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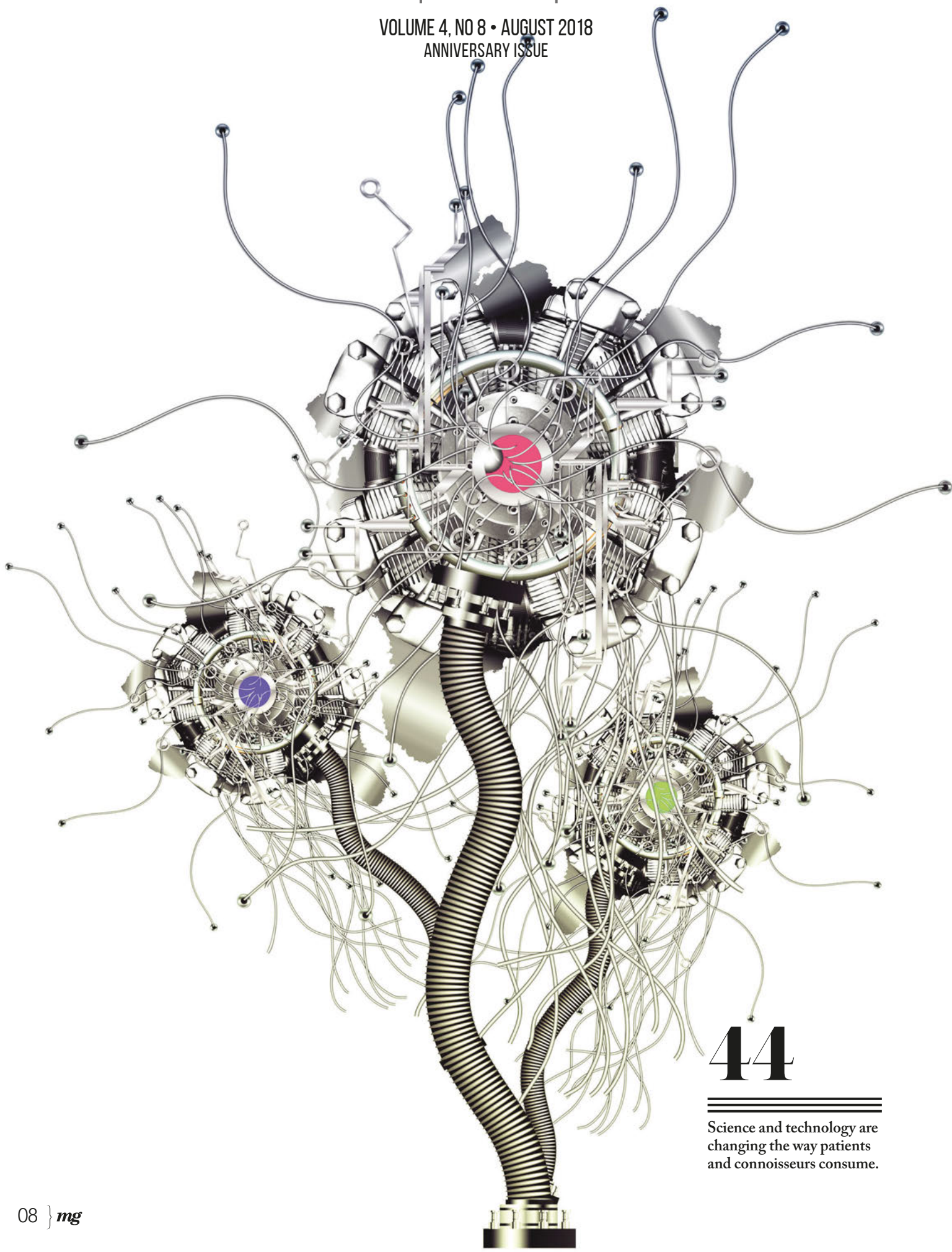
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SCHUMER'S QUIET GAMBIT

AS PROMISED, Senator Chuck Schumer (D-NY) authored wide-ranging legislation that federally decriminalizes cannabis by removing it from the Controlled Substances Act. The bill was filed quietly on a Wednesday morning in late June with barely a ripple of notice from a mainstream press focused on the Senate Minority Leader's public takedown of Rep. Maxine Waters after she said people should confront Trump Administration cabinet members. But the mainstream media may want to pay close attention to this bill, representing as it does Schumer's clever gambit to bring about a situation where, against all odds, the bill succeeds in gaining the bipartisan support it needs to make it to the president's desk, where it will be signed into law.

Ostensibly promoted by Schumer as supporting states' rights and promoting opportunity for communities impacted by the War on Pot, the bill contains elements that could make it too delectable a treat for Congress and the president to pass up. First, Section 2(b) removes all import and export prohibitions, making the United States the immediate equal of Canada with respect to cannabis trade worldwide. Second, descheduling cannabis completely opens banking to the industry, unleashing a potential tidal wave of economic growth.

The first element sticks it to Canadian Prime Minister Justin Trudeau; the second sticks it to Trump's cannabis-hating attorney general, Jeff Sessions. Both men are on the president's shit list. Therefore, using the proven calculus that payback as the foundation for a Trump decision will win out and this congress will faithfully tow the line, Schumer's gambit has a good shot at succeeding.

Tom Hymes
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CORRECTIONS: "On Point" in the June issue misstated the physical address for Seven Point. The correct address is 1132 Lake Street, Oak Park, Illinois 60301. Additionally, the article indicated the legal age for cannabis consumption in Illinois is 21. In fact, the state has set no minimum legal age.

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ALL THE NEWS THAT'S FIT TO SMOKE

DEA WON'T PROHIBIT USE, SALE OF CANNABIS STEMS, SEEDS

WASHINGTON D.C. — The Drug Enforcement Agency issued an internal directive acknowledging some cannabis products are not prohibited under the Controlled Substances Act and use of specific parts of cannabis plants is not prohibited under current policy.

According to the directive, the DEA's enforcement policy is consistent with a 2004 decision handed down by the U.S. Ninth Circuit Court of Appeals in *Hemp Industries Association v. DEA*. The directive stated, "Products and materials that are made from the cannabis plant and which fall outside the CSA definition of marijuana (such as sterilized seeds, oil or cake made from the seeds, and mature stalks) are not controlled under the CSA. Such products may accordingly be sold and otherwise distributed throughout the United States without restriction under the CSA or its implementing regulations. The mere presence of cannabinoids is not itself dispositive as to whether a substance is within the scope of the CSA; the dispositive question is whether the substance falls within the CSA definition of marijuana."

The directive did not change the DEA's policy toward cannabis extracts and resin, which are explicitly prohibited. However, "any other compound, manufacture, salt, derivative, mixture, or preparation" created from the named plant parts is not prohibited, the directive noted, adding products produced from non-prohibited ingredients may be sold in the U.S. as long as they contain no THC. The directive did not directly address hemp or hemp-based products.

Despite the DEA's clarification, all is not rosy, as attorneys Justin E. Hobson and Lewis M. Horowitz pointed out on law firm Lane & Powell's The Pipeline Blog. "The logical and scientific inconsistency puts the DEA and purveyors of CBD goods in a precarious position," the pair wrote. "How will they determine which CBD products are subject to the CSA, and will people really be prosecuted for trafficking a Schedule I controlled substance where the substance is chemically indistinguishable from one that is not prohibited by the CSA?"

"We anticipate that at least one outcome will be buyers insisting on statements or warranties from sellers and buyer quality-control due diligence that their CBD products contain only excepted marihuana [sic] oil," they added.

77%

of flower sales are packages smaller than an eighth.
(Source: Headset)



O, CANNABIS! CANADA LEGALIZES RECREATIONAL USE NATIONWIDE



OTTAWA, Ontario —

Canada became the second country to legalize recreational cannabis use nationwide when the Canadian Senate passed Bill C-45, otherwise known as the Cannabis Act. The government expects sales to begin October 17.

New regulations will permit Canadians age 18 and older to possess up to thirty grams of cannabis. Adults also will be allowed to cultivate as many as four plants and create their own edibles.

Legalizing cannabis was a major part of Prime Minister Justin Trudeau's 2015 campaign. Trudeau has admitted to past cannabis use but has cited other reasons for seeking legalization. On the campaign trail, he said regulation could help keep cannabis out of the hands of minors and would cripple the black market.

Recreational cannabis use has been legal nationwide in Uruguay since 2013. In the U.S., nine states and the District of Columbia have legalized recreational weed. Thirty U.S. states allow medical use.



HICKENLOOPER THROWS CANNABIS ADVOCATES FOR A LOOP

DENVER — In what turned out to be two really bad days for cannabis businesses and advocates, Colorado Governor John Hickenlooper vetoed three legislative bills that would have increased access for patients and created greater freedoms for the industry.

On a Monday in mid-June, the governor, a Democrat, vetoed a bill that would have allowed cannabis “tasting rooms” in Colorado dispensaries. On Tuesday, he vetoed legislation that would have added autism to the list of conditions eligible for medical cannabis oil treatment. That same day, he vetoed a second bill

that would have repealed business restrictions including background checks on investors, limits on the number of out-of-state owners, and prohibition of publicly traded entities holding state licenses.

On the positive side, in the same week Hickenlooper signed legislation allowing school personnel to administer medical cannabis to qualified students and placed his John Hancock on a letter of support for the federal STATES Act, introduced by senators Elizabeth Warren (D-MA) and Cory Gardner (R-CO), which would give states cannabis autonomy.

CONGRESSIONAL COMMITTEE DECLINES TO PROTECT CANNABIS BANKS



WASHINGTON, D.C. — A congressional committee declined to amend federal banking rules to prevent to the U.S Department of the Treasury from “penalize[ing] a financial institution solely because the institution provides financial services to an entity that is a manufacturer, producer, or a person that participates in any business or organized activity that involves handling marijuana or marijuana products,” even if the entities and products comply with state and local law.

The amendment, proposed by Rep. David Joyce (R-OH), could have fixed a major problem in the cannabis industry. Without access to banks, dispensaries are forced to operate with cash only. Often, the cash is kept on-site, making shops a prime target for criminals. The issue is “not whether or not one approves of marijuana,” Joyce said. “This is about public safety and financial transparency.”

The Fraternal Order of Police opposed the amendment, saying “public safety is threatened by the growing use of marijuana nationwide.”

SCHUMER INTRODUCES BILL TO DECRIMINALIZE WEED AT FEDERAL LEVEL

WASHINGTON, D.C., — Senate Democratic Leader Chuck Schumer (D-NY) in late June introduced legislation that would remove cannabis from the list of scheduled substances under the Controlled Substances Act, thereby decriminalizing weed at the U.S. federal level. Further, the Marijuana Freedom and Opportunity Act would allow states to determine how they treat marijuana possession and use.

The bill does not, however, propose to change federal authorities’ ability to prevent trafficking from states where cannabis is legal to states where is not legal. The bill also preserves the federal government’s ability to regulate advertising, just as it does with tobacco, so advertisers cannot target children.

The proposed legislation also takes steps to help

communities that have been disproportionately affected by current marijuana laws by authorizing grant programs designed to encourage states and local governments to allow individuals to seal or expunge marijuana possession conviction records. Also included is a new funding stream to help ensure women and minority entrepreneurs have access to emerging cannabis business opportunities in their states. The bill also provides for investment in research to fully understand the effect of THC on both driving and public health, particularly in adolescents.

The Marijuana Freedom and Opportunity Act is cosponsored by Senators Bernie Sanders (I-VT), Tim Kaine (D-VA), and Tammy Duckworth (D-IL).



CULTIVATION OFFERS HIGHEST EARNING POTENTIAL FOR CANNABIS WORKERS

OTTAWA, Ontario —

The cannabis industry may be creating new jobs at a breakneck pace, but that doesn’t mean everyone is raking in the cash. According to a recent Canadian survey, the average budtender earns \$11.93 per hour, but cultivation professionals can make much more.

According to Alison McMahon, founder and CEO of Cannabis at Work, there has been a 14-percent increase in cultivation positions in Canada over the past year. Quality-control workers fetch between \$81,000 and \$103,000 per year. Both salaries are substantially higher than the average Canadian wage of \$51,000 annually.

As Canada prepares for full legalization in October, wages may climb even higher. The legal recreational market is expected to add another 150,000 jobs to the Canadian economy by the end of the year, and businesses already are jockeying for qualified applicants.



SENATE COMMITTEE APPROVES FARMING BILL THAT INCLUDES HEMP LEGISLATION

WASHINGTON, D.C. — The Senate Agricultural Committee voted 20-1 to send to the floor 2018 Farm Bill legislation that will legalize industrial hemp farming in the U.S. The lone holdout was Republican Chuck Grassley of Iowa.

The bipartisan Farm Bill, also known as the Agricultural Improvement Act of 2018, includes provisions and reforms for a broad platform of programs from farm subsidies to food stamps, crop insurance, expanded WIFI for rural communities, battling the opioid crisis,

and funding for water resource infrastructure. It also incorporates the entirety of Senate Majority Leader Mitch McConnell's formerly standalone Hemp Farming Act.

House Republicans blocked an effort to add hemp measures to their farm bill, which passed in mid-June. Since the Senate's version included hemp, however, the final combined product most likely will, as well.

The White House has said it expects a bill on the president's desk before summer's end.



FDA APPROVES FIRST CANNABIS-BASED DRUG

LONDON — Epidiolex, a cannabis-based drug for treating severe forms of epilepsy, received approval from the U.S. Food and Drug Administration in June. Developed by U.K.-based GW Pharmaceuticals, Epidiolex is the first cannabis-based medication approved by the FDA.

Epidiolex is a purified form of cannabis-derived cannabidiol (CBD) oil that contains no tetrahydrocannabinol (THC), a psychoactive compound. Presumably, FDA approval will allow conventional doctors to prescribe the new medication. However, federal prohibition of cannabis-related products, as well as state and local regulations, may present a hurdle for prescribers, especially in states that have not legalized medical cannabis.

"This is an important medical advance, but it's also important to note that this is not an approval of marijuana or all of its components," an FDA statement noted. "This is the approval of one specific CBD medication for a specific use, and it was based on well-controlled clinical trials evaluating the use of this compound in the treatment of a specific condition. Moreover, this is a purified form of CBD. It's being delivered to patients in a reliable dosage form and through a reproducible route of delivery to ensure patients derive the anticipated benefits."

44%

of all Colorado dispensary employees quit within the first year.

(Source: Headset)

63%

of Canadians expect to move their cannabis purchases to legal channels by October, when recreational sales begin nationwide.

(Source: Deloitte LLP)

33%

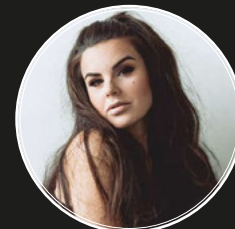
of Canadian consumers plan to purchase legal cannabis online.

(Source: Deloitte LLP)

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SENS. WARREN, GARDNER INTRODUCE STATES ACT

WASHINGTON, D.C. — U.S. Senators Elizabeth Warren (D-MA) and Cory Gardner (R-CO), along with U.S. Representatives David Joyce (R-OH) and Earl Blumenauer (D-OR), in June introduced the Strengthening the Tenth Amendment Through Entrusting States Act (STATES Act), which would “ensure each state has the right to determine for itself the best approach to marijuana within its borders.”

The bipartisan legislation would amend the Controlled Substances Act (CSA) so that its cannabis provisions are subordinate to state laws, redefine “drug trafficking” so the concept does not include state-legal transactions, and remove industrial hemp from the CSA.

The bill does not change federal criminal provisions for endangering human life while manufacturing cannabis or cannabis products. Regardless of state law, the bill prohibits the distribution of cannabis at transportation facilities such as rest areas and truck stops, non-medical cannabis sale or distribution to persons younger than 21, and cannabis-industry employment of anyone younger than 18.



U.S. SURGEON GENERAL: ‘HHS, FDA TAKE NO POSITION ON CBD OIL’

INDIANAPOLIS — Neither the U.S. Department of Health and Human Services nor the Food and Drug Administration has taken an official position on nationwide CBD legalization but “components” of the compound are under study, according to U.S. Surgeon General Jerome Adams, MD.

CBD, or cannabidiol, is one of many compounds derived from hemp and whole-plant cannabis. Unlike THC, or tetrahydrocannabinol, CBD does not produce psychoactive effects. CBD oil increasingly is used as an alternative medicinal therapy for patients suffering from cancer, epilepsy, chronic pain, and other serious medical conditions.

“We want to make sure folks understand the benefits and the dangers of any medication that is out there,” Adams said. “Used properly, some of these substances can be helpful, but misuse can lead us down the path of addiction. That’s what we want folks to remember.”



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CANDESCENT WINS RED HERRING TOP 100 NORTH AMERICA AWARD

SANTA BARBARA, Calif. — Canndescent, a cultivator of premium flower, in June became the first cannabis company to receive a Red Herring Top 100 North America award, an accolade honoring the year's most promising private technology ventures in North America. The company was honored as a life sciences/biotech sector leader.

To determine the award-winners, the Red Herring editorial team analyzed hundreds of cutting-edge companies and technologies, evaluating them on twenty main quantitative and qualitative criteria including disruptive impact, market footprint, proof of concept, financial performance, technology innovation, social value, management quality, strategy execution, and integration into their respective industries. Other 2018 winners include Agile Health, CloudPost Networks, StackPath, StartEngine, and Unitas Global.

"The cannabis industry is now disrupting business, society, politics, culture, health, and leisure, and this award is one more nail in the coffin ending prohibition," said Canndescent Chief Executive Officer Adrian Sedlin. "I really see this as an industry achievement award, and we share it with all the other great companies in the cannabis industry who've been innovating and swinging hammers to redefine the industry."

Canndescent has turned what many perceive as an agricultural commodity into a luxury brand, helping to mainstream cannabis and redefine public perception. The company was the first to abandon strain names and market cannabis flowers based on effect: Calm, Cruise, Create, Connect, and Charge

CANDESCENT.COM



WELCAN CAPITAL LAUNCHES CANNABIS-FOCUSED FUND

NEW YORK — Cannabis-focused venture capital firm WelCan Capital launched an impact investment fund to invest in four core verticals across the cannabis sector: business services, emerging technology, software, and licensed operations. Initial Fund I investments include vertically integrated, Massachusetts-based licensed operator Sanctuary Medicinals and dispensary-oriented software-as-a-service platform Treez.

A company statement noted WelCan, which takes a "people + purpose + profits" approach to the market, intends to donate a portion of its annual profits to "organizations that have demonstrated efforts to move the industry forward in a responsible way."

WELCANCAP.COM

BACEAE EDIBLES TO BE AVAILABLE IN LASSENS GROCERY STORES

CAMBRIA, Calif. — Cannabis edibles maker baceae has worked a deal with grocery store chain Lassens to offer organic, vegan, fair-trade CBD goodies in central and southern California.

To start, a total of eight Lassens stores will carry baceae's entire line: peanut butter cups, chocolate tarts, granola bars, chai bars, truffles, turtles, bonbons, and fudge. The test stores are located in San Luis Obispo, Santa Maria, Thousand Oaks, Los Feliz, Echo Park, La Brea, Bakersfield, and Ventura. Others are expected to follow later this year.

Established in 2016, baceae calls its CBD edibles "food first": designed to be unintimidating and crafted to allow the flavors to be enjoyed before the "high." Lassens, founded in 1971, offers 100-percent organic foods produced by local, ethical, sustainable farmers.

BACEAE.COM, LASSENS.COM



LAGUNITAS DEBUTS INFUSED, IPA-INSPIRED SPARKLING WATER

PETALUMA, Calif. — On July 30, craft brewer Lagunitas Brewing Company debuted Hi-Fi Hops, which the company calls the world's first IPA-inspired sparkling water. Lagunitas said the beverage also represents the first time a major brewery has been represented in the THC-infused beverage space legally.

The product, created in collaboration with CannaCraft subsidiary AbsoluteXtracts, is infused with THC and/or CBD and has no calories or carbs. It is available in two dosages: one with 10mg of THC, and one with 5mg of THC and 5mg of CBD.

Initially, Hi-Fi Hops will be available only in California dispensaries.

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↓5.36x



Since 2014, as individual categories (U.S.):

CONCENTRATE
sales have
grown
412%

EDIBLES
sales have
grown
272%

FLOWER
sales have
grown
149%

(Source: MJ Freeway)



PELE MOUNTAIN, BHANG ENGINEER REVERSE TAKEOVER

TORONTO — In June, publicly traded Pele Mountain Resources Inc., a Canadian renewable energy company headquartered in Ontario, submitted a non-binding letter of intent to acquire 100 percent of Bhang Corporation, a privately held American cannabis intellectual property company. If completed, the move will constitute a reverse takeover and change in control of Pele. The agreement contains an exclusivity provision through August 15 along with a \$25,000 initial payment to Pele and additional \$10,000-per-month payments to meet Pele's working capital needs during the exclusivity period. The transaction is expected to close in the fall, pending regulatory and shareholder approval.

Under the terms of the agreement, Bhang must raise \$7 million to \$10 million in financing to raise its enterprise value to between \$35 million and \$45 million. Pele must migrate from the Toronto Stock Exchange Venture Exchange to the Canadian Securities Exchange, reorganize, transfer non-core mining and energy assets, and reduce its working capital deficiency to below \$10,000.

Bhang licenses rights to a range of cannabis and hemp products including chocolates, gums and oral sprays, isolates, vapes and vape cartridges, and accessories. Pele focuses on the development of renewable energy projects and holds mineral resource interests.

BHANGCHOCOLATE.COM, PELEMOUNTAIN.COM

NUGGETS



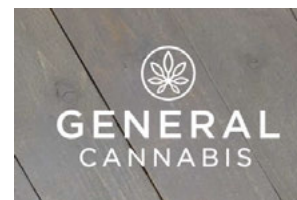
1 KUSH BOTTLES INC. closed two stock offerings totaling 11 million shares of common stock, resulting in total proceeds of \$36 million.
KUSHBOTTLES.COM



2 MERIDA CAPITAL PARTNERS crossed \$50 million in assets under management and closed transactions involving nine companies in its second fund.
MERIDACAP.COM



3 TILRAY INC., A Canadian company supplying medical cannabis in Canada, Australia, and Europe, filed for an IPO on NASDAQ using the symbol TLRY.
TILRAY.COM



4 GENERAL CANNABIS CORP invested \$600,000 in Dope Media Inc. to help the latter expand publishing and events targeting cannabis consumers.
GENERALCANN.COM;
DOPEMAGAZINE.COM



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| HARVEST: Business |

WEEDMD SCALES UP TO MEET EXPECTED INCREASE IN CANADIAN DEMAND

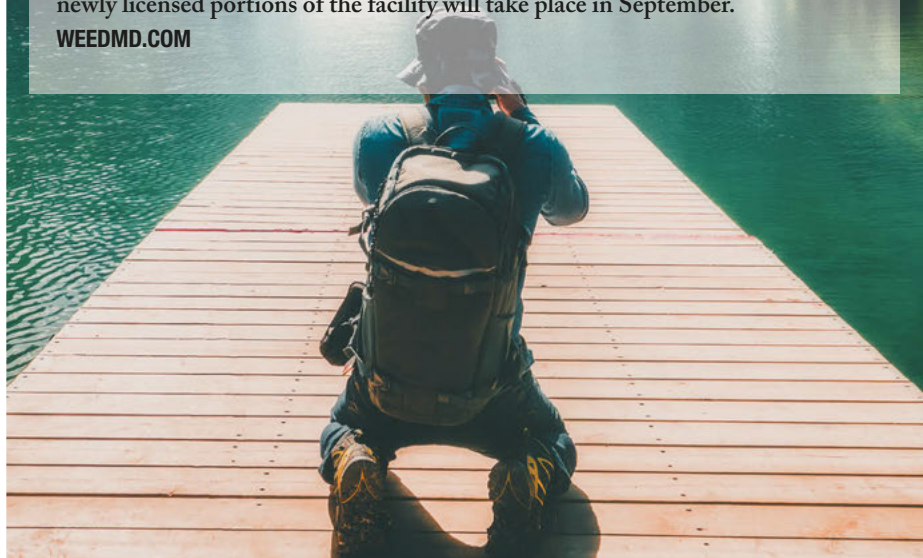
TORONTO — WeedMD Inc., a federally licensed producer and distributor of medical cannabis, has secured a Health Canada Cultivation License for the first four grow rooms within the 220,000-square-foot Phase I retrofit of its 610,000-square-foot greenhouse in Strathroy, Ontario.

The company plans to bring a total of twenty grow rooms online over the coming months in order to meet what it predicts will be burgeoning demand under Canada's new nationwide recreational cannabis law. When Phase I completes by the end of the year, WeedMD expects to have increased production from 1,500kg annually to more than 21,000kg annually.

The company also expects to complete its fully-funded Phase II expansion by year-end 2018. That project—an incremental 175,000-square-foot conversion representing an additional yield of 12,000kg—will add a potential yearly yield of more than 33,000kg. Taken together, both phases will increase the cultivator's potential annual output to more than 50,000kg.

The structure comprises fourteen acres under glass. The first harvest from the newly licensed portions of the facility will take place in September.

WEEDMD.COM



CANOPY RIVERS TO INVEST CAD \$5 MILLION IN CIVILIZED WORLDWIDE



SAINT JOHN, New Brunswick — Civilized Worldwide Inc., a media and lifestyle brand highlighting cannabis culture, has secured a convertible debenture investment of CAD \$5 million from Canopy Rivers Corporation, part of the Canopy Growth group of companies. According to a Civilized statement, the company will use the funding to support the website Civilized.life, the video platform Civilized Studios, and Civilized Events, which produces gatherings.

Founded in 2015, Civilized claims to reach more than 2 million website visitors monthly with content for motivated, productive adults who enjoy cannabis but aren't defined by the plant. Canopy Rivers works collaboratively with strategic counterparties who seek financial and or operating support. **CIVILIZED.LIFE, CANOPYRIVERS.COM**

HIGH TIMES PARENT COMPANY LAUNCHES IPO

LOS ANGELES — As prelude to a NASDAQ listing planned for late 2018, in June High Times Media Corp., publisher of the eponymous magazine, announced a Regulation A+ initial public offering. The offering, which U.S. law limits to \$50 million, allows any member of the public to acquire shares in the company for a set value of \$11per, 10 percent less than the company anticipates its NASDAQ opening price will be.

Chief Executive Officer Adam Levin said capital raised by the IPO will be used to expand the company's publishing, events, and licensing business, invest in video and audio content, and add products.

The move came shortly after High Times added former Mexican President Vicente Fox Quesada to its board of directors.

HIGHTIMES.COM

\$510 million to \$1.04 billion

Predicted sales of illegal cannabis in Canada during 2019.

(Source: Deloitte LLP)

NCIA LAUNCHES ALLIED ASSOCIATIONS PROGRAM

WASHINGTON, D.C. — The National Cannabis Industry Association launched a program designed to facilitate cooperation and assistance between NCIA and local cannabis organizations. The goal of the Allied Associations Program (AAP) is to harness collective knowledge and provide mutual, nationwide support for industry efforts.

Under the AAP, NCIA will provide complimentary workshops and information sessions as well as monthly updates about relevant legal and policy issues. The first workshop took place July 25-27 in San Jose, California. Organizations also will receive complimentary tickets and exclusive discount codes for other NCIA events.

Initial AAP member organizations are located in California, Ohio, Arizona, Texas, Nevada, Louisiana, Oregon, and Washington state.

THECANNABISINDUSTRY.ORG



33%

of Canadian consumers plan to purchase
legal cannabis online.

(Source: Deloitte LLP)



GB SCIENCES FILES PATENTS FOR PAIN THERAPIES

LAS VEGAS — GB Sciences Inc. filed a provisional patent application for cannabis-based therapies that offer promise for chronic inflammatory pain conditions, peripheral neuropathy, urinary cystitis, asthma, and some types of hearing loss. The GB Sciences drug development team believes the treatments could herald the dawn of "individualized medicine" by re-establishing balance in patients' endocannabinoid systems.

Sensory neurons contain multiple members of the transient receptor potential (TRP) ion channel family. When sensory neurons detect pain, inflammation, stress, or noxious environmental signals, TRPs relay the signals by activating or deactivating calcium, sodium, and magnesium ion gradients across cellular membranes.

By studying the responses of cannabinoids and terpenoids both individually and in combinations at the level of individual receptors, GB Sciences has discovered reversible mechanisms that make personalized, precision medicines possible.

GBSCIENCES.COM



AVERAGE CANNABIS COMPLIANCE SCORES BY LICENSE TYPE

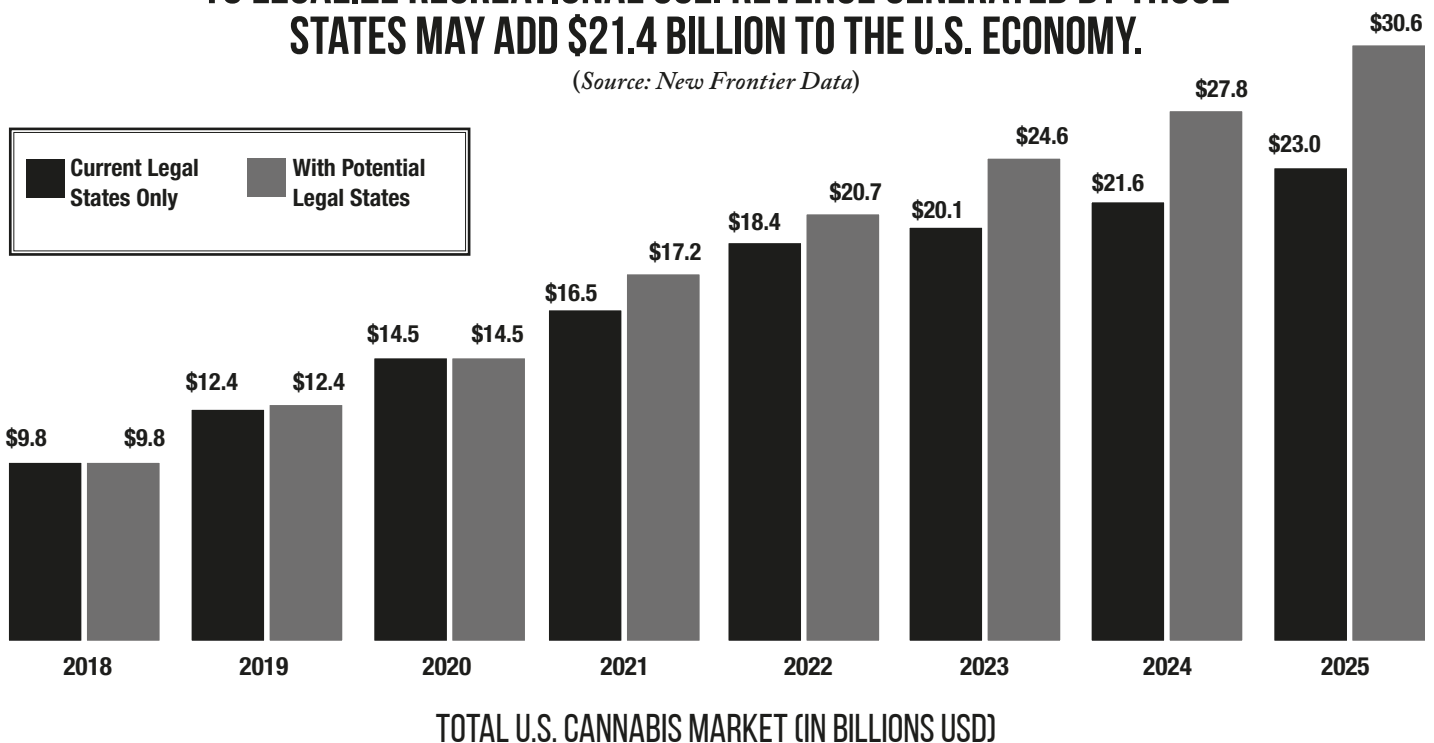
(2017)

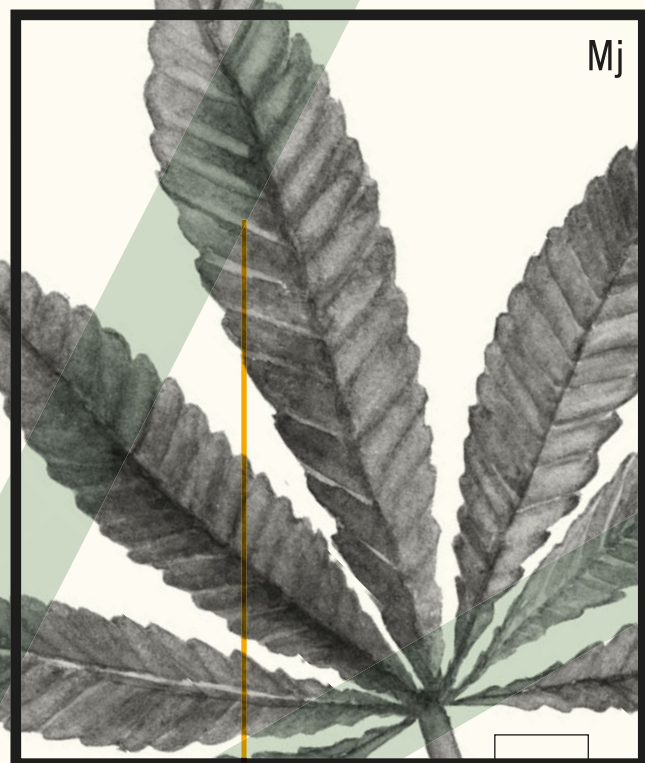
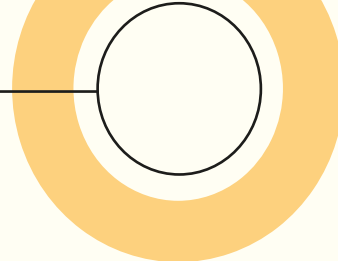
| | COLORADO | WASHINGTON | NEVADA | CALIFORNIA | ILLINOIS | MARYLAND |
|---------------------------|----------|------------|--------|------------|----------|----------|
| Medical Dispensary | 84.6 | 79.2 | 88.9 | 76.8 | 95.6 | 94.2 |
| Medical Cultivation | 84.2 | 78.6 | 83.4 | 75.5 | 96.8* | 93.8 |
| Medical Manufacturer | 83.8 | 79.1 | 86.2 | 72.1 | 96.8* | 96.3 |
| Recreational Store | 85.2 | 83.1 | 89.7 | N/A | N/A | N/A |
| Recreational Cultivation | 83.1 | 81.4 | 85.4 | N/A | N/A | N/A |
| Recreational Manufacturer | 82.6 | 80.7 | 88.6 | N/A | N/A | N/A |
| AVERAGE SCORE | 84.2 | 79.3 | 86.3 | 75.4 | 96.1 | 94.9 |

*N/A: not enough data or license type didn't exist in state. (Source: Adherence Compliance)

13 STATES ARE EXPECTED TO LEGALIZE CANNABIS BY 2025. OF THOSE, 9 ARE EXPECTED TO LEGALIZE RECREATIONAL USE. REVENUE GENERATED BY THOSE STATES MAY ADD \$21.4 BILLION TO THE U.S. ECONOMY.

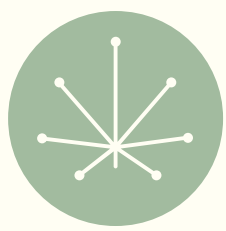
(Source: New Frontier Data)





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SEPTEMBER 2018 EVENTS SCHEDULE

The following is a list of select industry events taking place during September 2018.

GROWUP CONFERENCE AND EXPO SEPTEMBER 7-8

SCOTIABANK CONVENTION CENTRE,
NIAGARA FALLS, CANADA

Focused on the education, collaboration and growth of the cannabis growing industry. Meet licensed producers, suppliers, equipment manufacturers, investors, lawyers, government officials, and growing enthusiasts, all in one scenic location.

GROWUPCONFERENCE.COM

CHAMPS KISSIMMEE SEPTEMBER 15-17

THE GAYLORD PALMS, ORLANDO, FLORIDA

Founded in 1999 and now one of the largest counterculture trade shows in the world, CHAMPS hosts premier exhibitors and draws buyers in the thousands from all over the world. Vendors offer glass pipes, vaporizers, cleaners, and extraction machines, among other stock.

CHAMPSTRADESHOWS.COM

HALL OF FLOWERS SEPTEMBER 17-18

SONOMA COUNTY FAIRGROUNDS, SANTA ROSA, CALIFORNIA

An invite-only, highly curated, B2B trade show specifically designed to facilitate the trade of premium cannabis products. With more than thirty years' experience producing fashion and music trade shows, the Hall of Flowers founders are dedicated to providing a professional platform for buyers and sellers to conduct business.

HALLOFFLOWERS.COM

GRIFFIN'S 2018 GROWER AND RETAILER EXPO SEPTEMBER 26-27

LANCASTER COUNTY CONVENTION CENTER,
LANCASTER, PENNSYLVANIA

Producers and buyers meet among discounts and deals, product knowledge, and technical advice. New products, new varieties, and new vendors are featured at each expo.

GRIFFINS.COM

THE STATE OF CANNABIS SEPTEMBER 27-28

THE GRAND EVENT CENTER, LONG BEACH,
CALIFORNIA

A two-day conference allowing elected officials, regulators, scientists, and business leaders to learn from each other and affect policy in smarter ways. According to organizers, "Higher learning" is our state of mind!"

STATEOFCANNABIS.ORG



Hall of Flowers

SEPTEMBER 17-18th, 2018

PARTICIPATING BRANDS

apothecanna



HEMPER



HALLOFFLOWERS.COM



EMBRACING THE NEXT GENERATION OF CANNABIS BUSINESS EVENTS

BY RICARDO BACA

STANDING IN MY DENVER OFFICE in early June, it all seemed so very far away. In the weeks that followed, I would be heading northeast to Toronto, and then farther east to Saint John, New Brunswick, and then *waaaaay* southwest to Mendocino County, California—all for cannabis business gatherings of different stripes.

One of the events, O'Cannabiz in Toronto, was a straight-up business expo, and I moderated a compelling panel on the future of adult-use marijuana with the biggest cannabis brands in the world on stage alongside me. Another event, the World Cannabis Congress in Saint John, was a modified take on the conference format, with invite-only “delegates” instead of attendees, no expo floor, and curated panels. Mine was on the role of the media in a 420-legal society. And the third, Meadowlands, was something of an anti-conference—a scheduled, if informal, camp-out focused on California’s post-implementation cannabis supply chain in the stunning Mendo woods three hours north of San Francisco.

More than 3,500 miles separated Saint John and Mendocino, but truly, some of these events were closer philosophically than many of the cannabis business conferences to which we’ve grown more accustomed.

You can’t stroll the meandering floor of any cannabis business expo without hearing execs lamenting this still-new industry’s ever-expanding conference space. Some events, like MJBizCon and the Cannabis Business Summit, are the must-attend big dogs. There are

seemingly countless other events serving specific niches including technology, individual product categories, and even singled-out cannabinoids like CBD.

But as the legal marijuana industry settles into its fifth year of adult-use sales, and as Canada preps for its recreational dawn on October 17, it’s also encouraging to see a new breed of cannabis business gatherings emerging from the fray: the boutique business event.

Let me set the scene: After navigating a series of winding roads paved among towering redwood trees, I parked my rental car in a dirt lot and approached a dimly lit pop-up tent marked as registration. A few minutes later I checked into my teepee, and a few minutes after that I walked into a large meadow where an acoustic band played on a simple stage and a couple hundred people gathered around a large fire pit.

What a welcome to Meadowlands, a grassroots event thoughtfully organized by Meadow, a software solutions provider known for its handy cannabis delivery platform and its status as Y Combinator’s first start-up in the legal marijuana space. The loose schedule stood out for its star-gazing night hikes, ganja yoga seshes, and infused cooking demonstrations, though its three (*total!*) panels stood out for the legitimate depth they attracted, including top state cannabis regulator Lori Ajax and influential city marijuana officials from San Francisco, Los Angeles, and Sacramento.

It was impossible to have a conversation that weekend that didn’t address the event’s special singularity, unique environment, and

casual atmosphere. Joints, pipes, and vaporizers were passed around widely during the regulators' panel discussions, a differentiator that did not go unnoticed. While it wasn't outwardly a business gathering, the event drew a crowd of entrepreneurs, decision-makers, and thought leaders, and business definitely was conducted around the campfire.


A few days earlier in the equally out-of-the-way city of Saint John, a similar segment of cannabis industry decision-makers gathered for the decidedly business-casual World Cannabis Congress—an event that was more Canadian in focus but similar in intention to the California-centric Meadowlands.

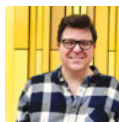
The WCC's agenda was jam-packed with panels, sure, but it also was peppered with thoughtful programming and amenities, including full breakfast, snack and lunch buffets (as opposed to the coffee-and-danish spreads more common to business events); a comfortable makeshift lounge serving soft drinks and cocktails directly across the hall from the panel rooms; afterparties that celebrated Saint John's seafaring locale via delicacies including seaweed and fiddleheads; and multiple female keynote speakers, including comedian Chelsea Handler and New Frontier Data Chief Executive Officer Giadha Aguirre de Carcer.

Like during Meadowlands, the WCC delegates were consistently charmed by the event's small size and personalized approach.

Whereas the cannabis industry's largest expos set up shop in conference hubs like Los Angeles and Las Vegas, there was an undeniable novelty to leaving the tiny Saint John Trade and Convention Centre (which shares a large building with a buzzing public market and the town's public library) without thinking about hailing an Uber—and instead walking the city's quiet, hilly streets in search of food, drink, and familiar faces.

It was more than a metaphorical breath of fresh air. It was actual fresh air, with stunning views of the Bay of Fundy, to boot.

The cannabis industry relies on the big shows, and I know I'll see many of you at the Cannabis Business Summit in Anaheim and MJBizCon in Vegas, shows that I likely won't miss out on in the next five years because of how essential they've become. But the industry also needs more boutique business events like the World Cannabis Congress and Meadowlands—gatherings that provide a different atmosphere and scope, not to mention a different level of intimacy and personal connection. 



RICARDO BACA is a veteran journalist and thought leader in the legal cannabis space and founder of Grasslands: A Journalism-Minded Agency.

Have an idea for our national cannabis columnist? Send your thoughts to Ricardo Baca via Twitter [@bruvs](https://twitter.com/bruvs) or via email at ricardo@cannmg.com. Be sure to start your subject line with "My ideas for mg's national cannabis columnist."

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OUT WITH THE ANTIQUATED, IN WITH THE NANO

BY TERRY GROSSMAN, M.D., CO-FOUNDER AND CHIEF MEDICAL DIRECTOR,
NANOSPHERE HEALTH SCIENCES

CANNABIS CULTIVATION and consumption date back hundreds—even thousands—of years, and yet the industry only recently began developing and adopting new methods of delivery, paving the way for the next generation of cannabis use. Joints and pot brownies, step aside. The future of cannabis lies in technology.

It's a tale as old as time: Traditional methods of consumption can bring with them a host of adverse effects. For instance, edibles can take thirty to ninety minutes or more to produce effects, while dosages are often improper or inconsistent. The challenges lead consumers to take too much too quickly, resulting in adverse reactions. What's more, inhalation is detrimental to the lungs—not to mention many vape products contain harmful chemical additives.


Over the decades, science has made significant advances with cleaner, safer, and more reliable administration methods for most other drugs on the market. Why not cannabis? In part, legal issues played a role; however, this is no longer the case. Problems such as low bioavailability, inconsistent dosing, unpredictability, and lung damage long have plagued cannabis consumers. Fortunately, turning to the biotechnology and pharmaceutical sectors has revealed effective strategies for resolving these common, age-old issues, leading to cleaner, safer, and altogether more trustworthy and desirable products.

Creating unique, sophisticated, and effective products in safer, smoke-free modes of delivery is no longer an option—it is a necessity. One groundbreaking solution lies in nanotechnology, which allows for the nanoencapsulation of a broad range of bioactive

compounds in a protective membrane. This mode of delivery allows the beneficial cannabinoids and terpenes to be transported rapidly and efficiently into the bloodstream and cells for results that are not only fast-acting, but also highly effective.

Through nanoencapsulation, beneficial agents are made safer and more bioavailable, reducing adverse side effects by delivering extremely precise doses of smart nanoparticles to the desired target sites, resulting in swift uptake that can be felt within mere minutes. Whether used to relieve anxiety, inflammation, chronic pain, or just take the edge off after a long day, nanotechnology is a more intelligent way to carry the vast medical benefits of the plant into the body for systemic healing.

Harnessing the power of nanotechnology lends itself well to product innovation, yielding an array of safe, alternative delivery mechanisms including intraoral, intranasal, and transdermal routes. The variety of delivery methods maximizes individual choice. NanoSphere Health Sciences' Evolve Formulas Transdermal NanoSerum delivers nano-encapsulated cannabis and extracts in precision-metered doses through the skin. Other companies are developing their own products.

Already progressing by leaps and bounds, the cannabis industry is on a trajectory to make major improvements in its ability to help patients and consumers find effective relief free of undesirable outcomes. There are still many hurdles to overcome, but with massive technological and scientific developments taking place at an exponential rate, we are well on our way to making the plant an accessible and trusted tool for both seasoned and new cannabis consumers. 

In addition to his role at NanoSphere Health Sciences, TERRY GROSSMAN, M.D., is founder and medical director of the Grossman Wellness Center and serves as international medical director for Vitallife Wellness Center, the wellness division of Bumrungrad Hospital. Dr. Grossman specializes in nutritional medicine and antiaging medicine. He is the author of 'The Baby Boomers' Guide to Living Forever' and coauthor with Ray Kurzweil of the best-sellers 'Fantastic Voyage' and 'TRANSCEND: Nine Steps to Living Well Forever.'

Need glass?

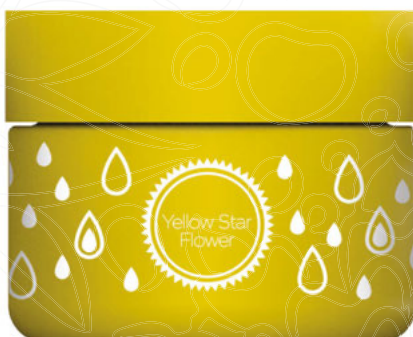
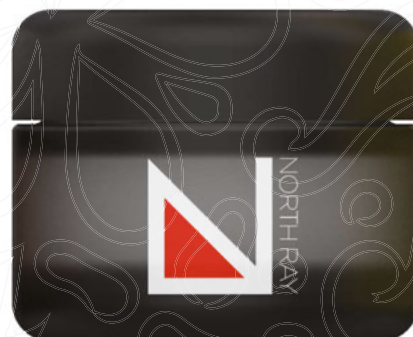
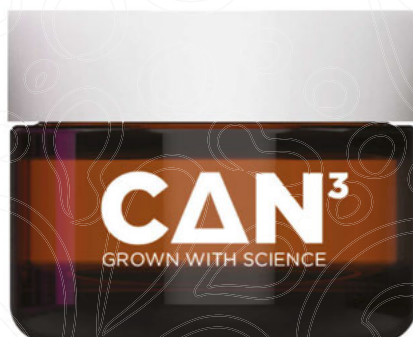
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LIGHTING THE WAY

With action sports stars as brand ambassadors and a tourist-friendly menu, Tokyo Starfish is one of the brightest retailers in Bend, Oregon.

TOKYO STARFISH'S brand story began almost twenty years ago. During a snowboarding event in Japan, Jason McCalister, Kale Gray, Keith Legum, and Gary Bracelin bonded while exploring the kaleidoscopic city of Tokyo. They were especially captivated by the view from their hotel, which looked out on a cross-section of five roads crawling with cars and neon lights. If they squinted, the vista looked like a gargantuan, psychedelic starfish.

After the trip, the four remained good friends. And they never forgot that view.

Fast forward to 2013: Legum and Bracelin were attending a school fundraiser when Bracelin suggested they start a retail cannabis business. Legum

proposed they recruit McCalister and Gray. Then, as if sent by the cannabis and snowboarding gods, a location presented itself. "It was a turn-of-the-century cottage that had become a dog grooming place and antique shop," said Gray. "We completely opened up the space and remodeled from the ground up."

The shop became a strange and alluring phenomenon, like the city in which the group met. Both locals and tourists took notice of the new retail establishment with its bizarre name and echinoderm logo.

Each of the four founders plays a specific role: Legum, who always has been fascinated by architecture and design, was charged with building out the space. Gray handles marketing and branding.

Did you know?

Above Tokyo Starfish is a two-bedroom, one-bath, cannabis-friendly bud 'n' breakfast apartment that can be rented on VRBO.com.

It's the only one of its kind in Bend, Oregon.



FROM THE SECOND A CUSTOMER WALKS IN THE DOOR UNTIL THEY LEAVE, CUSTOMER SERVICE AND THE SHOPPING EXPERIENCE ARE NUMBER ONE.” — *Kale Gray, co-founder, Tokyo Starfish*

McCalister, in charge of operations, is the details dude, while Bracelin oversees buying and distribution.

During construction, Legum’s driving concepts were “homey,” “friendly,” and “bucolic.” Those three words still define the experience. “From the second a customer walks in the door until they leave, customer service and the shopping experience are number one,” said Gray. In addition, he noted, the owners insist the shop reflect their love for the outdoors, action sports, and hanging out together. The quaint, snow-cabin-esque aesthetic Legum created exudes coziness and warmth. Flourishes like extracts displayed on skateboards, neatly folded apparel and coffee table books stacked in custom-made wood racks, vintage SnoPlanks snowboards here and there, and a mountain bike station on the porch gave Tokyo Starfish a singular vibe.

“He [Legum] did a great job of taking all of our insane ideas and spitting them out into one cohesive-looking place,” Gray said with a chuckle.

The dispensary’s signature attributes aren’t confined to the first floor. Located above the shop is a two-bedroom apartment the partners had intended to turn into an office. Instead, at Gray’s suggestion, they created Bend’s only bud ‘n’ breakfast. The spot has been a big hit, he said, and rentals add extra revenue.

“It was an opportunity to expand the experience of the shop,” noted Gray. “People who stay there love it. Many want to move in permanently.”

Although Bend hosts a smattering of professionally run and well-stocked dispensaries, with more on the way, Tokyo Starfish has become not only a local favorite but also a must-visit tourist spot. Many local guidebooks encourage tourists to stop in. Located near mountain biking trails, fishing pools, and snowboarding peaks, the shop has become a sort of ground zero for the action sports crowd to stock up before a day playing outdoors.


As for products, Tokyo Starfish places priority on growing its own flower with an emphasis on potent CBD strains. After all, a day on the slopes or cruising the rugged, snaking trails can leave active folks with aches and pains. In addition to stocking flower from most of the

local farms, Tokyo Starfish also offers what Gray called “connoisseur CBD strains” exclusive to its in-house grower, TG Industries. Extra-potent flower like Blue Shark, Harlequin, and Harle-Tsu fly off the shelves, he said.

He also said business growth has exceeded expectations. Between retail, wholesale, and grow, the company now employs thirty-five people. Gray is particularly proud of that. “Being able to create jobs for people is pretty awesome,” he said.

The shop sees nearly 400 customers a day; more during tourist season. While flower composes 50 percent of sales, cartridge and edibles sales are growing rapidly. That makes perfect sense to Gray: Both items are on-the-go-friendly. “Pre-rolls are picking up steam, too,” he said.

Tokyo Starfish’s secret weapon may be its brand ambassadors and buzzy event sponsorships. Professional snowboarding star and friend to the owners Max Warbington tops the list. Tokyo Starfish sponsors Warbington’s sold-out Quarterpipe Campout weekend, which takes place May 20-21 annually. Warbington’s signature showdown brings together some of the top riders and ancillary characters for a non-stop weekend of riding, partying, and catching up with old friends, all of which is filmed by cinematic master John Stark. Tokyo Rose also participates in the Dirksen Derby 10, river surfing with ambassador Jorma Nagel, and Mount Bachelor hiking excursions with a who’s who of the action sports world.

“We all come from the action sports world, and most of our employees do too,” Gray said. “Warbington is a local pro snowboarder who is a big advocate of ours, as we are of his. He’s one of the best because he goes out and makes things happen for himself. It’s really cool to have an advocate who brings things to the table that we can help with.” 

—*Rob Hill*



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BACK TO SCHOOL

Budtending classes help boost profits, lower employee turnover, and improve customer loyalty.

BUDTENDERS PROVIDE the first impression of a dispensary. They are a conduit of information and education and, like bartenders, they affect the bottom line. They are the outward face of your brand. One bad experience with a budtender can sour a customer for life.

Along with experience and passion, education can help ensure budtenders meet high standards. Studies and customer feedback have shown a majority of patients and consumers take budtender recommendations very seriously. The good news is there are a number of budtender schools that can help sharpen and refine skills.

Evan Erickson, chief training officer for Green CultureED, a seven-year-old cannabis e-solutions company, explained why it may be beneficial to send budtending staff back to school.

WHAT ARE THE EDUCATIONAL AND BUSINESS ADVANTAGES OF TAKING BUDTENDING CLASSES?

Evan Erickson: Budtending courses are a powerful tool for attracting new customers, increasing positive community relationships, and ensuring the safe operation of a dispensary. They cover all the bases. Dispensaries play a variety of roles for the customer but, above all, they must play the role of an educator when it comes to dosing, laws, and product knowledge.

The most important areas are boosting profitability, knowing compliance issues, reducing costs, and lowering employee turnover. The dispensary must play the role of a responsible community member, both in the local community and within the cannabis

community. With all the varied and stringent regulations, this can be a difficult task. The key to handling all these roles with the greatest ease and efficiency is education.

WHAT ABOUT SALES TECHNIQUES?

When it comes to sales, the value of being part of a team that consistently gives the same informed message is incalculable. Far too often the information relayed by staff is anecdotal, at best. Learning how to tailor your service is very important. Some dispensaries default to basic explanations that work for some customers but leave others seeking more information. Classes teach you not to treat all your visitors the same—because they're not. Some may just want any strain that is available, while others may expect a product that can deliver specific effects or flavors. The best budtenders leave first-time consumers and veterans feeling the same way: happy, heard, and taken care of.

CAN COURSES HELP IN BREAKING BAD HABITS?

Yes. Budtenders constantly repeat effects and characteristics of products, so it's easy to forget each customer is a unique and fresh interaction. All customers have distinctive histories with cannabis, so figuring out their level of familiarity is the first step. Learning how to avoid repetitious callouts like, "Indica couch-locks you" or "sativa is more energetic" is important.

Also, differentiating medical from adult-use is important for both the patient and consumer experience. Studies have shown

medical patients dislike budtenders who treat their medicine as “weed,” whereas adult-use consumers tend to be overwhelmed by advanced explanations. Remember: Customers vary and are there for different reasons.

DO SKILLSETS DIFFER BETWEEN MEDICAL AND ADULT-USE BUDTENDERS?

For adult-use budtenders, the most important traits are customer service skills and a friendly demeanor. They are going to be dealing

with a lot of people who have varying cannabis experience, so knowing how to assist different customers with unique demographics and needs is crucial.

Medical marijuana budtenders need the aforementioned skills and heavy cannabis knowledge. Ideally, they should have an interest or background in the medical field. Most states with a functional medical marijuana program in place require some kind of training or certification for physicians, but budtenders are rarely required to undergo similar training. *—Rob Hill*

A CRASH COURSE IN BUDTENDER SCHOOLS

THC UNIVERSITY

THC U offers a basic certification program designed for new staff. Grow Basics Certification, taught by world-renowned horticulturist Jorge Cervantes, is an introductory course for those who want to start a small retail grow. Courses offered monthly, quarterly, every six months, and annually. Tuition: \$50 to \$420.

THCUniversity.org

HERBAL RISINGS

Herbal Risings offers two online budtending classes: Budtending 101 covers the basics, while Scientific Budtender comprises six sessions covering therapeutic medicinal benefits, equipment and uses, flower classifications, compliance, and medical versus recreational. Online classes are \$99; small-group classes on campus run \$299.

HerbalRisings.com

OAKSTERDAM UNIVERSITY

One of the first cannabis schools in the nation, Oaksterdam University offers comprehensive educational programs for almost every career interest, including horticulture, budtending, legal, cooking, economics, dispensary business solutions, civics, and grow management. Tuition ranges from \$595 to \$1,295; scholarships available.

OaksterdamUniversity.com

CANNABIS UNIVERSITY INC. OF COLORADO

Cannabis University offers all-day classes the second Saturday of each month and specialized classes one Monday evening per month. The curriculum includes federal marijuana laws, growing basics, customer service, inventory management, and preparing edibles and tinctures. Tuition: \$100 to \$250 per class.

CannabisUniversityColorado.com

MED GROW CANNABIS COLLEGE

Med Grow's courses are heavy on education and advocacy for caregivers and budtenders. Students study legal issues and compliance, quality medicine, basic horticulture, cannabis history, customer service, and how to make edibles, drinks, tinctures, and hash. Classes are taught by Med Grow's team of doctors. Tuition: \$475.

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GREENBROZ: THE HEART OF THE DEAL

From a passion for machinery, Cullen Raichart built a company that cares about its customers as much as its products.

AFTER MASSIVE WILDFIRES swept through Northern California's Wine Country last fall, right at harvest time, GreenBroz Inc. made some of its high-end trimming machines available to cannabis growers and processors whose operations had been damaged or destroyed. For Donna Burch, owner of Thrive Hydroponics of Healdsburg, this was just another indication San Diego-based GreenBroz truly cares about its customers.

The fires were devastating, and the people who weren't themselves victims knew a lot of others who were. Burch's son lost his home and "barely escaped with his life," she said. For growers who were able to do so, getting back to work as quickly as possible represented the best way to cope. GreenBroz helped many of them by giving machines to Thrive and Hydro Pacific Garden Supply so they could lend the equipment to cultivators at no charge. "I can't

say enough good things about them," Burch said. "They're just a really good company."

She thought so before the fires, too, not only for the top-notch customer service she said GreenBroz always has provided, but for the machines themselves, which she said are in high demand for both sales and rental. All the customer service in the world won't help you if the product you're selling is substandard, she noted.

GreenBroz founder Cullen Raichart embraced that truism from the beginning. When he was a kid, his family was in the printing business, where the machines had to work perfectly all the time and last through decades of constant use. "My dad taught me the value and need for quality," he said.

Raichart always enjoyed working with his hands and said he "love[s] machines." The results of an aptitude test he took in high school revealed he should be a mechanical engineer. "But for some

reason, I decided to ignore that,” he recalled. Instead, he served a five-year stint in the U.S. Navy, serving in Operation Desert Storm. Then he took up software development, among other things designing email systems for Hewlett-Packard.

Along with a Navy buddy who is no longer with GreenBroz, Raichart decided to devise a better machine for cannabis trimming after witnessing some early models in action. At the time, around 2012, a debate raged about hand-trimming vs. machine trimming. The debate continues today, but now it most often centers around machines taking jobs from people. Back then, the arguments were more about quality. It was clear to Raichart that humans were still a lot better than machines. He set out to change that. By many accounts, he has.

“It’s not a question of ‘better than,’” he said. “It’s a question of ‘as good as.’” He believes once a machine is as good as a human at a given task, it’s just a question of economics—which is to say, speed and volume.

With twenty machines built, Raichart headed out on sales calls. He didn’t have much luck, but he made a \$60,000 sale to a distributor in Northern California, which gave him a bit of confidence. He pitched a plan to investment tank ArcView Group, but while investors seemed interested, even enthusiastic, they didn’t pull out their checkbooks. He tried again some months later, after finding a buyer for ten commercial-grade dry trimmers that sold for \$10,000 a pop. That was enough to convince investors to back him, and he landed his first \$150,000 in outside capital.

By the start of 2015, GreenBroz had logged \$360,000 in sales. By the end of the year, revenue hit an eye-popping \$3.4 million. In 2017, the company reported sales of \$5.7 million.

GreenBroz is profitable, and the only debt on its books is for manufacturing equipment, which, unlike in the early days when the company farmed out assembly, is now all housed at the company’s headquarters. “My engineers get to go right from their computers out onto the floor,” Raichart said. For technology nerds like Raichart and his employees, GreenBroz is now “like a really big playground.”

The quality of the machines has increased, too. The first trimmer processed eight pounds



Founder Cullen Raichart examines GreenBroz machinery under construction.



GreenBroz Chief Engineer Daniel Soltero (left) and founder Cullen Raichart.



Daniel Soltero examines equipment components.



GREENBROZ.COM

of cannabis per hour. The industry standard at the time was about two pounds per hour, which was faster than hand-trimming but not spectacular. Now, the company’s top-of-the-line 420 Dry Trimmer can process up to twelve pounds an hour, with much better accuracy, and it runs “whisper-quiet,” according to the company’s literature. According to GreenBroz customers, most people can’t tell the difference between hand-trimmed flower and that trimmed by a GreenBroz machine.

The trimmers, of course, are a mainstay. But much of GreenBroz’s recent growth comes from adding new products. Besides a smaller dry trimmer (the 215, which processes four pounds per hour), the company also offers precision batchers, sorters, de-stemmers and, most recently, a set of trichome extractors: the Alchemist 215 and the larger Alchemist 420. Most of the products come in two sizes, allowing GreenBroz to serve every market from mom-and-pop shops to large commercial grows.

Future growth, according to Raichart, lies in tying all GreenBroz products together in one package. “We’re working with cultivators to provide them with an end-to-end solution,” he said. The company’s approach now is to morph from a supplier of machines to a supplier of services, similar to the way IBM in the 1990s began de-emphasizing its computers and started acting more like a consultant (while still selling its machines and software, of course). “We’re in the business of helping our customers solve problems,” Raichart said.

GreenBroz now stands at a crossroads. Most likely, Raichart said, it will operate independently for at least a few more years. But as the leader in a fast-growing market, with fat margins and increasing revenues, he can’t help thinking about an exit, either by going public or selling to a larger company. Growth, he said, is obviously welcome, but also “painful.”

“You want a consistent budget, but you don’t know what you need to be spending and [you have] no idea if the market might change all of a sudden,” he said. And, in a brand-new industry like legal cannabis, “Nobody understands the cycles. There’s no history, no way to know. But you still have to spend a lot to keep up.” ^{mg} —Dan Mitchell



*Shimadzu analysts test cannabis samples.
(Photo courtesy of Shimadzu Scientific Instruments.)*

CANNABIS ANALYSIS

BY BOB CLIFFORD, PH.D., SHIMADZU SCIENTIFIC INSTRUMENTS

WHEN CANNABIS IS INTENDED FOR MEDICAL USE, continual testing and monitoring of products is vital. Tests can help reduce the risk of contamination and improve product quality if growers and dispensaries pay attention to the results.

The most valuable testing procedures include cannabinoid potency, terpenes profiling, pesticide screening, residual solvents, heavy metals testing, molds, mycotoxins, and aflatoxins. Specific instruments and methodologies underlie each procedure.

POTENCY TESTING

The single most important component of cannabis testing is an accurate analysis of cannabinoid potency. Depending on the way cannabis is grown, the amount of cannabinoids produced can vary. Most testing labs gather data for three major cannabinoids: tetrahydrocannabinol (THC), cannabidiol (CBD) and cannabinol (CBN) and whether they are carboxylated or decarboxylated.

Typical THC potency ranges from 5 percent to 25 percent in plant materials and edibles, but it can run much higher in concentrated oils. As of now, there are no established standards for chopping samples, homogenizing them, and performing extractions.

Therefore, variations in potency levels easily can exceed 20 percent. The two most commonly used testing methods for potency testing employ gas chromatography (GC) and high-performance liquid chromatography (HPLC) machines.

During GC mass spectrometry (GC-MS) and GC flame ionization detector (GC-FID), samples are vaporized under intense heat. This converts any THCA into THC, which labs report as “THC Total.” HPLC is also commonly used to determine the amount of cannabinoids present in a final product. HPLC machines do not require heating, generating a more accurate determination of the amounts of carboxylated or decarboxylated forms present in the sample.

TERPENE PROFILING

Terpenes are produced in trichomes in the flowers of the plant and are common constituents of cannabis’s distinctive flavor and aroma. Terpenes also act as essential hydrocarbon building blocks, influencing the overall homeopathic and therapeutic effect of the product.

Depending on the age of the plant, climate, weather, and even the time of day when harvested, cannabis may contain more than 120 different terpenes. The characterization of terpenes and their

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synergistic effect with cannabinoids is key for identifying the correct cannabis treatment plan for patients.

This profiling is best done using gas chromatography. GC-MS is the only accurate way to identify and quantify terpenes to ensure they are chromatographically separated from all interfering compounds. A GC-MS instrument vaporizes cannabis and releases a natural gas that is carried through the machine by a carrier gas. The terpenes are separated by the affinity they have for the chemically coated column. After separation, the terpenes are detected and then quantified with a computer. High-sensitivity GC-MS systems can qualify and quantify previously undetectable components and identify more than 3,000 flavor and fragrance compounds.

PESTICIDE SCREENING

The analytical detection of pesticides can be challenging. Pesticides are used in commercial grow operations to kill mites, spider mites, caterpillars, grasshoppers, and the brown marmorated stinkbug.

With so many insects threatening cannabis plants, it's no wonder there are an equal number of pesticides available to eliminate them. Problems arise because pesticides are carcinogenic and mutagenic and can cause serious harm to consumers, especially those who are immunocompromised. No lab can screen for every pesticide, but most test for the more common products: organophosphates, carbamates, pyrethroids, and avermectins.

Liquid chromatography combined with mass spectrometry (LC-MS/MS) is the preferred instrumentation platform for such testing. LC-MS/MS allows labs to identify various pesticides in one analytical cycle, ultimately reducing run times and costs. For analysis of some pesticides, however, the complementary technique of GC-MS/MS is the preferred solution. Some factors affecting LC-MS/MS or GC-MS/MS use are polarity, volatility, thermal stability, and ionization efficiency of the compounds.

RESIDUAL SOLVENTS

Residual solvents are chemicals left over from the process of extracting cannabinoids and terpenes. Common solvents include ethanol, butane, water, propane, and hexane, which are evaporated to prepare high-concentration oils and waxes. Sometimes it is necessary to use large quantities of solvent to increase extraction efficiency and achieve higher levels of purity.

Realistically, it is almost impossible to remove all solvents after the extraction process. Since they are not safe for human consumption, it is important to verify all traces of the substances have been removed.

The preferred technology for screening is GC-MS because of the machine's ability to quantify the solvents individually. GC-MS also allows users to employ an alternative sampling technique, such as a headspace unit, to improve quality assurance and control.

HEAVY METALS TESTING

Metals can be found in soils and fertilizers. As cannabis plants grow, they draw in those metals. Heavy metals like lead, cadmium, arsenic, and mercury are toxic. Lab testing helps ensure products are free of toxic concentrations.

There are several ways to determine trace metals in plant materials, all of which require a preliminary acid digestion. Inductively coupled plasma mass spectrometry (ICP-MS) is the most sensitive method and is preferred by quality-control labs for the rapid screening of heavy metals.

MOISTURE CONTENT AND PRECISION WEIGHING

Dried cannabis typically has a moisture content of 10 percent to 12 percent. A moisture content above 12 percent makes stored cannabis prone to mold. Because medical users may be immune-deficient and highly vulnerable to the effects of mold, constant monitoring of moisture is needed. The moisture content of a range of cannabis samples can be measured using a variety of precision measuring balances.


MYCOTOXINS ANALYSIS

Mycotoxins are a toxic secondary metabolite of mold. Continuous exposure to mycotoxins can lead to a buildup of progressively worse allergic reactions, with the potential to become lethal. Similarly, aflatoxins are a subset of mycotoxins found in soils and decaying vegetation.

Regulatory bodies have placed restrictions on the allowable limits of mycotoxins present in food. However, because cannabis is listed as a Schedule I substance, the U.S. government does not mandate testing to protect users: however, many states test for aflatoxins B1, B2, G1, G2, and mycotoxin ochratoxin A. Testing for and removing mycotoxins rests on the shoulders of scientists at independent labs and is a crucial step in the process of supplying safe, effective medical products.

Liquid chromatography (LC) equipment's high sensitivity makes it the ideal platform for screening for mycotoxins. In addition to standard LC, using an MS selective detector enables labs to obtain limits of detection up to 1,000 times greater than conventional LC-UV instruments.

THE FUTURE OF CANNABIS TESTING

As more states legalize medical and/or recreational marijuana and more cannabis-based products enter the marketplace, the need for cannabinoid testing continues to grow. A stronger integration of testing labs with grow operations, extractions, dispensaries, consumers, and physicians is necessary to ensure quality control and provide essential cannabis product information. 



DR. ROBERT (BOB) CLIFFORD received his master's degree from Villanova and his Ph.D. from George Washington University. He has published and presented more than 125 papers in the fields of food, pharmaceuticals, environment, energy, geology, material science, photonics, and cannabis. He has been with Shimadzu Scientific Instruments in Columbia, Maryland, for more than twenty-five years in a variety of roles and currently serves as general manager of marketing. Reach him at rbclifford@shimadzu.com.

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CANNABIS GOES HIGH-TECH

COMPANIES INCREASINGLY EMPLOY SCIENCE AND TECHNOLOGY TO
CHANGE THE WAY PATIENTS AND CONNOISSEURS CONSUME.

BY CHRISTOPHER JONES

E DUCATORS AND EMPLOYERS are putting increased emphasis on STEM—science, technology, engineering, and mathematics. The cannabis industry, too, is embracing the disciplines, not only in areas like genetics, laboratory testing, and greenhouse design, but also in consumer product development. As more doctors, scientists, academics, and other professionals migrate to cannabis from the mainstream, they're changing the way the plant is perceived and used.

It remains to be seen whether the cannabis industry learned anything from the tech industry's boom-bust cycles and other growing pains, but as this historically black-market business continues to transform into a legal, multi-billion-dollar economic engine, one thing is clear: Entrepreneurs are investing significant time and money in new technologies and scientific methods to help establish cannabis as an integral part of healthcare and lifestyle.

One prominent trend in the industry focuses on building more personalized and consistent experiences for consumers, whether they're using cannabis to treat chronic illness or for recreational purposes. As people better understand weed's potential, the trend is sure to become more widespread.

GOFIRE: AN APP-EALING ALTERNATIVE

Not long ago, bowls carved into apples and gravity bonges built from plastic two-liter bottles were considered innovative smoking apparatuses. Times have changed, and the medicinal properties of cannabis prompted scientists and technology entrepreneurs to give hippy lettuce more sophisticated, dignified delivery platforms.

For a variety of reasons, vaping has become the *de rigueur* method of cannabis consumption across the United States, so it was only a matter of time before someone tried to build the killer app that would let

vape enthusiasts take precise, remote control of their equipment. The GoFire (GoFire.co) may be the first real stab at such a product. A convection vaporizer built with pharmaceutical-grade components, the GoFire includes a proprietary SMART cartridge system that meters precision doses of flower, oil, or extracts. Instead of heating the entire contents of an oil cartridge as most other vaporizers do, the GoFire allows users to extrude oil into a separate chamber in 2.5mg doses. One of the unique benefits of the design is that only the oil sent into the chamber is exposed to heat, thus preserving



the delicate terpenes and the overall integrity of the custom oil blends. A Bluetooth-linked application on a smartphone displays the cannabinoid and terpene profiles and how much oil is left in the chamber, so users can see exactly how much they smoke in a given session.

"I don't like vaporizers. They don't taste good, and they give you an inconsistent, unreliable experience," said GoFire Chief Executive Officer Peter Calfee. "We solved that problem by creating a consistently delightful experience. Once people try it, they're smitten."

After completing a vaping session, users are encouraged to make notes and upload them to a cloud-based GoFire community. Machine-learning algorithms track the user information, which is displayed in a community science section where other users may review it. GoFire and its partners believe the post-purchase quantitative data will be a valuable source of product development information that can be used to refine current blends and develop new ones.

With a steering committee that includes twelve physicians, from the beginning GoFire was intent on building a product that would fit into the modern medical paradigm and give doctors and patients a platform suited for prescribing and accurately dosing cannabis products. "This is a true medical delivery mechanism designed to live up to the promise we've made to patients, and we went above and beyond in our design and materials to set this up for FDA approval," explained Calfee.

The GoFire also has crossover appeal for recreational users and can be put to use as a portable dab rig. The device allows for precise temperature settings, which is an important consideration when smoking rosin and resin extracts.

Above all, GoFire's engineers designed and built the device to demystify the science of oil blends, terpenes, and cannabinoids—the effects of which the scientific community is only beginning to understand—and offer a product that gives patients the same results each and every time.

"CBC and CBG, CBN... Why do you need to know all that?" Calfee asked. "The chemical structure is too much information. People are just looking for something to help them relax or sleep."

CANNABIS VS. OPIOIDS

The opioid epidemic in the U.S. results in more than 100 deaths each day from legal painkillers like morphine, oxycodone, and fentanyl as well as illegal drugs including heroin. Legal opioid drugs primarily are designed to replicate the pain-reducing properties of opium, which binds to receptors in the brain to disrupt pain signals and releases dopamine to give patients a sense of euphoria. Cannabis has been suggested as a potential adjunct for opioid addiction treatment, and James Henry SF (JamesHenrySF.com) has taken this cause to another level by working with a team of physicians to develop customized oil blends that specifically target chronic pain and other common medical conditions.

With its formulations, the Bay-Area-based cannabis company hopes to convince patients who use pharmaceutical drugs to give cannabis a try. Working with BAS Research, a highly regarded manufacturer based in Berkeley, California, James Henry SF has developed three oil blends designed to create different moods and levels of relief. Daytime Focus is a high-CBD formulation designed to alleviate anxiety and help people focus. THC-dominant formulation Evening Social is meant to deliver an uplifting, communal feeling. Weekend Retreat, a full THC formulation, was created for patients seeking pain relief and deep relaxation or experienced cannabis users looking for a more intense experience.

While developing its oil blends, James Henry SF principals realized no existing vaporizer would perform in a way that allowed patients to derive optimal benefits from the company's medications. Co-founder John Adams explained vaporizers go through dozens of heating and cooling cycles, and each

cycle slightly degrades the taste of the oil and terpenes. By reducing the oil's volume to 300mg per pen instead of the standard 500mg to 1,000mg, the company's formulations taste the same on the first drag and the last, he said.

Creating cannabis medicines that mimic the effects of pharmaceutical drugs like OxyContin, Adderall, and Prozac is one of the primary goals of James Henry SF's development efforts. Co-founder James Victor believes vaporization is the safest and most effective choice



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CANNABIS IN THE BEST
WAYS AND HOW TO DEAL
WITH COMMON CONDITIONS
SUCH AS INSOMNIA,
DEPRESSION, AND ANXIETY
WITHOUT GETTING BAKED
ALONG THE WAY."

—James Victor, co-founder,
James Henry SF



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for delivering cannabis medication because it delivers immediate relief and patients won't overconsume.

"Patients in pain don't want to wait around for an edible or sublingual to kick in," Victor said. "We want to educate patients on how to use cannabis in the best ways and how to deal with common conditions such as insomnia, depression, and anxiety without getting baked along the way."

In order to target specific ailments, James Henry SF has been working with physicians who specialize in cannabis-derived treatments. Dr. Janice Knox is a co-founder of American Cannabinoid Clinics; her husband David and daughters Jessica and Rachel all are involved in teaching patients how to use cannabis responsibly for illness, therapy, and healing. The family has consulted with thousands of patients over the past six years. Although they aren't legally allowed to prescribe medicinal cannabis, they can advise patients about how various cannabis products can help balance, regulate, and repair the body's endocannabinoid system. As a result of the ongoing collaboration, James Henry SF has been able to develop and refine its blends based on feedback from real patients and their physicians.

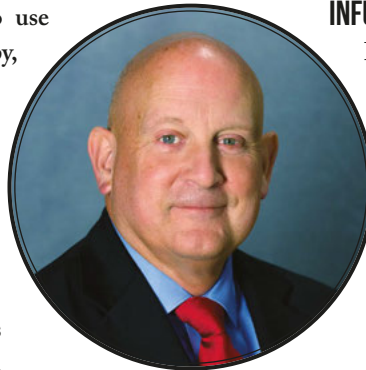
For instance, when the company created its Daytime Focus blend, scientists looked at the systemic feelings people experience when using drugs including Adderall, and then tested terpene blends with CBD and THC to mimic the same effects, said Victor. "We are also looking at CBG and CBN and utilizing that information in product development for more advanced formulations," he explained.

James Henry SF also is working with Dr. Ogadinma (Olga) Obie, an emergency room doctor who specializes in naturopathic healing. She recently moved from Houston to Oakland, California, in order to be closer to a community of doctors and patients who are researching the healing powers of cannabis.

"We need to better understand how the molecules of cannabis are working with our body, and James Henry SF sees that terpenes are probably the easiest to manipulate to develop medications," she explained. "I think their formulations are the direction we should be going. Patients don't want side effects. They want relief."

Because James Henry SF is focused on delivering very precise blends and dosages, the company has entered agreements with like-minded entities including BAS Research (which manufactures James Henry SF formulations), and GoFire.

"The GoFire is a very attractive device because it can administer precise dosages," said Adams. "In the future, doctors will be able to prescribe a certain dosage and lock the device when the patient has used up the formulation. We will be able to get into the nuts and bolts of the medical industry and move cannabis into the pharmaceutical realm."



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BUSINESS. THEY WANT TO
MAKE SURE MONEY COMING
IN STAYS IN-STATE, AND
THAT MEANS KEEPING ALL
THE LICENSE-HOLDERS
LEGITIMATE."

—Gordon Hope Jr.,
director of cannabis markets,
Applied DNA Sciences

INFUSING COCKTAILS WITH CANNABIS

Increased legalization over the past five years has precipitated a new perception of cannabis nationwide. Yet, firing up a joint or bowl in public remains likely to raise eyebrows. By contrast, imbibing alcoholic beverages is common practice in social settings. Kalvara (Kalvara.com), a new beverage infusion system, was designed to appeal to consumers who want a THC buzz without drawing attention to their cannabis consumption.

Using a patented technology called Vessl, Kalvara is packaged in small, nitrogen-pressurized "caps" that, with a simple twist, release a THC nanoemulsion into a proprietary bottle filled with two ounces of liquid. Once a cap's contents are dispensed, the bottle contains a 10mg serving of a neutral-tasting THC beverage that can be mixed with whatever the user wants to drink. Each Kalvara package contains four caps, and the bottle is reusable. Simply refill the container with water, attach a new cap, and it's ready to go again.

"This has one flavor, one function, and one dose," said Walter Apodaca, a twenty-five-year veteran of the beverage

industry who now serves as chief executive officer for Vessl (VesslInc.com) and Gizmo Beverages in Tempe, Arizona. "Kalvara can be a replacement for alcohol in social settings, but without the stigma of smoking or vaping."

One of the benefits of the Vessl technology is each dose in the caps is precisely measured, so the consumer can expect the same experience every time. The buzz

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Illustration by Kate O'Hara

sets in within ten to fifteen minutes, Apodaca said, so gratification is relatively quick compared to edibles.

The Vessl technology was developed by Scottish inventor Bernard Frutin, who created a pressurized delivery module that automatically expels its contents into a container of liquid when the user opens the container. Apodaca agreed to commercialize Vessl, and now he licenses the technology to partners in the U.S. and internationally.

Manufacturers of cannabis products face numerous logistical challenges getting their products to market, not the least of which is preserving freshness and potency as they make their way to retail shelves.

The Vessl's oxygen-depleted, nitrogen-pressurized environment keeps active ingredients fresh without preservatives and prevents oxidation caused by ultraviolet light. It's designed to optimize the freshness and potency of ingredients until the moment a consumer wants to partake.

Apodaca sees Vessl as a game-changer because it has the potential to reduce, dramatically, the amount of packaging material typically required for beverages and doesn't require refrigeration to keep the product fresh. He estimates about 700,000 Vessl units can be shipped per truckload, whereas only about 50,000 half-liter bottles—a more traditional size for beverages—would fit in the same space.

For the rollout, Apodaca said the company will stick to one flavor, but plans already are in the works to expand the product range.

"I see personalization, customization, and portability being really important, so people [will be able to] choose specific strains and their desired effects," said Apodaca. "Technology is the best way to deal with that, and so we expect to have five to ten different flavors and functions to help people relax, energize, and enhance libido or creativity."

In June, Apodaca and his Vessl technology won the Food and Beverage Innovation Forum's Marketing Award for the packaging product that disrupts the market via groundbreaking new technology.

TAGGING PLANTS WITH DNA

Ever wonder whence came that danky, frosty nug that landed on your doorstep when your canna delivery service made its weekly drop? If New York-based Applied DNA

Sciences has its way, you'll be able find out exactly which farm it came from with the help of a simple lab test.

Applied DNA Sciences has developed a type of controversial plant-tracking program that has law enforcement groups and regulators licking their chops while growers and other cannabis industry operators watch with caution. As the industry moves forward into more widespread markets, the company argues, its CertainT technology could be a boon for both the industry and the organizations tasked with overseeing it.

"With rigorous tracking on top of everything else, [CertainT] will give dispensaries reassurance that the product went through extra testing and what they're purchasing is aboveboard," said

John Shearman, executive director of marketing at Applied DNA Sciences.

"We can see [CertainT] being a badge on the packaging of things, like a Good Housekeeping seal."

In order for the tracking technology to be effective, every cultivator in a market would be assigned a unique tag, which would be sprayed on plants right after they are harvested but before they are dried and cured. This "CertainT" molecular certificate can be confirmed with a simple lab test that verifies the product's authenticity and origin anywhere it travels.

The company's formulation is based on water and a molecular tag that measures in the parts per billion. Tests have confirmed the tag adheres to plants throughout the processing and manufacturing cycle, so whether plants ultimately become oils, shatter, edibles, or other products, tests will detect the tag. Gordon Hope Jr., director of cannabis markets at Applied DNA Sciences, said the tag is "innocuous" and does not integrate with the DNA of the plant; instead, it's an additional

molecule.

Hope estimates the cost of implementing the system would be "less than 1 percent" of a product's retail price, and state inspectors could test at cultivators, processors, and dispensaries.

The tagging-and-testing technique already has been deployed in the cotton industry, where CertainT tracks more than 200 million pounds of Pima cotton. The technology also has been used to tag everything from microchips to pharmaceutical drugs.



IN THE FUTURE, DOCTORS
WILL BE ABLE TO
PRESCRIBE A CERTAIN
DOSAGE AND LOCK
THE DEVICE WHEN THE
PATIENT HAS USED UP THE
FORMULATION."

—John Adams, co-founder,
James Henry SF

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Dispensaries, regulators, and law enforcement officials potentially could use the tags to determine the origin of any cannabis or cannabis products, down to the farm where the plant was grown. If a cultivator owns a patent or other intellectual property related to a strain, the tag could help retail operators validate a product down the supply chain.

“When we look at it from a state and national level, the value proposition rises dramatically,” Hope said. “In Colorado, they are running a \$1.4 billion business and trying to protect it. They want to make sure money coming in stays in-state, and that means keeping all the license-holders legitimate.”


While every state that has legalized cannabis imposes some form of tracking program, most use software platforms to account for inventory as it works its way through the market. Employing a technology such as CertainT likely would require new legislation similar to that proposed in Colorado early this year. Though both SB029 and SB279 died on arrival in the state senate, the bills’ author, Senator Kent Lambert [R-Colorado Springs], has vowed to try again.

Applied DNA Sciences believes the technology could give doctors and patients more peace of mind when they are

buying products at a dispensary. “Doctors are concerned about getting the right formulation for patients,” Hope explained. “If I buy this brand, do I have the same experience? Clearly the answer is no. With the CertainT emblem on the package, it could become a recognized seal of approval.”

The tags also might be used to help demystify the true identity of strains, given the complex web of genetics and creative strain names that have evolved over the past few decades. In a recent study at the University of British Columbia, researchers found only a moderate correlation between cultivators’ ancestry claims and actual plant genetics.

A question is bound to come up with any tagging discussion: Is it safe to ingest DNA tags?

According to Hope, the short molecular tags used for traceability are chemically indistinguishable from the DNA in any of nature’s living things: humans, plants, animals, and bacteria. In other words, molecular tags are a new use for an ancient substance that is quickly metabolized and disappears once consumed. 



ADDRESSING THE OPIOID CRISIS

DR. OLGA OBIE IS A BOARD-CERTIFIED EMERGENCY MEDICINE PHYSICIAN WHO WAS WORKING IN TEXAS HOSPITALS WHEN SHE BEGAN STUDYING THE HEALING POTENTIAL OF CANNABIS-DERIVED MEDICINE. SHE MOVED TO THE SAN FRANCISCO BAY AREA TO WORK WITH PATIENTS WHO ARE INTERESTED IN CANNABIS-BASED TREATMENTS AND NOW PLANS TO OPEN A CLINIC IN HOUSTON TO CONSULT WITH PATIENTS ABOUT CBD AND NATUROPATHIC THERAPIES. SHE BELIEVES CANNABIS CAN HELP IN THE TREATMENT OF OPIOID ADDICTION AND MAY BE ABLE TO MIMIC OPIOIDS IN SOME TREATMENT PROTOCOLS.

WHY DO MOST PATIENTS COME TO YOU, AND HOW DO YOU DISCUSS CANNABIS TREATMENTS?

The majority come to me for terminal diseases, seeking cures for diabetes and cancer, and I have also started working with Alzheimer’s patients. My desire is to teach patients they can control their health, and that is the power. They can navigate medications and side effects and they are the powerful ones, not us. Then I can say, “Let’s talk about this and evolve your thoughts and treatment plan.”

Chronic pain is a huge issue. It’s enough to make people want to commit suicide because their life is threatened. When we start treatment, [cannabis] alleviates pain for them, which gives them immediate confidence in their health. They need time to heal; in order to

buy time, they need confidence. This support tells them they are on the right track. It’s important to say formulation-based medicine is more for symptom relief, whereas whole-plant medicine is more for healing, and one can’t go without the other.

CAN CANNABIS-DERIVED MEDICINE MIMIC OPIOID DRUGS?

Absolutely. In general, opioids are substances that affect our endorphin pain system. A lot has to do with pain and our sense of well-being, appetite, and other effects. You see the receptors they affect, and so you can get into the idea of reproducing the receptor effect and the overall effect without the negative side effects. Opioids are manufactured chemicals and only affect one or two receptors, and

there are no checks and balances. By contrast, cannabis mingles with our endocannabinoid system and self-regulates. So, when you see individual cannaboids, you can regulate the mimicking system you’re trying to accomplish.

WHAT IS THE NEXT STAGE FOR MEDICINAL CANNABIS?

Doing more research is invaluable, and I know of some physician groups that have PhDs involved in privately funded, controlled trials. But I don’t know of any that are formal programs. The problem is we need reproducible medicine and regulated medicine—meaning the regimen actually works and patients are not people who simply want to be under the influence.

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INVESTING IN AND RETAINING HUMAN CAPITAL



INSURVEY AFTER SURVEY, most business owners agree on one thing: Retaining the best employees ensures customer satisfaction, sales performance, and happy co-workers. If so many employers know this, why do they let great employees get away?

For one thing, there's a disconnect between knowing something and *understanding* it. For another, coming up with incentives that won't break the budget can be challenging.

CULTURE COUNTS

It's no secret that adopting a company culture of empowerment, trust, and collaboration creates a workplace that attracts talent. Jamie Seeker, principal consultant for business-management firm Seeker Solution, advises implementing the "two rules" amendment: One, be respectful, considerate and kind, even when you disagree, and two, always act in the company's best interest.

Seeker believes relentless pursuit of the two rules provides a basis for fostering a work environment with less drama, fighting, grudges, wasted time, and employee turnover. And throw out the antiquated requirement that employees seek approval for absences. "It's awkward having to ask a manager's permission to take time off," Seeker said. "We don't clock you in and out each day, so why should we track days off?"

A potential solution? Let employees make their own schedules. That may sound utopian, but focus group studies have shown allowing employees to coordinate time off with their clients or customers and team works well. "If company guidelines require X amount of hours spent per week per client, you'll go a long way letting employees schedule at their discretion," said Seeker.

BE SMART

Research industry wages before negotiating with employees, but remember: In the long run, investing in your human capital makes financial sense. Using

5

Habits of Highly Successful Employers

HIRE people for their values, potential, and professional goals. Train them to build their technical knowledge and skillset and to fill company needs.

PAY employees enough to take the issue of compensation off the table.

GIVE employees the resources, education, and support they need to do their job successfully.

BUILD trust by encouraging problem-solvers, not by employing mindless doers.

PROVIDE a healthy work/life balance.

the SMART model (specific, measurable, attainable, realistic, time-bound) to set expectations and goals is...well, smart. In fact, Seeker has used the method as a core solution during the fifteen years she has consulted with large, medium, and small businesses. Last year, when she segued into the cannabis industry, she was particularly eager to share SMART.

"Using goals and holding employees accountable is paramount—but do it by using data, not emotion," she said. "Make sure they have the tools they need to do their job. When systems are constantly down and they are having to spend the majority of their time troubleshooting because of inefficient or outdated systems, they become frustrated. All the wasted time lost in the inefficiencies goes straight to your bottom line."

When used properly, SMART will expose unfavorable behavior and underperformance, the first indicators something needs to be addressed. Although it is easy to assume underperformance lies with the employee, the core issue may be more systemic. "Remember, employees don't quit jobs. They quit managers," Seeker said.

OFFER PERKS

When it comes to value-added services, providing things like gym memberships, continuing education reimbursement, group fitness classes, or bonus and reward opportunities are important factors when employees are deciding whether to stay or go.

Also consider allowing employees the option of working remotely. Studies show more than 80 percent of employees consider telecommuting a perk. "Telecommuting is proven to increase employee output and productivity, positively impacting your bottom line," said Seeker.

Profit-sharing, while not for every company, not only serves as a perk but also cultivates a sense of buy-in for the team. "When the company is profitable, we are all profitable" is something every employee can grasp. "It's a great alternative to company bonuses, which have the potential to foster entitlement, versus black-and-white, defined profit-sharing metrics," Seeker said. "This is ideal for startups and fast-growing industries such as cannabis."

MIND THE BUDGET

Studies have shown the most common employee complaints in exit interviews are lack of performance feedback, no financial incentive, and lack of clarity about expectations. Studies also indicate poor communication from management and lack of leadership are the most common causes of employee turnover. A good way to minimize both sets of issues is to create transparent communication standards, policies, and expectations, and institute a 360-degree review process. "Offering 360-degree transparency with opportunities for bonuses and employee incentives aids in securing motivated new-hires and retaining top talent," said Seeker. "Be the boss everyone wants to come to with questions and for guidance, not the one they fear. Praise the good and handle the bad in a reasonable manner."

Before letting a great employee leave, remember: Lost productivity, a learning curve, and other, less-easily-quantifiable adjustments mean new employees can cost 50 percent to 75 percent more during their first year than retaining the previous employee would have cost.

"You must dedicate company resources to keep your current staff, or you will be spending those resources in replacing them," Seeker said.

TRAIN

Employee training programs aren't only about retention. They also help improve skills and abilities that greatly affect the bottom line. When employees are more efficient, they are more productive. "When employees learn and grow in their craft, they save the company in labor," Seeker said. "Of course, when employees experience growth and see continuous improvement in their performance, as well as the company's, they have increased job satisfaction, too."

PROVIDE OPPORTUNITY AND VALUE

"Studies show that newer employees want opportunities, while veterans want to feel valued," Seeker pointed out. She added that when examining the engagement and retention drivers of differently tenured employees, two things become clear: The longer an employee works for an organization, the more they need to feel valued by their leaders. Newer employees, on the other hand, are more driven by professional growth and career development opportunities. ^{mg}

—Rob Hill

SEEKERSOLUTION.COM

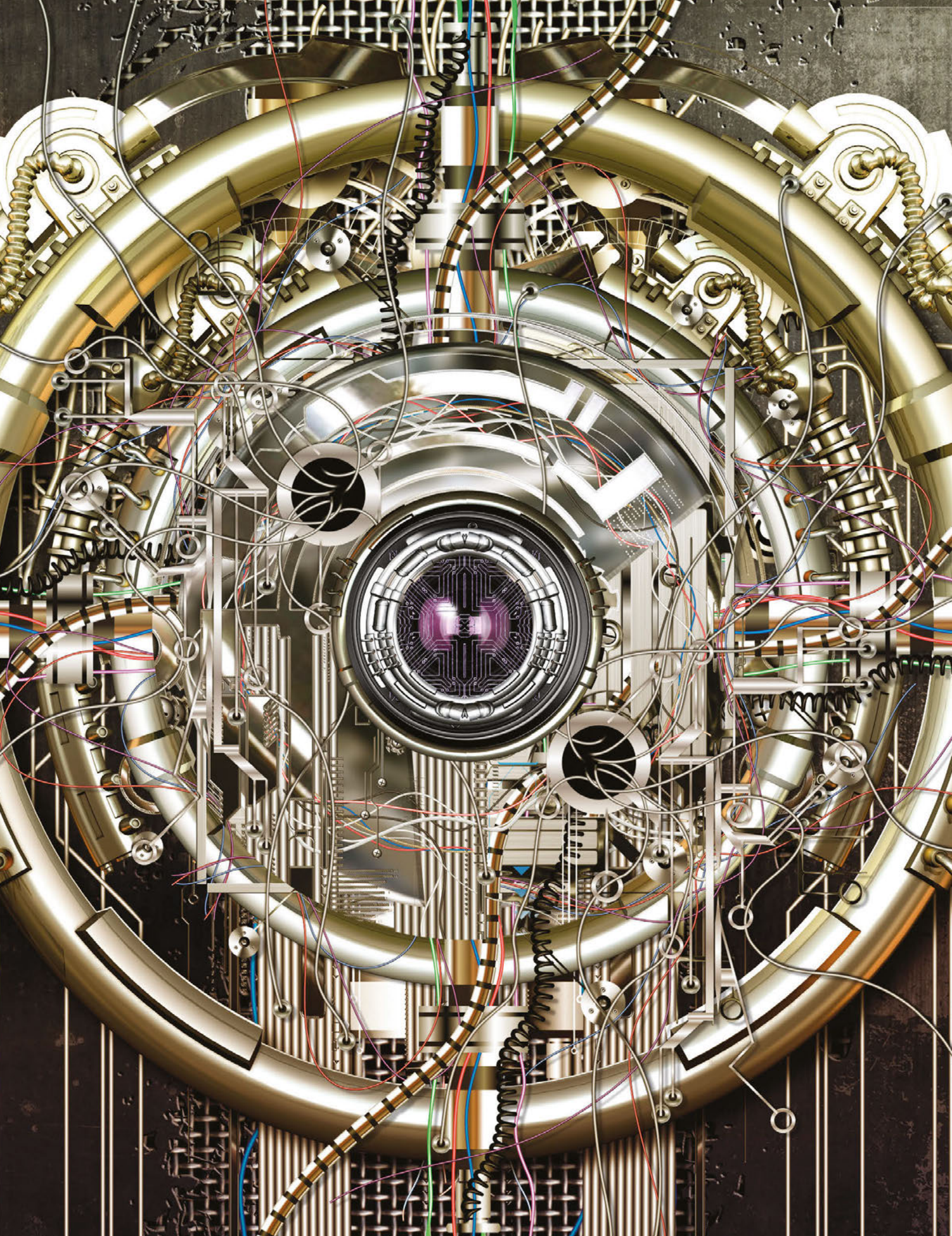
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TOMORROW TECH

A SELECTION OF INNOVATIVE PRODUCTS LEADING CANNABIS INTO THE FUTURE.

IT HAS BEEN SAID THAT CANNABIS WILL BECOME THE MOST TECHNOLOGICALLY ADVANCED INDUSTRY IN THE WORLD. That's a strange claim to make about a business built around a plant, but the prediction could end up being the understatement of the century. No matter the industry sector, cannabis is bringing out the techie in everyone—and for good reason. In the hottest growth industry in the nation, technological superiority could spell the difference between success and failure, especially with scaled cultivation. To that end, products, apps, and services aiming to improve efficiencies in farming are sprouting like...well, weeds.

The same is true in every sector. Vaping technology is in a perpetual upward trajectory in the drive to add new acolytes every day. Advances in lab testing technology are improving our understanding of what we put into our bodies. Cutting-edge retail technology will change the way we purchase not just cannabis, but everything. If necessity is the mother of invention, cannabis is the neediest industry around and should continue to be so for years to come.

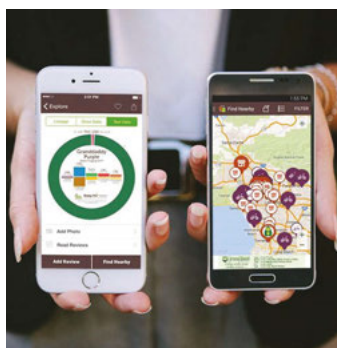
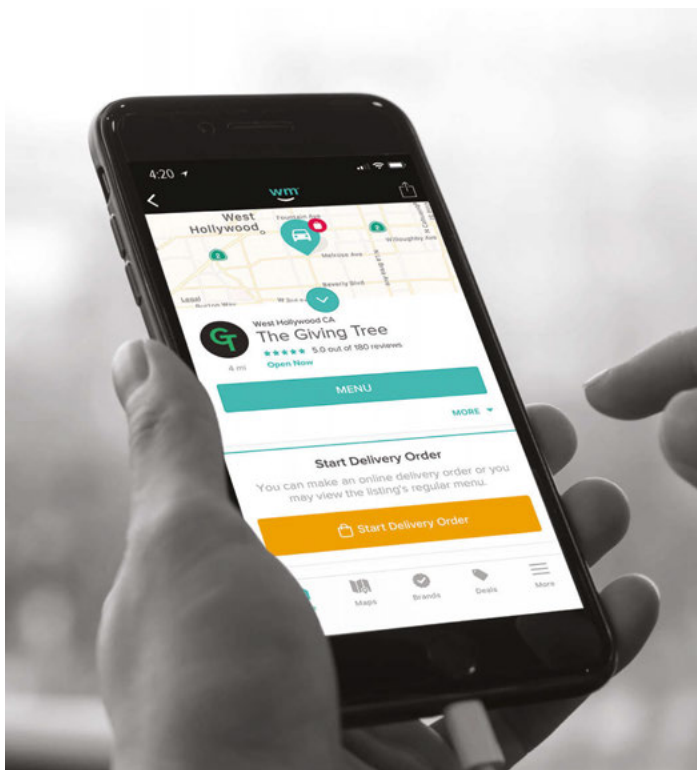
With that in mind, here are some of the technologies we think bear watching.

APPS + WEB

WEEDMAPS

MOBILE DELIVERY SEARCH ENGINE

Launched in 2009, Weedmaps became the go-to website and mobile app—a Yelp for cannabis—for discussing and reviewing local cannabis co-operatives and dispensaries in myriad states. Weedmaps also quickly became a popular method for locating brick-and-mortar retail establishments and delivery services. As the medical and recreational markets grew, the website branched out through acquisitions and strategic partnerships to solidify its tech roots. Weedmaps now has a database containing more than 3,000 medical dispensaries, reviews of more than 900 strains, and lists of hundreds of doctors. According to the company, millions of cannabis consumers exchange information through private messaging, chat rooms, forums, a job board, and Q&A. Recently, the site added a delivery service, which will enable consumers to order directly from Weedmaps. WEEDMAPS.COM

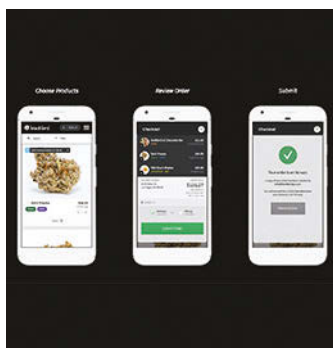


LEAFLY

DISPENSARY AND STRAIN REVIEWS



Founded in Seattle in 2010, Leafly—a mashup of Yelp and *Consumer Reports*—quickly became one of the world's biggest cannabis websites. With an emphasis on locating dispensaries and reviewing thousands of strains, the site now claims a whopping 13 million visits per month. To create a more robust experience, Leafly added an editorial component staffed by an army of content providers covering all things cannabis. LEAFLY.COM



BLACKBIRD

LOGISTICS SOFTWARE



Dubbed “your marijuana resource,” Blackbird began as a cannabis delivery service for the Las Vegas area but has expanded into an online community that publishes news, educates, and promotes activism. Deliveries cost \$1 per mile with a \$10 minimum. All Blackbird delivery drivers are subject to annual state and federal background checks and carry State of Nevada medical marijuana establishment agent cards. BLACKBIRDDGO.COM

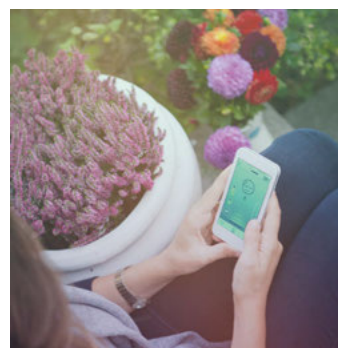


BDTNR

LEARNING MANAGEMENT SYSTEM



BDTNR is an online community where budtenders, dispensaries, brands, and consumers can interact. At its core, the site is a resource for budtenders to improve their trade, offering a safe place for caregivers and budtenders to tell their stories, demonstrate what they do, and address consumers' questions and concerns. The site contains a trove of passionate stories and uplifting tales about the healing power of cannabis. BDTNR.CO



RELEAF

CANNABIS EFFICACY APP



After watching his mother struggle with chronic pain, Franco Brockelman launched the Releaf app to help people like her track and demystify the world of cannabis. The data-driven app partners with dispensaries and doctors to track the results of cannabis treatments, then makes those results available to users suffering similar ailments. The app also reminds users when their next prescription is due. RELEAFAPP.COM



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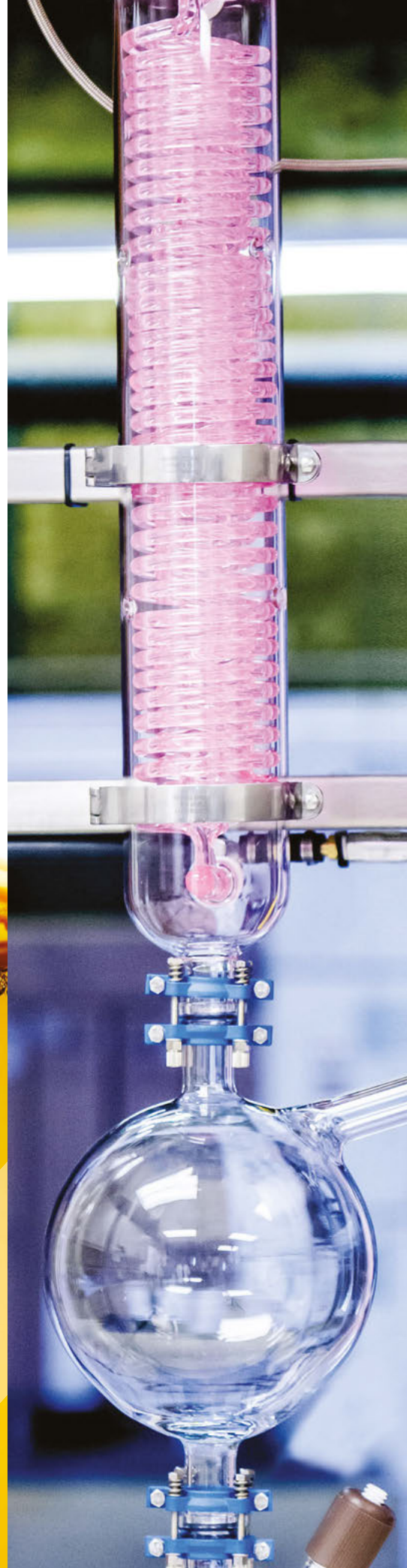


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TESTING / LABS



BENT IMMERSION PROBE

LOW-TEMPERATURE COOLERS

A manufacturer of temperature control solutions, Niles, Illinois-based PolyScience has adapted its best-selling Immersion Probe Cooler to be more lab-friendly. In improving overall benchtop layout by letting the hose hang directly on the edge of the glass, the BENT probe alleviates the need for harnesses or rigging to keep the hose in the correct orientation without compromising cooling power. The use of an immersion probe in a cold trap is a cost-effective substitute for dry ice in fractional distillation.

PolyScience Immersion Probe Coolers are designed to hold constant temperatures at maximum cooling potential, saving time and money over volatile consumable dry ice by providing heat removal on demand with no upkeep. Available in two sizes with cooling capacities of 100 watts at -80°C (model IP-80) and 35 watts at -80°C (model IP-100).

POLYSCIENCE.COM

PATHOGENDX

DNA-BASED TESTING KIT

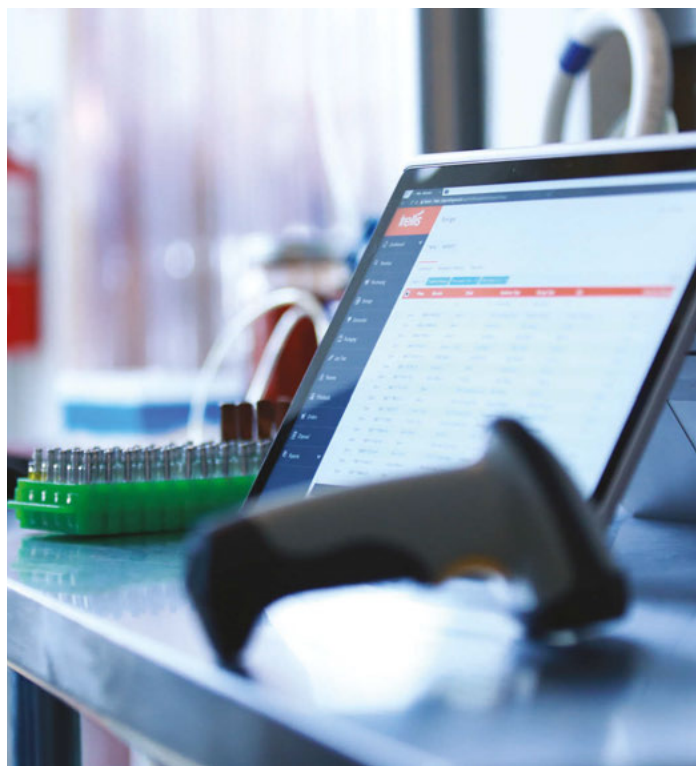


Offering the next generation “standard” for very-large-scale cannabis, botanical, food, and agricultural testing, PathogenDx threatens to end the dominance of the venerable petri dish via its Dx-C technology. The process can test dozens of botanical, food, or agricultural samples and analyze the data in fewer hours at 30-percent less cost than conventional plate culturing or real-time PCR techniques.

PathogenDx combines two technologies in a novel approach to detecting pathogens that harm humans, plants, and the environment. Raw sample genotyping (RSG), the first arm of the platform, allows raw samples—leaf/produce washes, swabs, or leaf/produce homogenate—to be analyzed at the DNA level without DNA purification, quantitation, and quality analysis. Low cost microarray (LCM), the second arm of the platform, enables labs across the world to perform twelve to forty-eight tests in parallel, analyzing ten to twenty pathogens simultaneously.



PATHOGENDX.COM



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CHILD RESISTANT SOLUTION

Child Resistant packaging compliant with July 1 regulations



**PATENTED
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US Patent 8,863,947 B2 / US Patent 9,878,821 B2

US Patent Pending CPSC 16 CFR part 1700.20

Child Resistant Lid Patent Pending: Pub #US-2017-0355-495-A1

VAPES

DR. DABBER SWITCH



With its patent-pending electromagnetic coil induction heating system and five LED lights to heat wax or herb, SWITCH is a singular product. Standing 9.5 inches tall, its hourglass design is both handsome and functional. All the pieces snap together, making the device simple to assemble. The glass at the top of the unit emits a cool, psychedelic light.

DRDABBER.COM



LOTO LUX

Loto Labs's Lux is a uniquely designed handheld vaporizer featuring a patent-pending magnetic induction process that requires no contact with electrical components and distributes heat more evenly than current resistance vaporizers. Generating concentrated magnetic waves trained on the product to vaporize it evenly in seconds, maximizing flavor and satisfaction, the Lux's unique capsule system also allows for multiple sessions using different products.

LOTOLABS.COM



STORZ & BICKEL MIGHTY

A first-class vape with a potent battery, futuristic good looks, and a patented combination of hot-air convection heating and conduction, Mighty is portable but not pocketable. The device's stats are impressive: It heats at 104°F to 410°F (40°C to 210°C), takes only 90 to 120 seconds to heat up, and can last all day on one charge.

STORZ-BICKEL.COM



SILICON CALI B-LAZE LASERBONG

Created by Silicon Valley tech minds, the B-Laze is straight out of a Ridley Scott sci-fi thriller. Made from silica- and boron-trioxide-rich borosilicate glass, the device is powered on by a keyed ignition. A smartphone app controls bowl rotation, lights, settings, and the two-watt, 445Nm-frequency laser at the heart of the beast.

SILICONCA.LI



THE WISP

Created by CK Inc., a Massachusetts-based technology startup, the Wisp is a medicinal-looking vape with multiple pre-packaged, high-quality pods containing different herbal blends. As a healthcare-centric product, the Wisp is made to provide users with consistency without mess; the pods are recyclable. The futuristic-looking pods are a patented design that, when combined with the Wisp's microprocessor, create a fresh, holistic vaping experience.

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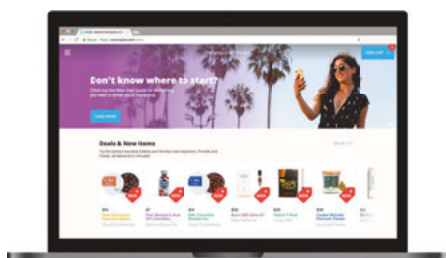


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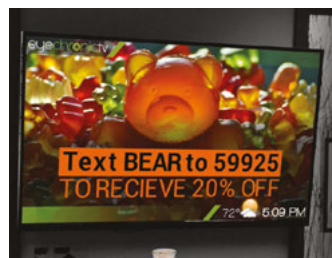


EAZE

DELIVERY SERVICES

Launched in 2014, Eaze—"the Uber of pot"—is a California-only lead-generation and delivery service with a twist: The background-checked drivers work for participating licensed dispensaries, not Eaze. With technology based on advanced algorithms that sync with GPS, Eaze claims to make drivers' jobs simpler and more efficient. The company is one of the fastest growing tech businesses in the industry, with deliveries surpassing 2.2 million to date.

EAZE.COM



EYECHRONIC

ADVERTISING

An ad-based network, Eyechronic broadcasts hourly cannabis nuggets consumers can digest while shopping in their favorite dispensary. In addition to the segments, Eyechronic's back-end tech provides valuable data and analytics about what's selling, plus customer testimonials. The system also provides a point-of-sale-integrated dispensary menu and training courses.

EYECHRONIC.NET



SUNDERSTORM

SUBLINGUAL NANO-MOLECULAR TECHNOLOGY

Because the digestive tract dilutes THC and CBD and the liver converts THC into a compound that can produce anxiety, edibles' effects may be delayed and sometimes don't unfold the way users expect. Sunderstorm addressed those challenges by wrapping cannabinoids in nanomolecules of fatty lipid "smaller than a wavelength of light." Placed under the tongue, the water-soluble oils carry THC and CBD directly into the bloodstream, allowing rapid onset of effects and reliable dosing.

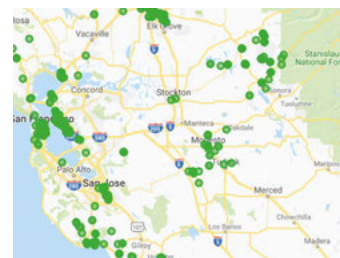
SUNDERSTORM.COM

CANNTRADE

BUYING/SELLING PLATFORM

A wholesale platform, CannTrade was created as a simple-yet-thorough tool for business management and expansion. The platform includes a store locator map, a wholesale storefront that enables 24/7 ordering, and the ability to track orders and accounts. CannTrade also allows brands to promote their products directly to clients and can assist with compliance issues and taxes.

CANNTRADE.COM



POTBOTICS

VIRTUAL BUDTENDER

A consumer app, PotBot, works like a virtual budtender, helping patients find the strains and products that meet their specific needs. PotBotMD, an artificially intelligent, HIPAA-compliant software-as-a-service platform, aggregates and correlates data to help doctors and their patients define treatment plans and better predict outcomes. Dispensaries can partner with the PotBot system to get help stocking their shelves based on app feedback from their patients.

POTBOTICS.COM



HUXTON



Cannabis blends labeled by effect. Live the life you choose to lead and bring the right experience to your moment.



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HORTICULTURE



TRELLA

PLANT TRAINING SYSTEM

TRELLA INDUSTRIES is a fledgling technology company focused on helping improve the future of agriculture through innovative techniques that allow indoor crops to grow larger than previously thought possible. The Massachusetts-based startup has created the patent-pending prototype for a plant training system that gently instructs plants to grow horizontally rather than vertically.

“Growers using indoor vertical farming setups are missing out on huge markets,” said Chief Executive Officer Aja N. Atwood, who developed the concept after having trouble growing tall cannabis in a small basement. “Until now, there hasn’t been an easy way to grow tall plants like hemp, tall strains of cannabis, wheat, or tomatoes indoors. Our device and system will help growers increase product offering, lower operating costs, and reduce plant stress and human error.”

The company recently launched a crowdfunding campaign on Indiegogo to help the agritech startup reach its next production phase. Seeking funds to help accelerate the production of units for beta-testing by professional farmers and growers, Trella plans to gift production-ready plant training units to independent growers through a community outreach initiative called SXG1. The program, which Atwood said will empower the indoor farming community on all levels, includes state-registered medicinal cannabis caregivers and non-profit urban farmers serving “food deserts.”

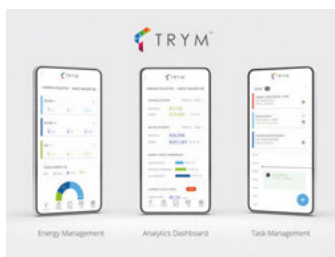
Per Trella Vice President of Engineering Andres “Dre” Chamorro III, “This is just the beginning, but we know our technology will be transformative for farmers, industrial cultivators, and even home growers who have limited space or restrictions on the number of cannabis plants they can legally grow at home.”

TRELLA.IO

CONSCIENTIOUS BY DESIGN

Founded by “a pair of mechanical engineers with a conscience,” Trella’s mission is to use technology to make indoor farming accessible, sustainable, and market-friendly. The prototype allows farmers to:

- ▶ Reduce human-introduced contamination.
- ▶ Reduce plant stress by lowering the potential for mishandling.
- ▶ Increase yield and reduce operating costs by optimizing space and light.
- ▶ Diversify the range of strains to meet market demand.



TRYM ENERGY MANAGEMENT

Using proprietary software designed specifically for commercial-scale indoor farms, Trym combines building management capabilities with control algorithms to deliver a PlantFirst™ approach to energy management. Focused on energy efficiency, automation, and sustainability, the Bay Area startup offers “actionable insights” about energy use in an industry where energy costs can account for as much as half the total wholesale price of one crop. TRYM.IO



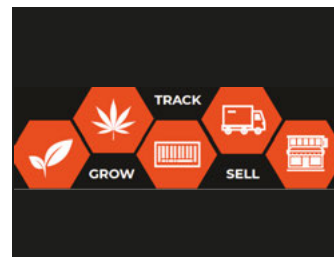
LODESTONE RFID PLATFORM

Lodestone Data Technologies's enterprise-level inventory and grow management solution uses radio frequency identification (RFID) to automate inventory and capture data about a plant's growth cycle clone to harvest. Software synchronizes cultivation data with compliance systems, minimizing error and maximizing efficiency, and the proprietary MöGrö platform lets farmers administer inventory via handheld or fixed-mount equipment. LODESTONEDATA.COM



GROBO ONE GROW BOX

The Grobo One is a fully automated hydroponic grow box that fits easily into any space in a home or apartment. Utilizing the latest technology and data to optimize the growth of plants, users simply plug it in, plant seeds, and select from more than 100 recipes on the Grobo app—including cannabis strains like Sour Diesel, Grand Daddy Purps, and Lemon Thai Kush—and let the Grobo do the growing. Requires a WiFi connection. GROBO.IO



TRELLIS INVENTORY MANAGEMENT

An early prototype of the Trellis software was incubated by Toronto cultivators dissatisfied with the tools available to manage their operations. They used their inventory management experience to design an intuitive system from the operators' perspective. Today, Trellis is a full seed-to-sale platform featuring inventory tracking, purchasing, and cultivation management, all controlled through dynamic dashboarding with real-time updates. TRELLISGROWS.COM



NOT ALL CANNABINOIDS ARE DELIVERED EQUALLY

AVAILABLE IN
Sunrise CBD
Harmony 1:1

Lightning Strike 1:20

Amplify Nano THC

Vitality 3:1 +5HTP

Tranquility Sleep Formula

Lucidity 1:3 +5HTP

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RETAIL



WURK

HUMAN RESOURCES

Tackling one of the industry's biggest headaches, WURK is a payroll, timekeeping, and human resources platform created especially for all segments of the cannabis sector. An all-in-one "human capital management" suite, WURK not only automates the payroll process, labor costs, and scheduling, but also has the ability to drill down and solve confusing compliance issues like Fair Labor Standards Act specifications, fluctuating tax regulations and rates, paid sick leave, new employment laws, Affordable Care Act issues, and Family and Medical Leave Act requirements.

Among WURK's standout features is a time-and-attendance solution that allows employers to maximize 280E deductions and minimize labor disputes about overtime and time off. Another particularly helpful component is the Applicant Tracking System module, which enables management of the hiring process end-to-end, including background checks, and leaves an audit trail. The scheduling function helps employers help their employees maintain a healthy work-life balance; an associated app lets employees check their schedules remotely and notifies them of schedule changes on the fly. ENJOYWURK.COM

FIRESALE

GEO-MAPPING



A web-based app, tech-savvy Firesale uses geo-mapping technology to help consumers find the best local deals for flower and infused products. Real-time price- and value-based searches, GPS capabilities, potency and strain searches, a strain index, and myriad push notifications are among the software's strengths. A reservation system makes product selection and pick-up as easy as clicking a button. The feature locks in the consumer price at the time of reservation.

The app offers benefits for dispensaries, too. According to Chief Executive Officer and co-founder Damien Payne, the platform integrates with POS systems to help dispensaries move inventory more strategically: Automatic price reductions may be pushed to Firesale users when the system flags products as overstocked or about to go stale.

Currently in beta for the Boulder, Colorado, area, Firesale is in the process of unlocking Sacramento and the Bay Area in California, plus Seattle. More cities are on the docket for 2019.

FIRESALE.COM





GRASSHOPPER

DISPENSARY SALES TOOL

Launched by a group of cannabis-savvy veterans, Grasshopper produces automated kiosks for dispensaries. Compliant with the Americans with Disabilities Act, the kiosks—essentially vending machines for weed—are equipped with teller-assist technology and state-of-the-art touchscreens, and they're customizable to carry products of different sizes and shapes. They're also temperature- and climate-controlled, so they can stock perishables and fluids.

For retailers, the kiosks provide a controlled-access inventory system, producing product tracking data that can be synced with many POS software platforms.

Ultimately, Grasshopper kiosks are time and labor savers. Stocking them with a dispensary's most popular items creates a "fast-lane" self-checkout line, freeing budtenders to help patients who require personal assistance and relieving savvy shoppers of frustrating wait times during busy periods. Berkeley Patients Group in the Bay Area was one of the first shops to install a Grasshopper kiosk and, according to the dispensary's CEO, the shop recorded more than seventy transactions at the kiosk on its first day in operation.

GRASSHOPPERKIOSKS.COM



ORGANIC DRY COMPOST TEA CONCENTRATE

Photo courtesy of:



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PISTIL POINT



Dying Breed SEEDS

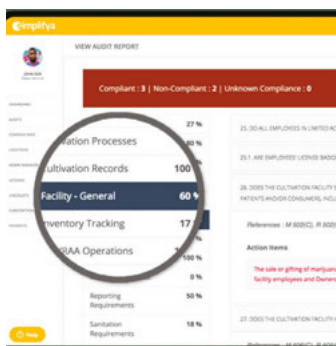
SECURITY / COMPLIANCE

VIVOTEK MULTI-SENSOR CAMERA

SECURITY SYSTEM

Vivotek's MS9390-HV multi-sensor dome network camera is the company's latest and most efficient panoramic, networked surveillance camera. Equipped with two wide-angle lenses, electronic image stitching, and dual high-resolution sensors, the eight-megapixel, 180-degree-view camera can maintain a higher vertical field of view (FOV) than most traditional multi-sensor panoramic cameras using four sensors. The higher vertical FOV enables more video coverage, thereby enabling users to capture more evidence below the point of camera installation. The MS9390-HV also features WDR Pro high-dynamic range technology for high-contrast environments, thirty-frames-per-second image capture at full resolution, and 180-degree infrared illuminators up to twenty meters, providing users with 24/7 comprehensive panoramic video surveillance.

VIVOTEK.COM

SIMPLIFYA
COMPLIANCE SOFTWARE

Founded in 2016, Denver, Colorado-based Simplifya offers compliance software for a cannabis industry drowning in mandates. With easy-to-use tools for scheduling, audit management, and tracking issues, Simplifya gives businesses a 360-degree view of their compliance requirements and the ability to delegate, review, and proactively manage tasks across all facilities and license types. As cannabis companies quickly are learning, compliance never ends.

SIMPLIFYA.COM

365 CANNABIS
SEED-TO-SALE PLATFORM

Offering what the company calls "the ultimate seed-to-sale experience," 365 Cannabis uses Microsoft's enterprise resource planning solution to provide the sophistication, scalability, and security of a program fully compliant and customizable for specific processes. Powered by Microsoft Dynamics, 365 Cannabis integrates seamlessly with Office 365, so email, calendar, and files merge seamlessly with data, reports, and business processes to improve workflow and efficiency.

D365CANNABIS.COM

FLOWHUB
BUSINESS MANAGEMENT SOFTWARE

One of the original Metrc-approved vendors with years of compliance experience, Denver, Colorado-based Flowhub is a "grow-to-retail" business management platform that has helped cannabis dispensaries in Colorado, Oregon, Alaska, California, Michigan, Maryland, Montana, Massachusetts, and Nevada stay compliant with state regulatory agencies and send reports automatically via the Metrc API. Features include inventory distribution, NUG for retailers, and cashless payments. FLOWHUB.CO

KRYPTALL
VOICE ENCRYPTION

Heads of state, Fortune 500 executives, and privacy advocates worldwide use Kryptall's patent-pending, user-initiated encryption technology for secure voice and data communications. The system, which requires modified, hardened IP phones or iPhones provided by the company, allows calls to anyone, anywhere, via the internet. According to the company, the calls can't be traced and call records are not stored. KRYPTALL.COM



CANNABIS CASH SOLUTIONS

CASH MANAGEMENT

Cannabis Cash Solutions provides automated answers to problems faced daily by retailers in a cash-intensive industry. The company offers back-office, point-of-sale, and mobile solutions, including a Smart Safe cash deposit vault that automatically counts cash and stores it for pickup. The retail solution dispenses cash automatically while the mobile solution secures cash that is no longer accessible by the driver. CANNABISCASHSOLUTIONS.COM



NATUREPAY MERCHANT ACCOUNTS



Founded in 2015, Naturepay is a banking and merchant account solutions provider for the high-risk cannabis industry. Products and services offered by the Anchorage, Alaska-based company include debit and credit card processing, point-of-sale equipment, an online payment gateway, gift and loyalty programs, ATM placement, and cash management and security. Clients include marijuana, cannabis paraphernalia, and CBD retailers. NATUREPAY.NET

BANKING / PROCESSING



PARAGON CRYPTOCURRENCY

Blockchain technology company Paragon is unique in that not only has it developed a cannabis-specific cryptocurrency called PRG Coin, but it's also developing a shared workspace for the industry. Expected to open in mid-summer, Paragon Space will offer flex desks, offices, lounges, and conference rooms. Located in Hollywood, California, the facility was purchased with PRG Coin, which also must be used to pay all rent. Even vending machines and other services will accept only PRG Coin payments.

PARAGONCOIN.COM



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POS



COVA

POS SOFTWARE

Cova describes its point-of-sale platform as “a Batman utility belt for budtenders.” An ID scanner, loyalty point program integration, auto-application of in-store discounts, cash management tools, and seamless integration with BioTrack and Metrc help Cova maintain an average end-to-end transaction time of 1.4 seconds. Additional features for enterprise resource planning, customer relationship management, e-commerce, and regulatory compliance make the system a complete retail-management software suite.

While any good POS system does most of the heavy lifting required to keep a cannabis business running, Cova also enhances the consumer experience with extras like cutting-edge digital signage and touchscreen menus. Parent company iQmetrix based its cannabis industry products on experience gained from providing similar POS services to the cellphone retail verticals. Cannabis-specific technology includes interactive signage that allows consumers to browse products and view live inventory. When a product sells out, the menu automatically updates and suggests the customer try something similar.

COVASOFTWARE.COM

BIOTRACKTHC

SEED-TO-SALE PLATFORM



BioTrack's comprehensive product suite comprises a software system designed to be transparent, accountable, consistent, and scalable. By monitoring key data points during cultivation, harvest, extraction, packaging, transport, and dispensing, the platform has become a standard for both business management and government oversight. In fact, in 2013 Washington state tapped BioTrack to develop the Washington State Traceability System, the world's first real-time cannabis seed-to-sale program.

To date, more than 2,000 retail locations in Washington, Delaware, New Mexico, Illinois, New York, and Hawaii have processed more than \$10 billion in sales through the system. Puerto Rico's nascent industry is expected to come online soon.

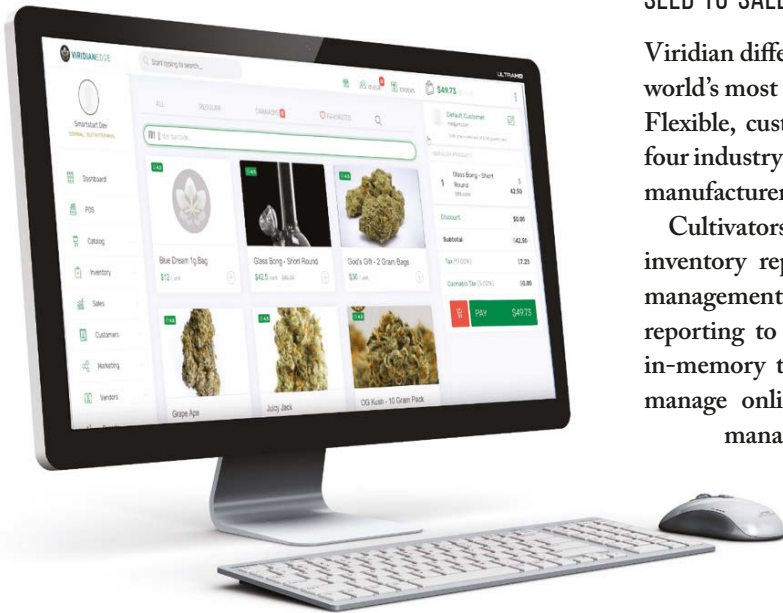
Whether cloud-based or locally hosted, solutions are extensively customizable for dispensaries, cultivators, processors, and manufacturers. Options include yield forecasting, genealogy tracking, monitoring plant applications, customer profiles, discounts and loyalty programs, purchase limits, conversion tracking, inventory audits, and automated data entry via integrated hardware. Integration partners provide additional services like online ordering and digital menu displays.

BIOTRACK.COM



VIRIDIAN

SEED-TO-SALE PLATFORM



Viridian differentiates its seed-to-sale platform by building on one of the world's most recognized financial software solutions: SAP Business One. Flexible, customizable, and secure, Viridian's scalable system supports four industry segments: retailers, cultivators, distributors, and processors/manufacturers.

Cultivators can manage their grows with Viridian's real-time stats, inventory reports, environmental control integration, and warehouse management. Processors are supplied with the required information for reporting to state systems, application performance, and analytics via in-memory technology. Dispensaries may customize in-store displays, manage online menus, and integrate e-commerce. Distributors can manage supply chains; process, package, and ship orders; forecast future supply and demand, and anticipate costs. All segments are supplied with the necessary tools to maintain financial and regulatory compliance. Data is stored in a single, secure cloud system where it is easy to access.

VIRIDIANSCIENCES.COM



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INSURANCE: THE CANNABIS INDUSTRY'S WHITE WHALE

BY JASON HORST, FOUNDER, HORST LEGAL COUNSEL

FOR DECADES, it was one of those white whales for cannabis operators: an insurance company that would both knowingly cover cannabis operations and pay out even the smallest claims when losses occurred. Few brokers were bold enough to brave this new and unique market. Genuine coverage for most catastrophic business losses was, quite simply, non-existent.

How times have changed! Almost every cannabis networking event has at least a handful of insurance brokers in attendance, and there are now dozens of insurers serving the industry. Cultivators, distributors, manufacturers, and dispensaries finally have the ability to shop for different policies that cover different aspects of their operations. In California, the Department of Insurance even has begun to approve insurance products offered by state-backed “admitted” insurance companies. *[Admitted insurance companies must file their rates and requirements for coverage with the state; non-admitted companies are under no such obligation. —mg]*

And those catastrophic losses? Try telling the Central Valley cultivator that just recouped \$1 million in fire-related losses genuine cannabis coverage is non-existent.

Nonetheless, navigating cannabis insurance markets remains exceptionally challenging. While there are a number of carriers in the market, they are spread across many different “lines” of coverage—general and products liability, property, professional liability, cyber liability, auto liability, crop coverage, and workers’ compensation, to name just a few. Each of these policies is offered on forms with language different from the next, and that language ultimately defines what is and is not covered. Far too often, significant risks remain uncovered by most policies; for some major exposures, no coverage is available at all.

THE GOOD

New carriers have trickled into the markets in recent years and pushed the envelope regarding the extent to which they expressly



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and conspicuously offer coverage for cannabis companies. Given the money laundering concerns that guide so many financial institutions away from the cannabis industry, this development is far from trivial. In addition to products customized by three different admitted insurance companies, the California Department of Insurance has approved a set of standardized forms built specifically for the cannabis industry, around which any affiliated insurer can build a policy. The non-admitted “surplus lines” markets are even more robust and increasingly are competing on the basis of who offers better coverage rather than who offers the cheapest policies. Finally, the brokers who have gravitated to the cannabis market in recent years generally are quite capable and conscientious.

Significant data points indicate thoughtfully procuring strong coverage pays off—literally. Following the recent California wildfires, headlines were consumed with stories about how none of the state’s cannabis farmers had any coverage at all. That was both true and tragic. At least a handful of operators in the Central Valley, however, had a broker with the foresight to negotiate coverage for changes in environmental conditions. The Central Valley cannabis operators now are slated to receive a total of roughly \$8 million in payouts from the carrier, including a \$1 million recovery for one cultivator. This is precisely how carrying insurance is supposed to work.

The United States district courts should get some of the credit for the above developments. In particular, a Colorado judge’s decision in *Green Earth Wellness Center LLC v. Atain Specialty Insurance Company* created a workable framework for handling the enforcement and interpretation of cannabis insurance policies in the courts. The court in *Green Earth* rejected several lines of argument from the insurer—who knowingly had insured a cannabis greenhouse operation—that the presence of cannabis rendered the policy unenforceable or triggered exclusions for “contraband” and the like. At the same time, the court refused to write crop coverage into a policy that contained a clear exclusion for “growing crops.” In sum, the court required the insurer to stand behind its policy but not to pay for losses that were clearly not covered under the policy. This, again, is precisely how insurance coverage is supposed to work.

THE BAD

Despite the progress the industry has made with insurance coverage, most policies include language that removes a staggering amount of risk exposure. It is hard to find real-world circumstances under which the saying “one bad apple spoils the bunch” applies as neatly as it does to an insurance policy. Fifty to 100 coverage-expanding pages of policy forms can be rendered effectively moot by a single-page exclusionary endorsement.

Although admitted insurance carriers tend to offer policyholders predictable terms and results, the first admitted cannabis products liability policy in California excluded coverage for injury or damage resulting from, among (many) other things, pesticides, illness, disease, and...wait for it...cannabis impairment. There goes your coverage for virtually every lawsuit cannabis companies are likely to see in the next few years.


Other policies include better-hidden but equally problematic language, such as one endorsement in another admitted company’s policy form that expressly eliminates coverage unless operators are in full compliance with each and every applicable state and local law, regulation, or ordinance. At first blush, such a “compliance with applicable law” endorsement arguably requires merely that licensed cannabis operators do what they already are required to do: adhere to state and local laws and regulations.

The problem, as any licensed California cannabis operator can attest, is complying with voluminous and ever-changing rules is difficult. Perfection in this task is practically impossible, and carriers have every incentive to scrutinize policyholders’ operations for evidence of any noncompliance.

Another issue: Even if a policy miraculously is devoid of the types of poison-pill endorsements discussed above, policies often fail to include things like the adequate third-party coverage required to comply with contractual insurance requirements, resulting in potential breach of contract claims.

Finally, certain coverage continues to elude the industry entirely. The outdoor crop coverage that could have helped so many Emerald Triangle and Sonoma County farmers, as well as coverage for property in transit (essential for distributors), generally is unavailable, though captive insurance solutions are cropping up in an effort to change that. Remember the carrier that paid \$8 million based on its coverage for changes in environmental conditions? It immediately picked up stakes and left the industry behind, and no other carrier is willing to offer the same language. So, similar victims of the next wildfire-related losses are less likely to recover.

THE LESSON

For all these reasons, it is critical that operators carefully review the insurance policies they consider purchasing to cover their practical risks and contractual commitments. Doing so can help cannabis operators survive major business losses and continue to do their part in building this unique industry. 



JASON HORST represents businesses, public entities, professional and nonprofit organizations, and individuals in complex civil litigation and appellate cases involving a wide variety of contract, real estate, insurance coverage, and technology disputes. A member of the National Cannabis Bar Association, he has a record of success representing both plaintiffs and defendants at trial, on appeal, and in alternative dispute resolution proceedings. HorstCounsel.com



THE NATIONAL CANNABIS BAR ASSOCIATION was formed in 2015 by a group of lawyers who saw a need to educate and connect with other cannabis industry lawyers in order to ensure excellent, ethical, and advanced legal assistance for the industry. NCBA hosts a variety of networking and educational events. The organization’s next in-person continuing legal education course will take in Washington, D.C., September 7-8. CanBar.org

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HARD GOODS

HARD EDGE LATITUDE LIGHTER

From Tsubota Pearl, this refillable butane lighter with a minimalist design comes in black and clear. A ribbed polycarbonate shell reveals the copper-hued metal casing within, creating a clever interplay of line and texture.

Made in Japan.

TSUBOTAPEARL.CO.JP

HAZE SQUARE VAPORIZER

The first quad-chamber vaporizer to hit the market features an on-demand convection heat system that allows little to no wait time between draws. Compatible with all material types—herb, concentrate, and liquids—the device's interchangeable material pods let users easily switch from one material to another.

HAZESQUARE.COM

ROSINBOMB ROCKET

Rocket is a professional-grade, solventless rosin press for home use. Small (10" x 6" x 6"), portable, and powerful, the device applies 1,500 pounds of force. The organic process requires no solvents. Made of quiet, high-quality 22-gauge stainless steel; plugs into any 11-volt or 220-volt outlet.

ROSINBOMB.COM

PAXIOM POPLOK VS

Easy-to-operate automatic tray-forming solution designed to erect self-locking corrugated and paperboard trays with or without a lid. The primary difference between the PopLok VS system and its standard PopLok predecessor is the ability to handle a tighter range of tray sizes and a simpler design.

PAXIOM.COM

GREENGO GRINDERS

These two-inch, three piece, 100-percent biodegradable grinders are made from Hemplyne, a completely biodegradable, hemp-based plastic material composed of organic fibers, hemp, polyacrylic acids, and lignin (a by-product of the paper industry). Smart, affordable, and eco-friendly.

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EYEHORTILUX.COM

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SMARTCANNABIS.COM

SENSAPHONE HARSH CLIMATE SENSORS

Sensaphone's comprehensive line of remote monitoring products safeguards valuable assets by tracking critical environmental data such as temperature, humidity, and power failures. The harsh climate models detect outdoor humidity, outdoor CO₂, and dew point, providing alerts and proactive monitoring data.

SENSAPHONE.COM

LUMIGROW SMARTPAR WIRELESS CONTROL SYSTEM

This app enables growers to manage LumiGrow LEDs remotely.

Quickly set up lighting zones, enable automation, and gain control over intensity, spectrum, and photoperiod. The software also monitors energy usage, fixture status, and switches the system to white-light mode for crop inspection.

LUMIGROW.COM





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PSYCHOACTIVE

FLAV GUMMY BEARS

Each Flav gummy bear is individually infused with sour fruit flavor and cannabis oil for taste appeal and medicinal effect. There's nothing organic or all-natural about the treats, but some things exist simply to be fun. Packages contain 10 doses of either 10mg or 25mg THC. FLAVRX.COM

LIFTED ELEVATED EDIBLES

Organic fruit and nut bites in six flavors: Pineapple Delight (indica), Superfood Brownie (hybrid), ginger (sativa), blueberry (variety), granola (variety), cherry mango (hybrid). An additional variety pack contains four flavors. Raw, vegan, organic, non-GMO, gluten free, and hand-crafted. Four bites per bag, each 25mg THC. LIFTEDEDIBLES.COM

WANA DROPS

Wana Drops are a bite-size hard confectionery item available in three all-natural flavors—Kiwi-Strawberry CBD/THC 1:1, Tangerine Sativa, and Watermelon Indica. Designed for precise dosing, each drop contains

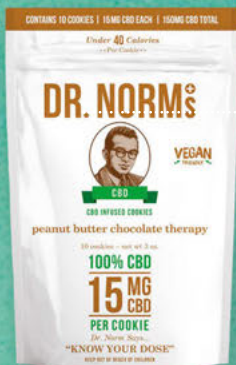
5mg of THC. Wana Drops come with 20 servings, 100mg total THC, per package. WANABRANDS.COM

QUEST AEROINHALER

An alternative to smoking and vaping, Quest's AeroInhaler delivers 10mg of pharmaceutical-grade distillate enhanced with live resin terpenes directly to the lungs. According to the manufacturer, each puff maintains an enticing flavor profile without heat, combustion, or throat burn. 100 puffs per canister; 6.8mg THC per puff. AEROINHALER.COM

ATLAS EDIBLES GOURMET GRANOLA CLUSTERS

Four varieties, each designed for a different taste and experience. Stratus (hybrid) promotes evenness, nurturing, and healing. Ember (sativa) promotes alertness, functionality, and creativity. Nimbus (hybrid) promotes balance, mindfulness, and playfulness. Origin (indica) promotes Relaxation, Healing, and Well-Being. Eight servings per package; 10mg THC and 40-50 calories per serving. ATLASEDIBLES.COM



NON-PSYCHOACTIVE

DR. NORM'S CBD PEANUT BUTTER CHOCOLATE THERAPY COOKIES

Infused with Dr. Norm's "laugher is the best medicine" attitude and 15mg of CBD from medical-grade plant extracts, these all-natural, 100-percent vegan bites are fortified with niacin, thiamin, riboflavin, and folic acid. Ten cookies/150mg CBD per bag; thirty-eight calories per cookie. DOCTORNORMS.COM

HEAVENSENT HEMP CHT+

Artisanally handcrafted from bioactive, phytocannabinoid-rich industrial hemp extracts, this tincture is produced using a proprietary organic olive oil extraction process. Each small batch is backed by independent lab tests that may be viewed online. Organic chocolate and mint oils added for flavor. 250mg CBD per one-ounce bottle. HEAVENSENTHEMP.COM

CBD LIVING ORGANIC BATH BOMB

Fill the tub with the color and the fragrance of amber bergamot, coconut lime, eucalyptus, or lavender with no concern about stains or rings. Each eight-ounce bomb contains 60mg of CBD along with sodium bicarbonate, citric acid, shea butter, alcohol, and natural fragrances and dyes. CBDLIVINGWATER.COM

HEMP BONE BACON APPLE DONUTS

Featuring natural bacon and apple ingredients, these artisanal baked pet treats are infused with 4mg of CBD per chew. Crafted free of corn, wheat, and soy with a bacon, apple, and cinnamon taste, the soft, all-natural snacks may be given daily to help promote pets' overall wellness. PHYTOANIMALHEALTH.COM

420 SKINCARE CBD SOAPS

This 100-percent natural, organic soap is crafted for sensitive skin. Fragrances include Strawberry Mystery, Cherry Vanilla, Vanilla Chocolate, and Chocolate Mocha with Oatmeal, each infused with the medicinal properties of the cannabis plant. Complies with all FDA standards. 420-SKINCARE.COM



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LEN MAY,

co-founder and chief executive officer of EndoCanna Health, recommends...

Dispensary

The Higher Path (*TheHigherPath.com*) in Sherman Oaks, California, is my favorite shop. The product selection is great and always fresh, and the staff is very knowledgeable.

Vape

I love **Care By Design** (*CBD.org*). Their pre-filled, disposable vape pen cartridges contain concentrated oil from two high-CBD strains: ACDC, a CBD-dominant with little THC, and Blue Jay Way, a more balanced CBD-rich remedy with a 2:1 CBD:THC ratio.

Edibles

I am a big fan of **KIVA Confections** chocolates (*KIVAConfections.com*) and **Dr. Norm's** cookies (*DoctorNorms.com*). Since 2010, KIVA Confections has worked with some of the best cultivators and certified analytics laboratories to make delicious, safe, and consistent edibles. The founders of Dr. Norm's come from a health and cookie background and make a tasty cookie that's dosed right.

CBD

Select Oil (*SelectOil.com*) is one of my favorites. I love how they incorporate essential oils—lavender, lemon, spearmint, peppermint—with their CBD to create a multifaceted healing effect. I'm also a big fan of **Charlotte's Web** (*CWHemp.com*), a family-owned Colorado company that makes CBD hemp oils, capsules, topicals, and pet tinctures.

Topical

Papa and Barkley Releaf (*PapaAndBarkley.com*) is fantastic. The variety of products—tinctures, soaks,

patches, balms, oils—are made with natural, sun-grown Humboldt flower and essential oils to target pain and inflammation. Great packaging, too. I also like **im•bue botanicals** (*imbuebotanicals.com*). They have a reputation for growing the finest organic Colorado hemp, which they process under the most stringent conditions. Their line includes tinctures, capsules, topical lotions, and salves for people and pets.

App

I love **Leafly** (*Leafly.com*). It's a great source for information about cannabis across the board. I am also a huge fan of **Heally** (*GetHeally.com*). As more people turn to cannabis as a medicinal alternative, Heally is a great platform to find certified and knowledgeable doctors to prescribe cannabis.

Flower

Forbidden Fruit is my favorite strain because of its delicious aroma, beautifully expressed look and, of course, its many healing and relaxing effects. Forbidden Fruit is an indica-dominant hybrid strain created by crossing the delicious Cherry Pie and Tangie strains. Its flavor is incredibly smooth and fresh, with a fruity-sweet-lemony taste.

Brands

My favorite is **Charlotte's Web**, created by the Stanley Brothers. CW is one of the most trusted botanical products on the market today. It was named for a 9-year-old girl named Charlotte Figi who helped inspire the legalization of medical marijuana when, at the age of 5, she took one dose of medical marijuana that reduced her epileptic seizures. Two years later, she was practically seizure-free. 

*ENDOCANNA HEALTH is a research and development biotechnology company specializing in direct-to-consumer genetic testing. The company's cutting-edge technology and access to the latest medical research allow EndoCanna Health to suggest cannabis products based on an individual's unique genetic code. **ENDOCANNAHEALTH.COM***

Photo: Jerry Avenaim

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