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The Windup Girl

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The Windup Girl

Paolo Bacigalupi



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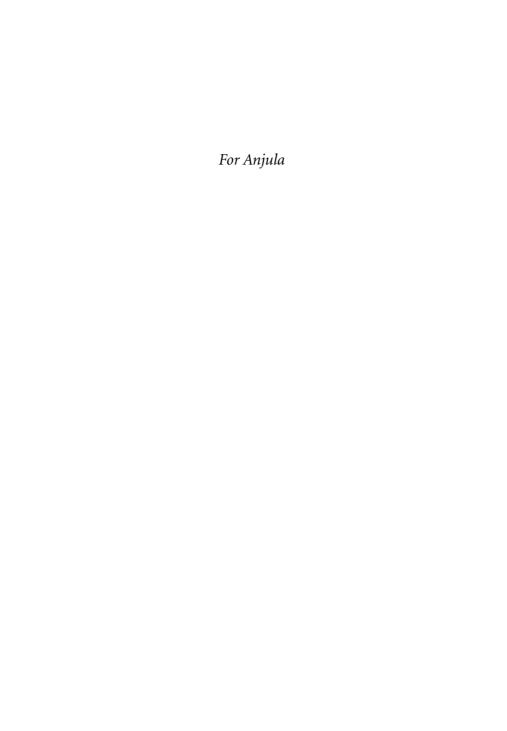
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'No! I don't want the mangosteen.' Anderson Lake leans forward, pointing. 'I want that one, there. *Kaw pollamai nee khap*. The one with the red skin and the green hairs.'

The peasant woman smiles, showing teeth blackened from chewing betel nut, and points to a pyramid of fruits stacked beside her. 'Un nee chai mai kha?'

'Right. Those. *Khap*.' Anderson nods and makes himself smile. 'What are they called?'

'*Ngaw*.' She pronounces the word carefully for his foreign ear, and hands across a sample.

Anderson takes the fruit, frowning. 'It's new?'

'Kha.' She nods an affirmative.

Anderson turns the fruit in his hand, studying it. It's more like a gaudy sea anemone or a furry puffer fish than a fruit. Coarse green tendrils protrude from all sides, tickling his palm. The skin has the rust-red tinge of blister rust, but when he sniffs he doesn't get any stink of decay. It seems perfectly healthy, despite its appearance.

'*Ngaw*,' the peasant woman says again, and then, as if reading his mind. 'New. No blister rust.'

Anderson nods absently. Around him, the market *soi* bustles with Bangkok's morning shoppers. Mounds of durians fill the alley in reeking piles and water tubs splash with snakehead fish

and red-fin *plaa*. Overhead, palm-oil polymer tarps sag under the blast furnace heat of the tropic sun, shading the market with hand-painted images of clipper ship trading companies and the face of the revered Child Queen. A man jostles past, holding vermilion-combed chickens high as they flap and squawk outrage on their way to slaughter, and women in brightly colored *pha sin* bargain and smile with the vendors, driving down the price of pirated U-Tex rice and new-variant tomatoes.

None of it touches Anderson.

'Ngaw,' the woman says again, seeking connection.

The fruit's long hairs tickle his palm, challenging him to recognize its origin. Another Thai genehacking success, just like the tomatoes and eggplants and chiles that abound in the neighboring stalls. It's as if the Grahamite Bible's prophecies are coming to pass. As if Saint Francis himself stirs in his grave, restless, preparing to stride forth onto the land, bearing with him the bounty of history's lost calories.

'And he shall come with trumpets, and Eden shall return ...'

Anderson turns the strange hairy fruit in his hand. It carries no stink of cibiscosis. No scab of blister rust. No graffiti of genehack weevil engraves its skin. The world's flowers and vegetables and trees and fruits make up the geography of Anderson Lake's mind, and yet nowhere does he find a helpful signpost that leads him to identification.

Ngaw. A mystery.

He mimes that he would like to taste and the peasant woman takes back the fruit. Her brown thumb easily tears away the hairy rind, revealing a pale core. Translucent and veinous, it resembles nothing so much as the pickled onions served in martinis at research clubs in Des Moines.

She hands back the fruit. Anderson sniffs tentatively. Inhales floral syrup. *Ngaw*. It shouldn't exist. Yesterday, it didn't. Yesterday,

not a single stall in Bangkok sold these fruits, and yet now they sit in pyramids, piled all around this grimy woman where she squats on the ground under the partial shading of her tarp. From around her neck, a gold glinting amulet of the martyr Phra Seub winks at him, a talisman of protection against the agricultural plagues of the calorie companies.

Anderson wishes he could observe the fruit in its natural habitat, hanging from a tree or lurking under the leaves of some bush. With more information, he might guess genus and family, might divine some whisper of the genetic past that the Thai Kingdom is trying to excavate, but there are no more clues. He slips the *ngaw's* slick translucent ball into his mouth.

A fist of flavor, ripe with sugar and fecundity. The sticky flower bomb coats his tongue. It's as though he's back in the HiGro fields of Iowa, offered his first tiny block of hard candy by a Midwest Compact agronomist when he was nothing but a farmer's boy, barefoot amid the corn stalks. The shell-shocked moment of flavor – real flavor – after a lifetime devoid of it.

Sun pours down. Shoppers jostle and bargain, but nothing touches him. He rolls the *ngaw* around in his mouth, eyes closed, tasting the past, savoring the time when this fruit must once have flourished, before cibiscosis and Nippon genehack weevil and blister rust and scabis mold razed the landscape.

Under the hammer heat of tropic sun, surrounded by the groan of water buffalo and the cry of dying chickens, he is one with paradise. If he were a Grahamite, he would fall to his knees and give ecstatic thanks for the flavor of Eden's return.

Anderson spits the black pit into his hand, smiling. He has read travelogues of history's botanists and explorers, the men and women who pierced the deepest jungle wildernesses of the earth in search of new species – and yet their discoveries cannot compare to this single fruit.

Those people all sought discoveries. He has found a resurrection. The peasant woman beams, sure of a sale. 'Ao gee kilo kha?' How much?

'Are they safe?' he asks.

She points at the Environment Ministry certificates laid on the cobbles beside her, underlining the dates of inspection with a finger. 'Latest variation,' she says. 'Top grade.'

Anderson studies the glinting seals. Most likely, she bribed the white shirts for stamps rather than going through the full inspection process that would have guaranteed immunity to eighth-generation blister rust along with resistance to cibiscosis 111.mt7 and mt8. The cynical part of him supposes that it hardly matters. The intricate stamps that glitter in the sun are more talismanic than functional, something to make people feel secure in a dangerous world. In truth, if cibiscosis breaks out again, these certificates will do nothing. It will be a new variation, and all the old tests will be useless, and then people will pray to their Phra Seub amulets and King Rama XII images and make offerings at the City Pillar Shrine, and they will all cough up the meat of their lungs no matter how many Environment Ministry stamps adorn their produce.

Anderson pockets the *ngaw*'s pit. 'I'll take a kilo. No. Two. *Song*.' He hands over a hemp sack without bothering to bargain. Whatever she asks, it will be too little. Miracles are worth the world. A unique gene that resists a calorie plague or utilizes nitrogen more efficiently sends profits sky-rocketing. If he looks around the market right now, that truth is everywhere displayed. The alley bustles with Thais purchasing everything from generipped versions of U-Tex rice to vermilion-variant poultry. But all of those things are old advances, based on previous genehack work done by AgriGen and PurCal and Total Nutrient Holdings. The fruits of old science, manufactured in the bowels of the Midwest Compact's research labs.

The *ngaw* is different. The *ngaw* doesn't come from the Midwest. The Thai Kingdom is clever where others are not. It thrives while countries like India and Burma and Vietnam all fall like dominoes, starving and begging for the scientific advances of the calorie monopolies.

A few people stop to examine Anderson's purchase, but even if Anderson thinks the price is low, they apparently find it too expensive and pass on.

The woman hands across the *ngaw*, and Anderson almost laughs with pleasure. Not a single one of these furry fruits should exist; he might as well be hefting a sack of trilobites. If his guess about the *ngaw's* origin is correct, it represents a return from extinction as shocking as if a Tyrannosaurus were stalking down Thanon Sukhumvit. But then, the same is true of the potatoes and tomatoes and chiles that fill the market, all piled in such splendid abundance, an array of fecund nightshades that no one has seen in generations. In this drowning city, all things seem possible. Fruits and vegetables return from the grave, extinct flowers blossom on the avenues, and behind it all, the Environment Ministry works magic with the genetic material of generations lost.

Carrying his sacked fruit, Anderson squeezes back down the *soi* to the avenue beyond. A seethe of traffic greets him, morning commuters clogging Thanon Rama IX like the Mekong in flood. Bicycles and cycle rickshaws, blue-black water buffaloes and great shambling megodonts.

At Anderson's arrival, Lao Gu emerges from the shade of a crumbling office tower, carefully pinching off the burning tip of a cigarette. Nightshades again. They're everywhere. Nowhere else in the world, but here they riot in abundance. Lao Gu tucks the remainder of the tobacco into a ragged shirt pocket as he trots ahead of Anderson to their cycle rickshaw.

The old Chinese man is nothing but a scarecrow, dressed in

rags, but still, he is lucky. Alive, when most of his people are dead. Employed, while his fellow Malayan refugees are packed like slaughter chickens into sweltering Expansion towers. Lao Gu has stringy muscle on his bones and enough money to indulge in Singha cigarettes. To the rest of the yellow card refugees he is as lucky as a king.

Lao Gu straddles the cycle's saddle and waits patiently as Anderson clambers into the passenger seat behind. 'Office,' Anderson says. 'Bai khap.' Then switches to Chinese. 'Zou ba.'

The old man stands on his pedals and they merge into traffic. Around them, bicycle bells ring like cibiscosis chimes, irritated at their obstruction. Lao Gu ignores them and weaves deeper into the traffic flow.

Anderson reaches for another *ngaw*, then restrains himself. He should save them. They're too valuable to gobble like a greedy child. The Thais have found some new way to disinter the past, and all he wants to do is feast on the evidence. He drums his fingers on the bagged fruit, fighting for self-control.

To distract himself, he fishes for his pack of cigarettes and lights one. He draws on the tobacco, savoring the burn, remembering his surprise when he first discovered how successful the Thai Kingdom had become, how widely spread the nightshades. And as he smokes, he thinks of Yates. Remembers the man's disappointment as they sat across from one another with resurrected history smoldering between them.

'Nightshades.'

Yates' match flared in the dimness of SpringLife's offices, illuminating florid features as he touched flame to a cigarette and drew hard. Rice paper crackled. The tip glowed and Yates exhaled, sending a stream of smoke ceilingward to where crank fans panted against the sauna swelter.

'Eggplants. Tomatoes. Chiles. Potatoes. Jasmine. Nicotiana.' He held up his cigarette and quirked an eyebrow. 'Tobacco.'

He drew again, squinting in the cigarette's flare. All around, the shadowed desks and treadle computers of the company sat silent. In the evening, with the factory closed, it was just possible to mistake the empty desks for something other than the topography of failure. The workers might have only gone home, resting in anticipation of another hard day at their labors. Dust-mantled chairs and treadle computers put the lie to it – but in the dimness, with shadows draped across furniture and moonlight easing through mahogany shutters, it was possible to imagine what might have been.

Overhead, the crank fans continued their slow turns, Laotian rubber motorbands creaking rhythmically as they chained across the ceiling, drawing a steady trickle of kinetic power from the factory's central kink-springs.

'The Thais have been lucky in their laboratories,' Yates said, 'and now here you are. If I were superstitions, I'd think they conjured you along with their tomatoes. Every organism needs a predator, I understand.'

'You should have reported how much progress they were making,' Anderson said. 'This factory wasn't your only responsibility.'

Yates grimaced. His face was a study in tropic collapse. Broken blood vessels mapped rosy tributaries over his cheeks and punctuated the bulb of his nose. Watery blue eyes blinked back at Anderson, as hazy as the city's dung-choked air. 'I should have known you'd cut my niche.'

'It's not personal.'

'Just my life's work.' He laughed, a dry rattling reminiscent of early onset cibiscosis. The sound would have had Anderson backing out of the room if he didn't know that Yates, like all of AgriGen's personnel, had been inoculated against the new strains.

'I've spent years building this,' Yates said, 'and you tell me it's not personal.' He waved toward the office's observation windows where they overlooked the manufacturing floor. 'I've got kinksprings the size of my fist that hold a gigajoule of power. Quadruple the capacity-weight ratio of any other spring on the market. I'm sitting on a revolution in energy storage, and you're throwing it away.' He leaned forward. 'We haven't had power this portable since gasoline.'

'Only if you can produce it.'

'We're close,' Yates insisted. 'Just the algae baths. They're the only sticking point.'

Anderson said nothing. Yates seemed to take this as encouragement. 'The fundamental concept is sound. Once the baths are producing in sufficient quantities—'

'You should have informed us when you first saw the nightshades in the markets. The Thais have been successfully growing potatoes for at least five seasons. They're obviously sitting on top of a seedbank, and yet we heard nothing from you.'

'Not my department. I do energy storage. Not production.'

Anderson snorted. 'Where are you going to get the calories to wind your fancy kink-springs if a crop fails? Blister rust is mutating every three seasons now. Recreational generippers are hacking into our designs for TotalNutrient Wheat and SoyPRO. Our last strain of HiGro Corn only beat weevil predation by sixty percent, and now we suddenly hear you're sitting on top of a genetic gold mine. People are starving—'

Yates laughed. 'Don't talk to me about saving lives. I saw what happened with the seedbank in Finland.'

'We weren't the ones who blew the vaults. No one knew the Finns were such fanatics.'

'Any fool on the street could have anticipated. Calorie companies do have a certain reputation.'

'It wasn't my operation.'

Yates laughed again. 'That's always our excuse, isn't it? The company goes in somewhere and we all stand back and wash our hands. Pretend like we weren't the ones responsible. The company pulls SoyPRO from the Burmese market, and we all stand aside, saying intellectual property disputes aren't our department. But people starve just the same.' He sucked on his cigarette, blew smoke. 'I honestly don't know how someone like you sleeps at night.'

'It's easy. I say a little prayer to Noah and Saint Francis, and thank God we're still one step ahead of blister rust.'

'That's it then? You'll shut the factory down?'

'No. Of course not. The kink-spring manufacturing will continue.'

'Oh?' Yates leaned forward, hopeful.

Anderson shrugged. 'It's a useful cover.'

The cigarette's burning tip reaches Anderson's fingers. He lets it fall into traffic. Rubs his singed thumb and index finger as Lao Gu pedals on through the clogged streets. Bangkok, City of Divine Beings, slides past.

Saffron-robed monks stroll along the sidewalks under the shade of black umbrellas. Children run in clusters, shoving and swarming, laughing and calling out to one another on their way to monastery schools. Street vendors extend arms draped with garlands of marigolds for temple offerings and hold up glinting amulets of revered monks to protect against everything from infertility to scabis mold. Food carts smoke and hiss with the scents of frying oil and fermented fish while around the ankles of their customers, the flicker-shimmer shapes of cheshires twine, yowling and hoping for scraps.

Overhead, the towers of Bangkok's old Expansion loom, robed in vines and mold, windows long ago blown out, great bones picked clean. Without air conditioning or elevators to make them habitable, they stand and blister in the sun. The black smoke of illegal dung fires wafts from their pores, marking where Malayan refugees hurriedly scald *chapatis* and boil *kopi* before the white shirts can storm the sweltering heights and beat them for their infringements.

In the center of the traffic lanes, northern refugees from the coal war prostrate themselves with hands upstretched, exquisitely polite in postures of need. Cycles and rickshaws and megodont wagons flow past them, parting like a river around boulders. The cauliflower growths of *fa' gan* fringe scar the beggars' noses and mouths. Betel nut stains blacken their teeth. Anderson reaches into his pocket and tosses cash at their feet, nodding slightly at their *wais* of thanks as he glides past.

A short while later, the whitewashed walls and alleys of the *farang* manufacturing district come into view. Warehouses and factories all packed together along with the scent of salt and rotting fish. Vendors scab along the alley lengths with bits of tarping and blankets spread above to protect them from the hammer blast of the sun. Just beyond, the dike and lock system of King Rama XII's seawall looms, holding back the weight of the blue ocean.

It's difficult not to always be aware of those high walls and the pressure of the water beyond. Difficult to think of the City of Divine Beings as anything other than a disaster waiting to happen. But the Thais are stubborn and have fought to keep their revered city of Krung Thep from drowning. With coal-burning pumps and leveed labor and a deep faith in the visionary leadership of their Chakri Dynasty, they have so far kept at bay that thing which has swallowed New York and Rangoon, Mumbai and New Orleans.

Lao Gu forges down an alley, ringing his bell impatiently at the coolie laborers who clot the artery. WeatherAll crates rock on brown backs. Logos for Chaozhou Chinese kink-springs, Matsushita anti-bacterial handlegrips, and Bo Lok ceramic water filters sway back and forth, hypnotic with shambling rhythm. Images of the Buddha's teachings and the revered Child Queen splash along the factory walls, jostling with hand-painted pictures of *muay thai* matches past.

The SpringLife factory rises over the traffic press, a high-walled fortress punctuated by huge fans turning slowly in its upper story vents. Across the *soi* a Chaozhou bicycle factory mirrors it, and between them, the barnacle accretion of jumbled street carts that always clog around the entrances of factories, selling snacks and lunches to the workers inside.

Lao Gu brakes inside the SpringLife courtyard and deposits Anderson before the factory's main doors. Anderson climbs down from the rickshaw, grabs his sack of *ngaw*, and stands for a moment, staring up at the eight-meter wide doors that facilitate megodont access. The factory ought to be renamed Yates' Folly. The man was a terrible optimist. Anderson can still hear him arguing the wonders of genehacked algae, digging through desk drawers for graphs and scrawled notes as he protested.

'You can't prejudge my work just because the Ocean Bounty project was a failure. Properly cured, the algae provides exponential improvements in torque absorption. Forget its calorie potential. Focus on the industrial applications. I can deliver the entire energy storage market to you, if you'll just give me a little more time. Try one of my demo springs at least, before you make a decision . . .'

The roar of manufacturing envelops Anderson as he enters the factory, drowning out the last despairing howl of Yates' optimism.

Megodonts groan against spindle cranks, their enormous heads hanging low, prehensile trunks scraping the ground as they tread slow circles around power spindles. The genehacked animals comprise the living heart of the factory's drive system, providing energy for conveyor lines and venting fans and manufacturing machinery. Their harnesses clank rhythmically as they strain forward. Union handlers in red and gold walk beside their charges, calling out to the beasts, switching them occasionally, encouraging the elephant-derived animals to greater labor.

On the opposite side of the factory, the production line excretes newly packaged kink-springs, sending them past Quality Assurance and on to Packaging where the springs are palletized in preparation for some theoretical time when they will be ready for export. At Anderson's arrival on the floor, workers pause in their labors and *wai*, pressing their palms together and raising them to their foreheads in a wave of respect that cascades down the line.

Banyat, his head of QA, hurries over smiling. He wais.

Anderson gives a perfunctory wai in return. 'How's quality?'

Banyat smiles. 'Dee khap. Good. Better. Come, look.' He signals up the line and Num, the day foreman, rings the warning bell that announces full line stop. Banyat motions Anderson to follow. 'Something interesting. You will be pleased.'

Anderson smiles tightly, doubting that anything Banyat says will be truly pleasing. He pulls a *ngaw* out of the bag and offers it to the QA man. 'Progress? Really?'

Banyat nods as he takes the fruit. He gives it a cursory glance and peels it. Pops the semi-translucent heart into his mouth. He shows no surprise. No special reaction. Just eats the damn thing without a second thought. Anderson grimaces. *Farang* are always the last to know about changes in the country, a fact that Hock Seng likes to point out when his paranoid mind begins to suspect that Anderson intends to fire him. Hock Seng probably already knows about this fruit as well, or will pretend when he asks.

Banyat tosses the fruit's pit into a bin of feed for the megodonts

and leads Anderson down the line. 'We fixed a problem with the cutting press,' he says.

Num rings his warning bell again and workers step back from their stations. On the third sounding of the bell, the union *mahout* tap their charges with bamboo switches and the megodonts shamble to a halt. The production line slows. At the far end of the factory, industrial kink-spring drums tick and squeal as the factory's flywheels shed power into them, the juice that will restart the line when Anderson is done inspecting.

Banyat leads Anderson down the now silent line, past more *wai*ing workers in their green and white livery, and pushes aside the palm oil polymer curtains that mark the entrance to the fining room. Here, Yates' industrial discovery is sprayed with glorious abandon, coating the kink-springs with the residue of genetic serendipity. Women and children wearing triple-filter masks look up and tear away their breathing protection to *wai* deeply to the man who feeds them. Their faces are streaked with sweat and pale powder. Only the skin around their mouths and noses remains dark where the filters have protected them.

He and Banyat pass through the far side and into the swelter of the cutting rooms. Temper lamps blaze with energy and the tide pool reek of breeding algae clogs the air. Overhead, tiered racks of drying screens reach the ceiling, smeared with streamers of generipped algae, dripping and withering and blackening into paste in the heat. The sweating line techs are stripped to nearly nothing – just shorts and tanks and protective head gear. It is a furnace, despite the rush of crank fans and generous venting systems. Sweat rolls down Anderson's neck. His shirt is instantly soaked.

Banyat points. 'Here. See.' He runs his finger along a disassembled cutting bar that lies beside the main line. Anderson kneels to inspect the surface. 'Rust,' Banyat murmurs.

'I thought we inspected for that.'

'Saltwater.' Banyat smiles uncomfortably. 'The ocean is close.'

Anderson grimaces at the dripping algae racks overhead. 'The algae tanks and drying racks don't help. Whoever thought we could just use waste heat to cure the stuff was a fool. Energy efficient my ass.'

Banyat gives another embarrassed smile, but says nothing.

'So you've replaced the cutting tools?'

'Twenty-five percent reliability now.'

'That much better?' Anderson nods perfunctorily. He signals to the tool leader and the man shouts out through the fining room to Num. The warning bell rings again and the heat presses and temper lamps begin to glow as electricity pours into the system. Anderson shies from the sudden increase in heat. The burning lamps and presses represent a carbon tax of fifteen thousand baht every time they begin to glow, a portion of the Kingdom's own global carbon budget that SpringLife pays handsomely to siphon off. Yates' manipulation of the system was ingenious, allowing the factory to use the country's carbon allocation, but the expense of the necessary bribes is still extraordinary.

The main flywheels spin up and the factory shivers as gears beneath the floor engage. The floorboards vibrate. Kinetic power sparks through the system like adrenaline, a tingling anticipation of the energy about to pour into the manufacturing line. A megodont screams protest and is lashed into silence. The whine of the flywheels rises to a howl, and then cuts off as joules gush into the drive system.

The line boss' bell rings again. Workers step forward to align the cutting tools. They're producing two-gigajoule kink-springs, and the smaller size requires extra care with the machinery. Further down the line, the spooling process begins and the cutting press

with its newly repaired precision blades rises into the air on hydraulic jacks, hissing.

'Khun, please.' Banyat motions Anderson behind a protection cage.

Num's bell rings a final time. The line grinds into gear. Anderson feels a brief thrill as the system engages. Workers crouch behind their shields. Kink-spring filament hisses out from alignment flanges and threads through a series of heated rollers. A spray of stinking reactant showers the rust-colored filament, greasing it in the slick film that will accept Yates' algae powder in an even coat.

The press slams down. Anderson's teeth ache with the crush of weight. The kink-spring wire snaps cleanly and then the severed filament is streaming through the curtains and into the fining room. Thirty seconds later it re-emerges, pale gray and dusty with the algae-derived powder. It threads into a new series of heated rollers before being tortured into its final structure, winding in on itself, torquing into a tighter and tighter curl, working against everything in its molecular structure as the spring is tightened down. A deafening shriek of tortured metal rises. Lubricants and algae residue shower from the sheathing as the spring is squeezed down, spattering workers and equipment, and then the compressed kink-spring is being whisked away to be installed in its case and sent on to OA.

A yellow LED flashes all-clear. Workers dash out from their cages to reset the press as a new stream of rust-colored metal hisses out of the bowels of the tempering rooms. Rollers chatter, running empty. Stoppered lubricant nozzles cast a fine mist into the air as they self-cleanse before the next application. The workers finish aligning the presses then duck again behind their barriers. If the system breaks, the kink-spring filament will become a high energy blade, whipping uncontrollably through the production room. Anderson has seen heads carved open like soft mangoes, the shorn