Technology, magic, anthropology, Cambodia

'*Technoscientific practices rely on their own kind of magic, such as translating ultrasound signals into the language of pregnant women, or data points into definitive outcomes.*' [1]
In her chapter, 'Science and a little bit of magic', Lynn Morgan writes that scientific knowledge and technologies of reproduction involve notions of magic and 'irrationality' – qualities for which other knowledge practices are disparaged – in addition to their more public qualities of rationality and objectivity.

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Above: Private clinic advertising its color, 3D, and 4D ultrasound services, Phnom Penh, 2010. (photo by author)

I THOUGHT ABOUT THIS WHEN, after describing my research on ultrasound imaging in Phnom Penh, people in quite different contexts responded with the identical phrase: ultrasound "is the new magic" for Cambodians. One person who said this was an Australian working for the Extraordinary Chambers in the Courts of Cambodia, then in the process of trying Duch, head of an infamous Khmer Rouge prison, for war crimes. Another was a Buddhist monk trained in Dubuque, Iowa (USA), who volunteered at the Phnom Penh Municipal Referral Hospital. I spoke with him while we were attending a ceremony celebrating the donation of biomedical technologies, including ultrasound machines. Another was a Dutch philosopher who focuses on medicine and the body. The first two, the ones who had spent many years in Cambodia, spoke of 'magic' in a tone that was disparaging towards Cambodians, whereas the Dutch philosopher I took to be more in line with Morgan, quoted above: ultrasound *is* magic, for almost everyone.

What is it about technologies and Cambodians that leads us to talk of magic? Is magic a category of expected responses to technology, one that draws on a legacy of colonial and development encounters? Is it a category of possible beliefs, in this case about illness, medicine, or reproduction, that thus invites a classical anthropological explanation? Ultrasound imaging was not available in Cambodia until 1989 due to the effects of war and instability on the health system, and has since proliferated, particularly in the private sphere. The people I talked to in hospital imaging wards, as well as outside of clinical settings, did not speak of ultrasound in terms of magic, though its workings and effects were considered powerful and mysterious. They sit with the majority of those who have had an ultrasound transducer placed on their skin in not being able to articulate how sound waves translate into pictures of tissues ordinarily unseen, or fetal measurements previously unknown, or diagnoses unanticipated. What many of the patients did show me, though, was how imaging involves mediation, and how bodily interventions – diagnostic or therapeutic, magical and technical, Buddhist and biomedical – come in multiple forms.

Studies of biomedical imaging within cultural studies of science and anthropology show how imaging technologies configure scientific and medical professions, health care systems, and understandings of the body and disease.[2] They describe how doctors and technicians produce and interpret biomedical images, and how these images simultaneously produce and reveal natural facts about bodily interiors. Studies of prenatal ultrasound imaging illuminate how its uses and effects within prenatal care relate to culturally specific moral reasoning about life, death, and pregnancy.[3] In these studies, technologies work, and biomedicine tends to have cultural authority in matters of illness and pregnancy. Less explored are how imaging technologies themselves may be unstable objects, because they may be second-hand or 'donated', or doctors may not be adequately trained to use them. In Phnom Penh, biomedicine and its technologies have long been the object of development and neglect,[4] and share their authority with other modes of understanding pregnancy and illness.

Perhaps, then, magic has to do with the notion that machines possess a transformative power that is independent and unpredictable. The ultrasound machine transforms a doctor into an imager who is better able to diagnose, or into an entrepreneur who can earn money. The ultrasound machine is transformed into a tool for diagnosis, or into a tool for making money. But doctors and ultrasound machines also have their autonomy. If the ultrasound machine is faulty, it will not transform the doctor into a diagnostic expert. If the doctor does not know how to use the machine, it will not become a tool for diagnosis. But we do not know what the transformation will be with respect to the machine or the diagnosis. And what if it involves more than just humans and machines, but also spirits, ancestors, or ghosts?

Magic, then, encompasses the inability to rationally comprehend or systematically predict the workings and effects of ultrasound machines folded into humans and others. Anthropological arguments stressing the indigenization of foreign technologies are an important corrective to simplistic 'first contact' stereotypes about people's inability to understand technology. But as anthropologist Brian Larkin argues, they may end up downplaying "the autonomy of objects, and the very real uncertainties and epistemic instabilities of objects themselves".[5] In the case of ultrasound imaging, uncertainty also relates to the ambiguity of images, and the challenges of interpretation. As Dr. Uch, a radiologist in Phnom Penh,[6] explained to me, *rien moel* [learning how to see] with ultrasound is a difficult and heterogeneous process: for older doctors it requires calibrating clinical experience with a new mode of seeing; for students, their clinical experience is configured through ultrasound. If some Cambodians seem mystified by machines, perhaps it is in response to uncertainties in what transformations they will perform, their instability and potential unreliability, or how clinical practice may be transformed.

Technologies and beliefs
The following story speaks to a second category of magic, where technologies are taken up with other-than-biomedical understandings of life, death, and disease. I met Sarouen,[7] a 41-year-old woman with a calm intensity, at the public maternity hospital in Phnom Penh. She had come for her second ultrasound exam and, as with her first, she had a precise expectation for what ultrasound visualization should do. She lived with her three daughters in the far northern suburbs of Phnom Penh. Her fourth child, a son, had died in a road accident. Sarouen was now pregnant with her fifth child. That morning she had bleeding and her doctor sent her to check the pregnancy with ultrasound. Sarouen told me and Sophea, my research assistant, that she believed this new child was her son who died, returning. In a dream, her son told her that he wants her as his mother again.[8] "It is him again! He asked to come back!" *Vea hneung haoey! Vea som mok nov vinh!* Her son had died one year ago exactly. She was worried about her bleeding because she could not bear to lose her son again. Sarouen was unlike many of the pregnant women I spoke to in that she did not seek out an ultrasound exam (or more than one) for any of her previous pregnancies. She had not participated in the widespread commercialization of this medical service. In her view, ultrasound exams were "not necessary" because her previous four children were born and lived healthily without them. She came for her first ultrasound scan because she wanted to confirm her dream as well as confirm that the pregnancy was still viable.

Sarouen's story follows popular Buddhist notions of rebirth,[9] though in her case, it was a particular and familiar spirit. The spirit of her dead son returned, wanting her to be his mother again. Sarouen did not say that ultrasound would visualize the spirit of her dead son. This would not be ultrasound's magic. Rather, the information from ultrasound worked in triangulation with information sensed from non-rational or unconscious ways of knowing. In her case these facts were in harmony, and I didn't ask what she would have done if they were in contradiction. Sarouen's story illustrates how ultrasound use may be motivated by desire for a certain kind of knowledge and reassurance, where past, present, and future family are at stake. Her story suggests that ultrasound imaging is a node of biomedical and other-than-biomedical understandings of pregnancy, and the entangled realities of dream worlds and waking worlds.

What, now, to make of the consistency in the comments about technology, Cambodians, and magic at the beginning of this article? In addition to the two loose categories I proposed – that in this context, 'magic' connotes a response to technologies, or to technologies cohabiting with

non-biomedical beliefs – I think these statements also reveal expectations of (medical) anthropology's proper object. To some scholars and health professionals, both Cambodian and foreign, research that combines anthropology + Cambodia + biomedical technology was puzzling. Suggested alternatives varied by interlocutor. Anthropologist: Why not study traditional birth practices in the countryside? Public health researcher: Why not study health problems, such as maternal morality? Medical doctor: Are you studying misuse of technology? Development worker: How do we get more technologies into Cambodian hospitals to modernize medical care? Health official: But how do we regulate these technologies?

I hope my research will speak to at least some of these questions. But I also hope to show how anthropology can engage biomedicine and its technologies in places associated with their absence, such as Cambodia, as well as their abundance, such as Singapore or China. This can tell us something not just about Cambodia, but also about technologies, and how they are configured within particular economic and historical relations, and particular understandings of health and mediation.[10] Imaging technologies are constitutive of particular forms of modernity, and following the movements of imaging technologies and biomedical images is a way to study practices of making families, earning money, rebuilding health systems, and imagining futures.

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References
1   Morgan, L.M. 2000. 'Magic and a Little Bit of Science: Technoscience, Ethnoscience, and the Social Construction of the Fetus, in A.Rudinow Saetnan, N. Oudshoorn, & M. Kirejczyk (eds.) *Bodies of Technology: Women's Involvement with Reproductive Medicine,* Columbus: Ohio State University Press, pp.355-367 (see p.357).
2   See, for example, Dumit, J. 2004. *Picturing Personhood: Brain Scans and Biomedical Identity,* Princeton: Princeton University Press.
3   See, for example, Gammeltoft, T.M. 2014. *Haunting Images: A Cultural Account of Selective Reproduction in Vietnam,* Berkeley: University of California Press.
4   Anne Guillou writes about medical professions, and medicine, in the context of shifting development and aid regimes; Guillou, A.Y. 2009. *Cambodge, soigner dans les fracas de l'histoire,* Paris: Les Indes savantes.
5   Larkin, B. 2008. *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria,* Durham: Duke University Press, p.9. For uncertainties about machines, including possibility for accident or ghostly encounters and how these are culturalized, see also, Pemberton, J. 2009. 'The Ghost in the Machine', in R.C. Morris (ed.) *Photographies East: The Camera and Its Histories in East and Southeast Asia,* Durham: Duke University Press, pp. 29-56.
6   29 September 2010. His name is a pseudonym.
7   15 October 2010. Her name is a pseudonym.
8   In Ellen Bruno's (1989) film *Samsara,* about people returning home after the defeat of the Khmer Rouge, one of the characters has a similar story involving death, dreaming, and rebirth. In the film, a woman tells the story of her dead brother visiting her in a dream, and asking to be reborn into the family. The next child born in the family resembled this brother; Bruno, E. 1989. *Samsara: Survival and Recovery in Cambodia.* 29 minutes. Transit Media.
9   Ang Choulean describes popular Buddhist and animist beliefs about pregnancy and birth in Cambodia; Ang, C. 1982. 'Grossesse et Accouchement au Cambodge: Aspects Rituels', ASEMI 13(1-4):87-109.
10 See Kim Fortun's proposal for what ethnography in the present moment might look like; Fortun, K. 2012. 'Ethnography in Late Industrialism', *Cultural Anthropology* 27(3): 446-464.