

Projections

FALL/WINTER 2015

Planetarium Newsletter



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Storytelling, whether it is around a campfire, on our television, or supporting an immersive theater experience, is a part of our lives. It is how we communicate and comprehend. Our lives are a story, with each moment of each day leading to the next. Some lives are stories filled with more action and adventure than others, and some may have far too much drama for either the protagonist or the supporting characters. Stories help us understand information. Most people are not wired to recall a great amount of facts and figures, but when we apply a story to them, the information is conveyed in a way that fits how we are wired, progressing from one moment to the next with each decision and action leading to the next set of decisions and actions in a sequential story of events.

Raw data is meaningless without context, a series of numbers on a page is difficult to understand. To better grasp the meaning of any data, we apply that information visually as charts, graphs, maps, or however we can to begin to add context. As each series of data is applied to a situation, be it weather patterns, bird migrations or finances, we can start to form the real meaning behind the data as we start to find the story behind the data.

Communicating that story is how we bring that information to others. Most of the information we process is visual. There is so much visual information flowing to us that as much as two-thirds of our brain is often credited with being involved in the processing of visual information. The old saying “a picture says a thousand words” still holds true, and is greatly enhanced when these

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images are presented sequentially to show how data changes over time. When we experience data visually, part of that story is told, whether looking at visualizations of the solar system or tracking bird migrations. Motions of these objects start to show patterns and ideas that would otherwise be difficult to understand as easily if perceived only as numbers on a page. In fact, just reading these few paragraphs, you've probably wanted to see a picture or two to support this idea. If so, I've already proven my point.

An immersive experience in a planetarium can support the visual and audible senses, but the story is what completes the experience. Whether the content is a produced and rendered show or a live presentation, storytelling is an important factor in making the experience memorable. The presenter or narrator can connect the data to the concepts, adding context in a way that make it easier to comprehend. In this issue of Projections, we've got some stories to share that you may enjoy, and hopefully some that will help you in your work.

Thank you for reading!

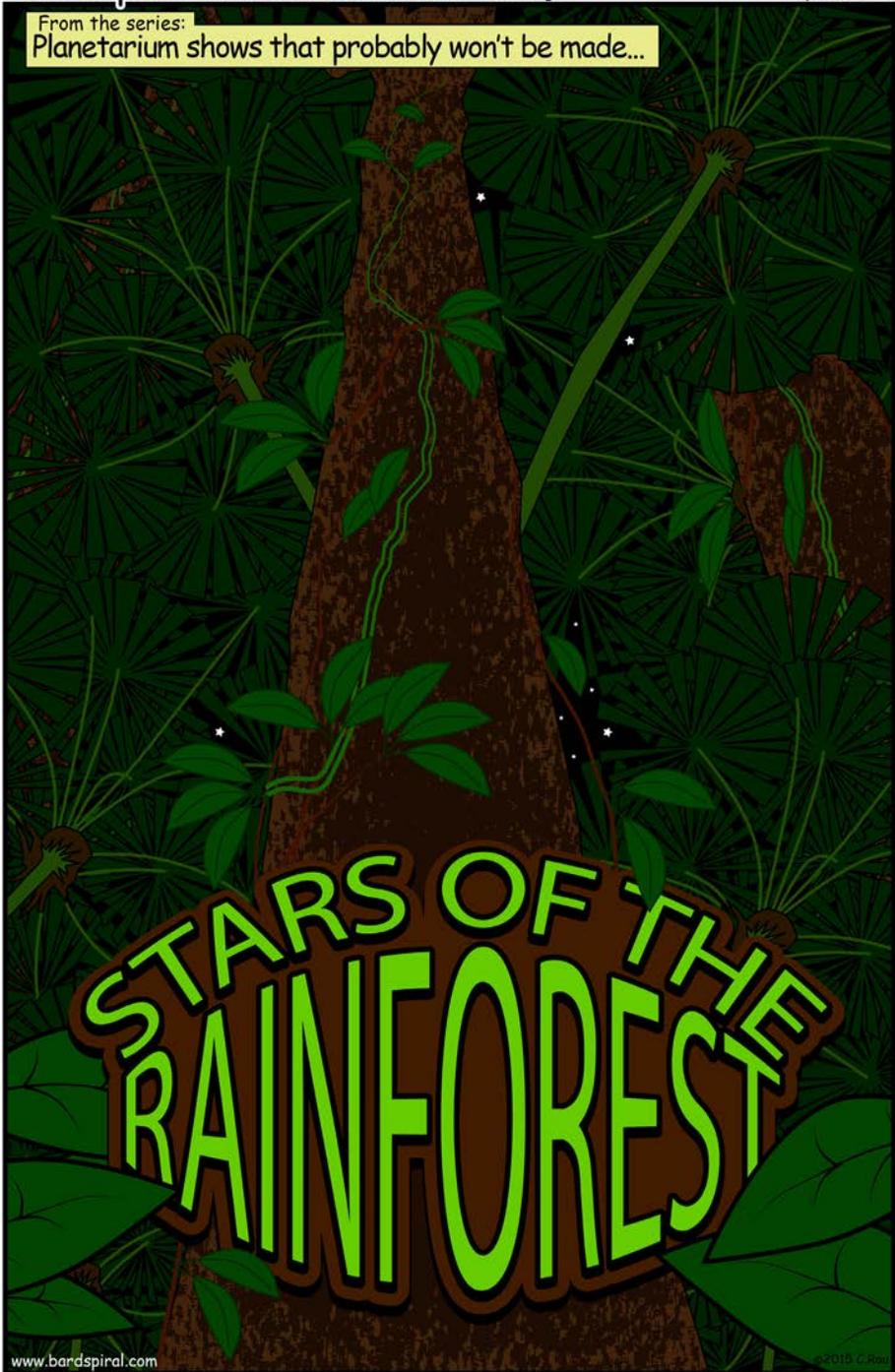
-Chuck

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From the series:
Planetarium shows that probably won't be made...



Safe Software

DOWNLOADING FREeware WHILE AVOIDING POTENTIALLY UNWANTED PROGRAMS

By Marion Sudvarg

A potentially unwanted program (PUP) "is a program that may be unwanted, despite the possibility that users consented to download it. PUPs include spyware [and] adware ... and are often downloaded in conjunction with a program that the user wants." PUPs can include software that injects intrusive advertising into web browsing, even going so far as to track a user's browsing habits or redirecting legitimate web pages to malicious sites. PUPs can be as innocuous as a browser toolbar (one common example being the Ask toolbar), but even these can add up, causing a slow and cluttered web browsing experience.

So how can a user avoid PUPs? Since PUPs typically come bundled with a wanted program, an important habit is to only download programs from their original sources. For example, many websites require the browser to be running an updated version of Adobe's Flash Player plugin. At the date of writing, a Yahoo search for "update flash player" will yield three sponsored results before any actual links to Adobe's website. These sponsored results will provide the user with a Flash Player package, but the installers are bundled with unwanted software. Google used to be a culprit for providing unsafe software sources in sponsored links, but recently the search engine giant has been improving these results. Looking at the URLs displayed in search results and ensuring that the software is being downloaded from the original source will help prevent unwanted programs from being installed.

Even formerly legitimate software repositories are now guilty of including unwanted programs with their software downloads. CNet's downloads.com was once a handy repository for finding free, clean software. But downloads.com bundles PUPs with many (if not all) of the software available on their site, and should now be avoided. Softonic is another such site to avoid, and even Sourceforge has been in the spotlight lately for taking over some of

the software projects they host and including advertisers' software in the installer packages.

PUPs can also come bundled with software from original sources, but this is often easily avoidable. Oracle, who provides the free Java runtime environment, bundles the Ask toolbar with their software. And Adobe, which provides the free Flash Player plugin, bundles a variety of third-party software with their installer package. In both cases, though, one can easily opt out during the installation. So another important habit to adopt when downloading and installing software is to pay attention at each step of the process, rather than clicking "yes," "ok," or "continue" blindly.

The moral of the story is that it's easy to fall victim to adware or spyware that comes bundled with legitimate software. But with a little care and some safe browsing habits, it's also easy to avoid such unwanted programs and maintain a clean browsing experience.

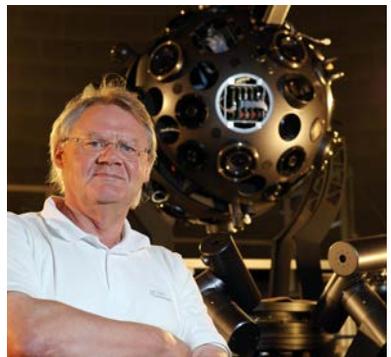
¹ Rouse, M. (n.d.). PUP (potentially unwanted program) definition. Retrieved August 30, 2015, from TechTarget: <http://searchsecurity.techtarget.com/definition/PUP>

A Visit from Wilfried Lang

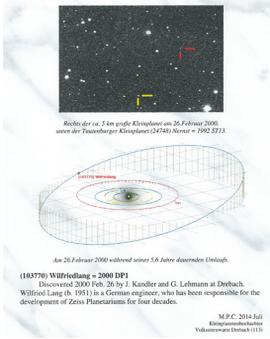
By Chuck Rau

This fall at the Seiler Instrument headquarters in St. Louis, Missouri, we were joined by Wilfried Lang, our longtime friend and colleague from ZEISS. The visit was his last official act as head of the ZEISS Planetarium Division before retiring. Wilfried has offered considerable contributions to the planetarium field through his time at ZEISS. Working in roles of engineering and management in Jena since 1973, he has been a driving force in the continual development of the modern ZEISS planetarium.

I had the opportunity to speak with Wilfried about a variety of topics, including the direction of various projection systems and light sources. It



(103770) Wilfriedlang



is clear that he is very proud of the VELVET projectors as a digital solution to planetarium projectors and for flight simulation. "We should have started with VELVET," he said to me as we spoke about various projection systems. Wilfried had been chasing black skies since the company started offering digital projection systems. Like other vendors had found, laser was not the answer as a light source, and even in modern projectors, still

not reaching the black levels necessary to offer a clear night sky.

While Wilfried is rightfully proud of what he has been able to bring about to help planetariums enjoy sharp pixels and pinpoint stars in a brilliant night sky, his customers are also quite proud of him. So much in fact, that one customer decided it would be fitting to name a small planetoid after him. 103770 Wilfriedlang is a 5 km large object discovered on February 26, 2000 by Jens Kandler and Gerhard Lehmann at Drebach.



I met Mr. Kandler when we visited Drebach last year. It is a small village with an impressive interest in astronomy. They had recently added a VELVET projection system to their SKYMASTER ZKP3 in an 11m dome. Mr. Kandler is a gracious host, and the facility is wonderful. Apparently, he and Mr. Lehmann had each discovered other planetoids which they had already named after themselves and decided that Wilfried needed one too in appreciation for his achievements and support he had provided them through the years.

While visiting Jena, I had the chance to see the photo book the ZEISS staff were presenting to Wilfried. It was filled with incredible photos through four



decades of work at ZEISS. As a world traveler, Wilfried has touched the lives of planetarians across the globe. It was great to see some familiar faces in there too. I also noticed that in the background of several photos was Dr. Martin Wiechmann. Martin has taken over as the new head of the ZEISS Planetarium Division. Almost like a foreshadowing of the change that would take place years later, it was a bit like playing "Where's Waldo?" as I looked at the photos and saw many proud moments of a great man with big shoes to fill.



At Seiler Instrument, we didn't get to name any big space rocks after Wilfried or have nearly as vast of a collection of his world travels, but it was great to have him back to the states for another visit, and he was working the whole time as some of our customers joined us for tours of our facility. We did manage to get him to stop working for a moment to surprise him with a lovely crystal decanter set which we had engraved with the following message in German:

"Good Friends are like stars. You don't always see them, but you know they're always there."

Wilfried, in turn, surprised both Eric and Rick Seiler, giving each a pair of incredible ZEISS binoculars. If it weren't for the curve of the earth, they might have been able to use them to see Wilfried sipping some tasty retirement. Thanks for everything, Wilfried. Enjoy retirement, you've earned it!

And as for photos, here's another one for your collection, Wilfried...



Things You May Not Know About the VLA

By Chuck Rau

I recently visited the NRAO's The Karl G. Jansky Very Large Array near Socorro, New Mexico. It was an impressive tour and well worth visiting. I hope you will make the opportunity to go there yourself sometime. Many of you may be familiar with the facility, but for those who have missed out, I thought I might share a few bits of information that I found interesting.



Image courtesy of NRAO/AUI

THE BASICS

The array consists of 27 radio antennas, each 25 meters in diameter. The individual antenna dishes and their mounts are placed on concrete pads at various distances depending on the configuration, extending from 1 km to about 36km.

THE POWER BILL IS \$1M ANNUALLY

This is a little bit more than 1% of their \$97M annual budget. They are the largest consumer of power in the area. The joke (or gripe) among the locals is that when the power goes down, the company is just sending it all to the VLA. They are likely also the first to have the power restored. I believe the "Cha-ching" sound was overheard as they told us this amusing fact.

THEY ARE NOT LISTENING FOR EXTRATERRESTRIALS.

No one was out on the hood of their truck with headphones on listening to the sounds of space like Jodie Foster in the movie *Contact*. While there could be research done that inadvertently discovers the potential for life elsewhere, this is not the purpose



of the facility. It is a telescope, but rather than looking deep into space optically, it is receiving the faint noises of radio emissions from stars and other bodies, affected by whatever else might be out there. The signals are compared and processed by computers to create visual images of the areas observed. In many ways, it acts more like a camera than a microphone, using the data to put together a picture of the universe around us through interferometry.

THEY ARE NOT BROADCASTING.

There is no attempt to broadcast signals to space. The array acts as a receiver only. Each dish is fitted with 8 receivers mounted in the center of the dish that are tuned to specific bands of frequencies ranging from 1 Ghz to 50 Ghz. The system can very quickly select bands by altering the angle of an aiming deflector at the focal point of the dish. The receivers are cryogenically cooled and are very sensitive to receive the faint radio signals of space. A cell phone placed on the moon would appear to be the brightest radio source in the sky, and the system would be able to detect the phone if it were as far out as Jupiter. We were asked to switch off our cell phones or put them in airplane mode to not cause interference during our visit.

YOU HAVE TO GO FOUR TIMES TO GET THE FULL EXPERIENCE.

There are four different configurations, each with various spacing between the massive dishes. While we were there, the array was in configuration "A" with the dishes spread out across a 35km radius. In configuration "D," the array is the tightest, with all the antennae clustered closely together across 1 km. A special machine is used to move each



Fountains of hot gas erupt from a black hole known to radio astronomers as Hercules A. by B. Saxton, W. Cotton and R. Perley (NRAO/AUI/NSF)

dish. It is driven underneath on railroad tracks and lifts each dish from the pad. It slowly moves the dish to the desired pad (or the repair building) as needed. The spacing of the dishes not only affects the photo opportunities, but also allows researchers to “zoom in” for greater detail.



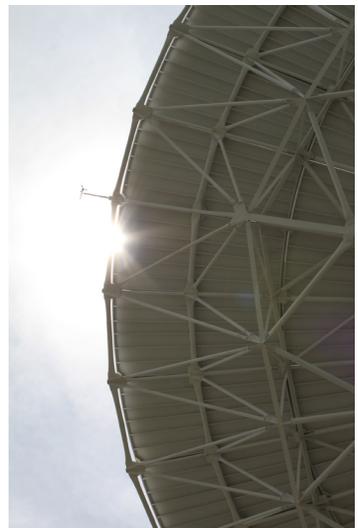
B. Saxton, NRAO/AUI/NSF

THE RESEARCHERS CAN BE ANYWHERE

At the start of the program, it was necessary to live nearby and work on site. There was a community feeling, where you would get to know people that worked in other areas of the facility while taking the bus to and from Socorro each day. But with the modernization of the facility, the data can be accessed wherever you are. This may change the community feeling, but the mission and facility reach a greater range of scientists who may otherwise not have been able to uproot their lives while working with the data.

ANYONE CAN DO THE RESEARCH.

Anyone, even you, can propose use of the instruments for your own research. The data and the system use is available freely. Proposals are reviewed and prioritized, then placed into a cue that provides an efficient use of the array. Rather than swinging each dish back and forth across the entire sky, the system will determine the best path to aim at the objects in the cue as needed, considering efficiency and priority. As a researcher, you then have one year to privately work with your data and publish your findings before the raw data is released publicly. You can also look at any of the existing data and compare against past surveys.



“Ted” Talks

By Chuck Rau



Like so many others, my grandfather Ted was a man of many stories – some he would share, while others he kept to himself out of honor, loyalty and love for his country – eventually taking them with him when he passed. Ted had many jobs in his lifetime, even working in counterintelligence, which is why he said that some of those stories may still be classified and he wasn't going to share, just in case. He was a great man and a patriot, but also a wonderful source of inspiration and

amusement for those around him.

When I was young, he taught me how to count in binary by hand. He had me until he counted to four, then my juvenile mind got a bit distracted. Not sure what I mean? Go ahead and count it out on your fingers, have a good snicker... 00000, 00001, 00010, 00011, 00100... and come back to us. Remember, I did say “juvenile mind.”

There are two stories of his that I really enjoyed and still find to be rather applicable in today's world for looking back, or even forward, with a bit of perspective. I'd like to share them both here, perhaps you will find some meaning for them in your own life, or simply enjoy them.

COMPUTER SECURITY

Ted was one of the first computer security specialists in Texas. As such, he was invited to speak at a





conference. While I can't tell you who the conference was for or when it was (not out of national security concerns, but because I simply don't know) those specifics don't really matter, this was a loooong time ago. I'm not going to say it was so far back that he was the inspiration for the TED talks, but with as many people as he knew, I'm not

going to rule out that possibility either, because this was probably well before those started.

Computers were out of their infancy and just past toddler stage, quickly becoming a powerful tool for business, so security was becoming an important factor. A concern on the horizon, one that Ted spoke of, was that as these devices became more connected, there was the potential for people to write programs that would take over control of these devices from other remote computers, great distances away.

"That's nonsense! You're talking science fiction, that will never happen!" is not the kind of thing that one would ever be able to say today, but one guy in the audience thought the idea was so preposterous that he chose to exclaim just that. I'm sure I'm wrong, but I often imagine him to be the oldest person in the room. I don't know if he ever had the opportunity to receive the proper reality check that would cause him to reflect deeply on his own ignorance in such a statement.

Computer viruses as science fiction? Back then it did sound like it. In fact, there have been many stories and movies even in more recent times created about this very topic. Today, pretty much everyone





who has a computer has encountered some form of malware or virus at some point in their lives. Recently, there have even been news reports of people being able to remotely hack the controls of a car, just to prove the point that it can be done, and similar claims from others interfering with the

entertainment system on an airplane. We're not quite to the point of SKYNET taking control or the inevitable great robot uprising, but can you imagine someone standing up at a conference today and berating the speaker, saying that computer viruses and Trojan horse deployment is nonsense?

When was the last time you thought there was no way something could happen? It doesn't just have to be about bad things. There's plenty of pessimism in the world, but the same goes for optimism. Don't discount the possibility of finding a generous donor when asking for the right systems for your facility. Settling for less than ideal because you assume something can't happen will not ensure the best possible outcome.

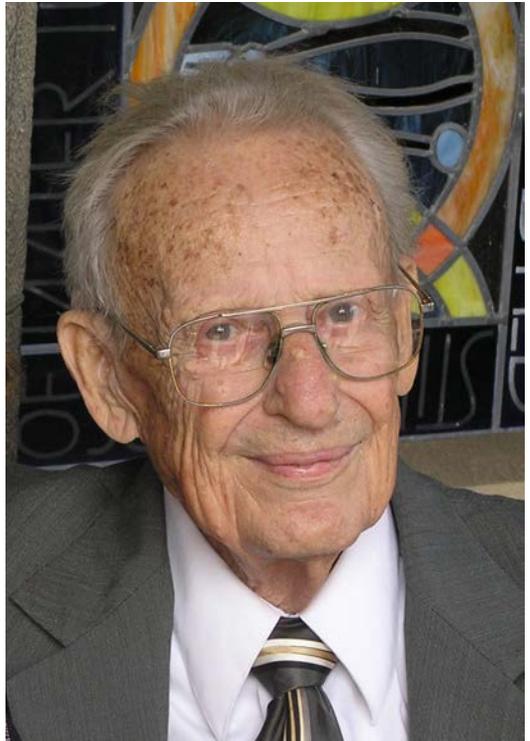
UPSIDEDOWNSIZING

While Ted was working for Westinghouse (I know he was old, but I assume he meant the company, not the man himself) he was approached by his boss and told "Ted, we have to make some cutbacks, I need you to find two people to let go from your department." He liked these people and they did great work, so he quickly replied "Well, that's easy, you can have my job, and I guess I won't need my secretary at that point, so there's two." But the boss wouldn't have any of that, saying "No, no Ted, we need you! Seriously, please give this some thought and get back to me."

So he did give it some thought. He took a serious look at the

team and all of the projects they were working on. He put together information about each one and asked the boss "Which of these projects would you like to cancel?" Of course, he did more than ask a simple question. He presented his case for keeping the staff required to perform the tasks needed by putting the termination of some of the team in the context of what would not get accomplished. Each member of the team was important and contributing to the overall success of the department, losing any of them would mean that some of the projects really weren't going to get done. The surprise in the end wasn't that he was able to keep the people he would have had to let go, but that he was given more people!

I have seen so many people over the years in various institutions acting from a place of fear, not wanting to rock the boat for fear of being fired, or others in academia complain that this program or that should be shut down so they could have the budget. The reality of the situation is that if you can show that your team is actively contributing and you are being a productive part of the organization, you'll more likely have the support, the team, the budget and be looked at as an asset, not a liability.



The next time someone says you have to trim back on staff or budget, don't just accept the premise, challenge the process with productivity. The key to success here is that you have to already be doing something of value.

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