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Feature Story

Get Off the Couch and Farm Indoors

Food, Water, Shelter,

They're the most basic of human needs. For many people around the world they're needs that go unmet. In the past we've spoken about how humidity monitoring could one day bring fresh water to those who need it thanks to moisture farming. Thanks to the ingenuity of work done at the University of Arizona, and some big dreams from a writer, extreme farming may one day be a common thing to help end hunger.

Science, mixed with the careful monitoring of temperature and humidity, could bring fresh produce to a variety of extreme environments, from the frozen tundra of Green Bay to the frozen wasteland of Mars.

In the pages ahead you'll read more about this topic as well as others relating to keeping your assets safe and your auditors happy.

Thanks for reading, and I hope you enjoy the February issue of Dickson Insights.



Dickson is planning a user



DICKSON

when every point matters

Recent graduate or experienced professional, we have a spot for you.

We're huma for positions in

- Sales
- Marketing
- Engineering
- Manufacturing
- Production

At Dickson 'Every Point Matters' and that starts with the hiring of the best employees. Our team is a diverse group of individuals with a multitude of skills, all of which make Dickson an exciting place to work. From our engineering to our marketing department, we welcome new faces with friendly faces, never giving bad nicknames to new hires.

Each day inside Dickson offers a new challenge, and with that new challenge a new opportunity. As Dickson grows, so will you. Come have fun with us, even on Mondays.

Find our listings at:

- dicksondata.com/careers
- inkedin.com/company/dickson_2
- 间 glassdoor.com



MARK YOUR CALENDARS

Dickson is planning a springtime user meetup for our DicksonOne user base. We'll be hanging out and discussing a variety of topics with current and potential users alike

Join us as we discuss upcoming features to the DicksonOne platform and any potential new product releases.

Network with fellow users to understand how your peers are using the system and ways you may be able to adopt a variety of features to make your user experience even better.

Provide feedback on the platform discussing any features you'd like to see in the future and ways that the system can better meet your needs.

Reach out to Scott at scott@dicksondata.com to learn more or visit bit.ly/DicksonMeetUps for a brief survey on the upcoming event.

Curiosity is one of the most interesting aspects of life. The desire to know or learn can give life meaning. It's about the desire to grow and to better one's self and in some cases humanity as a whole. Few places is that more on display than at Pittcon, the world's largest conference and expo on the field of laboratory science.

The show covers a variety of topics including subjects like biomedical and electrochemistry. Its audience is made up of all laboratory scientists, and provides value to anyone who identifies, quantifies, analyzes or tests the chemical or biological properties of compounds or molecules, or who manages these laboratory scientists. While the convention was initially rooted in analytical chemistry and spectroscopy, Pittcon has now evolved to include life sciences, pharmaceutical discovery and QA, food safety, environmental, bioterrorism and other emerging markets.

Last year, one topic that was often discussed involved water. Several of the companies and researchers we spoke with had invested tremendous time on the subject. General Electric was working on a product that would allow them to do a better job of recycling surface water for human consumption. Another had been working to detect oil spills that occur off the mainland. (You can learn more about both of these at our blog. Just search Pittcon 2016!)

This year's show is located at McCormick place in downtown Chicago. If you're attending, or considering to, reach out and let us know. We'll be set up at booth 5245 and would love to hear from you. We're currently scheduling live consultations with our validation and mapping experts as well as time with our product manager for discussing our DicksonOne platform. Send an email to jeff@dicksondata.com to know more.

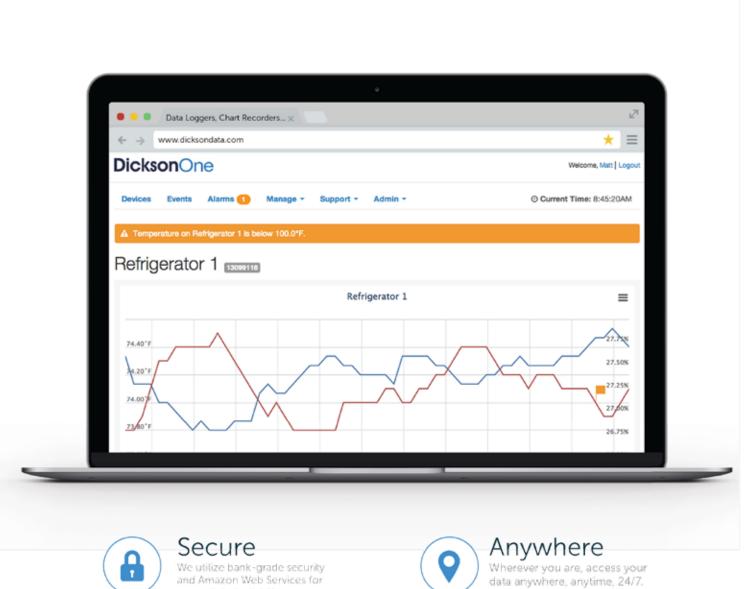






We've re-thought temperature and humidity monitoring making it easier, scaleable, and cost effective.

Your data. How you want it. When you want it.





unparalleled reliability.





Infinite

Securely store all your data in the cloud, whether you're recording for days, months, or years.



Automated

Devices send all collected data to the DicksonOne servers automatically, so you don't have to.



On Your Time

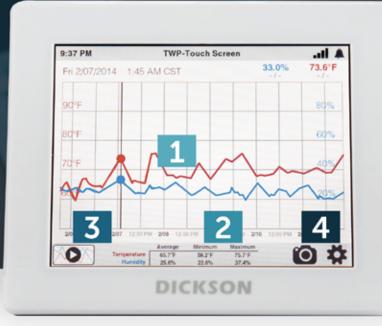
Create customizable reports delivered exactly when you want them.



Immediate

Receive real-time email, text, or phone call alarms when excursions occur.

Stay Connected. Wherever You Are.



01

02

03

04

THE GRAPH

We updated the user-interface, and made it easy to view and manage your data.

YOUR CHANNELS

The touchscreen automatically calculates and updates summary data for the selected time range

MONITORING

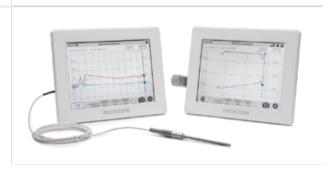
Pushing the play button brings you back to the most recent readings, updating the view in real-time.

SETTINGS

Easily adjust sample rates, set alarms, and connect to DicksonOne.

The Touchscreen

The Touchscreen gives you the option to connect directly to DicksonOne. You get all of your data at your fingertips, and now you can access it anywhere too. Just connect your device to your local WiFi network or plug it into an Ethernet port, log into DicksonOne, and boom, complete data control.



DicksonOne Enabled • Capacitive LCD Touchscreen Replaceable Sensors • WiFi, Ethernet, and USB Connectivity

Email us at support@dicksonone.com | Talk to a specialist at 800.452.4626 | Sign up for a webinar at dicksonone.com

Dickson One

Touchscreen

MODEL REMOTE PROBE PRICE

TSB USB Download DicksonOne Wifi/Ethernet Connection and Download S524 S524 DicksonOne Download and Power over Ethernet S599



Dickson One

Display Logger

MODEL REMOTE PROBE PRICE

DWE DicksonOne Wifi/Ethernet Connection and Download

Starting at \$350



DicksonOne Software

One of the most common pain points when discussing monitoring is the retrieval of data. DicksonOne loggers send data to the cloud automatically, freeing up resources to do what they do best.

Talk to a specialist now | 630-543-3747

NEW!

Per device billing now available!

\$**3**

per device, per month Requires a credit card

BASIC

\$0

Unlimited Devices Data stored for 30 day

STARTER

\$300

per year

1-10 Devices
Data stored for life of account
Multiple sample rates
Email, Phone, & Text Alerts
API Access

REGULAR

\$725

per year

11-25 Devices Data stored for life of accoun Multiple sample rates Email, Phone, & Text Alerts API Access

PLUS

\$1,400

per yea

26-50 Devices
Data stored for life of account
Multiple sample rates
Email, Phone, & Text Alerts
API Access

ENTERPRISE

Call for Quote

630-543-3747

51+ Devices
Data stored for life of account
Multiple sample rates
Email, Phone, & Text Alerts
API Access

HEALTHCARE IN



MEDICAL DEVICES PRINTED TO FIT YOUR NEED

"While prosthetics have come a long way, they're still far from resembling an organic hand — which is what 90 percent of computer interfaces are designed for."

The health of America is fascinating to research. Obesity is a mass epidemic, yet we live longer than ever. At the turn of the millennium just over 30% of U.S. adults dealt with obesity. Today that number has increased to 38%. Even so, the average life expectancy has increased by two years during the same time frame.

The reasons for the confusing relationship are pretty straight forward and it isn't because increasing your weight is good for you. It's because of an evolving healthcare system. We've already talked about it's transition from medieval to modern thanks largely in part to refrigeration but we haven't talked yet about how technology is changing people's lives.

Today's medical devices are becoming stronger and safer than ever before.

The Medical Device Technology Magazine has even put together a list of the top 10 innovations from 2015. A few highlights include naturally controlled artificial limbs (#7), new water purification systems (#4), and advances in vaccines (#1).

The process for getting a medical device from concept to market typically ranges between three and seven years and is regulated by the FDA. Such regulations should be stringent on anything that could be implanted within the human body. Even so, there are a number of devices in today's society that are getting into consumer hands without all the red tape. It's all thanks to 3D printing.

We've covered the printing practice on our blog and in last year's February issue of Insights so we won't rehash







Vaccines were number 1 on *The Medical Device Technology Magazine's* list of the top 10 innovations from 2015. DicksonOne helps make the monitoring of vaccines like these easy. Learn more at *dicksondata.com/vaccines*

how the process works here. Instead we'll talk about a printed device that is giving back technological control to amputees in the form of a smart wristband. According to an article by 3Dprint.com, using a mouse is something that often gets "taken for granted." They continued on to discuss the solution.

"In order to mitigate this difficulty, researchers developed a double band device, affectionately nicknamed the Shortcut, that lets prosthetic users click away. The device consists of two bands, one worn on the wrist and the other on the arm. The band on the wrist assists in navigation through a small optical sensor that is attached. The movement of that sensor is transferred to movement of the mouse."

This solution was developed by three German design students from the Berlin Weissensee School of Art. Lucas Rex, one of the student developers spoke with Digital Trends on the rationale behind creation.

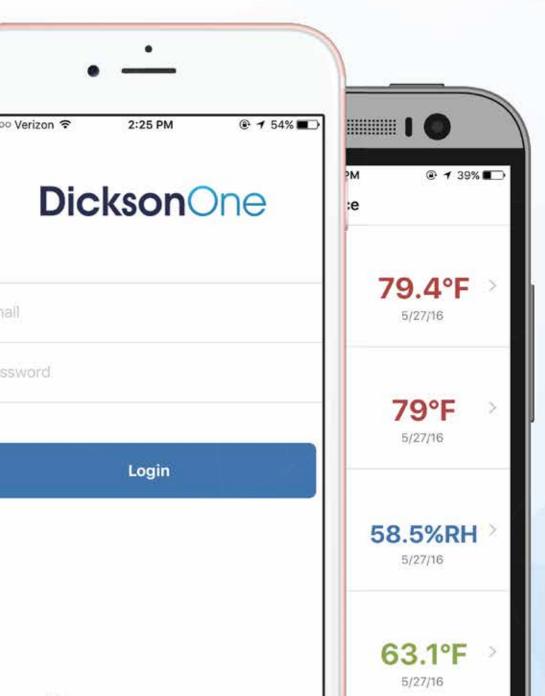
"In our research we found out that a big problem for hand amputees is using computers. That becomes even more significant when you consider that the majority of hand amputees lose their hands in accidents involving heavy machinery. After that, they have to be reeducated to do office jobs, which invariably means using computers. While prosthetics have come a long way, they're still far from resembling an organic hand — which is what 90 percent of computer interfaces are designed for."

Many amputees experience the feeling of what's often called "phantom limbs." This occurs when an amputee believes they can still feel their missing limb attached to their body. In other words, just because someone loses a hand doesn't mean they can't send nerve impulses to the body that would normally raise a hand or point it. The band uses its optical sensors to take advantage of this ability.

The team of designers still have one more iteration of a working prototype to complete and then their hope is to begin usability testing before looking for ways to get the product into the world for use. If the device ever makes it into use, it may not save lives but it'll certainly better them. Those are the kind of results you should always put in print.

Have something personal you'd like to add to the conversation? Send your thoughts to jeff@dicksondata. com for a chance to be featured in a future blog or article in our magazine.

THE DICKSONONE MOBIL



EAPP

MILLIONS OF DATA POINTS RIGHT IN YOUR POCKET

Instant access to all data logger and location information in the cloud.

Anytime. Anywhere.



DID YOU KNOW?



Assurance that you're getting the best.

Calibration Services

SETTING THE STANDARD

Calibrations are essential to all devices that measure a variable. However, we often get the questions, "Why isn't it accurate already?" "Isn't it made to be accurate?" The answers are: it is, and yes. However, while our devices are accurate without calibrations, we can't be positive they are accurate to a specific measurable degree (and thus can't prove their accuracy) unless we perform a calibration.

HOW CALIBRATION WORKS

STEP ONE

STEP TWO

STEP THREE

STEP FOUR

CALIBRATION OPTIONS

What works for my company?

1-POINT **NIST**

- · One specific temperature point calibration
- · Good if your temperature varies by little
- · Choice to specify the temperature point to best reflect your application

Example: A calibration lab determines that a device is reading 26°F when it should be reading 24°F. So, the calibration lab adjusts the device two degrees, so that it now reads 24°F. A 1-point NIST assures accuracy at this specific point.

3-POINT **NIST**

- · Three-point (high, middle, and low) temperature point calibration
- · Grants a larger proof of accuracy
- · Choice to specify the temperature point to best reflect your application



ALL YOUR CALIBRATION DATA. RIGHT ON THE SENSOR.

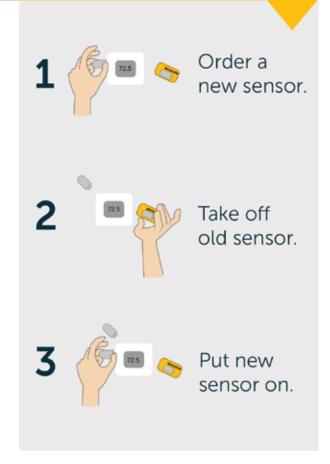
Now, you have the option to calibrate the sensor as opposed to the unit. Think of it like this: the Replaceable Sensor takes an environmental reading. and the data logger or chart recorder records that environmental reading. By splitting up the sensor from the data logger and chart recorder, we've created a plug and play device, that will keep you in compliance, but save you time and resources.

Replaceable sensors allow for:





More cost effective calibrations



TEMPERATURE MAPPING 101

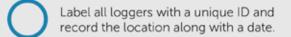
Temperature mapping your facility, warehouse, or refrigerator is a daunting task. We know, we've done it a lot. Dickson can help keep your business fully compliant in audits, streamline your business operations, and protect sensitive products with our temperature mapping services.

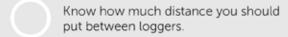
WAREHOUSE **TIPS**

Warehouses are one of the most common areas that need the service of temperature mapping. We've included a few tips to get your process started.











Getting Started

Whether you're being audited or just want information on what's happening in your facility, then a mapping report can be an asset to your company. Once the mapping has ascertained where the points of temperature variation lie within a temperature control system, then monitoring can be installed so that owners and users can prove their adherence to the related health and safety standards.



Some industries are required to have documented evidence that environments are under state of control. Let Dickson's skilled professionals get you up to date.

Want more information? **Contact a specialist today.** (630)-923-6565



Validation Services

SOLUTIONS TO SUIT YOU

If you're in the quality assurance business like us, validation is a term you hear every day. "Validation" falls under the umbrella of terms businesses use to discuss the quality of their product, facility, or service. For those not well-versed in the world of quality assurance, hearing "validation" can send you running to hide under your desk. It's a word that can scare you into a frightful Google search, an emergency call to someone in your quality department, or worse, it can scare you into ignoring it.





- ▼ TESTS
- . ENSURES
- OF SYSTEM PER SPECS

OQOPERATIONAL QUALIFICATION



- TESTS
 - VERIFICATION OF CORRECT EQUIPMENT OPERATION
- ✓ ENSURES

 CORRECT OPERATE
 OF SYSTEM PER SPE
- ✓ VERIFIES

 SYSTEM MEETS CLAIMS
 FROM PARAMETERS

IG

INSTALLATION QUALIFICATION



- TESTS
- VEHICLETION OF CORRECT
 SOUTHENT INSTALIATION
- ✓ ENSURES

 CORRECT INSTALLATION
- ✓ ESTABLISHES

VALIDATION VOCAB

If you are reading this, you may be familiar with Medical Device and Life Sciences specific acronyms for example IQ, OQ, and PQ. For those who are new to the specific world of Validation Services, we'll try to help with some of the important terminology.



Dickson offers validation services for our DicksonOne or Dicksonware software, and temperature controlled equipment like refrigerators, stability chambers, freezers, walk-in chambers, and more.

Is your company ready for a quotation or need more information?

Contact a specialist today.

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CHART RECORDERS

Want a physical readout right where you are monitoring? Our Chart Recorders have you covered. For ninety years we've built the best chart recorders in the business. Check out our models below.

8 and 6 Inch Models

MODEL	FEATURES	STARTING PRI	
KT6P	6 Inch Temperature	\$369	
KT8P	8 Inch Temperature	\$419	
TH6P	6 Inch Temperature and Humidity	\$489	
TH8P	8 Inch Temperature and Humidity	\$489	



4 and 3 Inch Models

MODEL	FEATURES	STARTING PRICE
SL4350	4 Inch	\$239
SL4100	4 Inch	\$239
SC3	3 Inch	\$239



SL4350 (top) and SC367 shown above

DATA LOGGERS

For data loggers, information (temperature/humidity measurement and date and time) are stored as information. That data is stored in the device for later download (via software) onto a computer, or sent to a cloud application or server for remote access.

Compact

_	
SP125 Temperature Logger, Accuracy ±1.2°F, ±0.67°C, Range -10 to 176°F, -23 to 80°C.	\$119
SP175 Temperature Logger with Thermocouple Probe. Accuracy ±1.8°F, ±01°C. Range -300 to 2000°F, -30 to 50°C. A203 Probe required for +500°F	\$229
TP125 Temperature and Humidity Logger. Accuracy ±0.8°F, ±0.45°C. Range -10 to 176°F, -23 to 80°C.	\$199
SK550 Temperature: Pack of twelve: Accuracy ±1.8°F, ±1°C. Range -4 to 158°F, -20 to 70°C.	\$699
TK550 Temperature & Humidity. Pack of twelve. Accuracy ±1.8°F, ±1°C. Ranges -4 to +158°F, -20 to +70°C.	\$999



SP125 shown above



SP425 shown above

Display

SM300 Temperature Logger, Accuracy ±1.2°F, ±0.67°C. Range -10 to 176°F, -23 to 80°C.	\$249	TM320 Temperature & Humidity. Accuracy ±1.8°F, ±1°C. Ranges -4 to +158°F, -20 to +70°C.	\$299
SM320 Temperature Logger with Thermocouple Probe. Accuracy ±1.8°F. ±0.1°C. Range -300 to 2000°F, -30 to 50°C. A203 Probe required for +500°F	\$299	$TM325$ Temperature and Humidity Logger. Accuracy $\pm 0.8^{\circ}\text{F}, \pm 0.45^{\circ}\text{C}.$ Range -10 to 176°F, -23 to 80°C.	\$399
SM325 Temperature and Humidity Logger. Accuracy ±0.8°F, ±0.45°C. Range -10 to 176°F, -23 to 80°C.	\$399	SP425 Temperature. Accuracy ±1.8°F, ±1°C. Range -4 to 158°F, -20 to 70°C.	\$159
SM420 Temperature. Accuracy ±1.8*F, ±1°C.	\$499	TP425 Temperature & Humidity. Pack of twelve. Accuracy ±1.8°F, ±1°C. Ranges -4 to +158°F, -20 to +70°C.	\$249

High Temp Solutions

INDICATORS

- 1 HT 300 Waterproof, High Temperature Data Logger HACCP and FDA Compliant. USB Download. IP68 Rating. Temperature Range -40° to 257°F (-40° to 125°C).
- \$349
- 2 HT350 High Temperature Process Logger HACCP Compliant, K-Thermocouple Probe, USB Download, and a large temperature range. Temperature Range -40° to 257°F (-40° to 125°C).

\$349



Instant Data Solutions

INDICATORS

TC700/TH700 Touchscreen Handheld Indicator

Instant temperature or temperature/humidity data. No-slip silicone cover. Battery powered.

\$299



DICKSON BLOG

blog.dicksondata.com

Want to learn more about using, buying, or learning Dickson products and the applications and industries we serve? Check out:











GET OFF THE COUCH and GROW INDOORS

Writers often make the best scientists.

That's a bold statement, but it may not be as far off base as you'd think. We've already covered how sci-fi has become science fact in our society. In that piece we talked about the ways temperature monitoring has helped companies develop devices that allow for farming moisture from the air, thus making the potential for fresh water a reality around the globe. This was an idea that was explored by George Lucas in Star Wars: A New Hope.

Another book, The Martian by Andy Weir, explored farming on the surface of Mars. That seems like a pretty far out idea considering all the things required for successful farming. Plants require nutrients in addition to sunlight and water to grow. Often, these nutrients are entered into ground soil through the decay of plants. In cases where this is not possible, like on farms where crops are harvested before they are allowed to die, fertilizers are used to maintain nutrient levels.

EXTREME FARMING IN EXTREME LOCALES

"We have a wide array of sensors that monitor all of the environmental conditions in (the greenhouse). We have a controller that we can program and make changes to the day-to-day routine that the plants experience, and just being able to collect all of that data and really understand the behavior of the system through that data is very interesting for me."

ERICA HERNANDEZ SENIOR, PLANT SCIENCES, UNIVERSITY OF ARIZONA

On a planet where there are no organisms, finding nutrient rich soil would seem nearly impossible, but the main character in Weir's novel was able to make the process work once he used some ingenuity to create moisture in the barren environment. That wasn't as far off is it seemed in the book, considering scientists from the University of Arizona have already figured out how to grow crops on the frozen planet.

The CEAC, or Controlled Environment Agriculture Center, is part of the university's College of Agriculture and Life Sciences. At the campus, a team of researchers have spent seven years working on a functional prototype lunar and Martian greenhouse. The project has seen collaboration from 20 researchers with varying backgrounds to attempt to grow crops in conditions similar to other non-Earth environments. The university's website goes into detail on how this is accomplished.

"The lunar and Martian greenhouse at the UA relies on a complex hydroponics system to provide fresh water that, when combined with nutrients, supports the plants.

Hydroponics, or the recirculation of plant fertilizer and water to grow plants in the absence of soil, is the driving force behind the greenhouse. The hydroponics system and controlled-environment greenhouse provide yields 10 times of those in an open field, so the notion of feeding a crew of astronauts for hundreds of sols — Martian days, spanning 24 hours and 39 minutes — isn't just sci-fi."

Being able to grow food for a crew of astronauts on a mission of exploration is a fine cause, but we live on a planet where nearly 800 million people go hungry every day. According to the World Food Programme, poor nutrition is the cause of nearly half of all deaths in children under five years old.

There are a number of factors that contribute to world hunger including a lack of agricultural infrastructure and things like war, but drought is one of the most common causes of food shortages in the world. Climate change is only making this issue more prevalent around the world. Greenhouses like the ones scientists have been working on for lunar farming could one day solve this major issue. Luckily,

companies are already working toward that future.

Brightfarms, an agriculture tech startup, is raising money to bring high-tech greenhouses, and the food they produce, to a city near you. Right now, the company's goal is to provide fresh produce to parts of the country where vegetables aren't often grown. That means greens are loaded up on trucks and shipped around the country damaging their quality and often increasing their costs.

Even though the midwest is covered with farmland, core produce like lettuce and tomatoes grow only in specific parts of the country. A number of maps that outlay this disparity have been provided by the USDA and can be viewed on our blog (just search "extreme farming").

As their maps illustrate, there are large parts of the country that require long distance shipping for access to both lettuce and tomatoes. That means these greenhouses can make both more available to large portions of the country. That potentially means more food is available for those who need it and a higher quality of produce will be available



to those who most often lack opportunity to purchase it.

According to Fortune, this is a real problem in America. According to the USDA, 29 million Americans currently live in what are called urban and rural food deserts. By definition, a food desert means that Americans in low-income rural areas have to travel ten miles to get to their nearest supermarket and those living in urban neighborhoods are required to travel a mile or more. Fortune provided a detailed example of the issue in their article.

"Oneikah Delgado walks two hours to buy her family food. The 40-year-old mother of six lives in the Bronx's Baychester neighborhood. Delgado makes her monthly visit to Part of the Solution (POTS) in the Bronx, where they have a food pantry for people to supplement their household supplies with canned

vegetables, fresh produce, eggs, beans, and grains. About 80 people visit the pantry each day, which happens to be a few blocks away from a supermarket."

The real problem is that the food desert definition doesn't do a good enough job of diagnosing the problem. Delgado's situation doesn't technically categorize her as living in a food desert. Many areas like hers include access to things like bodegas or mediumsized grocery stores but many are too high priced for low income families. That means many stores aren't options for large percentages of the population.

This is starting to become a national issue thanks to Michelle Obama's "Let's Move" campaign. One of the key goals is to eliminate food deserts in these areas. That only answers part of the problem, because access doesn't necessarily equate to

adoption. The steady ascent of produce costs means that low income families will still have a hard time changing their diets even with access. In the future local growers could help offset some of the increased costs, thus making produce a legitimate option for all Americans.

Thanks to the foresight of a writer this may all one day be a reality. Without his dream there'd be no destination and with no destination there's no reality. It's about creating action. It's about producing a hunger to learn and to grow. There'd be nothing bold without that.

Have something personal you'd like to add to the conversation? Send your thoughts to jeff@dicksondata.com for a chance to be featured in a future blog or article in our magazine.

PLANTING BY THE MOON

Gravity and moonight can help you gauge the best time for certain gardening activities during each lunar phase.

organiclesson.com

NEW



Increased lunar gravity aids seed germination. Plant above ground crops with outer seeds.

2ND QUARTER



Increased moonlight aids in leaf growth. Plant above ground crops with inner seeds.

4TH QUARTER



Moonlight and lunar gravity decrease. This is the best time to harvest your crops.

FULL



Lunar gravity increases and moonlight decreases. Start planting root crops.

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Points that Matter



DICKSON IS COMING TO PITTCON 2017!

This year Pittcon is coming to McCormick Place in Chicago, IL! If you'll be at the expo March 5 - 9, make sure to stop at our booth, 5245! For more information send a message to Jeff at Jeff@DicksonData.com, or see page 3 for more information.



Dickson is planning a user meet up for this upcoming spring. Go to blog.dicksondata.com and Search "Meet Up" for more information or email Scott at Scott@DicksonData.com to learn more.

DICKSON **Blog**

blog.dicksondata.com

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