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The picnic started with the breaking of the Grain of Paradise, the sharing of which Abena described as a way one might start an exchange. We tested the small seeds, and an awakening heat burst onto our tongues. The social awkwardness of our first meeting disappeared in this shared moment of heat, and was replaced by an acute sense of presence.

Towards the end of our picnic, Abena's husband and daughter joined us for suya, a West Africa shish kebab of sorts, originally made by the Hausa people of northern Nigeria and Niger. Suya is skewered beef, fish, or chicken, rubbed with groundnuts, cayenne pepper, ginger, paprika, and onion powder, then barbequed. Abena requested we get them from a new restaurant down the street that she wanted to support. We bought food for the whole crew, and the owner was so excited he asked Dan (our production assistant) for his phone number. A week later, the man from the restaurant called Dan to see how he was doing.

AMY: Can you talk about where you would place your work relative to the *Powers of Ten*?

ABENA: I'm interested in the interface between popular understanding of science and technology and elite understandings of science and technology. I came to this because I grew up in a rural environment in Pennsylvania, and my parents were both academics – one was a professor of chemistry and engineering, and the other a food sociologist. So, I was living in an environment where there were a lot of people who were farming and people who were working at the university, so the culture was rubbing up against these different ways of knowing, even for me in the playground at school.

In my research on drug discovery from plants in Africa, I'm interested in the ways in which scientists, especially African scientists, understand the medicinal properties of a plant. And then how this compares with both the popular understandings of consumers and the specialized knowledge of what we often call "traditional healers." This interface between elite and popular knowledge often hinges on the question of orality, since knowledge that is communicated across centuries in African settings has been learned through observation, from grandparents



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and parents, communicating with children, or in more formal situations where someone might be trained as a professional herbalist to identify and use flora through years of apprenticeship. For instance, consider pods of the pungent pepper plant Grains of Paradise, which I brought here with me today (FIG. 1). Someone in Ghana who learned about its popular uses from their grandmother through observation and conversations might remind me that in Akan it is called *fam wisa* or “pepper from the ground,” and that it is used in cooking and remedies for children. A trained herbalist might explain how to add it to many herbal remedies to strengthen their potency. People trained in a laboratory setting in African countries are going to call it *Aframomum* and want to know,

what is it in Grains of Paradise that makes it biologically active? What is it that is impacting on the nervous system, that’s impacting on the endocrinological system in the human or in the rat? If I talked to somebody who is coming to this from a more spiritual perspective, they might say that it has to do with the environment in which the pepper grew. And there’s something to be said for that. A late scientist in Ghana, Albert Nii Tackie, did research looking at different pods of Grains of Paradise from different parts of West Africa, and tried to see if there was some truth to the environmental impact on its effects, chemically speaking. He found that different samples had different levels of volatile oils, which can be related to their potency.

AMY: Like *Powers of Ten*, we will pull out and look broadly, but then we will zoom really closely into some particulars. Let’s begin at the picnic, an intimate frame, the human scale on which we’ve chosen to pause for several reasons. In your research, where do you see yourself located in relation to that?

ABENA: Well, I’m interested in the conversational level, the level where you have two people talking to one another, two people exchanging ideas, two people exchanging a material object such as a plant. Often we make the story of drug discovery from plants, or bioprospecting, as it’s sometimes called, much more complicated than it is. What interests me is this: How does information travel? How do people

learn how a plant may or may not be bioactive? Who decides to take that plant into a laboratory setting? Who conceals information and who doesn’t? So, my research tries to imagine, and pinpoint, those moments of exchange when you have an object moving between two hands (FIG. 2).

Even as we look at the ways in which people are exchanging information at the human level, at that moment of personal encounter, when you map out many, many personal encounters, over time and over space, you *can* begin to see patterns. So, again, moving back to the Grains of Paradise – this is a plant that’s lightweight, it’s something that is exchanged in conversation. If you’ve ever read *Things Fall Apart*, by Chinua Achebe, the



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protagonist of that novel, Okonkwo, goes to visit friends and they offer him an alligator pepper, which is the same thing. It's cracked open and chewed together as something to promote conversation among friends. And so that is a microlevel exchange happening in one place, in Nigeria perhaps. But the seeds of this are planted, and they move from household to household, so we have opportunity for information about a plant to travel. What interests me is, to what extent is information about the uses, the taste, the ways in which this might be viable medicinally – a local construct – something that happens at the village level? And to what extent is it information that has spread globally?

AMY: That global scale, how do you track that from origins of such intimately scaled interactions?

ABENA: With a plant like the Grains of Paradise, I can augment my interviews with scientists, healers, and popular users in Ghana with published recipes. These are often small bits of information that perhaps European explorers were able to glean, starting from about the sixteenth century. More recently, the African Union has done comprehensive interviews with herbalists and documented recipes for uses of medicinal plants. So what I've done in my research, working with graduate students at UC Berkeley, is to try as best we can to find the geographic coordinates of the geospatial information associated with each of these medicinal recipes – in this case, we use about 400 instances of recipes – and show where they're situated on a map. If you look at how people are using these plants in all of these different locations,

and you can see what they think the recipe is doing – for example, the uses of Grains of Paradise as an aphrodisiac – you can map how widespread these individual exchanges, at the level of an intimate conversation, truly are. So even though it grows in tropical West Africa originally, it's also cultivated now in the Caribbean, and it's used in Morocco. And in all of these places people are using it as an aphrodisiac (*FIG. 3*).

MICHAEL: As a social scientist, what tools are you using to collect this data?

ABENA: The tools that I use in my research are varied, and it depends on the kind of problem that I'm encountering. For the research I do on scientific knowledge in African settings, I've had to use a lot of apparatus to capture oral data that isn't

documented and is not written down. Sometimes this is to get information from the scientists who may not be so explicit about the ways in which they're making knowledge. But often, it's with people who may not use literate forms of communication as their primary forms of operation. So in terms of the technologies that are in use, I have used different kinds of microcassette recorders, digital recorders, and increasingly, digital video. You might have these moments of exchange about plants in a fairly low-tech setting, but in order to understand it, we're using computers and mapping technologies. For instance, in my book *Bitter Roots*, I look at the history of Eli Lilly's use of the plant periwinkle to make therapies to treat blood cancer. In Madagascar, I tracked down some of the farmers who cultivated periwinkle for the company. We sat on the edge of a vast plantation with

my digital cameras and recorder to document the stories of farm laborers who helped make what was initially a local weed into a viable commodity for the country.

AMY: So, connected to that, this movie was made in 1968, and we're trying to use that as a marker for each person's field. Can you talk about any major shifts that have happened from that time to now, and any specific happenings that marked those shifts?

ABENA: My work on the history of pharmaceuticals and African herbal medicine straddles two main fields. It straddles work that's been done in African history and African studies on the one hand, and history of science and sociology of science on the other. Increasingly, those fields are converging, but if we step back forty years, historians of science

did not normally situate scientific practice in African settings.

In the field of African history, forty years ago we find the dawn of nationalism in African settings. And so, the kinds of historical work that were being produced at that time were trying to show the genesis of the nation-state, to show the authority, the reality of African peoples.

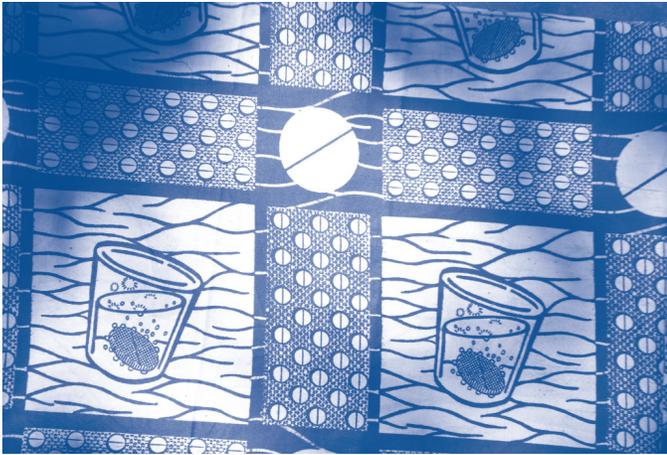
But by the 1980s, historians of Africa found themselves within a moment of great despair in terms of what the political future of African states might be. So we have historians that start to look at social history by talking to people in the rural communities to get their oral information, their sense for how you survive within a coercive colonial state or failing postcolonial one. It's no longer this celebratory narrative of the success of these new states and

the throwing off of colonialism. By the 1990s, social historians of Africa turned their view to the trajectory of medicine under colonial occupations, trying to understand the extent to which colonial subjects adopted biomedicine.

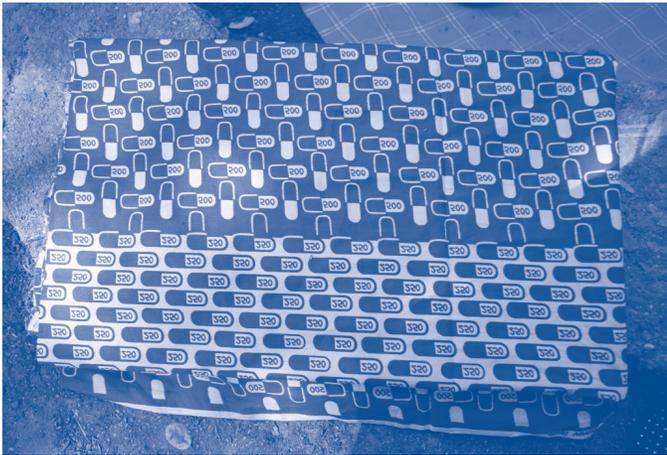
Increasingly, and perhaps because Africa is becoming more stable in many ways, people are doing a variety of things in African history. The work that I'm doing is much more transnational. It is not focusing on a microhistory in a village setting, or at the town level, or even at the state level. It is trying to map out questions, like how herbal medicine and pharmaceutical chemistry interfaced, that people haven't necessarily had the tools or the interest to pursue to this point.

If you look at the shifts in something like science studies, they've also been quite dramatic. And

I'm not going to get into the wars about the extent to which science is socially constructed, but that's also a central issue. If we look at the history of science over the past forty years, and particularly the history of medicine, there's also this way in which the narratives of the success of medicine, of the implication of new drugs and new technologies that are going to provide health to the world, have been complicated by the field. Instead of saying that we have these pills that are going to save people, we say, well, to what extent are pharmaceuticals dangerous to society? To what extent are the drug companies implicated in a way of making people think that they need these medicines that they don't actually need? So it's less heroic. And my work pushes this narrative even further to ask how African healing actually shaped the rise of pharmaceuticals, and the extent



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to which communities might be compensated through channels of redistributive justice. That would be a shorthand view of it.

One primary means of research for me is through material objects, which sometimes spur conversations, like these Grains of Paradise pods. Increasingly in my work, another way is through textiles and fabric. The fabric that I brought today speaks to some of the questions about shifts in how people view medicines and pharmaceuticals.

This is a fabric showing a tablet fizzing in a glass of water, surrounded by grids of circular pills (FIG. 4). And this is something that women in West Africa especially, and men, but especially women, might have made into a shirt, into a dress. As we see fashions change, increasingly people are using these not to create a traditional ensemble, but perhaps to spruce up a t-shirt. Recently, at the airport, I saw a woman wearing a hot pink t-shirt, and really big puffy sleeves that were made using bright wax print fabric. These are fabrics that were historically printed in Europe, in Holland especially, by the late nineteenth century. After independence, African countries worked to set up factories where they could produce their own wax print fabric; this one is

printed in Ghana. So you can see right here “veritable wax imprint in Ghana” is visible on the fabric itself. So this is a Ghanaian fabric printed in Ghana that shows capsules (FIG. 5).

This material shows you the ways in which pharmaceuticals have become part of the fabric of African life, how normalized they are. And it’s something that is celebrated in dress, and in popular culture, but that might not be immediately obvious if you go to the archives. You’d miss it looking in official documents, you might not see that people think that taking pills are great, they think it’s cool, they think it’s a sign of modernity. And these fabrics are a way to get at that essence.

AMY: And this one is a computer! It is interesting to think about how this connects to the period when this movie was made by IBM.

ABENA: Let me see where this one was made. Yes, it’s Vlisco, the Dutch fabric company, which is part of why I brought this book by Catherine McKinley, *Indigo*. She has a great section where she talks about the history of this Dutch company that has been making designs for the West African market for over a century. They also are part of the historic interest in Holland



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in the Indonesian markets as well – fabrics that might not have succeeded in West Africa were sent to Indonesia. They are ostensibly adapting a batik technology that comes from Southeast Asia and also from West Africa. This one says, “never say never” in French and in English, and it’s a typewriter. This design was made in Holland, but they market and distribute it in Africa.

I don’t know if you guys are getting a bit tired in the hot sun, but it might be interesting to taste one of these Grains of Paradise. It’s very spicy, hot. I bought these in Oakland at the specialty foods shop near Chinatown (FIG. 6).

AMY: Wow. I’d like to use it as toothpaste.

ABENA: This stuff always disappears. I gave a talk at Yale at a conference on intellectual property law, and as I was leaving, a faculty member from the medical school was asking if he could have some. I don’t know if he wanted to use it personally because I said it was an aphrodisiac, perhaps he wanted to put it under his tongue or under the microscope. I brought these pods because they are a symbol of potential for medicinal plants in Africa and the ways in which they’re forgotten and remembered. Sam Adams, in its summer

pale ale, uses this spice and calls it “a once-forgotten African spice” that was “according to medieval legend thought (erroneously) to have aphrodisiac properties,” perhaps because they do not want to alarm consumers. I also brought BioVigora because it uses Grains of Paradise, along with kola, to treat those who are suffering from impotence. There are actually patents that have been filed by Canadian companies, one patent in particular, to allow them to have exclusive rights to a process for making capsules using *Aframomum* to treat impotence. I’ve done focus group interviews in some places like Ghana, and its powers are common knowledge – it’s used as a spice in cooking and in medicine.

AMY: Can you tell us about the other books and magazines you brought?

ABENA: This is *Media Monitor*. It is an attempt to look at standards in the local media in Ghana. For example, there are articles about the Nigerian Nollywood film industry, and Ghollywood, in Ghana. It discusses the state of the film industry, how to make sure that films made locally succeed, and that the images aren’t too graphic, how to keep up the standards. These are the films that had been made on VHS tapes and distributed widely, which

were profitable. In this case, somebody who is at the NFTI, which is the National Film and Television Institute in Ghana, is trying to make a case for their way of doing film, vis-a-vis the influx of low-cost digital productions.

There is a sense sometimes that Africans are presented in the wider international media in certain ways, so I brought this because it’s something that’s happening in a Ghanaian country, where people are trying to say, how are we presenting ourselves? What are our concerns? Our concerns are about managing our film industry. Our concerns are about accuracy and corruption with journalists. And they’re slightly different conversations than you might expect. They have high hopes. This was printed by the School of Communications in Ghana in 2004, which is trying to train journalists, train media workers, create a need for itself.

I also brought *Guide du cinéma africain* because it also concerns how people present images of Africa. This guide is very important, because these filmmakers are trying to create forms of narratives that will also be viable internationally and present new images of African settings.

MICHAEL: Is there a film that you saw that you remember?

ABENA: Yes, there is a film by one of my favorite filmmakers. *La Vie Sur Terre*, by Abderrahmane Sissako, a Mauritanian/Malian filmmaker. He has been seen as the apparent heir to Ousmane Sembène, the renowned Senegalese writer and filmmaker, who unfortunately passed several years ago. *La Vie Sur Terre* is a film about the ways in which people in a small town in Mali are trying to understand what it means to be living in the year 2000. This is a really important, award-winning film, but this isn't necessarily the film that people on the street are going to want to watch, either.

Regarding the books I brought ... for me, my research on plants and technologies and medicine in Africa is a personal story. I grew up in the United States and also in Ghana, a little bit in the UK, a little bit in Japan. And I was confronted at an early age with stark disparities in access to health care. So, my mother's family is from the Bay Area here in California. The kinds of health problems that her family members were confronted with – from diabetes to cancer – were treatable and people didn't die immediately. On the flip side, my father's family had little access to hospital care in their small town in Ghana, West Africa, and relied on herbal medicine and lay healers. So unfortunately, his

mother passed in childbirth in the 1950s, and his sister passed in the early 1990s in childbirth. At a very deep and personal level, I was trying to understand – I live here and there, and why is it that somebody living in the United States has a better chance of living a long and prosperous life? And what it is about these medical technologies that allows them to work or not work, and provide appropriate healthcare in these different settings? So my interest in herbal medicine is very pragmatic, and I try not to romanticize societies in African countries where people seek access to biomedical care, too.

The two books I brought, *Indigo: In Search of the Color That Seduced the World* and *The Gene Hunters: Biotechnology and the Scramble for Seeds*, are both books about searching. And I especially like Catherine McKinley's book, *Indigo*. She is somebody who, like me, circulates in many different cultural worlds. She was adopted, and has cultural ties to Jewish families, to African-American families, to New England white American families. And she, in her own way, went to West Africa to try and understand more about herself, and also more about textile and fabric. So this is a narrative that charts her journey through West Africa – Ghana, Niger, Mali – to look for the

source of indigo, which is the blue dye of ancient lore. She's trying to find somebody who was using organic indigo in the traditional way, but it's almost impossible. She thinks there are only maybe two or three people using it in its pure form.

In the classic book *The Gene Hunters*, Calestous Juma (who is a professor of public policy at Harvard University) writes about the search for new seeds across history as people sourced plant materials from farmers from the Americas to Africa. For my work on bioprospecting, I'm also interested in documenting the traces that plant hunters have left. For me, it's important to visit the places where people are looking for new plants, to go to the laboratories, to try and find the field in Madagascar where Eli Lilly cultivated periwinkle flowers to make Oncovin and Velban. There's something visceral, that I need to see this place, and smell it, and talk to some of the farmers who were cultivating these flowers, and see what they say. There is also a political valence implicated in the search. So figures like Ely Lilly are searching all over the world to find plants that may or may not be bioactive, from which they can then make blockbuster drugs. And they may or may not compensate – in

this case, not – to any extent the farmers who cultivate those plants. There's some friction there that interests me. So that's why I brought these two books.

AMY: Why do you think IBM made this film?

ABENA: In 1968, the United States is trying to make sense of its place in the world. It's trying to make sense of its place vis-a-vis the Soviet Union – you have the Cold War, the arms race, and you also have the space race. And you have questions of who is going to be the first to land on the moon, the first to visualize the earth from space. So in 1968, we have the Apollo 8 spacecraft mission, where you're going to get that first global view of earth hanging in space, virginal and ripe for the taking. Previous images of the globe had territorial marks on them, they had the boundaries between nations. But this was erasing that, and somehow the United States is asserting its authority by creating this image, but it's also noticing that it's somewhat less consequential. It has a smaller place to play, perhaps, in global affairs.

If you look at the objects that are on the picnic blanket in the Eames film, they are speaking of this space moment, trying to understand at what level

humanity is relevant, at what level we have power to assert ourselves.

AMY: It's interesting to think about the simultaneous searches going on and the pioneering spirit inherent in searching, whether it is space or land or in reference to *Gene Hunters* and bioprospecting.

ABENA: What interests me in my work are the multiple narratives that come into play when you have many people involved in some production. There is a tendency to find the person who was first – the first to discover, the first to patent, the first to land on the moon. But that erases the many people that contribute to the process. In the case of plants, it excludes those who may have discovered that they were bioactive, perhaps independently, perhaps through very complex networks of trade and exchange. And so when you start looking at different levels, you see different ways in which people can own information, and they can own space.

With *Grains of Paradise*, you have something that can be considered a traditional medicament; it's something that's exchanged at a very local level. It belongs to very specific communities, but it belongs to many communities. So you're going to have overlapping narratives of ownership – you're

going to have a community in Cameroon that's going to say, we've always known that this is an aphrodisiac; it's our plant. You can also have Chinua Achebe use it in *Things Fall Apart*, and then alligator pepper is deeply Nigerian. You can also have a Canadian company marketing it as a treatment for impotence and backing some of this with patents or not, and saying, this is our independent discovery; we are the first. No one else has ever said that this could be used to treat impotence. That's the kind of language that comes through with a patent.

MICHAEL: Can you talk a bit more about these overlapping narratives?

ABENA: Yes, I can talk about that. Finding ways to better extend access to adequate medical care shapes one of the major dilemmas of our times. And access to medicines that affect therapy is a real problem. Activists have said we should do away with drug patents for essential medicines and allow less wealthy nations to buy or manufacture critical medications at cost. Because people in places like Adukrom, where my father grew up in Ghana, did not have access to colonial hospitals and adequate imported medications, they sustained knowledge of herbal medicine. Now, we have a dilemma if we consider on one

hand calls to flout patents, and on the other hand, efforts to strengthen intellectual property rights in a place like Ghana. Should people in my father's hometown in Ghana share herbal knowledge that might help in the creation of new pharmaceuticals, and if they choose to do so, ought pharmaceutical companies compensate them? Or, should they keep the bits of valuable information that they have on plants secret, perhaps only sharing them with Ghanaian scientists (who might even be from their town) to try and make domestic products? Should the Ghanaian scientists seek patents in North America or Europe, or is it just too expensive to try to compete with international drug companies? And even if a blockbuster drug comes through, who is to say that the people in my father's town of Adukrom would be the only ones to have rights to share in profits, considering that plant knowledge often circulates across vast regions? These are some of the historical, geographical, public health, and legal questions that my work seeks to better understand. So something like a patent is often going to speak to the question of the active ingredient, not the plant itself.

AMY: That's interesting, confirming the idea of something being bioactive through the tools

of analysis and measurement available to the pharmaceutical companies, as opposed to the ways in which someone in Nigeria would observe the plant's effect. It brings me back to the *Powers of Ten*, using the microscope to access what can't be seen observing with our eyes. We wanted to just stay on the picnic blanket and observe at that level.