CULTURAL ANTHROPOLOGY

GOLDEN SNAIL OPERA: The More-Than-Human Performance of Friendly Farming on Taiwan's Lanyang Plain

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How can visual and textual materials gain equal weight in an article? This was the challenge we set ourselves in contributing to *Cultural Anthropology*'s Sound + Vision initiative. Searching the archives for good examples, we felt distressed. Most everywhere, either visual or textual materials dominate: the other is just an add-on. Many articles use visual materials as exemplification. Many films have explanatory texts. But how might we create a text-and-film document in which both lead—though perhaps sometimes in different directions?

In working through this question, we thought about music-and-text synchronization, as in an opera, where sound and story augment each other, creating a combined effect. Neither dominates; neither makes sense without the other. In this spirit, we have written a sort of opera: a script intended to be read along with a film. Yilan, our setting, is the home of Taiwanese opera, which is quite

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different from European opera in ways that support our conceit. Like the friendly farming we describe, it is grassroots, amateur, and infused with a queer sensibility. Still, we do not use the traditional form; we have more kinship with the newer Taiwanese *o-pei-la* (胡撇仔), in which aesthetics mix and mingle. We've taken percussion from Yilan opera, but we combine it with the noises of snails, water, birds, and other beings. Our filmic "music" forms a dialogue with, rather than an accompaniment to, the script, which combines material from interviews, participant-observation, and our analytic imagination. The script and the video tell different but related stories; we ask the reader to perform them together while appreciating their difference. Through video and text, various beings of the rice fields offer their enactments of living in common.

The piece was composed to be read aloud, whether by an individual, using multiple voices, or by a group. However, we have arranged it here so that a silent viewer might also enjoy it. The film runs throughout the text, but sometimes readers are asked to stop reading to just watch film before continuing. We ask readers to watch for the following synchronization signs in both the text and the film; the open-book symbol means "begin reading," and the crossed-out book means "stop reading; just look at the film":


When you see one of those signs in the text, check that you see it in the film and vice versa. If you do not, pause the video or your reading until the signs synchronize. When the film gets exciting, we stop the text, signaling when it is time to read again; do not stop the film when you are reading, though. Our aim is to create a dialogue between script and video in which each gets its times to be dominant. So that they do not interrupt the reading, we have gathered explanatory notes and citations at the end.

Our story has three voices: Farmer, a member of Yilan's friendly farming community; Pedant, a fixture of the archives; and Wanderer, a roaming ghost. For those who would like to perform the script aloud, one person can read all three voices; or, several readers might join to read together, as at a party or in a classroom. Note that many other modes of responding to changing ecologies are represented through the video. For example, we have used time-lapse photography to show rice responding to weather and animals, growing, and flowering; these are subtle activities, invisible to many nonfarmers. We challenge viewers

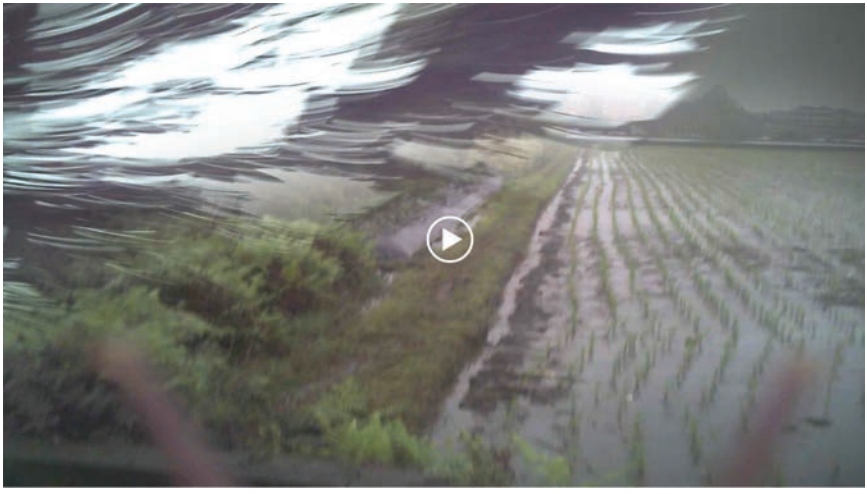
to *notice*: those who can find the rice shooting out flowers win our special respect. (Hint: check minute 49.)

The video and the text make complementary—but only rarely mirroring—arguments; we ask reader-viewers to attend to both. In the text-free segment that opens the film, for example, viewers are asked to notice how both snails and farmers are keen observers of the conditions of paddy farming, but each toil without the clarity of transcendent knowledge. This argument frames our article but is not repeated in the script.

Older Yilan *o-pei-la* performers liked to say what they did was *kún koa-á* (滾歌仔), which meant "roll the Yilan opera." So instead of rock 'n' roll, let's "*o-pei-la* 'n' roll."

PROLOGUE

Begin the film.



Farmer: They say that the Emperor Yao, who is now a god in the temple, long ago began the merit-based promotion system for officials in China. Grandpa Chang told this story about him: when it came time for him to pass his rule to a successor, he passed over his own son to choose Shun, a farmer known for his extraordinary

filial piety. Shun was so filial that when he went to the fields, the animals joined his work.

Grandpa Chang was commenting on a 1950s Green Revolution film on how to use chemical fertilizers and pesticides for rice farming in Taiwan. He remembered that during transplanting season, in those days, the world was completely silent, without the sounds of animals or birds. Now, with the coming of a new generation of "friendly farmers," he said, the sounds had begun to come back. As they did for Shun, the animals are joining the work.

But not all the animals support the farmers. Some do everything they can to thwart the harvest.

Pedant: Perhaps you've heard of the golden snail. Some call it "apple," or *Pomacea canaliculata*. During the high times of twentieth-century development, the snail was imported from Argentina to Taiwan as a potential food-production project. They called it the "golden treasure snail," but no one would eat it. Abandoned, it spread across the countryside, attacking rice seedlings as its favorite food. This sequence was repeated across Asia and beyond. In Southeast Asia, the golden snail threatens wetland ecologies. Native snails dwindle. Everywhere, it consumes the young rice. A poster child of progress, again, became a dangerous pest. Much has been written by development experts on what to do, from deadly-poison molluscicides to labor-intensive hand-picking, especially at night. Have you ever wondered how small farmers deal with this rising new pest? Do you imagine they follow the experts or traditional knowledge? Our group found something else: a set of experimental natural-history practices in which farmers try out interventions that might change the dynamics of the multispecies landscape. Science, folk religion, tradition, community debate, social media: all are worked together in such experiments. Many creatures are new here, including the snails; farmers check out how other creatures check out each other. The result is a shifting multispecies choreography. Perhaps the best way to show you is this text-and-image multispecies opera.

SCENE ONE: A Breath of Wind

Wanderer: I came to this place alone, uprooted, and hungry. I had lost my sense of direction. The rain infused me. The river tugged at me. I had no house to rest and no kin to feed me. They called me "lonely spirit, wandering ghost" (孤魂野鬼; *guhun yegui*). No one noticed me. I crept up behind you until you felt

my nudge. "Caught you," I cried, but you never heard. I was put out. I tossed the civet cat in front of a car; I swerved that truck into your motorcycle.

With all the accidents, you noticed; you felt a nagging. You gave me food, clothes, and money. And so I came back to the mud where my bones rested for so long. I discovered a circuit of life to haunt and to possess. If you give me stuff and talk to me, I'll help you out a bit. But don't think you own me! I'll fart in your face and take off just when you want me close by.

My kind, we're not just with you; we are many. We rise with the rice, but we are also the weed. We are the rasp on the tongue of the snail. And we are the hand of the farmer that removes it from its feast.

I am still hungry; feed me.

Farmer: It's a hot day here, yet I feel cold air on my neck. Maybe it's sweat, but I think it's the ghosts. I feel their presence. Do you know how the old farmers here found them? In the 1950s, those farmers discovered their bones when they improved this area for farming. It was during the U.S.-sponsored land reform, when hills were flattened and remade into fields; here, there were bones. We think they are the victims of the American bombing during World War II, when Taiwan was a Japanese colony. These people were running for shelter to the Deep Ditch from which this village gets its name. They never made it. They died here in the fields. We don't know who their families are. After experiencing so many traffic accidents, we realized we had to be better neighbors. Old farmers made a temple for their bones, but we new farmers have only begun to learn about them. We still don't know how much to sacrifice to them, or what kind of currency they spend. But we do our best to respect them, since it is we who invade their places.

Pedant: Ghosts: they need to eat. And others too: snails and frogs; birds and leeches; the vegetables on the bunds and the weeds. The questions the friendly farmers are asking—and our research team with them—have to do with how each of these creatures conducts itself while making a living. How do they each interact with the others? Are there differences between newcomers, such as golden snails, and old residents? And are there ways to insert one's own goals without exterminating everyone? The farmers are learning, and so are the other creatures who make a living here. We watch them; we work toward privileged angles; we join in. These are our natural-history experiments, at four levels: the paddy-field creatures encountering and negotiating with us and each other; the

farmers testing new ways to live in common; the research project of the team; the performative script and film.

All this matters at four levels too. First, friendly farming is a response to the high-input, high-output Green Revolution, which dominated agriculture in Taiwan since it was instituted in the 1950s. The Green Revolution segregated crops from ecological communities to make them reproductive machines. Loving the crop meant wiping out everything else. Friendly farmers have tried to bring back wider ecologies in which rice might respond to more than the industrial mandate. Friendly farming's natural-history experiments nettle the agro-industrial legacy to open possibilities for more-than-human livability. Friendly farming is a movement as well as a means of livelihood.

Wanderer: Movement: it flows, like drowned souls in the water. Water carries pasts. It seeps across containment and refuses directions, mixing what comes in and what goes out. Industrial chemicals linger, blended in water, thwarting the best intents. Snails travel with water, and so do minerals and microbes. Water is the flow of violence . . . and the flow of blessing.

Pedant: What's that? Nothing? Well, let me continue. Second, those experiments contradict much that social scientists tend to say. Farmers, according to so many of my colleagues, either follow modern scientific knowledge, or, alternatively, stick to traditions. The Green Revolution gave us that most unhelpful dichotomy. Lately, it's been updated, but the differences are subtle. Villagers are either part of Western hegemonic science, with its "one-world world," or else they practice arts of indigenous ontology. Yilan's friendly farmers can't be dumped in either sack. Some are old farm residents, but some are newcomers from the city with a lot to learn. Some pride themselves on their interest in science, reading professional literature, devising experiments, and designing small-scale engineering—such as traps for snails and electric-powered sluice gates. But these farmers, too, acknowledge the ghosts, learn from the elders, and try their hands at multiple ways of living with paddy-field creatures. Nor are they content with prepackaged organic dogmas. They encourage curiosity, alerting each other about the often changing conditions of multispecies paddy life.

Third, by attending to paddy-field creatures in an open, experimental way, friendly farmers raise questions about the ontological worlds of nonhumans—not just the forms assigned them by varied human perspectives but also the ontic status of their practical interactions with each other and the world. Such questions

rarely arise in the discussion of radical cosmopolitical difference, yet they are at the forefront of friendly farmers' engagements with other creatures. The farmers want to know how they might realign their practices *and* those of other species; this requires attention to the others' ways of noticing—and of being. Farmers watch other creatures' performances of livelihood; so did the research team, which we thought to show you through film.

This brings us, fourth, to the research collaboration, involving, in four bodies, the experience of two friendly farmers, two filmmakers, and two anthropologists. The team has built a performance format for multispecies performances.

Wanderer: Hey, notice me.

Pedant: What? My notes just disappeared. Aah!

SCENE TWO: Becoming Many

Wanderer: Watch me. I am plastic; your field is my challenge. Those snails' forebears knew another world, but here they watch and learn. They flourish with your seasons; they become anew. In the winter we bury ourselves in the mud for the slow undeath of sleep. When I feel the warmth return, they rise with me and we eat. Young weed, young rice: we take you all. We saw the stems of seedlings and let them topple into the mud. Then we smell our companions and join them in a heap for hours of copulation. We are many.

I am the mud; I am the seasons; I am the snail; I am the rice stalk on which they lay their eggs. I do them and I do them in!

Notice me. I am the would-be mother crawling, heavy, up into the burning air to offer my pink eggs a home above the waterline, where few will touch them. I place those hundreds slowly, one by one; I do not rush. And when she descends, I rest within those masses, one day, one week, two weeks. I am the tiny snails that hatch, fall, and float, and then eat and eat and eat. I am those tiny snails, and I am not them. I am many.

Falling in your field: we are many. We have learned this place; we have made it a place for our increase. What kinds of neighbors will you be, you farmers? Who is more fearsome, you or we?

SCENE THREE: The Flow of Violence and Blessings

Farmer: My village has a long history, and when I say long, I mean really long. Yilan was once a section of the Okinawa trough, slumbering at the bottom of the Pacific Ocean. The Lanyang Plain emerged through the gradual deposition of sediment over many years. From this muddy beginning, Yilan has always been mercurial, blessed with an ever-changing landscape. An archaeologist friend told me that the sand dune on which people lived and collected shellfish some four thousand years ago is already five miles from the sea. Today's hills and valleys only emerged some two thousand years ago.

Our region is in the records. In 1650, the Dutch East Indies Company recorded nine thousand aboriginals in Yilan who called themselves Kbalan. Then, in the early nineteenth century, one hundred thousand Han Chinese poured into the plain. This was the first large-scale ethnic rout in Yilan history. You might think it's strange. Since it only takes one hour to travel from Taipei to Yilan these days, why did it take the early Chinese settlers in Taipei a whole century to make it to Yilan? Between Yilan and Taipei, lie the Datun (大屯) and the Xueshan (雪山) mountain ranges. For a thousand years, the Austronesians rowed from Yilan to Taipei. The Qing government cleared a footpath, shortening travel to three days. In 1916, the Japanese built a public road, but it wound treacherously through the mountains. When I passed through as a child, the roadside was filled with spirit money placed to comfort lost souls. In 2005 the first eastward highway out of Taipei was finally completed. It was this infrastructure that suddenly transformed Yilan into a rural playground for the urbanites of Taipei. Since then, seven thousand minimansions have sprung up on the Lanyang Plain, an average of two a day. The highway brought urban sprawl and land speculation, but also new people and fresh rural-urban dialogue. We, humans, like the Lanyang River, continuously remake the plain.

Pedant: Farmer blames the highway for the commodification of Yilan's land, but frontier capitalism dawned in Yilan much earlier. Among the nineteenth-century wave of immigration, aside from Hokkien armed settlers, there were the indigenous Pazeh Pingpu from central Taiwan, and the wealthy Hakka landlords from

the west. The Han immigrants brought two hundred years of capital and expertise from opening irrigation canals in western Taiwan, in addition to dirty tricks in dealing with indigenous people. Oh, I don't mean only infectious diseases. The Han Chinese settlers were like anthropologists—skilled at discovering cultural differences. They learned that the Kbalans considered the corpses of animals filthy, so the Kbalans began to find dead cats and dogs in their gardens. They heard that the Kbalans left their fields while mourning a death, so on their return, the Kbalans would find Han rice-paddy bunds moved several *cùn* into Kbalan gardens. The Kbalans fell into desperate poverty. In half a century, the Kbalan were pressured southward. Today, the Kbalan presence is heard most often in the name of a bus company and a whiskey brand, which echo people long forgotten.

Wanderer: The living imagine themselves all powerful, but there are also the dead. Among us, Han and aboriginal intertwine, and even human and animal, confusing identities. We are the formless ones; we reside in water, stones, and fields. There are many of us among the meandering waterways of the Lanyang Plain, where water catches even the most adroit; we gain by their drownings.

Han and aboriginal people drowned in different ways. There aren't many Kbalan ghosts from the river. Drowned Kbalans died in the ocean, near which they had lived by fishing and swidden rice-farming. Han occupied the banks—and drowned every time the river shifted. Villages were established, and villages were forced to move, each time adding to us the formless. The geographical borders of Shengou village were not fixed until the Japanese built a levee near Neicheng in 1936. But the levee often broke when typhoons rising out of the tropical Western Pacific visited Yilan each summer. One summer—1962, they say—there were three major typhoons. By the time the third one hit, the village heads knelt atop the levee praying for mercy from us. This is why, to this day, we enjoy a special boar feast every year in the twelfth lunar month.

But this also makes a wanderer like me truly wonder: Why do those humans with the power to break new land bother to seek our protection? Why do the humans pray to us ghosts as much as they pray to the deities, if not more? Would it be too daring to say that when the Lanyang River comes rushing in, even the gods have trouble protecting themselves? With all due respect, I remember an Yilan proverb: "*ông-kong* ['War God'] took leave before everyone else (王公走代先)" when a flood destroyed his majesty's temple and village some 150 years ago.

Here is my humble theory: when it comes to dealing with water, ghosts of our kind can be more useful than gods. Because water ghosts call the Lanyang River home, we are a better go-between.

A hundred years ago, the sage Yang Shifang (楊士芳) prayed to the *lāu-tuā-kong*, the "old masters" (老大公), allowing floodwaters to pass around the village. Today, he still leads the ceremony on the levee. Instead of relying on the heavenly decree of the gods, villagers recruit the ghosts to support their cause. We best top-down command; we are the formless.

SCENE FOUR: Offerings and Calendars: Sources for Local Action

Wanderer: We settled here because we found it good. Even the new farmers learn to offer us incense; in fire and smoke they make ready for us the things we use: our clothes, our fine materials, our cash. From us they learn propriety, lest we disrupt their harvests. "Don't toss your tools around," old people tell the new set, worrying that they will disturb us ghosts. "Don't use coarse words in the paddy," they advise. They say, "A good farmer checks on the paddy every day," and who but we are there to notice whether or not they do?

Farmer: We learn to observe *tseh-khuì* (節氣), the twenty-four solar terms. Grandpa Chang says that when it comes to retransplanting seedlings, you must finish before *tshing-bîng* (清明). Auntie Qiao says: if you want to make preserves, ferment soy sauce, you must finish before *pe̍h-lōo* (白露) or the Yilan sun won't be hot enough and the soy sauce will be more likely to mold. Before moving to the village, my Taiwanese nationalism led me to believe that the twenty-four solar terms was the stuff of mainland Chinese ideologies, irrelevant to Taiwanese agriculture. Only later did I learn that Taiwanese farmers long ago created their own methods, localizing the twenty-four solar terms, creating a convenient set of standards for Yilan's agricultural work.

For us new farmers, there is a lot of learning. We observe, experiment, and dig up old farmers' knowledge. Over the years and through the course of each growing season, our efforts gradually accumulate. In 2015, the idea circulated that snail picking is most effective at night. Some people started making dates with the snails every midnight. After they reported their success, other farmers followed. By 2016, it was standard to pick at midnight. One farmer even affirmed the point with a Japanese academic publication. But while the Japanese scientists say the snails are most active from 9 p.m. to 3 a.m., some farmers

disagree, saying Shengou snails come out as early as 6 p.m. Grandpa Chang says there is no general rule: temperature makes the difference. "When it is chilly during the day and suddenly gets warmer at night, the frogs are croaking loudly, the bird calls join in chorus, and the dogs bark incessantly. This is when the golden snails are the most active. There are so many snails it will scare you!"

When the season comes, golden snails invade our work and jokes, and even our dreams. From community kitchen to social media or random conversation while checking on water levels in the fields, snails multiply in every encounter. From *kenn-tit* (驚蟄) ("awakening of the insects") to *lip-hē* (立夏) ("beginning of summer"), we continuously ask, "How shall we save rice seedlings from the ferocious appetite of those snails?" Snails unite us.

Wanderer: As for me, I predate these communities. I am local, but I exceed local dreams. They ask for permission to live in this place, and, yes, we give it to them, but they never fully know us.

SCENE FIVE: Science: Snails and Seasons

Farmer: We're not afraid of science in our village. Two of my farmer neighbors are credentialed scientists. They keep track of the snails, studying ways to keep them at bay without poison, and inventing snail traps and baits. After testing cabbage leaves, bananas, fish food, and pineapple, they concluded that rice bran is the best at attracting snails. Rice bran is also the most affordable for us farmers; some city researchers suggested bananas, but who besides a government-funded lab is going to buy bananas for their snails?

These scientists, my neighbors, inspire us to try new ideas. Sometimes the rest of us jump to conclusions. They do a test. "Really, I think knowledge is so important," one said to me; "otherwise, just relying on hearsay can be really dangerous." We all make observations, but they verify what we notice.

Of course there are different kinds of science. During the Green Revolution, science seemed so grand; it was part of a package with chemicals, machines, and earthworks. Everything that wasn't part of that package was old-fashioned, and no one was supposed to do it anymore. There was a wall between the old and

the new. But a lot of criticisms have been directed at that package; the pieces have fallen apart. Friendly farmers pick up some things and leave others alone. We watch the snails, we read about them, we ask our neighbors, and we try some small trials that might show if our ideas are right.

One of my farming partners noticed something this year: when a conventional farmer nearby put poison in his field to kill the snails one afternoon, by the next morning the cement bunds around the field were covered in snail eggs! At that time, it was still cool. My field didn't have any eggs at all. We read about it, and it seems that stressed golden snails lay eggs. The poison killed adults but led to many more snails-to-come.

Snails have their seasons for us; we've given up on killing them all, so we learn to live with at least a few. We watch them—learning from our elders and our scientists as much as from our peers. When the rice is older, we've found, the snails can't break the stem. Then, suddenly, the snails can be our friends. We use them to keep down weeds. Here's what Grandpa Chang said: "I collect the large ones, but I don't collect the fourth and fifth generations. Once the seedlings have grown for forty to forty-five days, those snails will have grown big and will start eating weeds. Don't worry about that generation, they are there to help us. We are making use of the golden snails."

We change our strategies; we make them anew. We use our senses, our tests, and the experiences of older farmers. You might call one science and another superstition, but for us each opens a door, alerting us to the challenges of a season. Of course, we come from different perspectives; we fight about which kind of knowledge is better. "Foreign scientists don't know about our situation," said another of my neighbors. But none of us dump the options.

Pedant: Burned by the science wars of the 1990s and excited by the possibilities of indigenous cosmopolitics, many anthropologists and science-studies scholars in the twenty-first century began searching for alternative world-making practices that could bring them outside "science." In contrasts between science and indigenous or vernacular forms of knowledge, the logic of science looks suspect: science convinces us that only one kind of knowledge is correct; it refuses multiplicity and alternative formulations. In these accounts, science is identified with the problems of the modern world.

Such analytic work is accomplished through contrasting *concepts*. "Imagine the world through indigenous concept A versus scientific concept B," the analyst requests. This technique works well where the analyst aligns herself with local

contrasts between our way and theirs. The sharper the indigenous contrast, the better the analyst's contrast works. Where local people do not begin with such contrasts, however, the situation offers analysts a different gift: the possibility of working with local *practices* through which many kinds of concepts, frames, and philosophies mix, overlap, compete, and otherwise jostle each other. Such an approach does not abandon the work of separating strands, but here it is the beginning of the investigation rather than the end. The goal is to watch how people work across frames, negotiating when one kind of frame might best be applied and when another.

Science looks different in such an investigation. Science joins other kinds of claims, including those of ghosts and deities. To learn about golden snails, one cannot be afraid of reading science. But it need not be applied with the authority of faith. Scientists' claims join those of personal observation, public debate, and ghostly interventions.

Wanderer: They are always talking about me, but they can't hear a thing I say. All they hear is the rain, which sweeps my words away. Still, I'll tell them about snails: they are hungry like me. If the farmers miss a single night of snail picking when the rice is young, they lose an entire section of the field. Should I pity the farmers or the snails? So much life! It scalds me.

SCENE SIX: Debate: The Bird Disruption

Wanderer: What do the water birds say as they search in the paddy-field mud? I listen to them all, and not just the farmers' white ducks. There are spot-billed ducks, painted snipes, white-breasted waterhens, and moorhens. Birds are active souls. I know them; they are hungry like me. They stick their heads in the mud that took my bones. I'm in those sediments, which layer algae, bugs, and seeds, but also other times and other arguments. Watch me splash some up. Then you might notice me.

Pedant: Development experts suggest that farmers tackle the golden snail infestation of their rice fields through keeping ducks, which eat snails. Indeed, Yilan was once famous for duck herding. Alas, when humans transformed themselves from dog eaters to dog lovers—and some to dog deserters—bands of roaming dogs wagged their ways into the new rural ecology. The empty minimansions strewn across the Lanyang Plain provide the gangs with splendid, marbled shelters. They prey on ducks and chickens and harass lone joggers. Duck-rice farming in Yilan makes for great PR but bad farming sense. Now ducks are kept in fenced commercial farms, which buy snails hand-picked by farmers. And when we consulted those ducks about helping with our natural-history experiments, they vehemently refused us.

Farmer: But there are other birds—and they are a big problem! This year, the moorhens (*tsuí-ka-līng*) have been terrible. They forage in the mud, pecking at the roots of the rice seedlings, leaving the seedlings in disarray. They don't even flinch at my screams when I shoo them. What are we to do?

Moorhens are not a new bird, but somehow this year they have become such a pest. "Green beautification" projects converting riverbank wetlands into lawned parks might be the cause, but we are not sure. What is certain is that moorhens stir big discussions in the village. One farmer says we are overreacting: just leave the flattened rice seedlings alone, he says, and the rice will straighten itself out. Another farmer says that guy can only say that because farming is not his main source of income. Farming is her living, she says; she has spent a fortune this year replacing flattened seedlings. The debate has possessed the whole village; every day we hear more opinions.

As for me, I replaced the seedlings the moorhens flattened, three times. I also set up a simple string device in my paddy, hoping that it would somehow deter the visits.

A few days after I tried the red string, two neighbors told me that it wasn't going to work. They explained: The birds learn where the trip wires were, and they just walk over them.

Grandpa Chang is probably right about the birds. Here's what he said: "Ah, the birds! It's the biggest challenge. The problem is, the birds are smart. All of the tactics people have tried—scarecrows, lights, flags, strings, fireworks—work for three or four days at most before the moorhens figure out there's no danger."

"The moorhens thin out once their favorite seed hull treats are gone," he continued, "but that's when the spot-billed ducks come, breaking the seedlings in half with their raucous play."

If it's not one bird, it's another. If it's not birds, it's weeds. How can we keep the rice out of trouble? At least, we're paying attention.

SCENE SEVEN: Surviving the Green Revolution

Farmer: Our farming feeds our bellies, but it also puts forward an ambition: to live well with others. We can't make that dream by ourselves. We draw in many kinds of others. Every season we have short-term volunteers. Despite their lack of experience, their enthusiasm keeps us from falling too far behind with the busy spring labor. We're also part of a larger movement to remake lively relations between city and countryside. City people come to experience farming. We want them to get their feet dirty, so we show them how to transplant rice seedlings or pick up golden snails. They are squeamish and clumsy, and sometimes they make a big mess. But we want them to know there's no food without farmers, no cities without the countryside. Sometimes we romanticize ourselves a little in the process. We might fail to point out that when they aren't around, we transplant seedlings with machines. Still, for them the point is the farming experience. They can't have that without stepping in the mud, which we do every single day.

We also can't make our farming work without other beings, and both the living and the dead. Some animals promote our cause. Everyone in Taiwan knows the song about the pond loach, a little fish of the paddy fields that reminds us of the innocent pleasures of children. But pond loaches started disappearing with the modernization of irrigation, the replacement of dirt bunds with cement, and the rise of agricultural chemicals. Maybe pond loach nostalgia can help us explain friendly farming.

Some animals help us because they help the rice. There is a leech that eats golden snails; we need it. Those leeches aren't interested in human blood. They specialize in water snails—all kinds. But we've learned to draw lines: we love the native snails. When we are picking golden snails, we put native snails back into the water. Our native snails don't eat rice seedlings; some help us out by clearing algae.

Even golden snails become our friends when the rice is old enough to resist them. The snails help us keep the weeds down. So instead of trying to kill off all those animals, we pay attention to them, learning the ways we just might live together.

Pedant: What's involved in paying attention to others? There's a method to it. We call it *natural-history experiments* to foreground the importance of observation in a broad sense. Many senses and sources are tapped: farmers count off calendrical rituals; they listen to birds, pick snails at different hours of the day, and use their

bodies as tools; they watch for social-media postings and read scientific journal articles.

Natural history, more conventionally, refers to a European practice that, following the Enlightenment, brought observers out in what they knew as nature. We refuse that narrow definition to include all kinds of world-watching practices, and particularly those in which the social relations of other kinds of beings are explored not through rote learning but through bringing personal observation into socially guided interpretation. In this expanded sense of the term, Yilan's friendly farmers are masters of natural-history practice, using their ever-growing repertoire of knowledge about paddy life to inform their farming. Each observation inspires others. Farmers are not trapped in a static cosmology, whether science or tradition; they explore the peculiarities of the world.

While such an expansion of the term loses the particularity of the European elite experience with its colonial frame, it gains the possibility of attention to what many kinds of noticing share. It breaks up a priori distinctions between vernacular and professional, and the West versus its Others. It allows us to consider sets of practices that—crosscutting many lines—allow farmers to work with ontological difference, making it their ally rather than being held in its sway. Farmers, like anthropologists, appreciate that there are many kinds of world-making, and, like anthropologists, they know how to switch, combine, and juxtapose. Yilan friendly farmers' natural history is in dialogue with other natural-history conventions—and yet exceeds them, finding its center of gravity in local farming practices.

In expanding the definition of natural history, it seems useful to consider whether other living things might also be involved in similar observations (at least if observation is expanded to refer to many forms of sensual experience). Golden snails are new residents of Taiwan's paddy fields. They explore: they taste many plants, and even animals, developing their diets. They try cement bunds, rice stalks, election-campaign flags, and research cameras as egg-laying platforms. They come into contact with native snails, leeches, and farmers, among others, as they find their way. Conversely, the animals and plants around them reacquaint themselves with a world in which their presence looms large.

This expansion again loses particularity, here of human practices, but it gains the possibility of asking what humans and other beings have in common. If humans are not alone in exploring and making the world, we have a basis on which to work at living together.

And what of ghosts? Yilan's ghosts are capable of observation. They cause calamities; they save people from floods. They demand being noticed and object when they are not acknowledged. It seems difficult to ban ghosts from the annals of those *doing* natural history, as well as of those being observed—even as ghosts, the formless ones, never emerge into form. This, of course, messes with European Enlightenment notions of nature, but isn't that part of the point? Opening up what counts as nature allows analysts to look at patches of practice in which ontological frameworks are worked out by humans and nonhumans alike. Dividing such frameworks by their genealogies is just one step of the analysis, not its endpoint.

All of this, too, has a politics. Friendly farmers acquaint themselves with all kinds of other beings for a reason. The policies put in place during the second half of the twentieth century—in both city and in countryside, in both elite enclosures and impoverished wastelands—threaten the livability of the earth. To recapture the possibility of livable landscapes, friendly farmers must learn something about those beings that the Green Revolution and the commercialization of land blocked. Instead of making their fields into monocrop deserts, they expect other life forms in their paddies. Instead of working to exterminate adversaries, they accommodate them. It doesn't sound like a grand program, but—in aiming to survive the Green Revolution—it's our best hope.

Wanderer: "Hope," he says. Ha! There's no hope for me; I'm already dead. I persist in this world in both your terrors and your blessings, and you don't know which ones I'll bring. Shall I bring on the apocalypse or waft a good harvest in your direction? You won't know. After all, our numbers grow from your hubris and your violence. We are as happy to accept your newly found U.S. dollars as your old-fashioned clothes and combs. Our mystery has the last word.

I humbly suggest: feed me.

ABSTRACT

Combining video and performance-oriented text, this genre-bending o-pei-la *is a multispecies enactment of experimental natural history. Our players consider the golden treasure snail (*金寶螺; kim-pó-lê; Pomacea canaliculata *and relatives; golden apple snail), first imported to Taiwan from Argentina in 1979 for an imagined escargot industry, but now a major pest of rice agriculture in Taiwan and across Asia. Whereas farmers in the Green Revolution's legacy use poison to exterminate snails, a new generation of friendly farmers (*友善小農; youshan xiaonong*) in*

Taiwan's Yilan County hand-pick snails and attempt to learn enough about their lives to insert farming as one among many multispecies life ways within the paddy. Drawing on a variety of knowledge sources, including personal experience, international science, social media, traditional calendars, and local understandings of ghosts and deities, these farmers construct an experimental natural history of both new and old paddy-field denizens. Their experiments self-consciously intersect with the investigations made by other species of the paddy field. Our article offers an ethnography of both kinds of experiments, human and nonhuman. Video and text together show the performative features of cross-species acquaintance. In the process, we contribute to debates about radical alterity, showing how anthropologists can do more than sort for difference: we can identify vernacular patches of practice that mix and juxtapose many ontological alternatives. [experimental film; multispecies ethnography; friendly farming; golden apple snail; multiple ontologies; Taiwan]

NOTES

grassroots, amateur, and infused with a queer sensibility: In traditional Taiwanese opera, actors and musicians perform outdoors in an informal setting, under a tree or in front of a temple, while the audience snacks and cheers for their friends. In contrast to European opera, it is a grassroots creative form, not high art. Performances deploy just a few amateur actors and musicians. The "queer sensibility" we mention refers to the importance of cross-dressing and of plots full of mistaken identities and wild claims to be someone other than who one is supposed to be. Once men played female parts as well as male ones; more recently, women play all the major roles, male and female. Recent attempts to make the form an official icon of Taiwanese culture have led to professionalization, but the grassroots legacy remains clear.

in which aesthetics mix and mingle: The newer *o-pei-la* was born under Japanese colonial rule when traditional genres were forbidden and the modern West was to be the guide; troupes switched between portraying themselves as Japanese *kominka* subjects (when colonial police came by) and Taiwanese cross-dressers. The genre that flowered from these restrictions mixes all kinds of convention. (One contemporary *o-pei-la* troupe mixes Greek tragedy and Taiwanese opera plots.) The friendly farming we describe also pulls materials, genres, and perspectives from many kinds of sources.

the script, which combines material from interviews: Mandarin Chinese is the official language of Taiwan, while Taiwanese is the predominant local language among the older generation. Taiwanese romanization is used where our informants were likely to use Taiwanese. Quotations are translations from interviews.

This argument frames our article but is not repeated in the script: Lucien Taylor's (1996) phenomenological approach argues for consideration for an image-sound based anthropology, different from the discursive and representational aspects of written anthropology (see also MacDougall 1997). We have been doing written anthropology with images and sounds, rather than exploring the full capacities of cinema as experience and discourse. As Taylor (1996, 80) argues, "films should not so much illustrate as actually embody anthropological knowledge." Anna Grimshaw (1997) argues that participant-observation is already inherently a visual practice; visuality should be a framework for understanding anthropology. Ethnographic film presents information that is beyond the capabilities of the page. It is a physical and intellectual act of seeing, not just data. Neither a recapitulation of a foreign vision nor the first-person expression of the filmmakers, it is an act of translation.

In this spirit, we present our video footage and sound recordings without full explication, hoping that viewers will notice the mysteries of snails clicking inside their shells, dogs smelling, and rice flinging out thin flowers. Our first film footage is taken

with a microcam carried by a giant African snail (an invasive pest in Taiwan) who observes the paddy from its muddy margins. The underwater snail is our golden snail protagonist. Golden snails' sounds were recorded by an underwater contact microphone. By recording the snail, but not explicating its sounds, we hope to convey the *friction* (see Tsing 2005) of contact across radical difference; this is also our aim in presenting only partially translated human talk. Here, we join multispecies ethnographers, but rather than searching for humanlike morality and consciousness, our performance piece stresses relational curiosity and the ecological consequences of living in common.

Fieldwork for this article was conducted by anthropologist-farmers Tsai from 2013 to the present and Chevrier from 2016 to the present. Tsing's contribution was to spark the opera, much of which was conceived in epic-length telemediated team discussions. Video footage and sound recordings were made between March and August 2016 by Carbonell and Chevrier via time-lapse, micro spy cameras, waterproof Sony Cyber-Shot, GoPros, a Sony A7rii, and a Canon 5D (see Haraway 2008 on the multiple agencies of the crittercam). The film's soundscape is of two kinds. We begin and end with Yilan opera percussion, recorded by Tsai and Chevrier. Our other sounds were recorded by Carbonell and Chevrier in the farming landscape, and, in the case of snail sounds, in an aquarium. Carbonell edited the video footage in a continual conversation with the team, as we wrote and rewrote the text and video.

Prologue

Some call it "apple," or Pomacea canaliculata: The golden snail we describe is mainly that identified as *Pomacea canaliculata*. The term *golden* refers to the amount of money entrepreneurs hoped to make. The snail is also called "fortune-longevity snail" (福壽螺; *fushouluo*). *Pomacea* are hard to differentiate; their shells, through which snails are most easily identified, show a great deal of variation within species. Adding to the confusion, several species were inadvertently imported to Taiwan from Argentina (Hayes et al. 2008). Like morphology, life-cycle traits have proved to be plastic; golden snails make use of this plasticity to become rice paddy pests. As Nestor Cazzaniga (2006) puts it, golden snails are "harmless and useless" in their native Argentina; by contrast, they have become major ecosystem engineers in Asia. Rather than to the commonly expected predator escape, many researchers look to the plasticity of snail growth and reproductive rates to explain this difference (Lach et al. 2000). Golden snails grow faster and reproduce much more frequently in warmer climates. A useful introduction is Joshi and Sebastian 2006. For both intentional and unintentional introduction across Asia between 1980 and 1990, see Naylor 1996. For ecological destruction, see Carlsson, Brönmark, and Hansson 2004.

Scene One

Maybe it's sweat, but I think it's the ghosts: Ghosts are less confined to individual identities than subjects of living states. After all, they have lost their names. We take advantage of their indistinct status to allow Wanderer some species and numerical flexibility. See Wolf 1974 on ghosts.

Friendly farming is a movement as well as a means of livelihood: Friendly farmers work toward nonindustrial alternatives, but outside the rigid institutional organic certification system. Some friendly farmers mix techniques from varied versions of farming. One farmer, for example, experiments by dividing plots between those farmed through state-approved chemical inputs versus those farmed in the friendly style. Another has tried planting the government-approved rice variety using friendly methods. Since the government pays guaranteed premium prices for that variety, usually grown with high chemical inputs, it is a sacrifice for farmers to experiment with alternatives. Alternative

marketing networks are necessary. For alternative networks and rural revitalization in Taiwan, see Lo and Chen 2011, J. Chen 2014, Wo 2015, and Tsai 2016.

or else they practice arts of indigenous ontology: Scholarly attention to radical difference has developed at the intersection between anthropology and science and technology studies. Two modes contrast. Some scholars show how practices of expertise, such as in science and medicine, diverge from vernacular practices (e.g., Mol 2002; Law and Lien 2013). Other scholars have turned to indigenous world-making (e.g., Viveiros de Castro 2012; Escobar 2011). The felicitous term *one-world world* comes from Law 2011. The work of Helen Verran (2001) is exemplary in bringing these conversations together. *Science and an African Logic* opens much of the analytic territory explored here; she offers conceptual contrasts, but then messes with them by introducing practice and history.

the ontic status of their practical interactions with each other and the world: Verran's term *ontics* allows a discussion of practical enactments of ways of being, rather than merely of philosophies. This concept opens the door to an exploration of nonhuman perspectives and enactments; ontics do not require practitioners to embrace philosophical canons. There is no reason that snails and plants might not have them.

Ontics are not essences tied to identities. The Green Revolution changed the nature of rice, as well as the ecologies in which rice was embedded. Friendly farming offers rice the opportunity to respond differently: not as a segregated reproduction machine but rather as a privileged co-resident of the paddy. Even as we show rice moving more slowly than dogs and snails, we challenge the reader to see this as activity. Our goal is to watch historical transformations in which plants—and other beings—make worlds (see Tsing 2015, forthcoming). Here, we join other scholars of plants (e.g., Hustak and Myers 2012).

Scene Three

Today's hills and villages only emerged some two thousand years ago: Chihhua Chiang contributed archaeological material to this article in personal communication with the authors.

in the name of a bus company and a whiskey brand, which echo people long forgotten: For early Yilan history, see Shih 1996, W. Huang 1998, W. Huang 2000, and W. Chen 2010. For rivers and ghosts, see C. Huang 1999, Zhang 2003, Ku and Tan 2004, Wu 2014, and Y. Chen 2014.

Scene Four

One farmer even affirmed the point with a Japanese academic publication: The publication mentioned is Wada and Yoshida 2000.

Scene Five

Friendly farmers pick up some things and leave others alone: Postcolonial approaches to science have stressed translation, in Shiho Satsuka's (2015) sense, which involves not only linguistic but also conceptual and material reworking (Tsing 2015, 217–26). Science must be translated into village idioms to be effective in friendly farming; a heated discussion in our village recently took place on whether science or local knowledge best constitutes a common language for farmers. Scientists are not the only translators here. Since new farmers had previously neglected offerings, Grandpa Chang gives classes on how to best make offerings to ghosts. Grandpa Chang is equally a translator, bringing an earlier layer of village practice into the world of younger farmers.

it seems that stressed golden snails lay eggs: For snail reproduction under conditions of stress, see Cartwright 2006, 16.

science is identified with the problems of the modern world: Two major figures in anthropology and science studies, Bruno Latour (2013) and Eduardo Viveiros de Castro (2013), have argued passionately that science has been at the heart of environmental destruction. This

article joins that conversation. Latour's conviction that scientific ideology contrasts with science in practice is a useful starting point. Yet further: when scientists are involved as participants in particular worlds of practice (here, small farming), they bring science and local cosmologies into workable confusions and juxtapositions. Science as an enterprise becomes fragmented and infused with vernacular knowledge. Divisions between ideology and practice may or may not hold, depending on the conversation. To remain clear that some kinds of science have been dangerous to life on earth yet acknowledge others as necessary to a toolkit for collaborative survival, it is important to recognize this process of local imbrication.

mix, overlap, compete, and otherwise jostle each other: In personal communication with the authors, Marianne Lien helped clarify the difference between contrast of concepts and analysis of practices.

they are hungry like me: According to Alejandra Estebenet and Pablo Martín (2002), golden snails go into a period of dormancy when conditions are cold or dry. Reproduction is seasonal in cooler areas but continuous in tropical regions. Some females spawn up to 3.7 times per week, on average, for their whole lifetimes, with a measured high of 10,869 and a mean of 4,506 eggs per female. Intercourse lasts from ten to twenty hours, and each incident of egg laying lasts five hours. Although the snails live in the water, eggs are laid above the waterline. The snails eat vegetal, detrital, and animal matter, but they prefer standing and floating water plants.

Scene Seven

a little fish of the paddy fields that reminds us of the innocent pleasures of children: Wo (2015, 30) translates Hou Dejian's 1975 song "Loach-Catching."

They specialize in water snails—all kinds: The predatory leech described is *Whitmania laevis*. It smells the mucus trails of aquatic snails, which form its prey (Lai, Chen, and Lee 2010).

they watch for social-media postings and read scientific journal articles: We use the term *experiment* not to require professional rigor but rather to note the open-ended, trial-and-error ethos of their work. Farmers are willing to be wrong.

it gains the possibility of attention to what many kinds of noticing share: Much has been written about European natural history from the seventeenth century to the present, ranging from inquiries into universal cognition (Atran 1993) to explorations of the imperial politics of botanizing (Pratt 1992; Brockway 2002). The latter is key in considering whether and how to expand the term *natural history* to other projects and places. It seems important to avoid generalizing too quickly about what E. O. Wilson (1984) called "biophilia," that is, human love of other living beings. Instead, projects of watching, naming, describing, or involving oneself among other beings should be considered in the cultural and political milieu from which they emerge. With that caveat, however, the exploration of such projects is an exciting field (see Nelson 1986 for an indigenous natural history from Alaska; Kohn 2013 on Runa communication with animals in Ecuador; Marcon 2015 on early modern Japan). In such historically grounded exploration, natural history can encompass both elite and vernacular projects, and in varied times and places. Such scholarship moves beyond the too common stereotype that only Western scientists care about the practical details of nonhuman worlds, while vernacular and indigenous Others traffic instead in cosmologies.

with a world in which their presence looms large: Agricultural experts often say that golden snails can only be controlled by pesticides because they have no natural enemies in Taiwan. But farmers have noticed that paddy rats, painted snipes, moorhens, and predatory leeches have learned to eat golden snails. Both farmers' observations and the animals' exploratory diets are natural-history experiments, in our sense. We would also include friendly farmers' experiments in cooking and eating golden snails, despite their reputation as a poor food.

we have a basis on which to work at living together: Expanding natural history breaks open conventional senses of both *nature* and *history* to the friction of quite different explorations.

Even in its most conventional senses, natural history took Europeans into many forms of temporality (e.g., Gould 1987). Further expanding the term will require sensitive attention to multiple temporalities of appreciating the world. Recent European explorations of the temporal experience of other animals (e.g., Foster 2016) open the door to such attention, even as they also show the limits of elite European conventions.

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