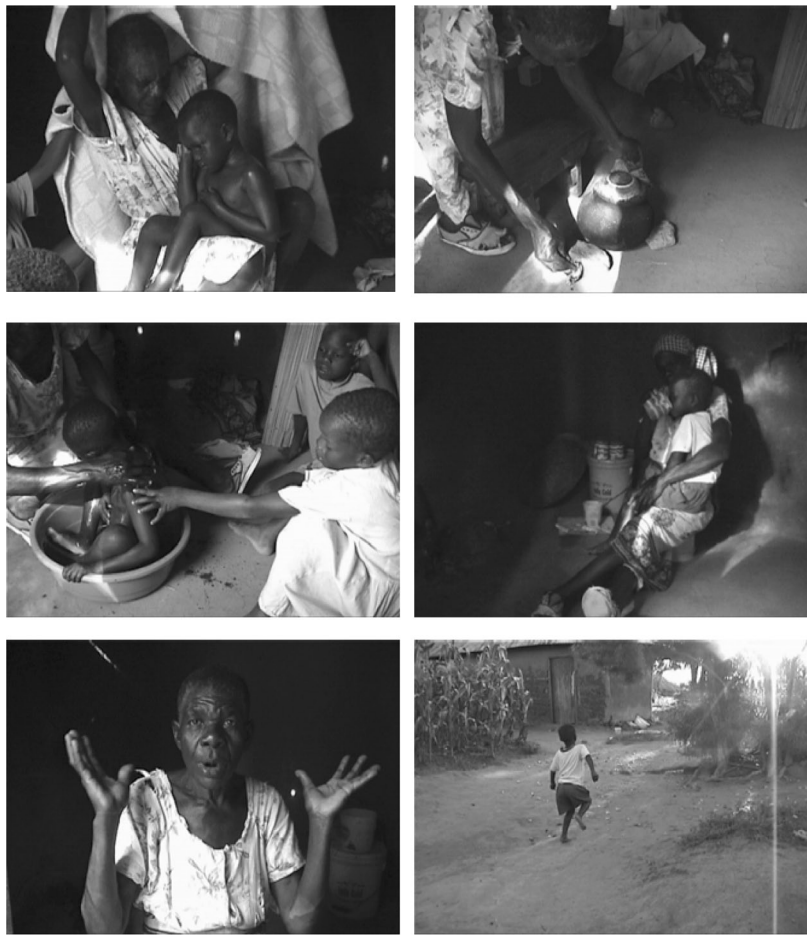
Healing and Touch

In 1999, Rebekka (b. 1944), Mary's daughter-in-law, lives with several grandchildren. Little Mary (b. 1996) has diarrhoea and rashes and Rebekka decides to treat her with a steam-bath (Fig. 1). Rebekka collects plants in the bush behind the home. Her daughter's son helps her. Their abilities complement each other: she shows him plants, he digs, and she carefully collects the plant parts. Being too old or too young, neither engages in sexual relations. Sexually active people should not touch medicines. This intentional disengagement between sexuality and healing suggests that the effect of plant medicines is understood in terms of the relations it involves, not as the innate capacity of the plant. Throughout Luo domestic life, horizontal sexual relations and vertical relations of nurture and elicitation should not be confused; for the same reason, medicinal knowledge is usually imparted between alternate generations (Prince & Geissler, 2001).

After collecting medicine, Rebekka covers the root to allow it to heal and to prevent other people from interfering with it. As the plant's healing potency derives partly from establishing a relation between human and earth, it can also be an entry point for malevolent interventions by someone who wishes to harm the patient. At home, Rebekka cleans the plant parts, stuffs them into a pot, seals it with cow-dung, and boils it on her hearth. Although she usually cooks in industrial aluminium pots, for preparing her 'pot medicine' she uses earthen pots, with their particular connotations: women, wombs and fertility; earth, moulding and creation; ancestors, spirits and memory, which underlie the herbs' capacity to maintain life.

Rebekka undresses little Mary, places the pot under her stool, sits down with the naked child and, assisted by other children, covers herself with the blanket. Mary and Rebekka joke in muffled voices about the heat, until they emerge sweating from under the blanket. Rebekka pours some liquid into a cup and some into a basin. Gently, she washes the sweat off and massages her granddaughter. She drinks some of the liquid, and gives the girl and her older siblings a drink from the cup, before she covers the pot and rekindles the fire to prepare dinner.

FIGURE 1
Steam-bath, Uhero 2001 (photographs by the authors)



Domestic medicine-use involves nearness, touch and sharing – in the steam, during herbal massage, or drinking the fluid. The healer works on the other's body in order to alter its state, but touch is here more than an instrumental action in a subject–object relation, as in 'applying medicine'. Touch itself heals and brings comfort to the body, lends power to medicines, and reflects back on the one who gives the medicine. Rebekka describes healing as '*hera*' ('love'). The term designates less an emotional disposition than concrete practices, such as visiting, talking, sharing time, place and food, or washing or treating a sick person – practices that emerge from and produce substantial relatedness and have a potential to transform those involved in them. Administered among other domestic practices, herbal treatments bring the plants of the bush to work within relations in the home.

The Composite, Porous Body

JoUhero (the people of Uhero) locate most childhood illness in the abdomen, but when asked about intestinal worms, many express the view that the body needs some worms to maintain its functioning: 'Worms are life'. Likewise, other non-human beings, such as maggots in the head under the spell of the moon, and internal organs possessing vital force and agency, are accepted within the body (Ocholla-Ayayo, 1976: 52–56; Geissler, 1998; Prince et al., 2002). This appreciation of ambiguous inner agents is critical to *JoUhero*'s understanding of illnesses being located in relationships between inside and outside, between belly and skin. Common illnesses of infancy combine different forms of diarrhoea with discoloured skin or hair, or rashes. Once illness emerges, it should be allowed to move out as part of its natural course or through medicinal incisions, sweat in the steam-bath, mucus provoked by snuff, or diarrhoea and urination induced with laxatives and infusions that 'wash' one's belly and restore flows. Such treatments do not permanently rid the body of illness agents but recreate continuity between inside and outside. The course of an illness is determined by this permeability of the body's surfaces and orifices, which medicines facilitate.

Illness and death result from impermeable body boundaries and cessation of vital flow. Therefore small children are massaged with plant material to ensure flexibility and softness and to prevent illness. Children are sensitive to changes of environment, and parents who move house with young children ought to take water from their original place of residence, mix it with water in the new place and bathe the child. In this way, substantial flows between body and different places are merged and the child is opened to its new environment. In turn, detached parts of the body can affect a child's well-being. The placenta should be buried in order to tie a person to her place, and to prevent others from using this vital link malevolently. Likewise, hair, faeces or footprints can be used to affect a person.

Ancestral spirits act in and on the child's body, sustaining her life as well as potentially causing illness (Ocholla-Ayayo, 1976; Hauge, 1981). Such spirits are not usually exorcized, but appeased or directed to somebody else (Evans-Pritchard, 1950; Abe, 1978). The spirit's agency is not considered harmful as such; problems arise from disturbed relations between living and dead people. This interfusion of person and body with the forces of other people, including the dead, makes it crucial that children are named after the right people: a wrong name can affect personality and health and cause sickness and death (Geissler & Prince, 2004). The notion of 'possession' is of limited relevance here: the critical question is not who *owns* a person's body – her self or another force – but to whom she *owes* her life.

For biomedicine and especially parasitology, only the whole, bounded and single body is healthy, while intrusions and divisions equal sickness. By contrast, child-care practices in Uhero acknowledge that the inter-action and interfusion of children's bodies with others is a source of life-force. The child's vital capacity does not reside in an essence, contained within its body boundaries, but between child and others. This relational notion of

capacity means that the child's growth is not an unfolding of given internal potential towards predetermined effects, as we shall suggest is characteristic for the capacity sought after by our scientific MKS project, but a less predictable event that occurs between moving persons and things. The constitution of the body as open and interfused with others and this transitional, indeterminate notion of capacity allows for continuous renegotiations of children's being in the world: worms curl up when they drink plant infusion; head-worms are calmed by herbal snuff; vapour opens the pores and releases illness; other medicines restore volatile ties with the spirits. Each relationship provides entry points to effective action, which inevitably remains open-ended, as none of the body's many inter-agents is defeated. Herbal medicines, though powerful, are imagined not as weapons to destroy illness agents, but as means to get in contact with ambivalent life forces, restore continuities, unblock passages and open surfaces, and make new pathways of life.

Herbal Medicines

JoUhero's herbs can do this, because, growing from the land, they link living and dead, persons and places, bodies and world.[4] Embodying relations, they are beings with whom one engages, not objects one utilizes.[5] When they are ingested, inhaled or absorbed into the body, plants do not just *symbolize* ancestors: they bring living and dead in touch, and this touch is, again, where the capacity to elicit growth lies. This transformative capacity of ingestion pertains to everything grown on one's land. Food does not simply add matter to the body, as in 'nutrition'. Eating the fruits of one's land, one's body and person partake in the growth of the land. Eating makes affinal relations, incorporates wives into their husbands' place, and non-kin settlers into their host's group. In turn, it is dangerous to eat food within troubled relations: a mother-in-law must not touch her son-in-law's food before he has brought bridewealth; eating food grown on land that one has sold (breaking ancestral ties) can kill one. Earth itself can be ingested to elicit and to interrupt growth: commonly eaten in pregnancy, earth can treat illness associated with ancestral forces; and, if ingested during a perjurous oath, earth can kill (Geissler, 2000). As the power of medicinal plants resides partly in relations between place and people, dead and living, past and present, people have special ties to plants of their place. Young wives return to their parental homes to collect medicines for their children; townspeople receive medical supplies from rural homes; Luo migrants abroad consult Luo healers. Herbs, like food and earth, are ties across space and time; embodied relations, growing and engendering growth.

As plants' capacity is not contained within them, in inherent properties, but in relations, medicinal plants are nobody's individual property. Medicines can be picked freely and the term *wuon* ('father/parent', also commonly translated as 'owner') *yath*, which designates the person who knows a medicinal plant, does not imply ownership as much as

responsibility and genealogical attribution (as a father is not his children's 'owner'). When one *JoUhero* bottled herbal remedies and transacted them on the market, turning a local medium of relatedness and growth into an object of exchange, another *JoUhero* (otherwise not opposed to market exchanges) complained. Similarly, healers who charged fixed 'prices' for their services, rather than 'just being given something', were subject to suspicion. Market relations contradict a medicinal knowledge premised upon the logic of sharing.

Herbal medicines' power also resides in relations between living people. Luo herbs are not a domain of expert knowledge but a communal resource of (mainly) women (Geissler et al., 2002). No woman knows all medicines, and women move with marriage between places with different flora and different knowledges. Thus, sharing knowledge about medicines is part of domestic life, linking and transforming the medicinal knowledges of generations and places. If someone shows one the 'root' of a medicine (*tiend yath*), this knowledge remains tied to the giver, and her name may be evoked in the course of treatment. Such relations to other knowledgeable people are part of the medicines and among the sources of their effects.

The fact that medical knowledge is owed to others is demonstrated by a story that a knowledgeable woman told Ruth about how she, as a child, acquired her first medicine: a dirty old woman she had met in the bush had asked her to be washed; after she had done so, the old woman had given her a plant and blessed it by spitting on it before she disappeared (Prince & Geissler, 2001). Entering into material contact with the woman through touching her body is here the first step towards sharing powerful knowledge; the sharing of capacities is predicated upon, and enforced by, material engagement. In a similar story about the acquisition of healing power, a father travelling home from Nairobi to get medicine for his sick child shared food with a stranger on the train, who afterwards gave him an herbal medicine for the child. Only after the stranger had alighted did the father realize that he had been one of his 'old people'. Medicines are, like food, land and even dirt, substances one shares with others – women of one's home, or ancestors in dreams and on trains.

Medicinal plants can be described as traces of relations. Traces materialize past encounters; they are substantial, yet ephemeral. They witness the conditions of their creation. Like the imprint of a foot in the mud (which also contains medical capacity), a plant in the bush is a trace of past contact. Getting in touch with these traces evokes the transformative capacity of consubstantiality, and channels it into future relations: one's children and descendants. The capacity of traces does not lie dormant inside the things, untouched by time, but exists in its momentary engagement with others, when it links the present to past and future occurrences. The outcome of bringing a trace to work on a body is never certain. Thus, one keeps trying.

The relations in which medicinal plants are engaged are not lines between given entities, connecting points on a map. They are movements that intersect and momentarily take on form, as persons or things, where they get in touch, and transform persons and things as they move on. What *is*, in this understanding, is the overall forward movement, or 'growth'. Figures and forms arise from this movement. It is not things and persons that are given, but the growth that makes them. Herbal medical practice – its concepts of body, well-being, illness and treatment, of knowledge and medicinal capacity and effect – is premised upon continuity and openness between inside and outside, humans and land, and between humans in time. The expression 'root of the plant' (*tiend yath*) points, rather than to the 'plant itself' – its name and identity – to a generative relation that implicates the plant with the place, and the person who gives it, establishing knowledge as a relation between living persons, place, and the people of the past. As the genealogical connotations of concepts such as *wuon yath* (parent of the plant) and *yath nyaluo* (Luo daughter's plants) underline, plant growth, medicinal knowledge and human life rely upon analogous and intertwined generative processes.

Knowing Knowledges

Scientific knowledge is often thought of as approximation to reality; such knowledge and its effects are linked by action: if knowledge corresponds to reality, then action guided by this knowledge will have aimed-for effects. By contrast, the medicinal knowledge we sketched in this ethnographic vignette is searching, directed but open: its truth is not an essence but arises from engagement. Ethnography inserts itself into this search into an emergent reality, and extends it in the ethnographic text, which is an effect of movement and encounter, rather than a mere representation of objective reality. Below, we shall complement the above 'conventional' ethnographic sketch of village healing with ethnographic examinations of other, first scientific and then 'social science' forms of knowledge making.

Our argument is not that one form of making known is more truthful, nearer to reality than the other – this would be as futile as an ecologist, a botanist, and a molecular biologist competing for closest correspondence to the world. Instead, we argue that the ethnographic attention to shifting relations, and to effects, instead of essences, provides a different direction of knowing. This other direction is important, not because it reveals perspectives and complexity that science hides, but because it calls for attention to effects of different forms of knowing – and their ethical and political implications. The effect of systematic reduction to essences can obviously be 'good', as when penicillin is isolated from a fungus and its effects proven in indubitably reductionist but unequivocal clinical trials (and the resulting drug made accessible to those who need it), and holism can be detrimental if it obscures possibilities of effective action in diffuse complexity. The question is not about good and bad ways of knowing, but about making their effects seen – within particular constellations and situations – in view of political debate.

Collections, Identifications and Extracts

Herbaria

Equipped with this ethnographic outline of herbal healing, we turn now to the scientific, ethnobotanical work in which we engaged *JoUhero*'s plants. Attempting to catalogue the Luo pharmacopoeia, we gathered about 100 medicinal plants, dried them between newspapers, and carried them home to Europe.[6] The most beautiful 'specimens' consisted of whole plants, flowers and fruits, compounding the plant's lifestages into single objects (and enabling botanical identification). To obtain such 'complete' specimens required collection of materials from the same plants, hidden in thick thornbush, at different times. Moreover, the women we asked about the plants gave the same plants different names and used the same names for different plants; one plant could be used for different illnesses and prepared differently; illnesses were untranslatable, and their signs diffuse; some plants were used but had no name, other were given names and attributed power, but the women did not know for what. We solved these problems by creating distinct units of information from the confusing conversations: each time a woman pointed at a plant, we recorded name, illness, part used and preparation on one page of our notebook. If a plant had several uses, we wrote them on several pages, each representing one 'medicine'. Information that did not fit into this schema, as well as doubts and speculations, were omitted, and mixtures were attached as cross-reference to single medicines. Defined single entities were the basic unit of representation and, by implication, of reality; movements and relations were rendered as secondary attributes of these entities.

Back in Europe, we sought help at the University Herbaria to identify the plants: to ascribe to them Latin names and places in the Linnaean classification system. Specimens were removed from the Kenyan newspapers and attached with paper strips to thick sheets of paper that were numbered, labelled and deposited in the old herbarium's cupboards. Ethnomedicinal information was assembled in a database, references to earlier studies added, and the resulting table of 'Luo mothers' medicines' published in an ethnobotanical journal (Geissler et al., 2002; see Fig. 2). By a few physical transformations and geographical dislocations, the plants had been removed from the undifferentiated, impenetrable bush, made into specimens, and re-inserted into a highly differentiated and unequivocal botanical, archival system. Reading the final table horizontally, we get the purified version of the Luo women's conversations: 'This plant [1st column], treats [2nd], you prepare [3rd] from plant part [4th]'; then the botanist adds: 'this species [5th], belongs to family [6th], and others have said [7th]'. Each line stands by itself; vertical connections have been cut (the scars marked by the occasional vague note 'mixing'); the lines are ordered according to botanical families.

Laboratories

Once this information was available, two Danish pharmacology students set out to test the plants' efficacy against infections: blood flukes and intestinal

FIGURE 2
Herbarium specimens of a plant from Uhero (photographs S. Harris).

worms, blood and tissue parasites, bacteria and fungi. For the production of the plant extracts used in this in vitro screening (observing effects on organisms in a glass tube) large amounts of plant material were needed, which in the case of small leaves was cumbersome for us and amusing for *JoUhero*. Drying the substances to preclude further transformations (for example, mould), proved difficult in a mud hut at the start of the rainy season. Some plants gathered in the first collection were different species than those collected, under the same name, during this second harvest. Eventually, we dispatched a box with labelled, brown paper bags of weighed materials to Denmark. Here, the plant materials were pulverized, and water-soluble and non-water soluble extracts made:

> 250 mg of plant powder [were] weighed into a test tube and mixed with 2.5 ml extraction fluid in an ultrasound bath for two hours. The test tube [was] left in a refrigerator over night. In the morning the extract [was] centrifuged at 2–3000 rounds per minute for 5 minutes. The supernatant [was] transferred into a beaker. Where the supernatant [was] turbid, the extract [was] passed through a filter dipped into extraction fluid. These raw extracts [were] used for the screening of the plant material against micro-organisms. (Olsen & Nielsen, 1999: 37; our translation)

Invisible in the clear liquid, the plant's pure capacity was almost reached – but not quite yet.

The extracts were employed in 'bioassays'. The plant's potential to restore human health was gauged by its ability to kill disease agents and

parasites. Like the plant extracts, these organisms had to be pure – both as species and regarding contamination with other substances or organisms – which was achieved by buying 'standard micro-organisms from American Type Culture Collection and International Mycological Institute' (Olsen & Nielsen, 1999: 34). Separating different life-forms was not always easy: the experiments on Bilharzia 'had unfortunately to be abandoned because the snails [the parasite's hosts] had a lethal bacterial infection' (Olsen & Nielsen, 1999: Preface). Thus, we do not know about the plants' activity against this common Kenyan disease.

Three different bioassay methods were used. For bacteria and fungi, 'bioautography' was employed: spots of plant extract were placed on Petri dishes with a growth medium, the dishes were sprayed with the micro-organisms in question, sealed with sterile film and incubated at body temperature. Further treatment made visible 'inhibition zones' around the spots, indicating the plant extract's capacity to delimit growth ('bacterio-static effect') or, ideally, to extinguish the organism ('bacteriocide'). Life equals here 'growth' in the sense of competitive territorial expansion. As the method's name indicates, life in this particular conquering and accu-mulating sense, or the capacity to prevent such life, inscribes itself on the surface of the artificial growth medium.

For the blood parasites, such as *Plasmodium sp.*, which cause malaria, human blood infected with the parasites was incubated for 2 days with the plant extracts. A radioactive medium was added and, after the parasites were dried, their previous rate of growth was measured through the amount of radioactivity they had taken up, and compared with a control without plant extract. The outcome was 'growth inhibition', ideally 100%, meaning zero growth and the death of all parasites.

The larger worms and flukes had to be produced for the experiments. Testing the extracts on worms in their natural habitat, bloodstream or intestines, introduces uncontrollable interactions, which is why the para-sites needed to be sustained in vitro, in a controlled, standardized medium. One example helps to gauge the complexity of this task:

> 10 snails [the Bilharzia parasite's intermediate hosts] [were] placed in a 10 ml beaker with 3 ml snail-water and left for 3 hours under a lamp. The lamp's height was regulated to obtain a temperature of 25–27°C [simulating a tropical pond]. While the snails shed the cercariae [the stage of the parasite outside the snail, which infects the human] the penetration-tube was pre-pared. The lower part of the tube was filled with cultivation medium and placed in a 37°C water bath [simulating body temperature], while the upper part was at room temperature [simulating the leg of a human standing in Bilharzia-infested water]. Immediately before the cercariae were added, a shaven and well-cleaned fresh piece of mouse-skin was stretched over the lower part of the penetration tube [to simulate the human skin into which cercariae penetrate, transforming into mature worms]. After three hours the snails had shed ca. 2000 cercariae, judged by 10 intermediate counts of 5 µl of water, which each contained ca. 30 cercariae. These were transferred to the upper part of the penetration tube, while the lower part was wrapped in foil, to make the schistosomula [the first worm-like stage] search towards

> the mouse-skin and the warm medium. After three hours, the lowest millimetre medium, including the schistosomula, was transferred to the test wells. (Olsen & Nielsen, 1999: 48–49)

While this instruction may seem complex to the uninitiated, it conceals the actual difficulty of developing this method, through series of failures, due to temperature, cleanness and thickness of the mouse-skin. Once produced, worms were exposed to plant extracts in different concentrations. After incubation, the worms were dyed to distinguish dead and living worms (killing all in the process). The percentage of dead parasites was calculated to determine 'the lowest effective concentration … of extracts, which was able to kill all parasites' (Olsen & Nielsen, 1999: 63). To ascertain that no uncontrolled factor disturbed the experiments, the procedures included pure positive and negative controls: a clean medium for the parasite to thrive on, and one with a chemical to eradicate the organism. The hoped-for result was a dead pathogen: a test-tube free of growth. In this standstill the definite truth, the plants pure capacity, would have been revealed.[7] The relative efficacy of each extract was calculated against this absolute value (see Hayden, 2003).

The most 'active' plant extract underwent subsequent 'bioguided purification'. It was concentrated, freeze-dried, diluted and run through a chromatography column, which fractionated it, according to its running speed related to molecular structure, into 448 fractions, which could be grouped into 18 fractions. Among these, two fractions were bioautographically shown to be active: these were again concentrated, freeze-dried, diluted, and chromatographically split into 22 fractions. Of these, four were active and these were fractionated in a third column system, providing 185 fractions, of which two active ones, 'A' and 'B' were selected for nuclear magnetic resonance (NMR) spectroscopy to identify their molecular structure. However, alas, not enough of substance 'A' was left: 'signals from the active substance disappeared in the background noise, since there has not been a sufficient amount of active substance for visible signals to occur' (Olsen & Nielsen, 1999: 80). Worse still, substance B 'had undergone chemical transformation during the cleaning process' and was 'insufficiently purified' to read the atoms' signals and discern the molecular structure (p. 81). The limits of purification were reached; vision became blurred again and separations doubtful. This is where this study of Uhero's plants ended. Insufficient collection and the material's ability to transform itself meant that despite the students' good work, the study had failed to discover a new pharmaceutical lead. The aim of this search was finality; the atoms, purified from distractions and changes, standing still and emitting their true signals – truth as the end of time and process. Like so often in narratives of scientific discovery, this destination had almost been reached and had only just been missed, it seemed, due to some minor, avoidable errors.

Ethnopharmacology: From Rebekka's Kitchen to the Atom's Signals

Our ethnopharmacological inquiry moved, through extractions, separations, purifications, from the entanglements of thornbush and women's

lives, through herbaria and laboratories, to the atoms of the active principle: an essence in which substance and capacity become one, apparently without further relation. Diving into matter, as if zooming through high-resolution imagery of village and bush, larger relations and movements become invisible: universal truth is reached beyond particular reality. This search for universals in atomic specificity tries to do away with relation and process, but the attempt to grasp stable chemical compounds is disappointed when the active principle decomposes and thereby evades its definite spectroscopic representation.

As the efforts described above illustrate, the *data* that our endeavour aimed for – from women's knowledge to molecular structures – were not given, but were made through work on the material. First, we extracted plants from relations to people, soil and seasons; identified them, collapsed their developmental history into herbarium sheets, and attached adhesive labels onto them, expressing the little we knew about their relations. Our subsequent work followed the opposite strategy: splitting carefully assembled whole plants – grinding, extracting, fractionating – into atoms, the smallest conceivable, indivisible wholes.

While separation, dis-entanglement and purification were stated goals of this scientific endeavour, literally enacting the 'modern constitution' of science (Latour, 1993), these procedures forged new connections at every stage. The herbarium makes relations between specimens in the Linnaean classification and shelving, and in the personalized collections of notable plant collectors; it connects past and present research through cross-referencing and creates links with the history of the University's collections, and with the future of scientific progress and phylohistorical remembrance. The laboratory produces networks between students of different diseases across the world: snail-experts and mouse-modellers linked to snails, mice, worms and microbes, spectrophotometers and chromatography systems. In the future loom pharmaceutical companies, pathways of synthetic drug production and drug trials on human populations, which might take the extracted, purified, identified and synthesized active medicinal substance back to be tested on people such as *JoUhero*. In this process, ostensibly of purification and isolation, new worlds are opened, new fields of activity for the plants from Uhero conquered, and widening networks woven and shaped by extending and cutting relations.

These new ways of making Uhero's plants known are no less 'complex' or 'holistic', not more 'reductionist', than our ethnographic description of Rebekka's healing. Their difference lies in the sequence of separations and relations: whether relations are conceived of as producing entities, or as being made between them; whether ties are necessary to produce things, or to be dispensed with in order to lay bare 'real' things. Our ethnobotanical and pharmacognostic trajectory aims to get to the bottom of matter, where, finally, stability should prevail (see Traweek, 1988); through purification, the universal 'nature' of the entity is identified. Relations (among humans, non-humans and between them) constitute in this view a specific, non-natural or

social 'context', and they are secondary to this primary identity (plant, substance, principle); as far as pharmacological analysis is concerned, such relations may be a potential hindrance.[8]

The problems that the indeed very 'active' substances and organisms posed to the investigators, remind us that things are not just there, and that to discover their essence requires work. Despite the transformations that we achieved from clay pot to the chromatography column, we reached no end. Yet, we conceptualized the contingent interaction between humans and non-humans in this work of discovery as a left-over, a margin of error, a lack of precision or a not-yet, that should be remedied by sharpened tools. Now, there was not enough of substance A, but another expedition, a larger extraction, a more refined laboratory will bring us to the molecular level; next time we will see substance B before it evaporates. As long as we can make things purer, we move towards truth. This imaginary neglects the resilience of matter to analysis, and the creative capacities of new connections.

This foregrounding of separation is where our ethnobotanical engagement with the plants differs from Rebekka's knowing and being in the world: for her, the plant's erratic collaboration is a taken-for-granted part of a creative relationship. She can name some of the relations involved in this encounter, such as certain relatives, but most of these relations remain diffuse, embodied in amorphous matter, such as earth. For Rebekka, these ties and movements are not imperfections or insufficiencies, leftovers on the way to pure knowledge and capacity: they *are* capacity, which needs to be carefully elicited. In her practice, these links are not after but before the facts. Such facts are made and act in relations, they are in Latour's (1999) term 'factishes', only in this case Rebekka is, unlike Latour's laboratory scientist, very comfortable with the, to her self-evident, overlap between fact and fetish. While most *JoUhero* seem little perturbed by their plants' hybrid, transformatory and mutative capacities,[9] we strove in our research to exclude or hide these traits in order to discern entities, to know the world as large and small wholes.

Revealing What and Why?

Set against the imaginary of scientific concealment and separation, ethnography is sometimes described as a work of revelation and completion. This suggests a misleading epistemological equivalence between ethnographic and scientific knowledge; as if the two would add up; as if ethnopharmacology could make for a better – 'alternative', 'holistic' – pharmacy by including life's complexity into its products. Yet, isolating an active compound from its complex origins, or synthesizing effective pharmaceuticals, requires reductions and purifications (and pharmacists are of course aware of the inherent reductionism of their work). Instead of re-introducing 'complexity' or improving the fit between scientific knowledge and reality, ethnography can address the unacknowledged participants and engage with the implicit relations involved in pharmacological work – more akin to Rebecca's 'trying', then, than to laboratory analyses. Not necessarily

making better medicine, but attending to the effects of drugs within political and economic relations.

While we, thus, do not deplore, nor aim to remedy biomedical essentializations and their powerful effects, we are more suspicious about the consequences of similar epistemological operations in the realm of the human or 'social' sciences, when imaginaries of purification and testing are transferred from the laboratory to other spheres of life. In the reminder of this essay, we turn our ethnographic attention to a series of social scientific studies of minds and persons, society and culture, which followed from the initial studies on Luo medicines. Concealment and purification appear to us more problematic in these cases than in drug production. Revealing patterns of the invisible and visible is then a step towards political critique.

Part 2: New Persons, New Relations

Plants and Cognition

While the pharmacognostics in Copenhagen fractionated our plants materials, we remained in Uhero conducting research on human cognition, studied by means of African plants. This project arose from wider academic interests in the impact of parasites on African children's physical and cognitive development (Nokes, 1996), the assumption being that intestinal parasites reduce body substance, and that this reduces the growth of the mind sustained by that body. Hence, the defence of bodily boundaries against parasites, or their eradication within such boundaries, promotes physical and mental development, understood as the unfolding of an inherent capacity through accumulation of physical and cognitive substance. The cultural specificity of this parasitological model of body and mind becomes particularly obvious in contrast to the one sketched above, which recognized bodily *openness* as precondition for life and expressed a lenient attitude towards worms and other co-inhabitants of the body, regarding body and person as partible and composite.

To prove the detrimental cognitive effects of parasites to potential public health funders, parasitologists needed tests to distinguish between the cognitive capacities of infected and uninfected people. Ideally, such tests should be 'culturally sensitive' and measure locally relevant cognition; for example they should measure locally relevant 'practical' instead of culturally specific 'academic' intelligence (Sternberg et al., 2001). Luo medicinal knowledge lent itself to this task, and a group of scientists studying, respectively, worms and cognition (Nokes, 1996), parasites and medicines (Geissler et al., 1998; Prince et al., 2001) and intelligence (Sternberg, 2004) set out to measure the practical intelligence of Uhero's children with an MKT and to see whether this measurement was positively or negatively associated with standard intelligence tests. This psychometric study, aiming to create a culturally relevant test that would elicit a specific Luo intelligence, allows us to reflect further on understandings of persons and minds, relations and differences. Just as *JoUhero*'s medicines were worked

upon on their way to herbaria and test-tubes, medical knowledge was transformed to make this new intelligence test.

Intelligence and Adaptation

In their study, 'The Relationship Between Academic and Practical Intelligence: A Case Study in Kenya', published in *Intelligence*, Sternberg et al. (2001) distinguish between two types of intelligence, one that is the same everywhere, and one that varies in different socio-cultural contexts. The authors object to measuring people in 'non-Western' societies on academic scales alone. However, individual cognitive difference, or intelligence, and its measurability remain unquestioned universals. Intelligence is 'developing expertise' (p. 405) or 'cultural adaptation' (p. 415). Intelligence tests measure 'acquisition and utilization of knowledge' (p. 405) and 'predict performance' in a relevant environment (p. 402). Intelligence is here emphatically 'successful intelligence' (Sternberg, 2004): a capacity located inside the individual person that is appropriated and accumulated, and utilized in individual, will-driven action for the benefit or survival of the individual in possession of it. This implies competition for benefits or survival, and may also (but need not) include, as secondary aim, the benefit or survival of others whom the individual cares for.

'Practical intelligence' or 'tacit knowledge' is in contrast to 'academic intelligence': 'what one needs to know to succeed in an environment that one is not explicitly taught and that is usually not even verbalised' (Sternberg et al., 2001: 404). To measure practical intelligence, individuals are given 'items':

> scenarios … in which people face on-the-job problems [… and] a variety of options for solving the problems … [and are] asked to rate the quality of each of the options on a scale of 1–9. … The ideal evaluation for any intelligence test would be individual 'real life' success, but as such a timeframe would exceed most researchers' patience and funding, proxy measures such as expert views must suffice. The closer the participant's profile is to the mean profile of the experts, the better the score on the test (p. 404).

Among US military personnel, African peasants and Alaskan hunters, practical intelligence does not correlate with academic intelligence. The two are different, and practical intelligence might indeed 'predict criteria of job success as well or … even better than does IQ'; for example, practical intelligence, and not IQ, predicted their superiors' ratings of American soldiers. Within this frame, our Uhero study aimed to confirm the distinctiveness of practical and academic intelligence in 'a culture rather far removed from Western cultures' (p. 406).

Uhero schoolchildren's medical knowledge was particularly suitable because their health was compromised by infectious diseases, so that medical knowledge was particularly adaptive. The study's initial outcome measures were intensity of infections, frequency of illness and ability to work, reflecting the tested intelligence's relevance to 'real life success'. Implicit to this selection of dependent variables is a causal sequence:

increased medical knowledge reduces infections and illness, which in turn increases productive ability and success. This chain assumes that *JoUhero*'s imaginary of illness and healing is the same as a tropical doctor's ideas about infections and pharmaceutical effects, and that success is a correlate of individual psychological and physical capacity.

When our tests were analysed, no significant effects on these outcomes emerged, which was attributed to insufficient sample size and the imprecision of *JoUhero*'s empirical knowledge. Again, we were non-yet-quite-there. We did not ponder the possibility that *JoUhero* might know plants differently, relate them differently to their bodies, and select them for different effects than parasite reduction or anti-biosis. Despite the statistical findings, the study's implicit assumption remained that medicinal knowledge was adaptive; that it enhanced individual chances of success. Otherwise it would not have been 'intelligence'.

Itemizing Medical Knowledge as Rational Choice

Eighty-five children were randomly chosen to neutralize confounding variables arising from relationships between them. They were given a test consisting of 'items', each providing an illness or symptom and a choice of correct and incorrect herbal remedies.

Correct items were derived from our ethnobotanical table, combining causal reasoning and rational choice. A sign or symptom is given a name, which leads to a tool, the plant, and calls forth a solution, a treatment. This clinical-style of reasoning is imagined as located in the mind of a rational agent. An example of a 'simpler, one-step medical knowledge test item' is the following:

A small child in your family has homa.
She has a sore throat, headache and fever.
She has been sick for three days.
Which of the following Luo medicines can treat homa?
1. Chamama. Crush leaves and put into the nose. [correct]
2. Kaladali. Drink an infusion of leaves. [correct]
3. Obuo. Crush leaves and put into the nose. [false]
4. Ogaka. Pound the roots, add water and drink. [false]
5. Ahundo. Crush leaves and put into the nose. [non-existent herb]

The items used multiple-choice because this format produces unambiguous, individual measurements. 'Children were reluctant to volunteer answers … about herbal medicine' but they were 'familiar with the multiple-choice format from their schooling and … comfortable with it' (Sternberg et al., 2001: 409). One wonders whether the choice of a format that the children knew from school was ideal to assess a capacity that supposedly was non-academic. More importantly, multiple-choice constructs knowledge and action as a subject's choice between pre-set options for optimizing an outcome. This way of relating cognition and practice presupposes a

notion of knowledge as information stored in the brain, and of practice consisting of intentional acts upon the objective world guided by knowledge, leading to success.

While splitting up healing practices into separate cognitive items, the test simultaneously proposed larger, bounded wholes: the totality of medicinal knowledge, which the test quantified; and the whole of the mind, which contained this knowledge alongside others, and which was approximated by the test. This double production of parts and whole – equivalent to herbarium specimens and active atoms, botanical species and Linnaean classifications (or classifications of individual and society in anthropology) – seems characteristic of much scientific thinking. Before we continue with the administration of the test and its effects, we want to go back to Rebekka's home and contrast the test's particular rendering of medical knowledge with a dialogue among *JoUhero* that gives a somewhat different picture of knowers, knowledge, and what is known.[10]

'You Just Try … '

NyaSakwa, Rebekka's youngest co-wife sits in her kitchen with Ingeborg, her 6-month-old daughter named after the ethnographer's mother/mother-in-law. Her mother-in-law Mary passes by to find embers with which to light her pipe. Ingeborg is crying.

> **Mary (M)** (lighting her pipe): Why is my friend crying?
> **NyaSakwa (N)**: The worm has followed her .... He strangles her and she vomits and sweats [*luya*].
> **M**: Why don't you just start with these people's medicine for … ?
> **N**: Which medicine?
> **M**: … for evil eye. The one they gave you earlier.
> **N**: Judith [a neighbour] refused to give my husband this medicine; do you think she would give it to me?

The first sentences of this encounter with the mother-in-law brought up two different aetiologies, but this does not stir a debate about what the 'real' illness is; for example, with reference to specific, named symptoms.

> **Wenzel (W)** (to NyaSakwa, pointing at Ingeborg): So this is *luya*?
> **N**: Yes, those white ones that swell on her head are *luya*.
> **W**: And *luya* is the illness she suffers from?
> **N**: *Luya* is just sweat just like you are perspiring now. These are just things of her body; not an illness.

As on other occasions when the ethnographers search for illness entities. the question: 'Is X the illness she is suffering from?' had failed. In everyday conversations, this question, or its affirmative answer, hardly ever figured. Instead, one would say: 'It could be X' or, more commonly: 'Why don't you *try* (the medicine) Y?', suggesting a medicine rather than an illness category.

> **W** (to NyaSakwa): Why do you then give her medicine?
> **N**: I try to treat her with Luo medicine that she drinks.

W: Which medicine?
N: Luo. Of the pot.
W: Yes, I mean, what is its name?
N: The name of that medicine?
W: Mmm.
N: I don't know; I just pluck it from the bush here.
N (to Mary): How is that plant called? She drinks *ober* and … for *wuoyo*, and I have also given her another one for *nala.*

These two new potential illnesses, *wuoyo* and *nala*, are like most infant illnesses marked by intestinal and skin symptoms they call for treatments such as steam-baths, which open up blocked body boundaries and orifices. Again, the issue – which specific illness the child 'really' was suffering from – was less important than the fact that she had been treated. Healing is an aspect of maternal nurture, which is a continuous engagement with the forces that pervade a child and affect her wellbeing.

N: Mary, that plant that you told me to massage her with yesterday, can I mix it with any oil?
M (to NyaSakwa): You just mix it with any oil that you can apply to her body. … [Looking into Ingeborg's mouth.] What have you put on this child's tongue?
N: She has drunk medicine.
M: Is that what is stuck on the tongue?
N: Yes, her tongue was bad, and I usually give her that medicine for *nala*.
…
M: You should have tried *atipa* for 'false teeth'.
N: Look now, her stomach aches so much that she doesn't want anyone to touch her. …
M: Oh, my dear friend!
N: I am still looking for the medicine that I was searching, when you saw me the other day. …
M: What medicine was that?
N: It grows up, behind your house. Where you cleared.

More illnesses and plants were mentioned. 'False teeth' (see for example, Mogensen, 2000) was the fifth potential aetiology suggested in the course of 5 minutes, and again the question of what to do took precedence over the question of diagnosis. The ethnographers, concerned with their little 'mother's' well being, joined in.

W (to NyaSakwa): Would you like us to take Ingeborg to Usigu [the government health post]?
N: I am tired of Usigu … You are just told about money. Here ten shilling, there ten shilling; you expect you will be given drugs, … [but] you are told 'there is no medicine, go and buy it from the shop'. … I stopped going to the clinic. …
M: You Luos you are stupid. Just try pot medicines on my friend! Long ago when there were no hospital medicines, weren't people growing well? …
N (trying to focus Mary's attention again): Look at the stomach! She pulls it in until it reaches her back. … There is something pulling in the stomach. … That thing just follows the lower stomach up to the loins. …

M: Do this: take soap and massage her stomach. You massage until the soap makes foam.
N: Like that blue bar-soap … ?
M: Yes. Massage her well! Do not throw this friend of mine away! …
[Mary sends Wenzel to fetch embers for their pipes.]
N (to Mary): Look at her stomach, now! If you touch that stomach of hers it is war.
M: Yes, you just massage her. It could be *okulbat*.
N: I thought *okulbat* is when the body is cool and she sleeps and sleeps …
M: That's the one!
N: … but when the worm has just started to make brrrrr sounds, isn't it … ?
M: Yes, probably it is just the worm.

The conversation had come to an inconclusive end. Any of its threads could be taken up at the next encounter, or if the child gets worse. The ethnographers, however, wanted to see something happen.

W (to Mary): Mary, why don't you try to treat this child? …
M: But don't you see that I have treated her!? I said she should be massaged with soap!
W: Is soap Luo medicine?
M: Yes.

N: If I could find Kaluma [mentholated ointment], I could massage her with it, after massaging her with soap. … I could mix Kaluma with that medicine you told me to use, couldn't I? It is difficult to massage her with medicine and then with Kaluma. Wouldn't it be good to mix them? Or are these medicines not to be mixed?

M: Why don't you massage her with the Kaluma that you once had?
N: The Kaluma got finished when the children had measles. I did not buy a new tin.
M: Then you are the one who makes the child sick, my dear. Is there no Kaluma in the shop?
N: This is what I wanted to come to you for.
M: So that I give you money?
N: Mmm.
M: I don't have any money [pointing at Wenzel]: you had better ask Wenzel.

We took Ingeborg to hospital, but although she received vaccinations and antimalarial treatment, she continued, like most infants, to be sick at times, and the women's conversations continued. Illnesses were discussed and medicines tried, but no 'real' illness or 'right' medicines were identified, and months later there was no end to trying. Meanwhile, Ingeborg grew tall and fat.

It would be difficult to extract causal trajectories – malfunction–diagnosis–treatment–function – from this conversation. One could extrapolate that, for example, 'soap treats stomach ache caused by worms' – but if one then asked the women to confirm such a cognitive 'item', one would just provoke further debates. More than a choice of tool was at stake: care, responsibilities, affection. Talking, being together, and treatment are ways

of 'trying', not in the sense of 'trial-and-error' (like a doctor without diagnostics) or of insufficient means (like a pharmacologist failing to identify a molecule). Trying is here not a not-yet-there, but a mode of continuously staying in touch with events. The women's questions aim not for the certainty of truth, for underlying physical reality, but for a path forward, for possibilities and opportunity for action. Their 'If' is the condition of the next step, and as long as one moves, one lives.

Comparing Amounts of Knowledge

These subjunctive and relational features of everyday medicinal reasoning contrast with the medical knowledge test's closed 'items': there were no delimited illnesses or medicines; no clear actors; and no unequivocal causal chains and optimal choices. Instead, tentative connections extended in various directions, searching for a way forward. In spite of these differences, we eventually convinced some of the (reluctant) knowledgeable women to act as 'expert sources of information' and to respond to the test's 30 items to validate them and to set scores: 'There was some disagreement on what herb was considered useful for which condition .... In order to avoid ambiguity in scoring, we kept only those items on which there was no or only minimal disagreement' (Sternberg et al., 2001: 410). Choosing simple remedies, excluding recalcitrant healers who would not be tested and the equivocal answers of others, was essential for the test's validity and effect: 'Based on these data, the tacit knowledge inventory *differentiated* children in terms of their knowledge of herbs' (Sternberg et al., 2001: 409, emphasis added).[11]

The inventory was administered individually, reading out items and choices, and recording answers. Emulating a particular ordering of reality, knowledge and action, individual children were confronted with a fact – body signs or the name of an illness – and had to respond to this problem by choosing its name and/or an optimal course of action. The 'adaptation to the environment' simulated by the test was imagined as individual response to a challenge to survival. While this certainly is one possible imagination of persons and their place in the world, its cultural specificity is evident in contrast to Rebekka's and NyaSakwa's cases, where what one person responded to was another person's propositions, rather than a factual, vital challenge, and where knowledge was not stored information in one's brain, but continuous dialogue. To prevent the oral administration of our test from turning into a dialogue, testers were urged to remain detached from the children, and 'trained to deliver each choice in the same manner, so no clues suggesting the best choice were given in item delivery' (Sternberg et al., 2001: 411).

By 'entifying' illnesses and plants, disentangling them and linking them to individual bodies and minds (and to numbers), we succeeded in constituting the children's' cognitive faculties as distinct, differently sized, entities: the MKT had the same power of differentiation as standard tests of intelligence and academic marks to which it was designed as an alternative.

It was another test of the same kind. Our test correlated *negatively* with measures of academic achievement and intelligence, confirming 'that practical intelligence as manifested in adaptive tacit knowledge for daily life may be relatively distinct from the kind of academic intelligence that leads to success in school' (Sternberg et al. 2001: 413). Children have either one or the other intelligence, and, the argument went on, since most Uhero children will become fishermen and farmers, practical intelligence is more developed. This argument conceptualizes medicinal and academic knowledges as equivalent cognitive, informational substances; their separate items fill the space of the mind. Similar to the notion of bodies being added to by nutrients and subtracted from by parasites, children's minds are construed as zero-sum containers that process and store definite amounts of information.

The production of a 'culture-relevant' cognitive test adapted *JoUhero*'s medicinal knowledge into a different, culturally specific, way of knowing, and reconstituted it in the image of its antithesis, the conventional intelligence test. One sort of differentiation has been displaced by another modality of the same strategy. According to the racist–universalist argument in the debate about intelligence, people of different origins are differentiated by an explicitly universal standard – intelligence; according to its liberal–relativist inversion, people deserve different standards to assess a universal entity – the mind (Sternberg, 2004). But does this liberate us from universalist preconceptions? *JoUhero* might have a lot of practical intelligence, but this specific measure of intelligence shares the conventions of any other such measure, producing individual units of appropriating, processing and acting upon the world. The individual's ability to act for his own success remains the only valid criterion of differentiation, and differentiation remains the ultimate aim of tests, and of the society they help to build. (Besides, alas, *JoUhero* can't do much with their greater practical intelligence in the world at large.) By extending the grasp of specific, individual notions of the person, the culturalist approach to psychometrics entrenches, in an ostensibly reverse gesture, the logic of knowledge and power that it shares with its opponents.

Like the work of pharmacology discussed earlier, making children's knowledge of medicinal plants known in this peculiar way reduces and conceals. But to what effect? The isolation and measurement of an active pharmacological substance helps to use it effectively. Depending upon the political–economic context, an effective drug is a desirable outcome. If humans are in the same way constituted and compared as entities, this equally serves their use; and the question of interest arises. If, as in Sternberg's other studies – notably the above-mentioned US army study – the purpose of knowing is the selection of the most productive – in this particular case, most destructive – individuals for a company or institution, such test may indeed work well. It lies beyond the remit of this essay to discuss the ethics and political economy of such utilization of 'man'. Our limited aim is to help make such discussion possible by showing that what

some claim to be the 'nature of man', or the 'nature of society', is produced by a particular order of knowing.

Making Further Differences

The last of the series of studies we scrutinize to this end elicited local 'Luo conceptions of intelligence' (Grigorenko et al., 2001). This study assumed that *JoUhero*, like all humans, possess a concept of the 'quantifiable cultural adaptation of the individual', or intelligence, but that this concept looks different from ours because 'the abilities needed to adapt' are different (Grigorenko et al., 2001: 368). In order to elicit and quantify components of such 'non-western' intelligence, 'viewed by indigenous people as important to their survival' (p. 368), we first identified *Dholuo* categories used to describe children. In the subsequent quantitative study, research assistants showed lists of the 80 children enrolled in the MKS to randomly chosen adult 'raters', who were asked to 'compare [selected triplets of] children and choose the one who … has the most': 'brightness' (*rieko*), 'school brightness' (*rieko mar sikul*), 'thoughtfulness' (*paro*), 'respect' (*luor*) and 'understanding' (*winjo*), and who has the 'best character' (p. 373). Each child was compared several times and an overall score calculated, which could be held together with her or his intelligence test scores.

Collecting these data during a period of food scarcity was difficult. Nobody wanted to express opinions about other people's children; people found that only somebody who lives and, in particular, eats with the children could know them; therefore, even parents referred us to the children's grandmothers. Children's characters are assessed in specific situations; thus, it was difficult to compare individuals' characteristics, especially for qualities such as 'respect', 'understanding' and 'thoughtfulness'. The notion of children's inherent capacities seemed of little relevance. With the exception of 'school brightness', which was measured in school anyway, a child was not seen as possessing a lot or little capacity, but the child either behaved well or less so towards other people or in challenging situations. The qualities with which our study differentiated individuals were regarded by *JoUhero* as being constituted in everyday practices around hearth, food bowl and sleeping mat – the main sites of togetherness – a matter of relations rather than personal properties. This understanding recalls *JoUhero*'s notions of physical capacity in the context of body, healing and medicine, discussed above: what a child *is*, is not a stored potential inside the child, but is created through movements with others; it emerges from encounters and everyday trajectories that defy measurement.

We eventually succeeded in placing each child on a numeric scale for each quality. Statistical analysis then revealed two distinct factors, which 'we named – social emotional competence [*luor* and *winjo*] and cognitive competence [*rieko* and *paro*]' (Grigorenko et al., 2001: 375). 'Best character' was associated with the former, while school achievement and 'conventional individual difference indicators' (intelligence tests) went with the latter. This bifurcation was explained by the commonplace about African

sociality, that 'respect and obedience are seen as central' (p. 375). This rendering of a societal emphasis on (social) respect as antithetical to an emphasis on (autonomous) intelligence, confirmed by statistics, reifies the individual actor as basic social unit: he or she can *either* obey another person, or successfully impose intelligent will upon the other. Autonomous or non-autonomous, autonomy is the standard of evaluation. That there *is* an individual, who either obeys or rules, relates or not, is beyond question.

Yet this antinomy of respect and intelligence might be specific to a particular way of constructing person and society. By contrast to the (recent) Euro-American devaluation of respect, in Uhero 'respect', rather than designating obedience vis-a-vis another person's will, is a sort of awe for the other person, and for the transformative capacity of human relations (Prince & Geissler, 2009). This awe extends to all creative forms of relatedness, not only to relations of generational seniority or differential power. *Rieko*, on the other hand, cannot simply be taken as Luo equivalent of intelligence. It is regarded as an ambivalent quality, which needs to be tied up with *luor* to produce peace and growth of one's home and children, which for Uhero's parents marks a good life.[12] These relational life-goals are less easily cast in terms of individual success and they are not achieved through deployment of individual properties.

This second paper on Luo intelligence confirmed the previous one: 'only one of four concepts of the *Dholuo* notion of intelligence and only one of the two dimensions of the Luo people's views of intelligence correlates with Western-style tests of cognitive ability and with school achievement' (Grigorenko et al., 2001: 376). Yet, all of them are addressed as 'intelligence', a measurable, individual 'practical and community-orientated social adaptive skill'. This transformative twist is reiterated in the conclusions: 'studies of intelligence in other cultures and particularly in African cultures can help us to understand the richness worldwide of implicit theories of intelligence'; 'concepts of intelligence outside the west seem, in general, to come closer to our concepts of practical intelligence – than do conceptions of intelligence in the west'. With methodological finesse, firm assumptions and some reiteration and slippage 'we developed a method permitting the quantification of individual difference on indigenous components of smartness' (p. 378). The authors' implicit theory of human nature was confirmed. Upon this pre-social nature, different cultures take a different view: ' … we may judge members of other cultures to be unintelligent ... , who may be judged to be intelligent by members of their own cultures. We need to take into account *their own views* of what constitutes intelligence' (p. 377, emphasis added). But by conceding the others their own views, their own perspectives, the *things* that are viewed are beyond questioning: objective reality. And if all reality is objective, all beings are ultimately things, entities on their own: cognitive items, intelligent individuals or Luo culture.

Knowing Human Nature

The psychological studies we examined in this second part of our essay show even more clearly than the contrast between laboratory and kitchen in

the first part that we are not simply shifting between different perspectives, or losing and adding context. Instead, things are made; objective reality, nature, is constituted. If the 'nature' of a herbal remedy is found in an active molecule, this can have beneficial effects, as long as the translational operation from village and bush to atoms is visible and open to questioning, and as long as the fruits of such translational moves – knowledge, intellectual property and pharmacological outcomes – are used for the common good. The plant can be had both ways – as relational being and as a thing in the lab. If children, knowledge and cultures are made known in the same way, this epistemology generates a particular anthropology, with ethical and political-economic implications. It then appears as if humans by nature are rational individuals; owners of bodies holding physical strength, and of minds carrying cognitive capacity; that they defend their bodies and compete for and accumulate limited resources to struggle for individual success. Blessed by 'comparative evidence', the knowledge derived from the MKS reifies hegemonic notions such as: individual choice, competitive adaptation, and differential success. By individualizing capacity and incapacitation, functioning and illness, this kind of knowledge produces particular health policies, such as anti-parasitic mass-treatment campaigns (see World Bank, 2002). More generally, such knowledge claims that self and other are comparable, that difference is measured by the distance between versions of the same things: individuals, minds, bodies, cultures. Known in this way, comparison serves to re-affirm our ways, rather than being a generative challenge to them. The 'generative tensions' inherent in difference (Verran, 2001: 27ff.) are deemphasized; difference is made static and given.

When we expanded the MKS from its initial focus on herbs and went 'out' to engage with people, we had hoped to obtain a broader perspective, to get closer to life, to complexity and process; but in retrospect we see that we had stayed within. As Verran acutely observed a propos her own, more subtle, relativism, we had further 'pulled their world into ours' (2001: 31). Our relativist endeavour had made 'difference unrealisable' (Verran, 2001: 32), turning creative differences into non-generative separations. We had hoped to get things into context by shifting our gaze from plants to people, but in the end we realized that our problem was not the loss of a few contextual details, but the nature of our gaze, which ended up framing plants, children, societies – and ourselves as knowers – in one overarching, universal political economy of knowing.

Conclusion: Knowing a World of Free and Equal Things

This epistemology claims that reality is made up of separate, autonomous, complete entities: cultures, persons, bodies. Engagements are treated as if they arise only secondary to these entities' existence, and they must therefore be rendered invisible in scientific knowledge of reality. This characteristically 'modern' imaginary of how the world should be made known recurs across our otherwise varied studies of Uhero's plants. As one would

expect, the efforts at purification remained incomplete, and did not achieve the wished-for definite order (see Latour, 1993). Yet, their insistence to cast knowledge in such terms, at times much against the resilience of the matter to be known, has effects – beyond the scientific investigation in question – in that it naturalizes its own terms. Although the imaginary order of scientific knowledge is not achieved, the effort to conjure it up, takes effect on the world.

Our scientific endeavours combined separating movements of progressive disaggregation, down to the molecular level, and the re-aggregation of larger, bounded, wholes, up to the level of cultures. Through the work of 'identification', things were brought to themselves, plants made into species and atoms, children into intelligent minds with individual adaptive capacities. Irrespective of their scale, the entities that we made known were envisaged as non-generative or non-creative. In this frame, things of one kind are equivalent, and their categorical identity produces separation. The ensemble of entities of a kind is a larger aggregate whole on a different level of scale, but with similarly well-defined boundaries: molecules–plants/herbs–species; cognitive items–minds/intelligence–cultures; bodies–individuals/persons–societies. Capacity is here no more than the cumulative capacity of the parts that an entity consists of.

Knowledge-practices such as *JoUhero*'s relate part and whole differently: the totality is here, rather than an aggregate whole composed of independent entities, a transformative movement in which porous and composite entities take shape through their trajectories towards and away from each other. Not only is lasting completeness at stake, but also momentary complementation of one by the other (see Strathern, 1993; Prince & Geissler, 2009). Entities have here not so much place and extension, but direction and duration. They cannot be conceived of independent of time and motion, in contrast to the 'specimens' of plants, bodies, minds and cultures discussed above, which must be stabilized for them to emit their truth. Accordingly, capacity – cognitive, physiological or chemical – is not a dormant propensity *within* the entity, but a force *in-between* or towards; it cannot be added up and accumulated, but is emitted from moments of engagement. This quality makes it difficult to capture, and as we suggested above, ethnography responds to this by abandoning epistemological fixity, engaging instead with movements, encounters and transformations.

What characterizes the beings of *JoUhero*'s medicinal knowledge – plants, grandmothers, worms, ancestors, children – vis-a-vis each other is not identity or equi-valence, but otherness. Difference is the condition of their existence. They are not by themselves, but from or towards, due to or for, the other. It is because one and other are incommensurate, non-identical, that they have generative capacity; they can relate, merge and engender 'growth' in the sense of continuous transformations. These capricious and surprising beings are, if tentatively, brought under control by the progressive ordering of our studies, and turned into something potentially useful. The ethnobotanical and ethnopsychological studies that we re-examined here

had the laudable goals to redress inequalities and restore respect for variation. The emancipatory agenda implies, however, that we ultimately all know and differentiate in the same way. This form of relativism de-emphasizes political and economic tensions and eclipses the challenge, or alternatives, that *JoUhero* offer to the way of knowing that these studies promote.

Thus, our 'scientific' studies of child cognition and of cultures of intelligence had political implications, which we think were contextually linked to wider political–economic transformations. Although the participants in this research did not pursue any political–economic agenda (personal and financial links with the World Bank were pragmatic; World Bank, 2002), the epistemological imaginary based on transactional monads resonates, when applied to human sociality, with the neoliberal imagery of the market as the elementary form of social order that has become self-evident over the past decades. This parallel became especially clear in the psychological studies, which construed Luo children as local versions of the information-processing, success-seeking rational actors that according to some economists inhabit the global market.

Along the same lines, this imaginary implies a particular rendering of process, of change in time: not as creative, transformative event, like in the healing practices examined above, but as accumulation: addition of substance to an existing aggregate whole. This was evident both in the nutrition–infection hypothesis of physical and cognitive development, mentioned in the first part of this essay, and in the assumptions about the mind, learning and success, in the second part. This rendering of process as mere accumulation of the same sustains the particular reality of man and society claimed by the 'culture of neoliberalism' (Comaroff & Comaroff, 2000: 335); and it obscures the greater potential of social process: creative transformation.

A further parallel between our studies and currently dominant political–economic ideas is the use of universal standards; the attempt to make different knowledges, capacities, cultures or societies comparable, 'different but equal'. Thus, all bodies grow by accumulation and defend their resources; all medicines kill disease agents, protect the body and increase individual survival, only the resources vary between environments; all action is rational choice, only the options differ; all children have intelligence, only the cognitive items vary; and all parents compare their children's capacity for future success, only in different terms. This underlying equality imposes universal values and creates the pretence of fair competition under the same rules. It resonates with the image of a 'free' market on which equal meets equal and balance is achieved by transaction. This relativist culturalism, like its counterpart universalist racism, obscures and naturalizes the reality of power, conflict and domination: Luo children compete with US children on the same terms, as do Kenyan and European culture, local knowledge and science. The game is fair – that the results are not balanced is a temporary market distortion.

These parallels between our studies of Uhero's health, medicines and children, and neoliberal imaginaries must remain a proposition. However,

a glance at a most recent study of deworming, informed by the same group's work and conducted (with World Bank funding) in villages only a few miles from Uhero, supports this association. Although this study did not find that deworming improved academic achievement, the authors showed in a paper published in *Econometrica* that deworming 'leads to human capital accumulation' (Miguel & Kremer, 2004: 205–06). Deworming decreases school absence, and when school attendance is converted into life-long productivity, measured by wages, it becomes clear that 'deworming increases the net present value of wages by over US$30 per treated child at a cost of only $0.49'. Due to this favourable investment/accumulation ratio, deworming and even paying people for accepting treatment 'can be justified as a human capital investment' (pp. 207–08). To prove this further, one would 'hope to track the children in this study as they enter the labour market in order to estimate how child health gains from deworming affect adult income and other socioeconomic outcomes' (p. 207). For the time being, 'this study ... provides microeconomic support for claims that Africa's high tropical disease burden is a causal factor contributing to its low income' (p. 207).[13] By contrast to that econometric study, our own research knew nothing of economics. And yet, in retrospect it appears to us that our scientific work on worms and medicines, and the subsequent 'social' studies in psychometrics and cultures, share a particular imaginary of how to 'develop' human society.

This is not the place to discuss alternatives – different public health interventions, other studies of foreign flora, richer visions of child development, and new hopes for society and culture. The 'convenient fictions' of difference that we used – between Uhero's kitchens and our laboratories, between ethnography and econometrics – can help us to prise open some of the taken for granted epistemological premises of our political economies of knowledge; but it cannot cut short our search for other ways of knowing and engaging with difference. The ethnographic evocation of other ways of knowing and being cannot, for example, turn us 'back' towards pre-scientific wholeness in a reaction against modern scientific ways – as in the praise of holistic medicines – that would only confirm the same modern imaginaries of difference. What it can do is render visible the historically produced patterns of a seemingly natural order of the world, reveal their specificity and situatedness and cast doubt over their universality and naturalness, and thereby call forth the possibilities of human knowledge, creativity and sociality: 'to go beyond the psychology of the white, adult, and wealthy man', as Emmanuel Lévinas (1995: 56) summed-up the goal of (Lévy-Bruhl's) anthropology. Thereby, ethnography might contribute to a broader vision of humanity, beyond its confinement to games and choices, utilitarianisms and individualisms.

Notes

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1. In 2002 Uhero had 956 inhabitants in 105 patrilineal, virilocal homesteads. Most *JoUhero* engaged in agriculture and fishing, while few worked as teachers and nurses. Many older people had lived as labour migrants in towns, and youths were moving between village and town looking for work. Most children attended the local primary school. Most households relied on migrants' remittances for cash needs such as schooling and medical care, but such cash flows were dwindling due to the declining Kenyan economy. At the end of the 20th century many *JoUhero* were looking back at the lost promises of modernity and the remote pre-colonial past, without great expectations for the future.
2. Strathern's critique of 'perspectivalism' applies to relativism and universalism alike: in the former, all perspectives are equally valid, in the latter, one of them is privileged, but the visual and representational mechanism of deriving knowledge from things remains the same (Strathern, 2009).
3. Understood as 'implicit set of working images/stories' that frames action (Verran, 2001: 37): 'not a "thing" of the mind but an overarching relation' that situates doing (Verran, 2001: 37).
4. Certain powerful medicines grow in abodes of spirits near the lake, on old homesteads and graves. In a wider sense all bushland between the homesteads is a potent abode of past and future life.
5. All non-industrial things of daily use – pots (Dietler & Herbich, 2001a: 97), musical instruments (Anyumba, 1970), hoes (Dietler & Herbich, 2001b: 249), boats (Odhiambo, 1970) or houses (Prince & Geissler, 2009) – are treated as beings.
6. We realized later that this private collection had infringed ethnobotanical conventions that were formulated at around the same time. The paper would not be published today, given changed political and ethical attitudes.
7. As Foucault showed, this medical truth has to 'pass through the stage of death' to reveal itself (1973: 197).
8. Some ethnobotanists have paid more attention to 'context' and made greater efforts at 'translation' than we have. However, we suggest that contextualization and translation are part of the problem, not its solution, because their implicit perspectivalism tends to reify the dominant, scientific epistemology.
9. For the 'born again' or 'saved' Christians in Ugingo, by contrast, this hybridity is a deep, maybe the central, worry. We describe elsewhere their daily efforts at separation and purification related to herbal medicine and other supposedly traditional or 'demonic' practices (Prince & Geissler, 2009).
10. The dialogue is taken from the film material used for the production of 'Adhiambo' (Prince et al., 2001).
11. *JoUhero* were bewildered, and at times irritated about this data-production process. While most people simply wondered about the purpose of the research and the benefit it entailed for them, in a period of draught and hunger, some (inconsequential) rumours linked our lists of children and the comparisons made between them to planned child-abductions and blood-stealing. The political–epistemological concerns became very clear in the local mission church's nativity play, which elaborated Herod's search for baby Jesus in an expansive parody of demographic and research practices.
12. Similarly, *paro* (thinking) is an ambivalent quality, which must not occur in excess, as it – for example after bereavement – is linked to sadness, loneliness and social isolation. The individualistic cognitive connotations of 'thinking' in relation to intelligence are here sources of concern.

13. In a footnote the authors remember that 'Of course, worms' impact on wages … can only explain a small fraction of the enormous income gap between African and industrialized countries' (Miguel & Kremer, 2004: 209, n. 64). Thus, the worm explanation is true only for a part, while many equivalent studies, employing the same notions of entity, capacity and effect, would together represent the whole of reality. It is this faith in our categories, and the universal relationship of parts and wholes, that is problematic to us.

References

Abe, Toshiharu (1978) 'A Preliminary Report on Jachien among the Luo of South Nyanza', *Institute of African Studies Discussion Paper*, University of Nairobi, No. 92.

Anyumba, H. Awuor (1970) 'The Making of a Lyre Musician', *Mila* 1(2): 28–33.

Comaroff Jean & John L. Comaroff (2000) 'Millenial Capitalism: First Thoughts on a Second Coming', *Public Culture* 12(2): 291–344.

Dietler, Michael & Ingrid Herbich (2001a) 'Theorising the Feast: Rituals of Consumption, Commensal Politics and Power in African Contexts', in M. Dietler & B. Hayden (eds), *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics and Power* (Washington, DC: Smithsonian Institution): 65–114.

Dietler, Michael & Ingrid Herbich (2001b) 'Feasts and Labour Mobilisation: Dissecting a Fundamental Economic Practice', in M. Dietler & B. Hayden (eds), *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics and Power* (Washington, DC: Smithsonian Institution): 240–64.

Evans-Pritchard, E.E. (1950) 'Ghostly Vengeance among the Luo of Kenya', *Man* 50(133): 86–87.

Foucault, Michel (1973) *The Birth of the Clinic* (London: Tavistock).

Geissler, Paul Wenzel (1998) '"Worms are our Life": Understandings of Worms and the Body among the Luo of Western Kenya' (Parts 1 and 2), *Anthropology and Medicine* 5: 63–81; 133–144.

Geissler, Paul Wenzel (2000) 'The Significance of Earth-eating: Social and Cultural Aspects of Geophagy among Luo Children', *Africa* 70(4): 653–82.

Geissler, Paul Wenzel, Stephen Harris, Ruth J. Prince, A. Olsen, Helen Okatcha, et al. (2002) 'Medicinal Plants used by Luo Mothers in Bondo District, Kenya', *Journal of Ethnopharmacology* 83: 39–54.

Geissler, Paul Wenzel, David Mwaniki, Frederik Thiongo & Henrik Friis (1998) 'Geophagy as a Risk Factor for Geohelminth Infections: A Longitudinal Study among Kenyan School Children', *Transactions of the Royal Society of Tropical Medicine and Hygiene* 92: 7–11.

Geissler, Paul Wenzel & Ruth Jane Prince (2004) 'Shared Lives: Exploring Practices of Amity between Grandmothers and Grandchildren in Western Kenya', *Africa* 74(1): 95–120.

Gould, Steven Jay (1981) *The Mismeasure of Man* (New York: Norton).

Grigorenko, Elena, Paul Wenzel Geissler, Ruth Prince, Frederick Okatcha, Catherine Nokes, et al. (2001) 'The Organisation of Luo Conceptions of Intelligence: A Study of Implicit Theories in a Kenyan Village', *International Journal of Behavioural Development* 25(4): 367–78.

Hauge, Erik H. (1981) 'The Spirit World of the Luo People in Kenya, East Africa', *Temenos* 17: 27–34.

Hayden, Cori (2003) *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico* (Princeton, NJ: Princeton University Press).

Herrnstein, Richard J. & Charles Murray (1994) *The Bell Curve* (New York: Free Press).

Latour, Bruno (1993) *We Have Never Been Modern* (Cambridge, MA: Harvard University Press).

Latour, Bruno (1999) *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press).

Latour, Bruno & Steve Woolgar (1986) *Laboratory Life: The Construction of Scientific Facts* (2nd edn) (Princeton, NJ: Princeton University Press).

Lévinas, Emmanuel (1995) 'Lévy-Bruhl und die Zeitgenössische Philosophie', in E. Lévinas, *Zwischen uns. Versuche über das Denken an den Anderen* (München, Wien: Carl Hanser): 56–72.

Lewontin, Richard L. (1981). 'The Inferiority Complex' [Review of S.J. Gould, *The Mismeasure of Man*], *New York Review of Books* 28(16): 15.
Miguel, Edward & Michael Kramer (2004) 'Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities', *Econometrica* 72(1): 159–217.
Mogensen, Hanne O. (2000) 'False Teeth and Real Suffering: Child Care and Child Survival in Eastern Uganda', *Culture, Medicine and Psychiatry* 24(3): 331–51.
Mol, Annemarie (2002) *The Body Multiple: Ontology in Medical Practice* (Durham, NC: Duke University Press).
Nokes, Catherine (1996) 'A Healthy Body and a Healthy Mind? The Relationship between Ill-health and Cognitive Function in School-age Children', *Journal of Biosocial Science* 28: 453–62.
Ocholla-Ayayo, A.B.C. (1976) *Traditional Ideology and Ethics among the Southern Luo* (Uppsala: Scandinavian Institute of African Studies).
Odhiambo, E.S.A. (1970) 'Some Aspects of Religious Activity among the Uyoma Fishermen: The Rites Connected with the Launching of a Fishing Vessel', *Mila* 1(2): 14–21.
Olsen, Anja & Bettina Nielsen (1999) *Undersøgelser af lægeplanter benyttet af Luo folket i Kenya*. MSc Thesis, University of Copenhagen.
Prince, Ruth Jane & Paul Wenzel Geissler (2001) 'Becoming "One Who Treats": A Case Study of a Luo Healer and her Grandson in Western Kenya', *Anthropology & Education Quarterly* 32(4): 447–71.
Prince, Ruth Jane & Paul Wenzel Geissler (2009) '*The Land is Dying': Contingency, Creativity and Conflict in a Kenyan Village* (Oxford & New York: Berghahn).
Prince, Ruth Jane, Paul Wenzel Geissler, Catherine Nokes, James O. Maende, et al. (2001) 'Knowledge of Herbal and Pharmaceutical Medicines among Luo Children in Western Kenya', *Anthropology and Medicine* 8 (2/3): 211–35.
Prince, Ruth Jane, Paul Wenzel Geissler, Gisela Tuchtenhagen & Margot Neubert-Maric (2002) *Adhiambo – Born in the Evening* (film, 68 minutes) (London: Royal Anthropological Institute).
Serpell, Robert (1993). *The Significance of Schooling: Life Journeys in an African Society* (Cambridge: Cambridge University Press).
Sternberg, Robert J. (1998) 'How Intelligent is Intelligence Testing?' *Scientific American* 9(4): 12–17.
Sternberg, Robert J. (2004) 'Culture and Intelligence', *American Psychologist* 59(5): 325–38.
Sternberg, Robert J., George B. Forsythe, Jenifer Hedlund, Joseph Horvath, Richard K. Wagner, et al. (2000) *Practical Intelligence in Everyday Life* (New York: Cambridge University Press).
Sternberg, Robert J., Catherine Nokes, Paul Wenzel Geissler, Ruth Jane Prince, Frederik Okatcha, et al. (2001) 'The Relationship between Academic and Practical Intelligence: A Case Study in Kenya', *Intelligence* 29(5): 401–18.
Strathern, Marilyn (1988) *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia* (Berkeley, CA: California University Press).
Strathern, Marilyn (1993) 'Making Incomplete', in V. Broch-Due, I. Rudie & T. Bleie (eds), *Carved Flesh: Cast Selves: Gendered Symbols and Social Practices* (Oxford: Berg): 41–51.
Strathern, Marilyn (2009) 'Can one Rely on Knowledge?', in P.W. Geissler (ed.), *Ethics, Evidence, Ethnography: The History and Anthropology of Medical Research in Africa* (Oxford: Berghahn Books, in press).
Strauss, John & Duncan Thomas (1998) 'Health, Nutrition and Economic Development', *Journal of Economic Literature* 36: 766–817.
Traweek, Sharon (1988) *Beamtimes and Lifetimes: The World of High Energy Physicists* (Cambridge, MA: Harvard University Press).
Verran, Helen (2001) *Science and an African Logic* (Chicago, IL: University of Chicago Press).
Whyte, Susan Reynolds (1997) *Questioning Misfortune: The Pragmatics of Uncertainty in Eastern Uganda* (Cambridge: Cambridge University Press).
World Bank (2002) *School Deworming at a Glance* (Washington, DC: World Bank).

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