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Repair in Translation

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Abstract In this article, the author juxtaposes writing and conversation about care for, with, and in spite of technology in Cambodia. The scene is medical care, and the actors are radiologists, engineers, cadres, and X-ray machines. A radiologist is forced to repair an X-ray machine for doctors of the revolution; the pressure and constraints are almost unreal, yet his skill in repair affirms his humanity and the specialized knowledge and creativity required for problem solving. An engineer teaches repair as he fixes an old X-ray machine. He finds words and necessary tools are missing in Phnom Penh, a familiar story of lack, yet repair is material practice that enables improvisation in spite of linguistic and epistemic challenges. A radiologist, the same one from before, in the twilight of his life, questions the dominance of technologies within medical care and the deskilling of doctors. Juxtaposing these stories bolsters attention for the mundane and creative work of keeping things going in a "broken world," in line with the ways that care and repair are mobilized in STS. It also shows how the radical potential of "broken world thinking" is circumscribed when a broken world is the one from which people are struggling to distance themselves. What we are left with are multiple, overlapping, fraught stories of modernity in which need, choice, and pleasure of repair all have a place.

Keywords Cambodia · care · repair · technology

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> Khmer is an ancient language. There are often no words to use for a direct translation. Sometimes surprising things are missing: there is no word for filament, or resonance, or vacuum tube.
> —Ed Hutton, "Snapshots from Cambodia: Engineering"

> As a technical ensemble, translation is not simply a means for substituting the language and meanings of one for another. It is also the letting loose and putting forth of the foreign, tasks made possible only by way of repeatable acts of promising and believing in the possibility of communicating with others into the future.
> —Vicente L. Rafael, *The Promise of the Foreign*

1 Stakes

What is at stake in encounters with difference? The first quote condenses so many issues. Language. Translation. Missing words and perhaps also things. Time is a way of locating the other: Khmer is ancient. Directness is an expectation of communication: words ought to have equivalents. Surprise is an affect of encounter. When words and the things to which they refer are missing, what to do? Stay with the lack, the absence? Make other possibilities for worlding? Repair the machine?

Technology, to be precise, a forty-year-old X-ray machine, enables the encounter here. "There is no word for filament, or resonance, or vacuum tube" writes the engineer in his diary (Hutton 2014). It is surprising. It is 2014, and he has come from the United States to Cambodia to establish a biomedical equipment technician training program. The diary entry is concerned with language, translation, the condition of being ancient yet in the present, and the mysteries of absence. As such, it is faithful to a genre of encounter stories found in colonial art, science, and travel, as well as postcolonial development and global health. Technology is a thing that enables some to translate difference into a situation of lack, or lag, that extends beyond the machine.[1] A modernity encounter. In the engineer's subsequent diary entries, he teaches a Cambodian doctor about the X-ray machine so that the doctor can translate from English to Khmer. Together they teach the hospital trainees and repair the machine. This is a happy ending. The machine is fixed, against the odds. The trainees are taught, probably quite well, by a man who cares deeply about equipment repair and technicians. "We make the hospital possible!" he told me with conviction, over the telephone (pers. comm., 2016). Yet the Cambodian doctor is not doctoring, he is translating, a skill he may not have and may resent being called on to perform. The X-ray machine is forty years old, and may not be in good shape, or even safe for technicians to use. Training comes from abroad, a gift with strings.

Repair carries both these stories of modernity—of lack and absence, of promise and futurity—and many more. I have been studying medical imaging since 2008, research which has included ethnography in imaging wards of public hospitals and private clinics in Phnom Penh; interviews with officials, distributors, and people outside

[1] Michael Adas's *Machines as the Measure of Men* (1989) surveys these practices over centuries.

clinical settings; immersion in everyday visual worlds; and archival research in Cambodia and France, which traced a genealogy of technologies and modernity projects in medicine from the 1950s to the present. In the course of this research, I have struggled to find terms and genres to write about technology and care in Cambodia that fetishize neither technology's absence nor the turmoil of Cambodia's history. Similarly, I have struggled with how and whether the stories I want to tell are Asian stories, ones that can and cannot speak for de-colonial, de–Cold War, and de-imperial "Asia."[2]

In the second quote that opens this article, translation and technology are explicitly conjoined. Translation is a technical ensemble, one that involves direct substitution of languages, yes, but also Vicente L. Rafael's (2005: 15) intriguing "letting loose and putting forth of the foreign." This quote has to do with the Philippines in the late 1800s. For Rafael, translation of novels, poetry, theater, rumor, government speech, and also technology between Tagalog and Castilian relied on repeated acts "of promising and believing in the possibility" of making futures with others (15). Emblematic is the poetry of Francisco Balagtas (1986: 106), who uses Castilian and Tagalog "in touch with each other" (134), next to each other on the line—"*Inhumano dolor—hirap na matindi*"—rather than in hierarchical relationship or in terms of each other. This flattening produces a new public, "of others who are always yet to hear, and in hearing, respond" (156). In translation, some things are gained, some are lost, and not all of these are known or guaranteed. Translation involves an other, a foreign place, or public, or time. The other is in the present and the future, not only the ancient past. A modernity encounter.

It is in this spirit of translation as letting loose, and putting forth, that I write Cambodian stories of care for, with, and in spite of technology into STS and Asian studies. This article considers the ways that care and repair are mobilized in STS as a call to attend differently to the world, appreciating the mundane and creative work of keeping things going; and the ways Asia is mobilized, including in the "Asia as method" genre, as a call for a different accounting of the world, one grounded in Asian history and politics. In line with Steven J. Jackson's (2013) exercise in "broken world thinking" and its resonances with feminist ethics of care, this article takes "breakdown, dissolution, and change, rather than innovation, development, or design" (222) as the ground from which technology studies should proceed. It also shows how the radical potential of "broken world thinking" is circumscribed when a broken world is the one from which people are struggling to distance themselves. The stories of care and repair I encountered in my research on medical imaging technologies in Cambodia are not the underbelly of modernity. They are modernity. How do radiologists and technicians, and I myself, translate contradictions and the multiplicity of care and repair into stories, arguments, and actions?

Juxtaposition is my response to the challenge of writing about technologies and care in Cambodia. The stories that follow are very different, but they all involve health care.

[2] Kuan-Hsing Chen (2010) argues that the problems of colonialism, the structuring of the world during the Cold War, and imperialism must be addressed together, and that historical experience in Asia must be an "imaginary anchoring point" (xv) for analysis. The "de-" signals its corollary, that movements against these problems must proceed together. There can be no decolonization, no transformation of subjectivity, without both colonizer and colonized reckoning with legacies of colonialism and the Cold War and ongoing forms of imperialism in Asia.

The actors are radiologists, engineers, cadres, and X-ray machines. The empirical materials are writing and conversation about medical imaging technologies in Cambodia. I use juxtaposition as a mode of translating repair, in Rafael's (2005) sense of translation as a "letting loose and putting forth of the foreign" in such a way that the "foreign" here may be repair in STS, or it may be repair in Cambodia. In any event, my emphasis is not on comparison (or "the devil of comparisons," Rafael 2005: 69, quoting Rizal) between STS and Cambodia, or Cambodia and other Asian countries. Rather, it is using translation as a mode of thinking the possibilities that theories of repair and care promise for understanding sociotechnical life.

Juxtaposition shares some resemblance to the "thin description" proposed by John L. Jackson Jr. (2013), "where you slice into a world from different perspectives, scales, registers, and angles—all distinctly useful, valid, and worthy of consideration" (16–17). For Jackson, the thinness of these slices is important. The "ways of blinking and winking and twitching through decidedly ethnographic eyes" (18) are not *thick* description, one of ethnography's hallmarks. "Thick description can be complicit with the more unproductive occultings of anthropological research, especially since seeing through another person's eyes is not the same thing as actually seeing that person" (15). It does not mean that the questions are thin, or the ethnographer's responsibility is tossed away. For Jackson, thin description is valuable "even if the scope of the questions posed are, in some ways, as massive as ever" (17).[3] This gravity is also found in Rafael's (2005: 14) concept of translation, in that it involves responsibility: translation is the "act of recognizing, responding, and thereby assuming the responsibility for what comes before and beyond oneself." In other words, juxtaposition involves and invests the author's voice. Furthermore, it is an imagistic mode of writing. Like montage, juxtaposition places a slice of story, in all its density, proximate to other stories to propel an argument. What we are left with are multiple, overlapping, fraught stories of modernity in which the need for, struggle with, and pleasure in repair all have a place.

2 Care with and for Technology

Centering "repair" is a way to understand the technicity of care.[4] Like studies of care, studies of repair in technology and infrastructure studies have explored the everyday, sometimes routine and seemingly mundane practices of working with objects.[5]

[3] Thanks to Noah Tamarkin, who saw resonances between John L. Jackson Jr.'s and my projects.

[4] This is not the only or even the best way to think about care. As I am explicitly focused on medicine and machines, my thinking here aligns with feminist work that takes technologies as part of care and life, not other to them (Mol 2008: 5; see also Benjamin 2016; Downey and Dumit 1997; Haraway 1991; Pols 2012). Furthermore, this is not the only way to think about care, or health care, in Cambodia. It is not speaking comprehensively, and one of the things it does not speak to are traditional or spiritual healers who are prominent actors. See Au 2011; Guillou 2009; Ovesen and Trankell 2010.

[5] As Joan Gross commented to me, a sense of breakdown and repair as normal and expected constituents of social life is central to studies of language. Conversation analysis, for example, views repair as the communicative means through which intersubjectivity is maintained. See Kitzinger 2012 for a review of work on repair in conversation analysis. As Denis, Mongili, and Pontille (2016: 7) note, ethnomethodology and conversation analysis assume mundane, face-to-face exchanges are the (vulnerable) constituents of social life; maintenance and repair studies in STS build on this assumption to include the material features.

Steven J. Jackson (2013) has proposed that "stories and orders of modernity," by which he means the past two-hundred years of Euro-centric human history, are coming apart. Instead of endless progress and invention, we find ourselves in imaginaries of risk and uncertainty. Erosion and decay. Breakdown. Jackson proposes "broken world thinking" in response to a sense that we cannot take the world for granted.[6] It is a call for different approaches to technology and the worlds in which we live. "Broken world thinking" centers around notions of a world of limit and fragility on the one hand, and a world of "a deep wonder and appreciation for the ongoing activities by which stability . . . is maintained, the subtle arts of repair by which rich and robust lives are sustained against the weight of centrifugal odds" on the other (S. Jackson 2013: 222). Technology is involved in the way we live lives without guarantees. Technologies are not merely tools for instrumentalizing, holding life or nature in reserve, or making guarantees on the world.

Broken world thinking, and the centering of repair, is a way to think about the materiality of technological objects and practices of relating to them. The issue of the journal *continent*, "R3pair Volume" (Houston et al. 2017), builds on Jackson's work, theorizing repair, care, and maintenance in creative and productive ways. Focusing on the temporality of repair, Lara Houston (2017; see also Jackson 2016) formulates repair as "differentiation" rather than "return." This affords a notion of breakdown as an ongoing process rather than a discrete event, and repair as not necessarily returning an object to a former whole. Furthermore, differentiation enables an understanding of objects as processual, in a new materialist sense of becoming and unbecoming, as material in flux, whereas return posits objects as stable or static. Jérôme Denis and David Pontille's (2017) two regimes of maintenance bring forward the specialization and visibility of repair. These authors ask, "Is repair the responsibility of occupational communities or general users? What kinds of objects and communities does repair enact?" Repair may be a political practice in the face of deliberate destruction of infrastructure by antagonistic state and nonstate actors, or corporations designing objects whose repair is foreclosed, thus accelerating cycles of acquisition and disposal. By keeping an object in circulation that otherwise might be replaced with a new one, repair thwarts normalization of constant consumption.

Centering repair and maintenance makes certain things easier to see about "modern societies" and about the world (Graham and Thrift 2007, the division is theirs). Though Stephen Graham and Nigel Thrift (2007) do not use terminology of "the foreign," in their writing we glimpse a future in which foreignness recedes. As Northern infrastructures are privatized and permitted to decay, the distinctions between Northern and Southern cities dissolve. The fact that social theory has failed "to satisfactorily incorporate global South urbanism" (11) results in a particular definition of the normal in which infrastructures and technologies work. Madeline Akrich (1992: 207) was an early advocate of breakdown as an important problem for STS: "If we want to describe the elementary mechanism of adjustment [between human and technological object], we have to find circumstances in which the inside and the outside of objects are not well matched. We need to find disagreement, negotiation, and the potential for breakdown." For Akrich, technology innovation and technology transfer, for example, of a

[6] Thanks to Ann Anagnost for talking with me about Steven J. Jackson's work.

photoelectric lighting kit from France to sub-Saharan Africa, are two areas where "objects and their supposed functions" are poorly matched. The attribution of cause of breakdown and responsibility for repair is revealing. "Technical objects contain and produce a specific geography of responsibilities," and thus technologies generate forms of knowledge and practice, as well as, importantly, moral judgments.

These authors want social theory to care about repair. What does this care entail? Repair as care means that ongoing work of tailoring, appropriation, and resistance is an attachment, for it is "to bear and affirm a moral relation" to the object (S. Jackson 2013: 231–32). Studies of care in STS and feminist studies share an objective to make visible neglected, everyday, and seemingly mundane labors and laborers. Maria Puig de la Bellacasa (2011: 86) asks, "Can care count . . . as more than the responsible maintenance of technology? Is it just a moral value added to the thinking of things?" She wants STS to think of care beyond a moral disposition, or a good intention, extending its senses to a material doing, the way we experience, perceive, represent, and live with things. Care "stands for a signifier of necessary yet mostly dismissed labourers of everyday maintenance of life, an ethico-political commitment to neglected things, and the affective remaking of relationships with our objects" (100). Jackson's broken world thinking, too, weaves the moral and material together. He argues that technology studies "should care about care" because care resonates with repair. Care values seemingly mundane or neglected material practices, and "opens up an important moral and political terrain" (S. Jackson 2013: 232). Furthermore, affect is not without obstacles; Michelle Murphy (2015) has cautioned against celebrating affect as a necessarily good or innocent part of care. Affect is involved in relations of domination and oppression as well; these may thrive under the cloak of care (Stevenson 2014), if not of love.

Repair, like care, concerns itself with neglected laborers and things, and the relations between humans and objects. To the extent that repair and broken world thinking normalize breakdown (S. Jackson 2013) and decay (Graham and Thrift 2007), they are stances toward the world. With these I concur, though I want STS to be explicit about where, when, and for whom this stance to the world is an intervention. Repair is not always a choice among other strategies, a moral good, or an affective response to objects. It may be compelled by higher authorities, as in the first repair story of this article. It may come as a neocolonial relation of health-related development, as in the second. Repair may shine so much light on the laborer, the object, or the human-object relation, that the question "Should the technology even be there?" recedes. That is the subject of the third and final story.

3 Care in and for Contexts

Before sharing these stories, I will provide the barest of sketches of post-Independence medicine in Cambodia, some context for readers unfamiliar with it. At the end of the section, I will reflect briefly on what this contextualization does.

The health system in Cambodia has undergone radical changes in resources, law, practice, and organization over the past sixty years.[7] If colonialism depended on

[7] My discussion draws on these important works in history, anthropology, and memoir: Au 2011; Bourdier 2016; Crochet 2008; Guillou 2009; Kong 2014; Ngor 1988; Ovesen and Trankell 2010.

distinctions between the modern and a-modern, and technology was its index and symbol, anticolonial and post-Independence nationalists also took up this rubric, in Cambodia, Thailand (Thongchai 1994), Indonesia (Mrázek 2002), and the Philippines (Rafael 2005), among other places. The public medical system was initiated under the French, and following independence from France in 1953, nation building involved expansion of medical services, infrastructures, and education, using development aid from both sides of the Cold War. Norodom Sihanouk, the leader of post-Independence Cambodia, pushed an almost theatrical expansion of technology and infrastructure, rejecting, for example, China's offer to train barefoot doctors. Private clinical practice also expanded during the 1960s, marking the emergence of what Anne Y. Guillou (2009) calls *fonctionnaires-entrepreneurs*, or "civil servant-entrepreneurs." The US-backed coup in 1970 initiated a twenty-year period of severe destruction, neglect, and constrained reconstruction of the health system. During the civil war between 1970 and 1975, Phnom Penh was flooded with refugees from the countryside, medical supplies were limited, and many doctors left Cambodia.

Following their taking of the capital in 1975, the Khmer Rouge emptied Cambodia's cities, abolished private markets, and dismantled institutions of health care and medical education in favor of their own training centers, some along Chinese models that emphasized low-tech lay health care and production of traditional medicines. Hospitals in provincial capitals functioned for high-ranking cadres only (My 2000; Ovesen and Trankell 2010). The majority of health professionals who had remained in the country were killed or died of overwork or starvation during Democratic Kampuchea (1975–79). Health care was anonymous, de-individualized, neglectful, and deadly.[8] The Vietnamese-backed forces that ousted the Khmer Rouge in 1979 were faced with a malnourished and ill population, few trained health workers, and a shattered infrastructure. Reconstruction of medical care and education began along socialist lines. Between 1975 and 1991, private practice was absent. Development aid came from the Eastern Bloc, while humanitarian aid from the West was concentrated in refugee camps swelling at the northwestern Thailand-Cambodia border.

The departure from Cambodia of Vietnamese and Soviet presence in 1989 and the arrival of the United Nations in 1991 initiated a large influx of aid. From 1991 to 1993, Cambodia was under UN governance, known as the UN Transitional Authority for Cambodia or UNTAC, after the Paris Peace Accords that officially (but not practically) ended the civil war between the government and the opposition coalition. Nongovernmental organizations (NGOs) were part of multilateral efforts to provide humanitarian aid, to educate the population about democracy and human rights, and to "strengthen civil society" in preparation for elections. Private practice was permitted again in the 1990s. In contemporary Cambodia, many health services are provided by NGOs operating independently or under contract with the government and donors (Ovesen and Trankell 2010; WHO and Ministry of Health, Cambodia 2012). The private market is growing, evidenced by signs for ultrasound imaging services blossoming in cities around the country, and ads for medical equipment distribution companies beckoning to (potential) consumers in online and print media. Many doctors in Phnom Penh told me stories of working with second-hand equipment with "ambivalent geobiographies"

[8] See Stevenson 2014 for a comparative case of neglectful, anonymous care in the Canadian Arctic.

(Beisel and Schneider 2012). Indeed, technologies travel via markedly different routes, depending on whether they are a development or humanitarian gift, new or used, donated or purchased, for the public health system, a private hospital, or a one-room *cabinet* on the ground floor of a doctor's home.

Cambodia's radical turns in the infrastructure, organization, and even political theory of health care require the analyst, writer, and reader to ask about particulars: which Cambodia, when, for whom? In a special issue such as this, which brings together different "Asian contexts" to enrich understandings of care, it can be easy to slide into a reductive reading of "nation." This article covers care/repair in Cambodia. Another article in this issue does care in Taiwan. Another article does care in Bangladesh and in Singapore. Whereas each author writes against this reduction, it may be an occupational hazard of compilation and comparison in STS.

Atsuro Morita (2017) has wondered about the yearnings for distinctive Asian theory in STS and in Asian studies. He traces how "Asia as method," as developed in Japan and Taiwan, destabilized notions of a uniform global category of modernity and the postcolonial. Yet this doing of difference is not innocent or without consequence. Morita (2017) argues that the diversity *within* Asia in fact creates a yearning for the distinctiveness *of* Asia relative to the rest of the world, Euro-America in particular. This is a fraught project. As the eloquent quotation from Takeuchi Yoshimi warns us, it is in fact difficult to distinguish between (pan-Asian) solidarity and (inter-Asian) invasion.[9] Kuan-Hsing Chen (2010) shows how economic and cultural interventions into Southeast Asia by Taiwan have been justified in terms of Asian solidarity and intimacy, what he calls *subimperialism*. Can the importance of Asia for care, or for STS, be thinkable, be sensible, without subordination or erasure of differences *within* Asia?

Cambodia's theoretical importance, here, is twofold. It makes the question of intellectual subimperialism, as a scholarly practice, impossible to ignore. Can Cambodia stand as an "alternative horizon" or point of reference for Asia? If not, why not? My analysis here also foregrounds the multiplicity of the nation, the need to handle "nation" as context with delicacy and precision. The point is not just to add contexts, to involute or further complexify (Morita 2014), but to avoid generalizations about the "postcolonial" or "Asia" that do not further our understandings of care and repair. Juxtaposition of care for and with machines—repair stories—is a strategy of writing and thinking difference without the subordination that accompanies reading one in terms of another.

4 Repair for Survival

The first repair story is a vignette from the autobiography of Dr. My Samedy, Cambodian radiologist, former dean of the medical school and director at the Cambodian Red Cross. I interviewed My Samedy in 2011, the year before his death. My gave me the English translation of his memoir, *Survivor for the Surviving* (2000), which tells the story of his life under the Khmer Rouge, and his work to rebuild health care and

[9] The quotation is "In the first place, it is a difficult question if one can distinguish *invasion* and *solidarity* in a concrete situation." Takeuchi Yoshimi, "Nihon no Ajia-shugi" ("Japanese Asianism"), cited in Morita 2017: 239.

medical education infrastructures in the People's Republic of Kampuchea. This story comes soon after his evacuation from Phnom Penh in 1975. My was made to labor in the fields like everyone else, and was constantly under threat of execution for being a member of the bourgeois class that prospered in previous regimes. However, My was called on to be a doctor when it suited Angkar, the name the Khmer Rouge called itself; My was repeatedly summoned to perform acts of diagnosis, treatment, and, as we will see, repair. In this story, My has been taken to Kampong Cham to work on broken X-ray machines.

> I went to see the two X-ray machines. One was a CGR, and the other was a General Electric used by the military. I knew these two machines well because I helped to assemble them in Kampong Thom when I was an assistant in the Ministry of Health in 1968. I also went to the darkroom and checked the chemicals. I asked what the problem was with these two machines. Mr. Chin and Mr. Sao seemed perplexed by the question. After a short while, one of the other supposed doctors of the revolution impolitely spoke up.
>
> "It doesn't work because it doesn't work. Angkar asked you here to repair these machines. Do not destroy Angkar's success. Do not ask too many questions. If we knew the reason the machines weren't working, Angkar would not have asked you to come here."
>
> After hearing his statement, I looked over at the young doctor of the revolution for a moment, trying to find some clue to know how to respond to these ignorant people.
>
> "Do you have any electricians here?" I asked carefully. "We need them to help repair these machines."
>
> "Your questions are not rational. Angkar has everything. We have excellent electricians. They know how to repair radios and televisions. They defeated the American imperialists and the treasonous Lon Nol regime. You should only say that you need an electrician to help. This is the language of the revolution of Angkar. Angkar really hates people who criticize Angkar!"
>
> I started over: "May I please have one electrician to help me?" (My 2000: 69–70)

An electrician arrives, and My commences work. He draws a plan of the radiography machine and table. He follows the electric wires from the line pole to the controls and to the lamp.

> I worked very hard to repair the machines. I redid all the wiring and took my time. I wanted to confuse them so that the young Angkar physicians couldn't understand my work very easily. They watched me repair the X-ray machines until 3:00 in the afternoon. Comrade Koeun, growing ever more dizzy and hungry, lost his patience and started cursing (71).

The comrades go to lunch, and My now works in earnest to finish the repair. When they return, he switches tactics, working in a manner to confuse them.

> I marked things with a pencil. I went from machines to the tables, and then from the tables to the machines. I rearranged everything. I made the job look very

> difficult. My goal was to confuse these ignorant people. It was very funny because those young, revolutionary doctors followed whatever I did. . . . I really confused them (72).

One of the comrades curses him, "You walk back and forth like a monkey!" My then asks for a volunteer to test the machine to see if it works.

> On the screen I could see the bone framework of five fingers.
>
> Suddenly, Comrade Koeun yelled stupidly, "The machine eats all the meat. We can only see the bones."
>
> I replied, "These x-ray machines are very powerful. Not too many people want to work in this field because X-rays can make our bodies weak and tired, but they can easily analyze diseases for us and make treatment easier. So, if someone wants to study in this field, he must eat a lot and take good care of his body."
>
> "No, no Uncle!" Comrade Koeun said categorically. "I don't want to work in this field. They can find someone who used to do this work in the old regime" (73–74).

I may be the only person interested in this story of repair and expertise, coming as it does in the midst of an autobiography that details the terrors of a genocidal regime and the struggles of reconstruction. This story is remarkable in several ways. First, the sheer feat. How many practicing radiologists could repair an X-ray machine? Even if someone had experience and the capacity, how to perform under this unimaginable pressure—where a technological error, a misplaced word, even, would surely result in your death, if not the death of your family? The book has set up the Khmer Rouge style of questioning and suspicion, so that readers unfamiliar with its rhetoric are by this point aware of its terrifying randomness and illogic, and the consequences of being wrong.

Second, the story illuminates the ways in which ideas of reason, technology, and technicians were central to anti-imperialist politics. The Khmer Rouge doctors, contrary to cliché, did not seek to destroy technology, or medicine. Rather, they wanted to dominate it, control it, and keep it for elite cadres. Dominating technology dominates the foreign. The modern is not missing, it asserts itself over and above imperialist arrogance, nonsolidarity, and misuse of tools.[10]

Third, it is a story of repair as the work of a clever expert who uses his knowledge, reason, and method to care for technology. This is creative reason. It can be subversive when it is anti-ideological. It is respectful of the machine and the knowledge required to use it. Repair is not a choice, though. It is not a moral stance about the life of objects or a broken world. The story illuminates familiar aspects of repair, at least, of repair as intervention in STS: creative problem solving, embodied expertise, intimate care for materials, and maintaining a technical object rather than discarding and consuming anew. But the story is extreme. Repair as absolute necessity, indeed as matter of life

[10] Science and technology are of central importance to states borne out of anti-imperialist movements. This is because, as Itty Abraham (2006: 211) notes, science and technology reinforced colonial and neocolonial dominance; technological transformation realized modernity on a practical level; and technology marked the missing modern, the rationale for the colonial project.

and death, is quite different from repair as an affirmative moral relation, or stance to the world.

Repair is a moral stance only if there is another way of doing. Extreme as it is, the case can illuminate some of the "for whom" questions explored in Michelle Murphy's (2015) work on theories of care in STS. In this story, the revolutionary doctors seem to expect technology to produce knowledge regardless of the human; My shows how the specific human matters, and the specific technology matters. The intricacies are relational. This machine does not work without the learned doctor-technician. Like the Khmer Rouge doctors, My, too, wants to control the technology but by holding it close, through drawing, touching, and confusing the others. For My, the missing modern is the Khmer Rouge, evidenced in this story by the doctor of the revolution's ignorance and utter disregard for the complexity of the machine, the mechanism of X-ray vision, and the relational intricacies of repair.

5 Repair for Development

The learned doctor-technician in My's story is Cambodian. In the second repair story, the Cambodian doctor has a different role—translator. The translator brings the foreign (words, things) into medical practice. What follows are excerpts from the literature of Engineering World Health, a US NGO that trains biomedical equipment technicians, and from General Electric (GE), which has partnered with Engineering World Health to create a training program in Cambodia and other countries.[11] In 2016 I spoke with Ed Hutton, quoted at the beginning of this article, an engineer with the NGO. His enthusiasm for his trade—technological maintenance and repair—was contagious. He is committed to mundane yet creative problem solving, caring for machines so that care *with* machines can go on. Yet something happens in translation to promotional media: a reduction, a simplification, a magnification of familiar lack/lag narratives (see, for example, Prasad 2014) in development. The following excerpts come from Hutton's (2014) diary during his trip to Cambodia to initiate the training program for provincial hospital employees:

> Cambodia is an amazing country, with an equally amazing and tragic recent history. Colonialism, decades of civil war, and genocide have left Cambodia with a severely debilitated base of human resources which lacks in expertise, education, and training – this has resulted in a great lack of senior tradesmen and technicians within the country. Accordingly, without the expertise to be able to service and maintain them, a great deal of the medical equipment in Cambodian hospitals is non-functional.

Guillou (2009) observed how, in the 1990s following the Paris Peace Agreement, foreign NGO discourse of tragedy, debilitation, and lack swept aside—the French

[11] Engineering World Health began work in Cambodia in 2012. They set up a training program for biomedical-equipment technicians from provincial and national hospitals, in partnership with GE Healthcare and the University of Puthisastra, and the Center of Excellence at Calmette Hospital. The university took over the training program in 2016. Ed Hutton's (2014) diary, quoted from at the beginning of this article, was published on Engineering World Health's blog.

term is *balayer*—the hard work done to reconstruct the health system in the 1980s. Hutton's diary of his 2014 training program illuminates the confluence of repair and development worlds. Repair is a field of lack and a mode through which development may be done.

In what follows, there are traces of *balayer*-talk—the focus on lack (of expertise, words, objects, good-quality service manuals) rather than what is there—but there is also the more constructive repair-talk of creative making do under constraints. And here, the translator appears:

> December 1—I lectured through a translator today who is a medical doctor. He is one of our teachers. Several times today we had a sidebar conversation where first I had to teach him the material in real time so he can understand the context and concept.
>
> Khmer is an ancient language. There are often no words to use for a direct translation. Sometimes surprising things are missing: there is no word for filament, or resonance, or vacuum tube.
>
> December 5—I started working on the broken X-ray machine yesterday while simultaneously preparing a presentation on it for class. The presentation also helps me logically arrange information, as the scanned service manual could be better. I don't know if I can fix it yet but I have narrowed the problem down to some power electronics.
>
> December 6—We fixed the X-ray machine today. A member of staff came in and worked with me to fix it. We have really good people. This machine was manufactured in 1976! It might be one I worked on originally, when it was new. These things are built like tanks and are repairable, just a bit of a nightmare to find what you want to touch going from schematic to real physical machine. (Hutton 2014)

I want to pause to emphasize what could be called the "spirit" of repair here: "really good people" doing their best in difficult circumstances, and, though old, a really good machine: built like a tank and repairable. I also want to pause, again, on translation. What labor for both the doctor and the engineer, teaching and learning in double: first, for each other; second, for the trainees! Doing repair brings *material*—its wild or stubborn agency, its openness to seeing and touching—to the scene of translation, whose risks and promises are so beautifully described by Rafael (2005).

The resonances with My Samedy's account of fixing the X-ray machine are intriguing, especially as the stories involve radically different actors and contexts. Hutton, like My, worked on the same model of machine at some point in the past; their skill in repair involves embodied memory. Hutton and My are able to move between schematic and machine, representation and object, looking and touching. Even if it is "a bit of a nightmare to find what you want to touch," it is doable. The doing of repair helps Hutton organize a better flow of information than presented in the service manual, it makes this encounter of teaching and learning better. Both Hutton and My had an audience, though the audience (Khmer Rouge cadres, provincial hospital employees)—let alone the stakes (life, a successful training program)—could not have been more different. Nonetheless, repair is performance.

Hutton's subsequent diary entries are titled "Food," "Hygiene," and "Ganesha," reflecting enduring themes of the travel-in-Asia genre. Repair is a "fulcrum" (see S. Jackson 2013) between worlds of risk and worlds of spiritual wonder.

> December 15—Ganesha is a very popular Hindu God. Ganesha is known as the remover of obstacles, and is a patron of arts and science. He is also known for wisdom, knowledge, and starting with new beginnings. It turns out the Buddhists are also very fond of Ganesha. You find him all over Cambodia. At the Royal Palace I even saw one with offerings.
>
> I think he is so well liked because he is an optimistic god. Ganesha is all about new beginnings and opportunity. When I saw him all green and confident in the middle of a Buddhist country, it was like seeing an old friend. I asked him for some help for EWH [Engineering World Health]. I think he has been good for EWH, and will be as we continue to expand and grow in new countries. (Hutton 2014)

Hutton brings repair, development, and health worlds together. The story illustrates the fact that in most of techno-medicine, care with and for technologies is driven by resource constraints. Hutton's repair work was not for direct commercialization. He used scanned service manuals and repaired a machine from 1976 rather than urging doctors to buy a new one. However, the "Ganesha" passage conveys how he works within a "growth in emerging markets" discourse in a field of corporate-government-university-NGO partnerships (Grant 2016, 2017, 2018).

Juxtaposition of these two X-ray machine repairs—My's in the late 1970s, Hutton's in the 2010s—brings different intensities to the question of how "repair" works in translation. Revolution and development, Cambodian and American, doctor and technician, terror and capacity building—can these "thin slices" (Jackson Jr. 2013) be sensible together? If breakdown is the norm, and repair is not a choice, what are the implications for STS? Something then is added to an understanding of breakdown as "the collapse of the relationship between a piece of apparatus and its use" (Akrich 1992: 224), which relies on the presumption of a particular preexisting relationship. Juxtaposition of the two repairs of X-ray machines brings out a different sense of breakdown. Breakdown *makes relation* between a user and a machine.

6 Repair for Care

Until 1989, X-ray was the technology for seeing inside the body in Cambodia. Ultrasound arrived in 1989, or 1991, depending on whom you ask. Doctors and health officials with whom I spoke valued ultrasound for its ability to improve health and health care, and their earnings, but they expressed strong concerns about its proliferation. Their concerns centered around issues of expertise and regulation. I do not focus on regulation here, but in Cambodia, as in many countries, there is minimal control over who can sell, purchase, and use ultrasound machines. As a doctor at the National Pediatric Hospital said with bitterness, "Anyone can sell land and buy an ultrasound machine." He situated imaging technologies within speculative practice, a broader

mode of ordering that has been remaking the country (see Nam 2011). Speculation is almost anticare; there is no concern for the object, just the exchange.

Amid stories of repair, the question of whether the objects should be in use at all may slip outside the frame (Ribes 2017: 74). We return to Dr. My Samedy, whom we encountered earlier as the doctor-repairman. If I had limited this article to My's memoir, I would have had one story, one in which he is the protagonist, a creative and expert actor, repairing machines under the nose of the ignorant, ideological, revolutionary doctors. In his story and in the subsequent one of Hutton's repair lessons, it is taken for granted that the X-ray machine is a "good" thing and that it should be repaired. But, following Murphy (2015) and David Ribes (2017), do these stories bracket the value of these machines for care? In other words, do they bracket (in familiar ways) the question of machines *for what*, and *for whom*? A third story brings a different configuration of doctor, machine, and care. Here is a man frustrated by imaging and how it shapes medical practice. This is a story of the need to repair care *in spite of technology*, rather than repairing technology *for* care.

In the spring of 2011, Dr. My came to meet me in the lobby of his private clinic, located just north of Sihanouk Boulevard in the center of Phnom Penh. He had short silver hair, and walked slowly and carefully, a bit shaky on his feet, but composed in manner. He greeted me as *neaksrey*, "Miss," placing me in hierarchies of age and professional status.[12] He led me down a short hall into his office, and gestured for me to sit on the opposite side to him of a large, uncluttered desk. There were photographs on the wall, depicting him with Cambodian and foreign dignitaries. Dr. My spoke fast and rolling, pausing to emphasize a point, switching between Khmer and French, and, occasionally, English.

His history is the history of a profession. Dr. My was among the first to graduate from the Royal Medical School, of which he would later become dean, after Democratic Kampuchea. He completed radiology training in Japan and in France, with Charles Gros, who trialed clinical use of ultrasound. Dates pierced My's story of radiology in Cambodia—exact dates, demonstrating his sharp memory, a tethering of medicine to events of political import. He would fall silent, watching as I wrote notes, wanting to be sure I got it right, asking questions. My responses were never quite right, and he would correct me.

Dr. My told me that laboratory and imaging technologies have displaced doctoring that relies on hearing and touch, in addition to vision.

> "Between then and now, things are very different, (*Khos knea chngeay*)" he said remorsefully, referring to the Sangkum era (1955–70).
>
> "How so?"
>
> "Before, we studied all specialties. We respected the older generation of doctors. We knew how to listen (*sdap*) to patients. We knew how to feel, to examine by touch, by palpation (*steap*). Now, doctors just send the patient to the lab, or to get an *echo*. They don't know how to work with their hands. They don't touch the patient, they don't talk to him."

[12] I use the Franco-Khmer transcription system developed by Huffman in 1983 and modified by Ebihara, Mortland, and Edgerwood (1994).

He narrated a hypothetical story of a patient presenting with abdominal pain, ending with questions: "What if you were a doctor in Mondulkiri, or Rattanakiri, where there is no ultrasound? If you don't know how to touch him, or how to take a history, what would you *do*?"

What *would* you do? For Dr. My, technologies displace multisensory expertise that makes good doctoring. It is a displacement brought about by technology. As a specialist in radiology, Dr. My was not antitechnology. Rather, he believed that being a good doctor involved different practices: touching, asking, listening, as well as taking and reading images. Ultrasound's importance for diagnosis should not foreclose other diagnostic skills, such as *steap*. Perhaps ultrasound displaced some of his income, too; one need not be a radiologist to provide imaging services. ("Anyone can sell land and buy an ultrasound machine.") Mondulkiri, a mountainous rural province in the northeast, was a signifier for lack of infrastructure and resources, a place from which city dwellers might feel distant in terms of both geography and time. Would a doctor still be a good doctor if he did not have his machines? Or, more specifically, if he did not have control over his machines? Care needs to be repaired.

Dr. My worried about the use and consequences of medical technologies in general, and imaging technologies in particular. They are invaluable in clinical practice. They may be symbols of modernity and expertise. Yet they can deskill care. There *is* a lack of expertise in imaging in Cambodia. That will change; it is changing. Doctors and medical students will be trained in new visual skills at school and on the job, in hospitals, by foreign experts like Ed Hutton, the equipment technician, or Cambodian experts, like those staffing the new National Cancer Center in Phnom Penh (Amaro 2018). For experienced doctors, new visual skills involve learning to see the ultrasound monitor as a map of the body's interior, and learning to translate their clinical experience to ultrasound's representational form. For medical students, their clinical experience will be defined through ultrasound's eyes. But there are always cases that are unusual, in which the only solution is to call in the old guns, the senior doctors.[13] Their expertise is outside the narrowly technical. Dr. My wonders what will happen to care when the older generation of doctors are dead.[14]

7 Language

My Samedy and Ed Hutton did not call the repair work they did "care." I run "care" and "repair" alongside one another to juxtapose different ways of caring with and for machines, given similar theoretical concerns with instability, vulnerability, and the everyday. The different topics and values that are folded into the English "care" are not fused in a single Khmer word, but spread across different words and phrases. *Pyeabal* is treatment and cure. *Ahphibal* conveys a Foucauldian notion of care and control as the responsibilities of leaders. There are different words for taking care of:

[13] Thanks to Christine Hauskeller for this phrasing.

[14] In addition to how technologies shape care as a skill is the question of how technologies shape health care as an as extractive practice. Health care is already a significant source of debt for poor and middle-class families. The cost of imaging services amplifies this, raising important political questions of resource distribution, regulation of costs, and standards of care.

chenhchoem, raising, nourishing; *thae*, *thae toam*, *thae roksa*, to look after, take care of.[15] These terms have to do with action, rather than attitude or internal stance. The phrase *yok chett tuk dak*, literally "to take the heart and keep it close, safe," marks action done carefully, with attention, and respect. I clearly remember hearing the negative "*Aht yok chett tuk dak!*" ("this is not good care!") in the waiting area of the Russian Hospital imaging ward. A woman had cried out, hot, wounded, and fed up after being skipped over in line while waiting for her ultrasound exam at one of the biggest government hospitals in the capital. Care for machines does not have the karmic or sacred valence that care for humans may have. Felicity Aulino (2016: 98) brilliantly characterizes family caregivers as "simply and literally technicians of the sacred," who tinker in the social world "attending to the gears so that the wheel of karma can freely spin."

The ways the Khmer Rouge controlled language and transvalued terms to do with health, medicine, and machines may have left its traces on how people speak of and express care.[16] Sickness was defined as being unable to labor. As such, sickness was an affront to Angkar (Guillou 2009). The enemy was not the illness within the individual body, rather it was the sick individual who poisoned society. The slogan "Angkar takes care of you all, comrades!" (Panh and Bataille 2013: 89), chanted in the face of mass starvation and terrorizing violence, produced an unreal reality of care. Disregard for the humanity of others was central to Khmer Rouge ideology and practice. *Aht yok chett tuk dak*! may be understood as a call, not for warmth or kindness, but for a degree of attention that conveys respect for the humanity of one waiting in line to be seen at the hospital.

8 Repair in Translation

How does one understand repair in Asia? Which Asia? Whose world is now, all of a sudden, broken? Who has the skills and traditions to thrive in worlds without guarantees? How does repair relate to concepts of improvisation (Livingston 2012) or *jugaad* ("reconfiguring materialities to overcome obstacles and find solutions" is one of many definitions from Sekhsaria 2016: 77), which translate necessity into a virtue? Like these concepts, repair, too, if we are not careful, can be subsumed under narratives that posit Euro-America as the origin of science and technology and the expertise to repair technologies.

Steven Jackson's "broken world thinking" sounds funny in Cambodia. Broken world thinking is "normative and ontological" (S. Jackson 2013: 221) in that it puts forward repair as a style of doing and a doing of being that bypass both technological functionalism and romantic humanism, in which technology has no place. Yet these cases from Cambodia show how the radical potential of "broken world thinking" is

[15] See Aulino 2016, Funahashi 2016, Seo 2017, and Stonington 2012 for approaches to care in Thailand as embodied routine, moral governance, circuits of infrastructure, and ethical location. Despite different histories and political economies, Theravada Buddhist Thais and Cambodians share ontological commitments to rebirth, karma, and impermanence that configure care practices.

[16] See Dwyer 2009 and Taussig 1989 on terror's transvaluation of terms.

circumscribed when a broken world is the one from which people are struggling to distance themselves.

Juxtaposition places a slice of a story, in all its density, proximate to other stories to propel an argument. Its grammar is imagistic. It is a way to hold differences together conceptually, without requiring one story be read in terms of the other. I juxtapose repair in STS accounts alongside repair in accounts of radiologists and technicians to explore what translation may let loose. Juxtaposing cases of technology and care in Asia shows repair as the mundane and creative work of keeping things going in a broken world, and shows how the need, the choice, and the pleasure of repair are unevenly distributed. Doctors want technicians to help hospitals run smoothly, as functioning infrastructure. They want to get on with the business of *moel echo*, seeing with ultrasound, rather than fixing printers or translating for foreigners.

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