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Abstract

In May 2007, the month before the Heidelberg conference entitled “Geographies of Science,” there appeared two bits of news, little-read stories beneath the notice of the regular press, apart from a few local papers. The irrelevance of the articles owed partly to their subject matter—science and technology in Africa, which is rarely reported on to begin with—and partly to their highly conventional, repetitive message of failure and promise.

Outer Space of Science: A Video Ethnography of Reagency in Ghana

Wesley M. Shrum, Ricardo B. Duque, and Marcus Antonius Ynalvez

In May 2007, the month before the Heidelberg conference entitled "Geographies of Science," there appeared two bits of news, little-read stories beneath the notice of the regular press, apart from a few local papers. The irrelevance of the articles owed partly to their subject matter—science and technology in Africa, which is rarely reported on to begin with—and partly to their highly conventional, repetitive message of failure and promise.

The first item concerned the Nigerian earth observation satellite, NigeriaSat-1, launched in 2003 at a cost of $13 million. It had come under criticism for mismanagement. The director of mission control had been sacked. Five engineers had been accused of stealing laptops with operational software, and then fired. Six more had left, "impatient" with progress according to the head of the national space agency. The new staff was, according to others, "inexperienced and mediocre," without the British training of earlier engineers. They simply captured the data from mission centers of other satellites in the area (Jones, 2007).

The second piece of news was upbeat. At an international conference on e-learning in Nairobi, ministers and technology executives announced the exciting results of a pilot project in 120 schools in sixteen African countries. A "35% improvement in students' examination performance" was recorded, and a plan was announced to rollout the "electronic schools" initiative in 600,000 African schools within the next decade. Marketing professionals were said to be slightly worried that the project's outcomes could depend on the speed of technology adoption by teachers. But the Kenyan Minister of Education, undeterred in his enthusiasm, asserted

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that e-learning would help Kenya mitigate another problem, the need for teachers (Abwai, 2007).

Failure and promise, mismanagement and initiative—the twin themes of African "development" since independence. Epitomized by the successfully launched but operationally problematic Nigerian satellite and by the "tested" rollout of the electronic schools program, they account for this chapter's concentration on an "outer space of science," one of many in Africa, Latin America, and Asia. The particular space is Ghana; the methodology is video ethnography; and the analytical perspective is based on the concept of reagency, "a process of redirection involving a contingent reaction between identities" (Shrum, 2005, p. 723). Although the story told in this chapter is usually categorized as one of development, that designation is misleading, if not destructive to understanding. In what follows, we describe our alternative concept, reagency, and explore the argument that distance lends autonomy. We do so through a video ethnography entitled *Outer Space of Science*, which we produced for the conference. The movie documents some of the efforts that were part of a project to facilitate the Internet connectivity of two research institutions in Ghana. The central themes are spatial and temporal relationships between bodies, new technologies of communications, and the social networks heard of and encountered throughout the film. Our discussion also addresses two failings of the movie and two of its characters, one of whom is the hero.

A Space for Reagency

In the new millennium, it is preferable to consider the globalization of science by replacing the concept of development with that of reagency. As defined above, the latter highlights the social interactions and processes—including those having to do with new information and communications technologies (ICTs)—that are set in motion by streams of resource flows from "developed" to "developing" areas of the globe. The concept of reagency depends on the crucial notions of identity and place.

The central interactions in this micro-oriented perspective are between Hosts (persons whose time is primarily spent "in place") and Guests (persons who "come from afar"). We note that guest–host interactions between "developed" and "developing" areas are relatively recent in human history. Even when limited to the academic Guests and their African Hosts, the frequency of Guest–Host interaction prior to the past century does not merit attention. As Jöns (2008) has shown in her study of African visits by Cambridge faculty, there were only three trips *altogether* between 1885 and 1924. During the entire period that she studied (1885–1954), neither of the two premier British institutions of higher learning made even a single recorded visit to Ghana, the "outer space" of our movie. This embeddedness of the identities of Guests and Hosts in places structured by resource inequities is what gives their interactions a reagentive character, like that of a substance used to produce a chemical reaction. Because this book is concerned with science, the Guests and Hosts of primary concern are researchers and educators, employees of government agencies, NGOs, and universities.

Reagency is antidevelopmental in two senses. One is a skepticism about the hypothesis that initiatives, programs, and projects that come from afar have broadly beneficial outcomes. As indicated above, the other sense is the conceptual point that "development" does not well describe processes at any level of analysis except the institutional. (There are, after all, development organizations and initiatives.) The conference in Heidelberg provided an opportunity to take stock of the African wing of our project, to check data and analyze footage from a 2-year period of work. This project was conceived of as an investigation in the sociology of science with a focus on the analysis of social networks. Yet it quickly became engaged in providing funds and equipment for improving Internet connectivity. Our general argument is that distance lends autonomy to actors, reducing the "power" of the core and undermining the received wisdom that greater resources somehow compel directed action. Indeed, if it were true that power and resources mattered, then either conspiratorial forces that prevent development would exist or whatever is meant by "development" would already have occurred to some significant degree.

But neither of these conditions holds. The concept of reagency, as applied to the scientific sector, points to scientific institutes as physical installations whose irreducibly "stationary" character allows us to elaborate the theory of the spatial concentration of knowledge (Meusburger, 2000) beyond the distinction between center and periphery. We are skeptical that the notion of a global hierarchy of centers captures what is important about science in Africa. As we shift to the local and micro frame of reference, an emphasis on the spatial rootedness of social systems teaches that identities located at scientific "centers" such as the United States and Europe may reposition themselves to new organizations in Africa, but they exercise no more influence over events at these centers than any other co-located agents. A relational approach to understanding "center and periphery" represents situations of interaction as the fundamental stratum of those far-flung interactions that are called "global." Centers are locations of rather frequent pilgrimage.

The Movie

Outer Space of Science was designed as a two-part film representing 2 years of progress, or, better, events during our work on African connectivity in universities and research institutes in Ghana and Kenya. We decided to work with three primary themes reflecting the objectives of the workshop as expressed in position papers and abstracts of other presentations. The first theme was the ways that spatial aspects have been shaping inquiries into both the production and circulation of science (Livingstone, in this volume). The second theme was the idea that new telecommunication technologies have not made the distinction between center and periphery obsolete (Meusburger, 2000). The third was the observation that social networks, particularly those structured by visitations, have been crucial to understanding the dynamics of research collaboration and data acquisition since the nineteenth century (Jöns, 2008). Spatial questions were to be crucial throughout the film because

the positioning of bodies in space could be shown to have an impact on the process of providing equipment to institutions, on the project objective of facilitating Internet connectivity, and on the means of collecting data on the scientists' Internet usage. That very connectivity—the new ICTs that offer the promise of reducing the impacts of distance—was to be cast as our intellectual problem during this decade. The two primary research problems were (a) the manner in which those technologies were used by scientists, educators, and researchers; and (b) the consequences of that usage. Would distinctions between center and periphery continue to hold with the reduction of the time it takes to communicate globally and of the attendant potential for remote collaboration? How would these new ICTs affect the social networks of scientists?

During our early work in Ghana, India, and Kenya, it became apparent that we would need to work with the local research organizations and use some of our project funding from the US National Science Foundation to help them establish and maintain Internet connectivity. After all, there was little point in studying the impact of ICTs in institutions where there were none, and where scientists, if they sent an e-mail at all, were simply going to Internet cafés. Because our reagency perspective was oriented to interactions at the microlevel that results from the organizational initiatives that import programs and projects into distant lands through agents from "developed" countries, we became objects of our own theory. With complete access to our own discussions and those of our permanent collaborators and temporary visitors, we began to develop video ethnographic techniques to follow the connectivity initiative in Africa and India, through the National Science Foundation program on Information Technology Research, to our own small project in three sites and six institutions in Ghana, Kenya, and Kerala (India).

By 2007 we had been collecting footage for approximately 5 years. From 2002 through 2004—the most active period of filming our attempts to make a difference to research institutes and university faculties—we reviewed 70 h of footage shot in Kenya and Ghana during the summer research visits for a selection of scenes illustrating various aspects of reagency. Although the editor (Shrum) was already familiar with the events (as a participant) and the footage (as either a cameraman or a subject), four undergraduate students reviewed each hour of footage twice. On the first pass, the objective was to become familiar with the material and to identify the segments that were audio-friendly and pertinent to the story line. On the second pass, attention shifted to producing specific and detailed summaries of important episodes. Although the footage and the stories developed differently in Kenya and Ghana, several individuals in Accra (Ghana) seemed to provide a kind of linear narrative through the vicissitudes of video ethnographic work. Because our fundamental arguments over what we were doing and why we were doing it were beginning in earnest during that period, it seemed best to focus on the West African events in order to weave a generally linear narrative.

There were two primary flaws in the Heidelberg presentation, as indicated in the discussion at the conference. One was the understanding of the narrative voice; the second was the identity of the two principal characters in the film, one seen frequently and one never seen (the names of some people referred to in the film were

altered for purposes of confidentiality). We deal with these characters below and again in the conclusion. To address the first shortcoming as we examine the method of video ethnography, certain presentational aspects warrant scrutiny. An audio track in a movie (analogous to the talking of a scholar behind the podium during a presentation) can take one of two forms: "voice-over" or "in situ." In a voice-over, the author of the movie provides verbal commentary as an audio context, background, or interpretation for what the audience sees on screen (the video track of the movie). This contribution occurs after the fact and from a different place, usually from an editing suite or office. A voice-over is retrospective, just like the interpretive net a traditional scholar casts over collected field notes or archival materials. In the conventional voice-over, the author has complete control over the ex post facto elucidation of an event. But what appears to be voice-over in *Outer Space of Science* is not of this nature; it is *emplaced*, temporally embedded interpretation. The voice that is heard was recorded at the same time as the associated video scenes. Of course, there is always a choice made to utilize such interpretation in the final analysis, for the selection process cannot be abolished. But this method dramatically reduces the scope for selection—audio tracks that are derived from original footage can only be "cleaned," not significantly altered. That is, one may eliminate unwanted sounds, but one cannot "piece together" sentences and still keep on the proper side of the ethical divide.

A clear example of this technique comes near the beginning of *Outer Space of Science* when a long shot (50 s) shows a pump as the author ruminates on the analogy between a water pump and the Internet, the subject of his own development project:

> The demonstration pump, for "practical irrigation." A pump pedal, getting the water from one place and out onto the ground where it is going to fertilize [*sic*] something, some crops. We're trying to connect people to the Internet. We want to get the information out of the pipes.

This real-time monologue is marked by mistakes (*fertilize* instead of *irrigate*), stumbles, and even statements of purpose that are called into question by the subsequent story line. But the importance of this emplaced narrator is that he is on location, positioned in time and space as part of this story. Because placement of narration is far from obvious to a viewer but crucial to the understanding of an argument in an academic movie, the spatiotemporal relationship between the locus and the substance of the narration must be considered a problem that needs a solution: What new "convention" could we use to indicate whether an audio track is "emplaced" interpretation or "supplemental" interpretation in the manner of traditional scholarship? The reason such a convention is needed is that both techniques are valuable, but the audience needs to know which is being used.

The second flaw in the Heidelberg presentation was more complex and related to the identity of the two principal characters. At the conference, both of them were viewed as ambiguous, though there was no ambiguity in the mind of the editor. Let us leave our hero until the conclusion and begin with the role of the unseen Derek so as to alleviate the concern that he existed only in the imagination of the project

principals. In the film Derek is shown to *reimburse* a sum of money for work that had not been completed. This behavior is unusual in the given context and is one of the movie's main story lines. Local conditions make such a refund unlikely, if not impossible, a circumstance the viewer does not discover until near the end of the film. Our intention was to use this singular event to shed light on the process of reagency and its typical forms. Why would it be so difficult and exceptional for an individual to give back a financial advance that had been provided to start work on a contract? One reason—but the least interesting—is the near impossibility of proving that no work was accomplished and that there was no further claim to payment on completion of the work. The more illuminating reason for the anomalous act begins 1 year earlier, in the attempt to jump-start the connectivity project in one Ghanaian research institute and one university college.

The project personnel consisted of a director—the first author of this chapter—and several doctoral students and national coordinators in each country, each located at a major university or college near Ghana's capital city, Accra. The coordinators were locals, but they were not ICT experts. Occasionally, as depicted in the movie, volunteers would join the project members out of desire to help and to experience faraway lands, and sometimes these individuals were knowledgeable in the ICT field. In 2003 several such advisors accompanied the project director and his associate to Accra to assist in meeting with locals, developing strategies to establish Internet connectivity, and collecting data on the usage of the Internet by scientists. Speaking in a film segment after the demonstration pump has been introduced, the narrator expresses his frustration with the progress of the project thus far. He quotes the German director of a nearby international research institute:

> It must be disappointing for you. After all, if I remember, your project is to collect data and find out how people use the Internet. Seems like you're spending all your time figuring out how to get people connected. Boy, he hit the nail on the head.

The first half of the movie illustrates this condition—hitting a nail on the head may be easier than connecting an organization to the Internet, but new ICT is not unequivocally beneficial to its recipients. The first indication that it may be a mixed blessing is the experience of a white expatriate in the north of Ghana. He learns that our project is here to help with Internet connectivity and to find out how scientists communicate with the Internet. He responds, laughingly, that in some sense they would be better off without the Internet:

> "With difficulty" is how we use the Internet. I used to be up in Tamale, and that was the next best thing to nothing. You really wish there were no Internet, because people have this expectation, "Oh, send me an e-mail." It's like, "Yeah, sure, I could deliver it faster on a donke". Yeah, that's great, you know. Anything you can do for us.

These expectations are one key to understanding both the "digital divide" and every divide that is defined as worthy of resource infusions, visits—sometimes extended ones—by Guests, and their scientific programs and technological projects. Expectations for ICTs are similar in this respect, but they are also divergent in that they are the means for conducting other kinds of business. The expatriate scientist wanted improved connectivity because his needs were simple—to communicate

with his colleagues on the same terms as he would in the US without the need for movement of bodies in space ("faster on a donkey").

The Guest–Host relationships that are characteristic of development projects have always involved this movement. What struck one project member just after the interaction with the expatriate scientist was that the scientist was "acting like a local" in his concern with a return or follow up visit. The theme of "return" has been pervasive since our project began in 1994 and has been noted by other scholars of the geography of science (Bauchspies, 1998). It is the expectation of return that creates relationships, friendships, and lasting commitments; but more common is its opposite, the Guest or Stranger who states an intention to return but does not. Projects that entail contracts and money generally require at least one return visit and a further visit for evaluation. Although Internet communication can be used as a substitute, almost all projects require funds for these face-to-face visits, just as they did before the advent of the Internet. Routine contact is less place dependent than such visits are (Meusburger, 2000), but the more important issues of project design and funding are subject to the "compulsion of proximity" (Boden & Molotch, 1994), which requires the movement of bodies in space, often over thousands of miles in the case of development programs.

The central interaction in the 2003 period depicted in the movie is a meeting of six individuals, three from a research institute and three from the connectivity project. One consultant questions the "demand aspect" of connectivity, suggesting that perhaps their connectivity problems do not result from issues of technological supply but rather from the question of whether "anyone cares about this enough to cause [the director] enough aggravation to make sure this is done." The director, supported by his staff, replies that his scientists go to Internet cafés if they need to send an e-mail when the Institute connection is not working. Clearly, his response does solve the problems of those who need to send these e-mails. But it is not one that the consultants find satisfactory. The project director answers that, taking everything into account, the most important issue is reliability. Low reliability teaches scientists that the Internet is not that useful and perhaps not worth learning to use.

This view is conventional but not universally accepted, as shown in the relationship between the project, the research institute, and the university. Although the decisive scenes were not subject to videotaping, the consultants do speak about their interactions with senior administrators. This meeting is clearly not the first with these individuals or their counterparts in Ghana, and the frustration of the consultants is apparent. Because reliable connectivity has not been achieved in 2003, the objectives of the project become increasingly unclear. In a simplistic way, the main interactions are characterized as negotiations over prices—the quotes are higher than they should be. In one scene, the project director asks a vendor if the prices being quoted for items are actually for *all* the items required, and the vendor responds that they are just for single items. The director is clearly aggravated.

But it is apparent at another level that the problems are more complex than getting the lowest prices for products, something that might be achieved in the US through shopping.com. Setting and getting the desired price is often a challenge in Africa, but the edginess of the interactions suggests that spatial proximity, the ebb and flow

of bodies in the outer space of Ghana, is the root issue. Plans are made, agreements are concluded, and processes move in different and unwanted directions when the expatriates leave, with or without e-mail connections. At the university, the project director explains to his consultant that the given context makes it impossible to keep to a strict plan:

> I make certain gambles and invest money at certain points, hoping that I'm going to figure out the next piece of the puzzle later. Here at the university, there are certain individuals that lead me to believe more difficulties might be there than at certain other institutes and universities. I'm aware of that, so I'm going in with my eyes open. But if you ask me whether I have an actual plan that guarantees. . .

The project director argues that it is better to be flexible, to have a general strategy and make decisions on the fly. But the consultant, unconvinced, cuts him off: "*Guarantees* is too strong a word. Are you going to try to convince me, or are you trying to convince yourself?"

Another scene at the university was filmed just after a meeting with top administrators:

> We're hearing from the same team of individuals that has been in place since we've been coming here. . .. I don't think they have any interest in moving things forward. I think they have an interest in keeping things exactly the way it is [*sic*], exactly the way it has [*sic*] been for the past four years.

Aggravation has been transformed into despair:

> We've been saying the same thing: "We're going to build a connection." They've been saying the same thing: "How much money do you have?" So I don't see anything changing, and I don't see anybody getting better connectivity. And I think our final outcome was fine. We said we're going to put in a server and buy five access points, put in a few network cards, and. . . we'll see if anybody's connected. And if they're not, then we're not going to spend any more money. We're going to leave it like that. If that's the way they want the university to operate, there's nothing that we can do about it.

The emotional energy generated by the meeting is evident in the face and tone of the project director, who shakes his head and looks down in resignation: "These people are going to have to die, or retire. . . before they change."

Part of the explanation for the director's surrender resides in one individual who had become a gatekeeper. Sources of funding such as this small project once had to rely on this individual, who had no formal training in information technology. He had developed a networking plan for the university and had ties to senior administrators. Instead of providing general access to a master plan for connectivity, he kept a set of drawings stored on his laptop computer. His personal knowledge remained private, so when the price of equipment dropped and solutions became more widely available, "what he did was to monopolize the knowledge. . .. [H]e's trying to figure out 'how can I make money?'. . . This is not his job as a university servant." Throughout many sequences this suspicion, this fact of "development," lurks near the surface of interaction. Individuals who are firmly anchored in a space where resources do not originate locally are motivated to establish relationships with

temporary residents who represent organizations authorized to distribute program and project funds.

> This particular place seems to have a group of people in charge of the connectivity who have figured out how to make money. As long as everybody's not connected, the money can keep coming. But once everyone is connected and it's functioning like a university in Europe, then there's no more money to be made.

The movement of these Guests into and out of their local space provides opportunities to negotiate over resources, but agreements and contracts are known to be "subject to local conditions." This movement of people and resources into an outer space is the motor of the reagency process.

An important part of our video ethnographic output is the flexibility it provides for discussion and interpretation. One of the most insightful interpretations is offered by a consultant who struggles to understand the problems faced by the project director in relation to his goals and motivations: "So your big thing is an ethical, a moral thing. . . taking your time that you could be devoting to doing something else when you're here?" More than anyone else, this person seems to relate to the ambiguities and uncertainties that produce not development but interactions of an unpredictable character, larger questions about how to proceed in spending money and signing agreements.

Director: I just want to do the right thing.
Consultant: What's the right thing. Something that feels good?
Director: I don't want to waste money. I want to give them something that will work. I want to give them something that is not outmoded.... There's just multiple considerations going on. Whether the technology is available, whether we can even get it—that's an important thing to know.

Doing the right thing is not a simple but a complex, sometimes unfathomable effort in pursuing the sociology of science. As an attempt to understand the impact of the Internet on science in developing lands, the project has become enmeshed in the problems of development, in the interaction with vendors, professors, consultants, and cablers who understand the dynamics of entering and leaving local space much better than the project director does. Generating action seems easy with face-to-face encounters: Commitments are made, and implementation is foreseeable. But frequently there is minimal follow-through—"you know how it is in Africa."

That final interaction between director and consultant makes a transition to a discussion of Derek, one of the two characters that the Heidelberg audience perceived as ambiguous in the film. He is to be hired to develop tracking software. In the second half of the movie, Derek dominates, along with the server, the piece of equipment he had been provided through the project in 2003. The consultants go back and forth, trying to find Derek, who some people say has gone to South Africa. No one seems to know where the server has gone, the implication being that it may have been stolen. The local university has been disappointed with Derek's service. The fellow may have come once or twice with his assistants. Sometimes, in the

words of one local, "The boys did come, but then they said something was not in place. They were going to come back, and they never showed up."

This pattern is typical, not just of donors and expatriates but also of locals engaged in projects. Their physical presence depends on other opportunities and constraints stemming from their social networks: "It's not that anyone was trying to do anything except their job. . .. It's that they have a lot of jobs." The director says there is only one way to find out: "We just have to go out there and see what's going on." The advisor demurs: "We send an e-mail and we say we'd like the server. If he refuses, we'll take action. We'll begin court proceedings." The statement is hilarious for the local coordinator: "Do you have lawyers in Ghana," he laughs. "We'll find some!" This exchange is indicative of the problem of accountability. Ultimately, expatriates have little recourse in the event of equipment that is purchased but uninstalled or of work that is paid but not performed. Everyone knows that Ghanaians cannot begin projects without some payment in advance, but often the advance is not enough to ensure completion.

But Derek is an exception. At the end of the movie, to everyone's surprise, he does return his advance. Why? The difference lies in the social networks that are activated within a few days after the arrival of project personnel in 2004. "We know people that he knows," says the project advisor. They are not just friends in common, but *expatriate* friends. Derek, it seems, was raised in Ghana, but went to college in a developed country at a prestigious institution. His self-image is tied, more than for most Ghanaians, to his feeling that he is, or would like to be, part of the expatriate social network. If Derek could be contacted, there would be some chance that something could be worked out. The remaining problem is how to reach Derek.

The rest of the movie deals with the search for Derek and the interactions using Internet and mobile technologies. First, at the busy Internet, café the advisor rapidly sends a series of e-mails to his and Derek's mutual friends. Until these ties are mentioned, Derek does not respond. Eventually, they meet, and Derek decides to return the advance payment rather than complete the work. Near the end of the movie, after the money has been returned, the director and the advisor argue about motivations and reasons that may have been peculiar to the case. They have divergent assessments, but the explanation of events lies in constraints imposed by timing and spatial positionings. The chain of events began when it was not possible to obtain bids for equipment before the project left Ghana in 2003. Had that happened, direct payment for equipment could have occurred. Instead, months passed before contracts could be signed and money transferred to Ghana. By the time the director and the advisor had imported equipment from Germany and were ready to have it installed, Derek had gone on to a job in South Africa. His network of contacts had provided him this other opportunity: "It wasn't his fault," says the director. "He's not supposed to wait around to earn [a mere] $500." Derek returned the money because his reputation *in the eyes of expatriates* was important to him and because the strategic use of available ICT made it possible to establish that this reputation was at stake. However, none of these circumstances would have mattered if not for the physical presence of project staff. These three themes—movements in and out

of local space, network ties, and ICT—will generally be required for an accounting of reagency, but they dovetail here in a singularity.

Conclusion

Structural inequality has persisted at a global level throughout the post-World War II era of development and into the modern period of globalization. Macro approaches to development aid show that it has changed the economic relationships in the world system very little. The rise of labor-intensive manufacturing in noncore zones has led to upward mobility for only a few countries (Mahutga, 2006). Our approach occupies the opposite end of the spectrum, combining video ethnographic methods with a microsociological perspective on aid. The association of the demonstration pump and the Internet places the action of *Outer Space of Science* within the context of the problems posed by development. Something is being "demonstrated," presumably something that "works." Conventionally, science in outer spaces is developed through technology transfers, with technologies being provided by agents of development who possess greater resources than do the recipients of development. What our approach contributes is the insight that the resource imbalance is only *financial* in nature. The distance of the recipients from developed areas lends them an important kind of autonomy. They possess the important resource of locality, and they use ICTs creatively to achieve diverse goals. In one sense the story we tell is a familiar one of constraint, failure, and corruption, just like the Nigerian earth observation satellite that was launched from and into "outer space." The reagency concept conveyed through this story is not judgmental, so we finish here with the positive story of our leading character.

He was connected above with the second flaw in the movie—confusion about the identity and even the valuation of the main character. The gentleman who often appears in a bright red shirt and cap, Dan-Bright Dzorgbo, is the "hero" of the film. He is a lecturer in the sociology department at the University of Ghana (in Legon). He has been the national coordinator of our project since 2000, but more important, he has been a good friend. That friendship is based on nothing more or less complicated than frequent and enjoyable interpersonal interactions. It explains our long-term association better than any notions of trust or contractual arrangements. It is a commitment built through repeated visits over time, a pledge to engage in annual visits for the duration of the project and beyond, a mutual understanding that "something" will keep moving, even if not the something originally designed.

Dan-Bright originally hails, like most Ghanaians, from a village. His Ph.D. in Sweden and his career in academia are hard won and unique within his family, meaning for him higher income and status than most Ghanaians have, yet also the obligations they entail. In the movie he appears several times in connection with serious problems with contractor relations. But throughout he is also shown in a pickup truck, collecting fellow villagers who need a ride. At the end he is seen making plans in a peaceful, rural area. This latter sequence—totaling no more than

2 min—is woven into the fabric of the project, but the images are green and red, clear and bright. They feature the rural landscape as opposed to the brown urban institute. The movement of bodies in space is communicated by the rush of landscape across the background and foreground and by Dan-Bright's peaceful stroll through the bush after arrival. Instead of the darkness and harsh light of the hotel, the research institute, and the Internet café, instead of the frustration, confusion, and conflict of development, one sees the evident anticipation of someone returning home: "To my village" is the sequence's only English phrase alluding to these first travels.

Midway through the film the audience witnesses the "pickup," as Dan-Bright stops his truck for five fellow villagers on foot. For viewers, the ambiguity of his role as the university professor returning home may be awkward in its status implications ("I will stop for them, but they will be behind. That's what they do. They will be at the back."). Dan-Bright does not speak with them; he merely stops, explaining the action to the expatriates in front. The remaining clips in the sequence occur at a special place on the planet. For Dan-Bright, it is his home or, more rigorously, it is a space near his home. He is showing his friends "where I've just acquired a plot of land to keep up a house in my village." After his return from doctoral studies, he consulted with community elders, who gave him the plot where he intends to build a house. It is on a cliff near the junior secondary school—a symbolic location—and will afford a grand view across a valley to the village: "When I build, I'm going to see the whole village. I think that is exciting for me to be able to have the whole village in perspective." He makes the point again later, "When you are in the house, you can have a bird's-eye view of the village."

From that perch, Dan-Bright's family will be above and apart from the village, yet the joy in his eyes is apparent at the thought of moving back home. In the final scene of the movie there is dancing, now to the village rhythm that originally accompanied Dan-Bright's homecoming. Though unstated, the dancing takes place at a funeral. The author of the film—the project director—is seen for one third of a second, smiling for perhaps the first time, watching at the edge of these festivities. The last edit returns to Dan-Bright, still dreaming of the house as he looks into the distance: "When I build, I'm going to have the whole town in front of me, so it's going to be very beautiful." Like Dan-Bright, the author is joyous but apart from the villagers. In a real sense, Dan-Bright may (or may not) be going home, but the author has helped him along the way. There is little question that, though the Internet connectivity was long in coming, if it ever did come at all, the project funds helped to build a family home through a legitimate professional relationship that became a friendship. That friendship was a structure in space that came from interpersonal connectivity and not Internet demonstrations.

Because this essay and movie have described processes of reagency that are commonly viewed as malfeasance, we emphasize that understanding geographies of science, particularly the outer space of science, requires one to suspend judgment about the eventual outcomes of these processes no matter how one participates in the present. In our own project, which continues (albeit without any direct concern for connectivity), we will continue to abide by the rules we have set. We will try to

prevent project funds from being misused—and we will call it stealing, should that be the case.[1]

Note

1. It is instructive to consider the East India Company's trading network, which was developed over more than two centuries, well before the current era of globalization. Erikson and Bearman's (2006) study of 4,572 voyages, based on the ship logs, journals, ledgers, and reports of English traders, shows that dense, integrated global trade networks gradually developed as an unintended byproduct of "systematic individual malfeasance" (p. 195). As ship captains sought private profit through the Eastern trade, they created fertile conditions for globalization and the geographies of science that characterize the modern world.

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