## THE CANDY MAN

as Brix, he'll even risk a week of 105-degree weather. But a rainstorm in the middle of summer? It doesn't happen here crews. For a couple extra points on the sugar register, a measure known on the vine until it reaches peak taste and only then call in his picking on the vine that the whole place feels swollen. As soon as a grape starts mutters, "and the sky decides to open up now?" It's late July, and the end. But a drought broken only for a moment by a freak summer storm. almost made peace with this dry. It would end when it was ready to valley and tries to figure out what damage the rain has done. He had which is to say the nation, wants to maximize flavor. He'll hold his fruit Pandol, who may be the most picky table grape grower in California to the lurk of mold and mildew, harvest their grapes on the early side gus rot the whole cluster in a hurry. Most table grape growers, attuned gets out of hand, the skin on a berry cracks open, and filaments of funthe microscopic, but it doesn't stay that way for very long. If moisture to ripen, it's on a fast track to perish. Trouble in a vineyard begins with harvest of table grapes has leaped into full swing. So much fruit hangs "a no-good rain," borders on the cruel. "The worst drought ever," he Jack Pandol Jr. stands in the silt of his vineyard on the east side of the

South Americans could feast on one another's grapes in their oppofinder who opened the market to Chile so that North Americans and 2010, eulogized as one of the greatest grape growers of all time, a path and his campesinos during the labor strikes and grape boycotts of the 1960s, farmed this stretch of valley for more than fifty years. He died in father, Jack, a legend of Delano for the way he went after Cesar Chaves He would curse the sky, but he knows it won't do any good. His

> une unit sulfur dust at his side. He used to tell Jack Jr., "Learn from than sulfur don't go to school all voire life." Course dirt. The old man outlasted drought, flood and pests with little ge season the island of Hvar, more than a century ago and farmed this could, on the island outlasted drought floor. His father's father, Stjepe, left the vineyards of Brusje in the seasons. His father's father, more than a continuous

Is imported flows to the east side. At age sixty-two, Pandol is a onany other growers, Jack Jr. is pumping devilish amounts of water only to keep the structure from falling into a state of disrepair. Like canal is filled with pooled water nearly up to the brim, but it's there nel from the San Joaquin River fifty miles to the north. The federal dild of the System. He's never grown a grape without the Friant-Kern nour mistakes, but don't go to school all your life." 900 feet. That's a monstrous plunge in the aquifer. "I can only afford to and it's about to go dry, too. The bowls that retrieve the water were set gore than a year ago. He drilled a third well to a depth of 1,000 feet from below the ground. The two old wells on this vineyard went dry deral project has delivered either no snowmelt or very little snow-Canal as a presence slashing across the land. During this drought, the dig deeper because I'm growing a crop with good returns," he says. "But #150 feet deep when he dug the hole two years ago, and now they're at It's been seventy years since the Central Valley Project distributed

oets are off," he tells me. These measures means a thing when a rain like this comes down. "All they apply sulfur dust and a steady dose of fungicides. But not one of when thin the leaves to allow more air to flow through the berries. gape. What's done in the name of fighting fungus isn't any more of son have to do with keeping the clusters free from mold and mildew. not for the farmer's myriad interventions. Add in the emitters of drip rand on its own is already a living, breathing place disposed to rot if gasonal drought, from May to September, to visit the valley. The vinehow much deeper?" astretch than what's done to pump up size, color and yield. Crews of litere's no fruit more bent and coddled by human hands than the table Many of the circumventions Pandol employs during the growing seaimpation, and it's about all the moisture a California grape can handle mure's candy" in this unfit ground. Every year, Pandol relies on the Adry summer is why a table grape grower can even attempt to grow

Driving in from his Bakersfield home, he could see the damage to

to weep. Mildew set in as fast as the clouds came and went. The farmen sugar when the rain cracked their skins and their sweet insides started the clouds came and went The started loss wasn't great. The Thompsons, however, were just finding their included their skins and their sweet inside were a week shy of winding up their harvest when the storm hit The the vineyards all around him. The Flames ripened early this year and

settle in on the back of his neck. He hopes it comes with a breeze." We dusted with sulfur and sprayed with fungicides." He feels the sun right after the rain and pulled off a lot of leaves. We clipped off beries the crop. But it won't be a wipeout." think we're gonna save it. We may lose twenty to twenty-five percent of "We need to get the air circulating," he says. "That's why we came in

absurd summer storm but table grape varieties that Pandol is growing species of grapes commonly found in the United States and Europe derivation. It was bred by combining the strongest traits inside a single Sweet Celebration, seedless and red, is a genetic freak of a different eastern lineage, it doesn't panic when it gets rained on. The other grape ries 30 percent more sugar than a conventional grape. With its north green and seedless, it actually goes by the name Cotton Candy and car be true. One of the varieties is a hybrid of two distinct species-East that they are like no other grapes anyone has ever eaten, and that may where his grandfather and grandmother used to live. He will tell you emerged from a test tube in a lab inside the old Delano farmhouse or Red Globes or Crimsons or any of the other usual varieties. They with water from ground and canal. These eating grapes aren't Flames ral flavors and enhance their ability to ward off fungal disease. pumping calcium into the tissues of both varieties to boost their natuthe moment they're picked. All through spring and summer, he's been introducing to these fields is the way he tends to his berries right up to bility of the table grape. The other half of the revolution that Pandol  $^{\rm is}$ Breeding, though, is only half the trick of altering the taste and dura-Coast father, West Coast mother-and tastes like cotton candy. Fat What brings me to the east side of Tulare and Kern Counties isn't an

of the most overlooked ingredients in growing good fruit. We've way in the drip irrigation system. I happen to believe that calcium is one only the lack of it but the quality. It's high in sodium. So we use calcium "The biggest problem with this vineyard is water," he explains "Not

> autrast, kicks out a grape that tastes sweet and smooth on the tongue. believest, but it kills the flavor of a grape in California. Calcium, by house it blows it up with water. Nitrogen may be great for corn in nitrogen. Nitrogen pumps up the fruit to unbelievable sizes and it strengthens the cell walls so the skin doesn't break open and rot

the whole vineyard." fice. He says he more resembles the Zaninovich side of his mom's tribe, Ngun receding since he hit middle age, like his dad's did. His build isn't though who knows what a full-blooded Slav should look like given the guile as stocky, and he has only a hint of his old man's sweetly tough Pandol is an average-sized guy with green eyes and blond hair that's

be of them all. More than a third of the county's cropland is planted of the ground, middling at best, bristles with alfalfa, the biggest water County, where the Holsteins have more clout than people and much that have crossed Croatia for twenty-five hundred years. gow table grapes, but it can take double that to grow alfalfa. mme for each acre, each irrigation, it takes three acre-feet of water to is pretty much growing all the time, which means it is drinking all the barrested once but is mowed a half dozen times through the year, so n some kind of hay or corn to feed all those masticators. Alfalfa isn't Were standing at the not-so-pretty edge of the dairy belt in Tulare

me "very wealthy family" in Philadelphia (he won't say their name) partners in the City of Brotherly Love. himself. But on this land, he's a tenant farmer sharing the crop with ten hundred acres scattered across Tulare and Kern Counties, he owns bunderwrite the cost of \$40,000 an acre. A good chunk of his eighoutside capital himself to convert alfalfa field to vineyard. He found Coast. Soil and water being what they are, Pandol decided he needed the money is coming from hedge funds and investor pools on the East Table grapes are still being planted here, though more and more

lavorful his grapes turn out to be. trated soil like dirt. He's found over the years that the more fertile the eath—the more potent its microbial matter—the stronger and more भूबी the compost he's spread. For too long, he says, grape farmers have mizes both sun and shade. His boots sink into the earth made spongy stem he borrowed from South African grape growers because it max-He steps under the canopy of cane and leaves, a gable-roofed trellis

Since we converted this ground three years ago, I've probably spread

THE DREAMT LAND



Jack Pandol Jr. measures the sugar in his grapes

off something in the range of fifteen to eighteen hundred boxes an acre." first crop. The way it's looking, even with this rain, we're going to pull fifteen tons of compost. This is the first year we're picking grapes, our "How does that compare to the old days?"

Production. My dad was using five acre-feet of water for every acre ably averaging five to six hundred boxes of grapes an acre. We've tripled old T-trellis system, watering by furrow instead of drip, we were prob-We're using three acre-feet." "When I first got out of school, growing those old varieties with the

columnist at the Fresno Bee and then worked in the test kitchens for others. There was an art to cooking that his parents were determined to meaty Slav-style sauce to Richard Nixon and Ronald Reagan, among ing for large gatherings of people, feeding his famous mostaccioli with pass on to their kids. His older sister, Maria, became the food section had never existed before and let each cluster ripen to its fullest? Not the flavors in the vineyard. What if he could create shapes and flavors that into a fascination with how science might join art to tease out different Nestlé in Los Angeles. For Jack Jr., the family cooking gene morphed His father was a big-hearted man who loved nothing more than cook

one road for at least the last sixty years," he explains. "The way we breed 16 or 18 on the Brix sugar scale that most grapes reach but 20 to 24 Brix the time it reaches the market. What does it matter that it tastes like wet tongue but for the eye. We harvest early so the fruit doesn't go soft by fruit isn't for taste but for shipping. The way we grow fruit isn't for the Farmers in California, my family included, have been going down

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har's old-school. Foodies demand flavor. The lack of it is why so many not twice. It's why tens of thousands of acres of peaches and plums, people have stopped eating fruit, or why they buy it once a season but the consumer wants fruit that's big and colorful. But Pandol says a few berries off a vine and hands them to me. They're swollen and apricots and nectarines are being bulldozed across the valley. He yanks they're crunchy, too. But they don't taste like a supermarket grape. They grow in our backyard. Sweet but not syrupy sweet. Then another flavor, taste like the sunbaked Thompsons my father and grandfather used to colorful, like the grapes they sell at the supermarket. I bite down, and Talk to most growers and supermarket buyers, and they'll tell you

one I'm not prepared for, takes over.

lection of you walking down the midway of the county fair as a kid and we're looking for. And if that sensation on your tongue triggers a recol-He smiles and nods. "We want you to say, 'Wow.' That's the response "Wow. Those are really good."

travel the world promoting the family's grapes. In the decade since he eating cotton candy, all the better." ally on sales and must adhere to certain quality controls and acreage around the world. Growers pay him a licensing fee and a 5 percent roycally flavored varieties have been planted in the San Joaquin Valley and introduced Cotton Candy, more than fifty thousand acres of his genetiing to the growing, it's a model his father would scarcely recognize: limits to keep the market from glutting up. From field to lab to licensmy father would probably say we're returning to the old way. To flabending water to grow bent grapes. "All this genetic breeding aside, vor. We've forgotten that what brings people back to fruit is taste, the The salesmanship comes second nature to a son whose dad used to memory of taste.

and got to chatting with some of the growers drinking coffee and eatago when I walked into a Perko's diner in Delano early one morning I first heard about "Junior's" experiments on the farm twenty-five years men who had been putting grapes in the Delano soil since 1924, when ing eggs and cantaloupe. Sons of the desert, they were descended from by himself with a team of mules and founded Columbine Vineyards Marin Caratan, a Slav from that same village of Hvar, leveled 160 acres Soon followed the other clans: Zaninovich, Jakovich, Radovich, Kova

grape strike. "The rightness or wrongness of the strike is something! come to Delano in the summer of 1966 to tell the story of the California our place to take sides," he told writer John Gregory Dunne, who had Mary's, had to declare himself neutral. "We've taken a stand that it's not Chavez and his strikers, Father James Dillon, the parish priest at St. Filipino farmhands. Even as big-city monsignors marched alongside two, dividing east side from west side, growers from their Mexican and can't answer. I think it's an economic issue. It's not a moral issue? the farmworker movement here in the fall of 1965, it tore Delano in Church and exercised such influence that when Cesar Chavez launched Tudor. They filled the pews and collection plates at St. Mary's Catholic cavich, Pandol, Pavich, Caric, Divizich, Dulcich, Bozanich, Buksa and collection plates at St. Manager

would have been, and this caginess had been passed down from father boycotts had left them more scarred and distrustful than they naturally wounds of that battle were still evident in their pose. The strikes and pass by since Delano became one of America's civil rights datelines. The Sitting in the Perko's in 1993, the growers had seen a quarter century St. Mary's for Mass. He drove ten miles east of town to a little Catholic parish of brown-skinned men and women who worked in the field, church in tiny Richgrove where, paradoxically, he worshipped with a holy equivocation. On Sundays, he no longer drove in the direction of Jack Pandol Sr. had a difficult time kneeling in the presence of such

cations were among the few things predictable about farming. Who week—was simple and easy. In the face of nature's caprice, the appli-Farming by chemical calendar—herbicide this week, miticide next had brought higher yields, higher profits and lower supermarket prices idled after the Second World War. For half a century, these chemicals cides and nitrogen fertilizers, by-products of chemical weapons labs growth of valley agriculture more than the rise of insecticides, herbimy thesis: Next to siphoning the rivers, nothing had accounted for the seemed to be all ears—no cell phones glued on back then—as I shared superspecies impervious to the assaults. Where would it end? They arsenal of petrochemicals, and the bugs were responding by creating to out-trick each other. Growers were manipulating an ever-wider the vineyards about how man and nature were going to greater length I told them I was looking to write a different story, one from inside

Use of cared to know, that these same chemicals were poisoning our

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sized berry full of color. These grapes tasted even better. grapes was hanging on the vine. The Pandols had always grown a goodand lacewings, the good bugs, were devouring the bad bugs. A load of paid a visit to the Pandol vineyards to take a look for himself. Spiders turkey shit, they figured, had gotten to his brain. Then each one of them around the table wrote Junior off as a little goofy. The hippies and the md stick their hands in the 140-degree heat to feel its life. The growers was even insisting that his office workers drive to the piles of compost bown as Amigo Bob. As part of their communing with the soil, Junior side was a ponytailed guru dressed in shorts, a T-shirt and sandals nide use by 70 percent and switched from synthetic fertilizers to difexperiment. On three thousand acres of vines, the Pandols slashed pesat the ag school at UC Davis, had talked his dad and uncles into a crazy unior was fermenting ten thousand tons of high-grade stuff. At his frent blends of compost. On forty acres east of their packing plant, Bothers that mystified them. Jack Jr., the middle son, the one educated business. But beginning in the late 1980s, a change had come to Pandol To save on costs, they even bought their own chemical-distribution empire ("Three Brothers" was their label) on the trigger of a spray rig. structure brothers, Matt and Steve. They had built their table grape grident devotee of chemical farming than Jack Pandol Sr. and his two dinking water and polluting our air? They nodded their heads in consent. No grower had been a more

to catch up. lew days longer," he'd calmly reply. "Let's give the good insects a chance panic. "We need to roll out the spray rigs," they'd tell him. "Let's wait a Whenever the counts of bad pests in the fields climbed, they began to great deal of persuasion to get them to agree to go "sustainable," he said not to say anything that might upset his dad and uncles. It had taken a and though he was now married and a young father, he was still careful meet Jack Jr. He had lived at home until he was almost thirty years old And with that introduction, I drove out in the late summer of 1993 to

ourse, farming this way was a pain in the ass. When Junior unwisely <sup>Il was a</sup> throwback to Grandpa Stjepe. Healthy soil high in organic matter produced a healthy vine that warded off pests and disease. Of The rationale behind the conversion was deceptively simple. In fact,

the way you learn," he said. As we stood in the middle of his compost took three chemical applications to wipe out the infestation. "But that's leave stood in the middle of his sharing it with my nose. "It smells like good, rich garden soil." cut back on one critical soil supplement, the vines got hit with mites h ful of humus to his nose, "It doesn't smell like manure at all," he said, he said yard, row after row of black mounds baking in the sun, he lifted a hand.

and uncles had abandoned sustainable farming and decided to split up two young children moved to Sacramento, where he spent the next ist. But sharing a farmer's perspective inside the state capitol was an and join the staff as undersecretary of the agency? He wasn't a politi ronmental Protection Agency. Would he like to come up to Sacramenio the front page of the Los Angeles Times in the summer of 1993. A few the operation. three years at CalEPA. By the time he returned to Bakersfield, his father opportunity he couldn't pass up. He and his wife, Carolyn, and their cian or a bureaucrat. He wasn't even sure he was an environmental days later, Jack Jr. got a call from the secretary of the California Envi My story about the Pandols jumping off the chemical treadmill ran on

ply, bunches ripened to full flavor. went into the vineyard and picked grapes from his personal home suptennis. When it was the Pandols' turn to supply the team snacks, lack At the time, his son and daughter were playing junior league soccer and said. "Got to get them bigger because that's what the consumers want? more water, more citric acid, more nitrogen fertilizer to get that size," he Crimsons with an emphasis on yield, size and color. "I was pumping ily habit. He began growing the usual Red Globes, Autumn Royals and On 320 acres he had bought on his own, Jack Jr. returned to the fam

People really care about taste. I had been indoctrinated so far in the vor. And that's when the lightbulb started to go on. Taste is important. fresh. I picked it this morning,' But they're telling me, 'No, it's the fladoesn't taste like this?' At first I'm tone-deaf. I'm saying, 'You know, it's grapes are so good. How come the stuff we buy in the grocery store These kids and their parents start walking up to me. 'Wow, these

and a top breeder to build a lab and develop a program. He teamed up pushed flavor in a novel direction. He went looking for local investors other direction, I forgot the basic ingredient." He decided to start from scratch and create new varieties that

> had name Flavor Promise, he was picking the first varieties of Sweet pudol grew the most promising offspring. Five years later, under the Bills of small test plots outside Delano and Arvin, and sentially unique. On small test plots outside Delano and Arvin, and sentially unique of small test plots outside Delano and Arvin, and sentially unique. Rube spring of 2001, Cain had developed thousands of crosses, each breders in the country, and formed International Fruit Genetics. Sunridge Nurseries and David Cain, one of the most innovative opentional grape, only far better. "It was more than sweet," he said. withdet a black seedless grape that ripened early and tasted like a

ble a chance on the grapes. Pandol labeled his bags the way vintners surrenders at each of its markets. Within three weeks, they were ame to the Flavor Promise pledge and provided his e-mail address so tot grapes you're ever gonna eat. Tell us what you think." He signed his be their bottles of wine. The tag told a small story: "These are the "I was sweet plus flavor." hwe find flavors never delivered by a grape before?" ing here. And that's when our breeding started to get creative. How het minds," Pandol said. "It blew our minds. 'Hey, we've got somendering full loads, running through fourteen boxes a day. "It blew assumers could respond. The chain agreed to take two boxes a day of His marketing wiz persuaded a small grocery chain in San Diego to

part permillion" is how the table grape grower describes his life. at them from the bottom of a clamshell box. "I deal in low badly they screwed up for another ninety days, when their mismate, is enough to change everything. Problem is, they won't know their gib coverage, one drop too heavy or too light, one day too soon or and each berry. To replace the seed's function, grape growers apply numer. Gibbing, they call it. They swear that a single small error in gowth hormone—in a series of methodical sprayings from spring to synthetic form of gibberellin—agriculture's version of the human pherellic acid that naturally thinned every bunch and sized and colattic family of grapes. Without the seed, the vine no longer produced man't the first time man messed with the genus Vitis, they castrated an kt. When breeders decided to remove the seed from the berry, which and an inordinate amount of their days trying to make up for this gowers in California, a fraternity of stressed and punctilious men, The problem with seedless grapes is they have no seeds. Table grape

The absence of seeds forces breeders such as Cain to reach across

grape is actually a fake. Rather than being completely barren, the grape grape of developments of developments. both male and female parts that allow for self-fertilization. A seedled vines, cultivated grapevines carry "perfect flowers," meaning they have different species of grapes to develop new varieties. Unlike wild grape small our teeth and tongues don't notice them. Through seeds, each hides tiny seeds that get arrested at an early stage of development, so and reaches peak production between the ages of five and twenty year, Most grapevines grown in California and Europe belong to the species berry conveys traits from both mother and father to its own off pring. games, crossing a Cabernet Franc with a Sauvignon Blanc, for instance infinite variations. This allows a breeder to play all sorts of fun genetic Plenty of recessive genes exist in the family to endow the children with Vitis vinifera, a hardy type that produces a single crop of fruit each year

half apricot) and the eponymous Russet Burbank potato. when he bred the Santa Rosa plum, Elberta peach, plumcot (half plum culture, wonder exactly what he set in motion more than a century ago cue, that might make Luther Burbank, the father of California hortitechniques known in the trade as hand emasculation and embryo resthat can be almost exotic? This requires a different scale of rending Northeast with large seeds and tough skins but also flavors and aromas species? Say a Concord grape from Vitis labrusca, a clan native to the to reach outside the species and hunt in the gene pool of a different with a hint of vanilla? What if the only way to steal such properties is job of resisting drought or mildew or, daresay, tastes like spun sugar What if the goal, however, is to create a table grape that does a better

curious visitor might interrupt his test trials. People regarded the horshort-brimmed top hat while at work, because he never knew when a and an emaciated body. Twice married, he produced no offspring of his own. A dignified man, he dressed in a black wool suit, bolo tie and was an odd strain himself. He stood five foot three with a long face ing agriculture across California than the railroad and irrigation. He millions of plants at any one time-proved no less a factor in spreadacre spread of gopher-riddled land. The genetic tampering that took place there—he had as many as three thousand experiments involving brother out to California and set up shop in Sebastopol on a fifteen An amateur nurseryman from Massachusetts, Burbank followed his

of and hybridization, he created many of and hybridization, he created more than eight hundred watched his and watched half Darwin, half Edison, and he became known far and half Darwin, half Edison, and he became known far and half Darwin, half Edison, and he became known far and the state's largest growers, who often made fortunes and shalon return. stand varieties of plants and watched his seeds and cuttings get

are him little in return. mulked Congress into allowing plant materials to be patented. In his the forest dealed on its own. He died in 1926, four years before Edi-Skill separate what Burbank had done to it from the genetic havoc purish boasted so many extra copies of genes that it was imposthe proposition that California's botanical diversity, which allowed for playful inventions as his freestone peach and white blackberry, allumial text New Creations in Fruits and Flowers, Burbank advanced different climates, altitudes, moisture conditions and growing as function of plants adapting to take advantage of the region's "so Burbank spent seventeen years perfecting a single flower, the Shasta

the witard. In Burbank's spirit, Cain first sought to enliven the Vitis theracly pushing the envelope of genetic prodding degrees beyond pute New York, Massachusetts and the Mississippi Valley. He was mijim grape in 2003 when he crossed it with a species native to and who were implanting a flounder gene into a tomato so it could like all modern horticultural breeders, Cain owed no small debt to ad splicing genes, was not where Cain was headed. kur handle cold weather. Genetic engineering, the science of cutting whunks manipulations, though not quite as far as scientists in Oak-

and Arkansas, in Fayetteville, where the resident fruit breeder had mofthepistil, without a sex partner. Cain then introduced the pollen pulled its male parts off the flowers. This emasculation left its ovary, Manus and chose grains of pollen with Concord grape lineage (think Wwind Muscat. For its mate, he combed through the storehouse in Cultural, a lat green berry with a nice crunch and the faint flavor of hew who his female was going to be. She was a Princess grape from ken collecting different hybrids and species of grapes since 1964. Cain America. He waited for the spring blooming of the Princess vine and ilda's juice) plus five different wild species indigenous to North Is create his Cotton Candy berry, Cain reached out to the Univer-

shipped out from Arkansas—horticulture's version of a stud. The mailen applied with an artist's bruck. ing of the two, a dab of pollen applied with an artist's brush, produced

them—into containers of potting soil and stuck them in a greenhouse winter, Cain and his crew pressed each spindly plant-ten thousand of long, with hairy roots on one end and faint leaves on the other. That six weeks of feeding and stretching, the babies measured three inches rous and magnesium. Sealed shut, it became an artificial womb After test tube filled with solutions of sugar, nitrogen, potassium, phosphoan embryo containing the combined DNA of its mother and fathg months, until they grew into a kind of callus. Inside each callus rested into petri dishes filled with seaweed extract and let them sit for ling Cain and his crew then delicately transferred each embryo into a sterile excised the seeds that were the premature babies. He placed the seeds that were the premature babies and let the seeds the seeds that were the premature babies. With scalpel, tweezers and microscope, Cain cut into the tissue and the tissue an

a chance to produce real grapes in a real vineyard. The ordinary ones grandparents had lived. It took a year or two, first leaf to second leaf, for from the mundane. The special ones, like Cotton Candy, were given the vines to produce enough fruit to distinguish the promising crosses transplanted into real dirt on the eighty-acre vineyard where Pandol's pletely unique in its own right. The vines were now big enough to be or sister to the other, shared the same mixed lineage and yet was com-By spring, each one had turned into a distinct vine. Each one, brother

ance. You need acid to stop the sweetness from sitting heavy on the grapes that are either red or black. Of course, one of the main things traces of seed, with a nice crunch," Cain explains from inside the lab we're now aiming for is flavor that dazzles. A good sugar-to-acid bal-"The supermarkets don't like grapes that are reddish black. They want "We're looking for thin but strong skins, hardy color, no discernible

would react to it. One of the workers took some bunches home to his vine 221, he recalls, when it began to fruit in 2005. He popped the hist ing it was burnt sugar, a caramel flavor. I wasn't sure how other people wasn't looking to create a grape that tasted like cotton candy. I kept say. ripe berry into his mouth and wasn't sure what to make of the flavor. "I Cotton Candy was standing in the middle of the test plot, row 48.

and his kids loved it. They said it tasted like cotton candy. That in the same and a description as any."

aunded as good a description as any."

| hop | line are so fantastic they'll never go commercial. Here, a grape the crosses are so fantastic they'll never go commercial. Here, a grape used pinkie finger, dimple on its blunt end, is finding its last color and the current Sapphire, a black seedless variety that looks like an ampualled Sweet Sapphire on its blunt and is find in finding. I hop into Pandol's Toyota 4Runner and we land in a vineyard where

won't harvest for another week or so. They'll easily get to twenty-These are probably nineteen Brix. They're plenty good already. But

for even a novelty grape. The more he kept popping the berries into his one Brix without losing any of their crunch." mouth, though, the more the flavor won him over. and dismissed it as a gimmick. The shape struck him as too grotesque Hed been watching Sweet Sapphire grow in a test plot for two years

md we get big yields. And it's a tough grape. It travels well." most defining thing about the fruit, its shape. "It's really easy to grow, black grape they were referring to. None of them, oddly, mentioned the agape," he says. "But it has a lot of flavor still." After that first harvest Bonda, singing the praises of "the black grape." He didn't know which of Sweet Sapphire, Pandol received several e-mails from customers in "It's not like Cotton Candy. When you eat it, you know you're eating

Strange. Where does this elongation come from?" I pluck off a berry and roll it between my thumb and index finger.

"A gene from the Middle East."

time dialing back. "That's a good grape." Igive it a bite. With Cotton Candy in my head, my tongue has a hard

40,000 acres to 900,000 acres. Back then, 10 percent of the farmland whe present, the irrigated cropland in Kern County has jumped from errupted vineyards, orchards and fields. From my grandfather's arrival south in the raisin glut of 1922. We are greeted by an expanse of uninof 1920 to work for Villa Kerkorian, the big shot who grew Thompson ardless grapes on ranches up and down the valley before it all went in America began, where his uncle dropped him off in the summer vineyard near Weedpatch. This is where my own grandfather's story We head seventy miles south across the Kern County line to his "In another week," he vows, "that will be a very good grape."

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The test tube grape called Sweet Sapphire

was planted to permanent crops. It's now Pandol, drought stopped being a reason to fallow farmland.

We cross a vineyard that looks more perfect than the others. "Who owns that?" I ask. "Deseret," he says. "The Mormon Church." I can't tell you how many Mormon acres. "I've crossed in this drought," I say.
"I had a Mormon classmate in

"I had a Mormon classmate in college. He told me, 'We have a problem every Sunday. We tithe. What to do with all that money? So we buy, buy, buy,' It makes it hard for the

regular farmer to compete. That's why I went to Philadelphia to find investors."

Half the farmers in the valley are being proposed in his

Half the farmers in the valley are being propped up by outside dollars, so no shame there. While the national media fixates on the woes of a parched California, farmers are teaming up with hedge funds and pension groups looking to make 20 and 30 percent on their money. Good luck getting it. They'll be lucky to clear 5 or 10 percent. But that's not the point. The investors are here in the first place, betting on California, because of the insane magnificence of our hydraulic system.

"It's magnificent until it isn't," Pandol says. He recalls his reading of Genesis, how Joseph had a vision that there would be seven years of drought, seven years of dearth. This gave him seven years to prepare for the hard times. He filled the granaries of Egypt with so much wheat it was like the sand of the sea. The seven years of famine came true but not in the land of Joseph's Egypt.

"We have a prophecy, too," he says. "It's called history. We've always had droughts and always will. But we pretend it's not going to happen again."

He then makes a concession that maybe only a Kern farmer who's also been undersecretary of the California EPA would make: "Across this whole southern valley, we've planted fencepost to fencepost. And there's just not enough groundwater to keep it all going."

The diverters of the Kern River had never gotten together and portioned out the water supply like they did next door in the Kings River

bisin. Instead, for the past half century, the development of Kern agriculture was allowed to outstrip the groundwater supply, and not by a culture was allowed to finds itself in a forever state of overdraft. In the Today, Kern County finds itself in a forever state of overdraft, the unsustainable pumping is near one million acre-feet. Some years, the unsustainable pumping regulate groundwater and limit some years, the need to finally regulate groundwater and limit some production of the pumping to levels that are considered "safe yields." But he's worried that pumping to levels that are considered "safe yields." But he's worried that pumping to levels that are considered the fallowing of farmland will find once the new law goes into effect, the fallowing of farmland will find

that can't be grown anywhere else but here. Is that not worth saving?" in California. And more than half of those acres are planted to crops and what it takes to do it. We've got eight to nine million irrigated acres guidenly sounding like his father. "They don't know what we do here can secure themselves a more ample "sustainable" supply in the future. vice areas" to establish a record of pumping. This way, before the teeth er ground inside the same area. By inflating their demands now, they of the law bite down, they can transfer that "historical use" to their betinstalling wells on third-rate land inside proposed "groundwater sermine the law, which it's actively trying to do. Some big farmers are dled in Kern County alone unless agriculture can find a way to underno end. field is citing a figure of 300,000 to 400,000 acres that will have to be that will have to be fallowed to achieve a sustainable aquifer," he says. "The enviros could really give a rat's behind about us," Pandol says. I don't tell him that the head honcho at the water agency in Bakers-You're talking about hundreds of thousands of acres in the valley

We pull into his vineyard outside Lamont, where a crew of farmworkers, each one a veiled secret, are picking a seeded black grape called swet Jubilee. Sam's Club won't be ordering these. Neither will any of the other U.S. buyers who happily compete for Pandol's seedless varieties. The Sweet Jubilees are headed to Asia and Mexico, where people motonly don't mind seeds in their grapes but prefer to chew them.

Pandol had hoped to give the bunches more time on the vine, to catch their full flavor. He now sees that the rain fell heavier on Lamont, so he's not sure how far the Sweet Jubilee can travel without succumbing to mold. He's going to send some berries back to the lab, where they'll be crushed inside a sterile petri jar and allowed to incubate for the days.

in cold storage and shipping. That'll determine whether we sell these grapes to Mexico or if they can make the longer haul to Asja," "The level of mold in the jar will tell us how long the grape will last

a petite twenty-one-year-old blonde, the child of Jewish Communisty Giorgio in February 1951. He had managed to fight off every attempt to in a campaign every bit as ugly. When their field hands voted to gio's four nephews took over the operation and fought Cesar Chave the summer of 1933, the largest strike in California history. Di Gior. from New York, who had led six thousand field hands off the job in unionize his farmworkers, including the one led by Caroline Decker, find any Di Giorgios there. The old man died in his pajamas at Casa Di join the UFW in 1967, the Di Giorgios, half out of spite, transformed vegetable juices and a wholesaler of Italian specialty meats. They fled their fresh fruit company into a canner and distributor of fruit and farming, fled Arvin, blaming Chavez, the Catholic archbishops and the 160-acre law. Just a dirt clod's throw beyond us sits the town of Arvin. You won!

graduation," he recalls. "My sophomore year the Brown Berets drove in dent body president, and Maria Pandol was vice president. "Freddy got divided white from brown. Freddy Chavez, Cesar's nephew, was studivision when the bad blood spilled over to his classmates. Protests from who knows where and came on campus. It was pretty scary? kicked out for protesting, and my sister ended up giving the speech at Jack Jr. was a sophomore at Delano High wrestling in the 138-pound

their cold storage shed went up in flames. Their father knew damn well truck when the truck caught fire, too, and burned his hands. That night boxes used to pack the fruit. Jim was trying to take the boxes off the boycott by six months members, detailed plans of union actions—set back the national grape financial records, lists of contributors, names and addresses of UFW mode. He armed his two boys with shotguns and a spotlight and told the jungles of the Philippines during World War II went into full battle the union was behind it. The old soldier who'd fought the Japanese in break into the UFW's offices at Forty Acres. The files the man filched-Santa Clara County sheriff's deputy and Republican Party activist to them to patrol the ranch in the pickup truck. Then he hired a former Jim when picketers pelted them with rocks and set afire the Styrofoam One day Jack Jr. was out in the field swamping grapes with his brother

> Conditions. And the wages could have been higher. There wasn't a los conditions. The farmworker had no power" The part of the other hand, we weren't always providing the best work-Williame. "It wasn't slavery all over again. It wasn't Jim What the news media printed, what the public believed, was not

nowbar he used on "The Day the Growers Stood the Line." bother Steve go. In his office, he erected an exhibit to show off the delind refused to attend the contract signing. He made his younger beamis, hippies and yippies, Marxists and the Leninists for his Un wers signed contracts with the UFW. Jack Pandol Sr. blamed numberbalance. The farmworker had no power." On a summer day in 1970, the Pandols and twenty-seven other

The day your dad signed the contract... Talk about Grapes of

ared about the workers." mewal. They disappeared. That's how much the United Farm Workers was a Communist, and he hated nothing more than a Commie. After we signed that three-year contract, the union never organized to get a "My dad hated Cesar Chavez until his dying day. He thought Chavez

which manipulation, if any, is responsible for a flavor evolving in the the factors can be manipulated," he says. "The trick is to determine that he's got a sommelier's degree on top of everything else. "Each of allow Cain's genetic crosses to achieve their optimum flavors. It helps aut what practices in the field—irrigation, pruning, micronutrients— He come to the valley to do postdoc work at Fresno State and figure win Shanghai and earned his doctorate in viticulture at Ohio State. graning shears draped over his shoulder. He's Dr. Yi Zhang, who grew nutle a few rows away and out jumps a young Chinese man with a all in his thirties, when farmland sold for \$2,500 an acre. There's a Delano and McFarland. He bought this 160-acre ranch when he was Kithe end of the day, and we're sampling grapes on his test plot between

Tho soft to pack and ship, but I'm hoping we can salvage the taste by ackenosing it into a grape with more durability." and day long. "Fabulous, huh? That's twenty-five or twenty-six Brix. a Wily Wonka. "This one will really blow your mind," he says, tossing mea black grape that feels a little soft but tastes like something I can He watches as Pandol and I grab flavors from the vines like the kids

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He tosses me another. "I call it the Lollipop grape. It tastes like a kid's

too thin-skinned to go commercial. The minute it gets ripe, it splits and turns into a rotten mess. But I keep it here because I just love eating it. "When you breathe out, it's almost like perfume on your breath, it's "You can really tell the Concord in it, that's for sure," I say.

white industrial complex skirted by vines and palm trees. Workers are ley dust suspended in the air. We arrive back at his headquarters, a big stay in cold storage. He throws a couple bags of Cotton Candy into my stacking boxes of warm berries onto pallets and tying them down for a backseat and tells me to enjoy them. I tell him my acceptance of his gift counts as a crime of journalistic ethics, and he laughs in my face. We climb into his 4Runner and carve a path through layers of val.

man. I ponder Luther Burbank laid to rest under the big cedar of Lebanow doing to fruit what it has already done to soil, river, aquifer and black walnut with the English walnut and created the Paradox walnut only for the cedar to die of root rot. He had once crossed the  $\mathsf{California}$ non at the Luther Burbank Home & Gardens in downtown Santa Rosa, a true freak. So much vegetative growth weighed down its sprawling and limbs that dwarfed every other walnut tree. The Paradox soared out walnuts with thinner shells and bigger kernels but with branches which seemed not to know where to put its catapult energies. It threw arms that they had to be propped up with metal crutches. The Paradox in its youth to sixty feet tall with a trunk that measured two feet wide, den, a brittle giant with gorgeous gnarls and sweeps that can't stop itself that the wizard planted in 1914 still graces the grounds of his old garand disease-resistant rootstock that more fecund varieties of walnuts a wood too porous. What the Paradox finally became was a vigorous for furniture, only to discover that its rapid cellular growth produced to be a prolific producer of nuts, he thought it might make fine wood from growing. Once Burbank realized that his Paradox was never going could be grafted onto. The Paradox is still grown commercially today, I leave Delano in the throes of harvest, wondering if agriculture is but it's hardly the same walnut tree that Burbank bred. A century of At the same time, generations of breeders have continued their tinkergenetic mutations have appeared spontaneously in various orchards torever splintered the Paradox's chromosomal makeup. ing of Burbank's tinkering in the lab. Together, nature and science have

> the line between the two, he isn't precisely sure where to draw it. fuit isn't candy, he knows, nor should it try to be. But while he respects then fruit turns around and does the same, it can be a slippery slope. that candy has been stealing flavors from fruit since candy began, and But each harvest season, as Pandol samples his fruit and gains five alls sugar, delivers healthy phenols for the heart. He reminds himself muds he comforts himself with the knowledge that fresh fruit, for nunt meth and opioids, are the two great robbers of life in this valarea thought to its implications. Obesity and diabetes, if you don't telefthat the pursuit alone is cleansing. This is not to say that he hasn't ad intelligence boys in Silicon Valley moving forward in theirs, with a pulle precision when he tailors his next generation of flavored grapes. Is using science to create new tastes that obliterate memory. for Com Drops, Brix 26. He isn't taking taste back to memory, they'll be Com props, science to create new tastes that helical and the control of the control willy of molecular science to single out these markers will guarantee of extra yield or that citrusy flavor on the back end. He believes the mesing given cultivar express the traits of mildew resistance or the now hired a molecular geneticist out of Cornell to identify exactly squares andy? I expect the obesity police will soon be on the prowl for mons. Brix 26. He isn't taking taste hack to but confectives to sugar before they become not "nature's candy" but confectives to sugar before the obesity police will soon be How wand sprinkle it with dew? How much more can he push the sunrise and sprinkle it with dew? How much more can he push As he powers forward in his vision, he seems not unlike the artifi-How fancy can the table grape get? How far can Jack Pandol Jr. take

been crossed. μρφ another and another. The line, my tongue tells me, already has fgapes, yank a Cotton Candy off the stem and pop it into my mouth As lapproach a stinky dairy outside McFarland, I reach into the bag