

Plant Science Says



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Modern Science and Ancient Culture: Fourteen Days in North-East Central China By Jackie Campbell

In June, Bob Sharrock and I met Li Huang in China to present seminars and meet scientists at Chinese universities and agricultural research institutions. While there, we saw many historical sites and enjoyed the rich cultural heritage of the northeastern part of this enormous country. Our trip involved international scientific exchange but also allowed time to see the sites and enjoy China along the way. The experiences and adventures we had are too numerous to recount here so I have selected a few of my highlights.

We arrived in the capital city Beijing where we stayed at the China Agricultural University (CAU). At CAU we were graciously hosted for dinner by several life science professors and their graduate students. As it was our first time in the city, Bob and I visited a few of the sites that represent Imperial China in Beijing. Our very hospitable guide 'Apple' (Hongtao) was a student who had just received her PhD from CAU. Apple took us to the Forbidden City (the emperor's home and office in the city), the Summer Palace (the emperor's garden and retreat), and the Temple of Heaven.

The Forbidden City was built in 1420 and served as the imperial palace from the Ming to Qing dynasties. It was reserved for the emperor and his household and served as the location for national ceremony and political gatherings. The 980 buildings of the Forbidden City are revered as a reflection of traditional Chinese architecture and aesthetics.



The Forbidden City, Beijing. L-R: Jackie Campbell and Apple (photo by B. Sharrock)

Each of the buildings has a distinctive and evocative name such as the "Hall Of Supreme Harmony". In 1925, the entire area became known as the Palace Museum when it was declared a world heritage site as the largest collection of preserved ancient wood structures in the world.

The Summer Palace, "The Garden of Nurtured Harmony", was originally built in 1750 but was re-built as it stands today in the late 1800's. It served as a place for relaxation and meditation for the emperor. The palace complex contains many gardens, pavilions, halls, temples, and bridges, all surrounding Kunming Lake.



The Summer Palace, Beijing. The lotus pond on Kunming Lake (photo by B. Sharrock).



The Summer Palace, Beijing—view from the highest point at the Summer Palace (photo by Bob Sharrock)

While touring, Bob spotted a group of people playing a game with soft racquets and balls. We were introduced to the group leader who explained the game of Tai Chi Ball to us and allowed us to give it a shot. The game involves tossing and catching a ball using the smooth and relaxing movements of Tai Chi. Bob and I were admittedly less graceful than the other players but everyone got a good laugh out of it.



The Summer Palace, Beijing. L-R: Bob Sharrock, tiny spectator, and Jackie Campbell playing Tai Chi ball (photo by Apple).

The Temple of Heaven complex was built in 1420 as a place of worship and ceremony and contains four temples on 675 acres. Today, with a sprawling cypress forest, it is the largest park in Beijing. Of the four temples, the best known is the enormous "Hall of Prayer for Good Harvests" (making it extra relevant to our mission on the trip). Throughout the park we found people engaged in a flurry of activity from isolated meditation in the cypress forest to group



dances and accordion performances. Bob was inspired by the music and began to dance down a corridor which was presumably named "The Corridor of Supremely Joyous Bob".

In the evening we visited the 2008 Olympic Green, which contains the Beijing National Stadium "Bird's Nest" and the National Aquatic Center "Water Cube". The Bird's Nest hosted the opening and closing ceremonies of the Olympics and many of the track and field events of the games.



The Bird's Nest National Stadium, Beijing. L-R: Li Huang, Bob Sharrock, and Jackie Campbell (photo by Apple).



The Water Cube Aquatic Center, Beijing. L-R: Apple, Li Huang, and Jackie Campbell

The Water Cube served as the venue of the swimming events. The vibrant lights of the two buildings and the surrounding park were an incredible site in the evening.

No trip to China would be complete without a trip to the Great Wall! The wall is roughly 2,500 years old and at over 4,000 miles long it is the single human-made structure that can be seen from space. We visited a section of the wall outside of Beijing known as Badaling.

We climbed to the highest accessible point of the Badaling section and treated ourselves to ice-cream. The climb was steep and slick in places but amazing and surrounded by very lush forest.

Our time in Beijing was over and we had to say goodbye to Apple, but only for a short time as she will be coming to MSU as a post-doctoral researcher in the Huang lab this fall.

We took a domestic flight from Beijing to **Xi'an** where we were met by **YanYan**, a graduate student from Northwest A&F University (NAFU) in Yangling (just outside Xi'an).



A&F University, Yangling. L-R: Dr. Huixian Zhao and Jackie Campbell in one of the re-



After a tour of one of the two NAFU campuses, Bob and I gave seminars on our research to students and faculty.



A&F University, Yangling. Li Huang and seminar audience.



Photo13. A&F University, Yangling. L-R Front Row: Jackie Campbell, Dr. Huixian Zhao, Li Huang, and Bob Sharrock. L-R Back Row: Dr. Zhao's graduate students: Mr. Meng Ma, Fassel, and YanYan.

In the afternoon Li and I met with our collaborators and their students to discuss our research.

It was fantastic to talk with the students working in similar areas of research to my own and to learn about their experiences as graduate students in China. Bob met with some of the students and faculty working on Arabidopsis (yes, there are a few).

From Yangling we traveled back to Xi'an to see some of the sites in that area. Xi'an is one of the oldest cities in China with over 3,100 years of history and was once the country's capital. Today Xi'an has a population of roughly eight million and is an important center of culture, industry, tourism, and education. In Xi'an we visited several extraordinary sites including the ancient city wall and the Terra Cotta Army.

The Xi'an City Wall was originally built over 1,800 years ago and much of the existing wall was built in 1370, making it the oldest and best preserved city wall surviving in China. The wall is 16 miles long, 40 feet tall, 40-46 feet wide, and has 98 ramparts each an arrow's-shot from the next. We rented bikes and rode along the city wall enjoying the bird's eye view of the city.



After our bike ride we had dinner at a nightly street fair of Muslim vendors. We tried many foods but my favorites were the udon noodles and fried persimmons.

From Xi'an we made a trip to see the Terra Cotta Army. This army consists of thousands of life-sized ancient clay statues of warriors, chariots, horses, officials, acrobats, strongmen, and musicians.

The army is said to represent the real life army of the first emperor of China, Qin Shi Huang. Built as funerary art near the site of the Qin Shi's mausoleum, the army was buried to guard the emperor in the next life. The figures have been dated to 210 BC but they lay undiscovered until 1974 when a farmer happened upon them while drilling a

well. It is estimated there are over 8,000 unique clay statues but the exact number is unknown as not all of the pits have been excavated.



Terra Cotta Army, Xi'an. One of the three pits on site.

The following day, we visited Hua Shan in the Qin Ling Mountain range which divides north and south China. Hua Shan is one of the five great Taoist mountains in China. It has five recognized peaks, the highest of which is 7,086 feet. There are trails up and down the mountain comprised of stone step walkways and carved vertical stairways with chain rails.



Hua Shan, Xi'an. Li Huang taking the "tough cookie" route up the mountain.

Many of the trails were originally constructed in the third and fourth centuries and contain shrines and stone sculptures.



Hua Shan, Xi'an. Jackie Campbell with the book of prosperity (photo by Li Huang).



Hua Shan, Xi'an. Bob Sharrock with the rock shaped like China.

We rode the cable car to the base of the North Peak and then hiked to the summit. The railings along the trail were covered with gold locks and red cloth strips.



Hua Shan, Xi'an. The locks and read cloth left to represent a commitment made.

The locks are part of a Chinese tradition that says if a couple leaves a lock on the moun-

tain their commitment will endure.

After seeing many wonderful sites in Xi'an, we traveled on to the Shanghai Academy of Agricultural Sciences (SAAS) in Shanghai. We were met there by Lu Ruiju, a SAAS researcher who is an old school-mate of Li's. After a tour of several of the SAAS facilities Li and Bob gave seminars on their respective research. We had lunch with several SAAS researchers and a graduate student named Dave who would be our guide in Shanghai. Dave took us to visit two remarkable attractions: the World Expo and the famous Shanghai waterfront, the Bund.

The World Expo is an international event of cultural exchange where countries prepare galleries and exhibits related to national art, design, education, trade, technology, and culture. Each participating country designs and constructs an enormous pavilion to house their gallery. The World Expo has received over 30 million visitors and will continue through October. The larger pavilions had waits up to six hours long! Instead of standing in line we appreciated the pavilions' exteriors. The most striking pavilion we saw was the UK's which looked like an exploding cube (photo20).



The World Expo, Shanghai. The UK pavilion



We were all pretty exhausted from the heat and the crowds after the Expo so we relaxed on a boat trip at sunset. We boated from the

Expo up the Huangpu River along Shanghai's famous waterfront known as the Bund. The Bund was the financial center of Asia in the nineteenth century and is lined with extravagant historical buildings. The buildings once housed banks, trading houses, and embassies of many countries. On the opposite side of the river from the Bund is Pudong, an area containing many new skyscrapers. Pudong is home to the Shanghai World Financial Center and the Jin Mao Tower, two of the tallest buildings in the world.

From Shanghai we traveled to the resort city of Hangzhou known for its scenic beauty. In Hangzhou, we visited the Lingyin temple and monastery made up of palaces, pavilions, and pagodas. Lingyin was established in 328 AD and is now one of the largest Buddhist temples in China. The temple houses a collection of important pieces of Buddhist literature in the library and is home to over 3,000 Buddhist monks. All around the temple grounds there are carvings in the rock faces surrounded by lush gardens. One of the most famous carvings is that of the fat laughing Buddha.



Lingyin Temple, Hangzhou. The Laughing Buddha (photo by B. Sharrock).

After the temple, we enjoyed a boat ride on the renowned West Lake. The lake is surrounded on three sides by mountains and is known for both its beauty and historical importance.

After relaxing in Hangzhou, we continued on to the city of Jiaxing, considered the "Home of Silk". In Jiaxing we visited the South Lake where the tenth century Misty Rain Tower

was rebuilt in 1548 AD. The South Lake is also known for being the location for the first meeting of the Communist Party of China, led by Mao Zedong in 1921, which took place on a boat in the lake. From Jiaxing, we traveled to the airport in Shanghai to return to Bozeman.

The entire trip was remarkable! It was very exciting to meet all the scientists and students in China and to discuss research with them. This trip helped me to realize that there are so many differences between China and America but there are far more similarities. It was also wonderful to see so many ancient and beautiful sites and to experience the rich Chinese culture. We spent **time with members of Li's family, including** her parents and her husband Wei, who made the trip very welcoming and relaxed. For me, the most incredible experience was the generous hospitality of our Chinese hosts who treated us as warmly as if we were old friends. All of our hosts and guides demonstrated amazing patience in teaching us about Chinese culture and language and made our trip truly fantastic.

"Hi-Five" Symposium By Cathy Cripps



Whitebark pine near Cooke City.

Our lab (Cathy Cripps, Bob Antibus and Leslie Eddington) attended and helped sponsor the "Hi-Five" Symposium June 28-30 in Missoula, MT. This conference brought 250 forest managers, academicians and concerned citizens together to discuss the future of high-

elevation five-needle white pines. It was the first major meeting to focus on a group of white pines with limited timber value but of great ecological value to the U.S. and Canadian West. This includes: foxtail, limber,



Ghost forest

Great Basin bristle cone, Rocky Mountain bristle cone, southwestern white and whitebark pine. All are declining in the West due to the impacts of white pine blister rust and mountain pine beetles, complicated by fire suppression and climate change. A major portion of the symposium focused on whitebark pine which is considered a threatened species in Canada and is now a candidate for the Endangered Species Act in the U.S. In areas of the West 90% of the magnificent whitebark pine treeline forests have **disappeared leaving only the "skeletons" of standing dead called "ghost forests"**. This is the only tree species in our areas capable of surviving at treeline on harsh sites. These high-elevation forests help regulate hydrologic processes by holding and slowly releasing snow late into the **spring. In our area the pine's range overlaps** with that of the grizzly bear and pine nuts are considered an essential food for the bears just before hibernation. Loss of this resource may affect grizzly bear populations. The seeds are primarily dispersed by nutcracker in the fall and squirrels make caches of the seeds that are raided by bears. The pines may depend on certain host-specific mycorrhizal fungi for their existence. It is a well-integrated and sensitive system im-



A pine in peril.

portant to a whole community of high-elevation flora and fauna. Presentations at the symposium focused on basic biology and management strategies. Currently huge complicated restoration efforts are underway that include: Identification of rust resistant trees, addition of verbenone packets to plus trees, cone collection, improving seed germination, growing reseedlings in the nursery, adjusting out-planting techniques, and examining the use of fire to reduce competition from fir and provide openings for nutcrackers and plantings. Over 200,000 seedlings have been planted but only 40% have survived and in some areas survival rates approach zero. Much of the conference focused on improving restoration techniques and strategies and integrating them across the West.

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The Keynote Address was given by Robert Mangold, Forest Health Protection Director **who spoke on "The US Forest Service renewed focus on gene conservation and restoration of five-needle pine species"**. Sessions included those on ecology of pine systems, blister rust and beetle epidemiology, rust genetics, rust resistance, tree physiology, monitoring and modeling of affected forests, fire ecology and restoration. There was a lot of interest in our research on the inoculation of whitebark and limber pine with native ectomycorrhizal fungi. We are studying some of the last intact forests in the Greater Yellowstone Ecosystem and applying what we have learned to Waterton Lakes Glacier International Peace Park where pines are seriously declining. We made three presentations on: **'Ecology of Native ECM fungi', 'Successful inoculation of whitebark pine seedlings', and on the 'Impact of fire on the ECM community on planted pines'**. Our program is funded by many of these agencies and we made many new contacts that will enable our research to be applied on a larger scale in forest nurseries.

We were not able to attend the field trip but returned to search for these elusive native fungi in high-elevation forests here and in the Rocky Mountains into Alberta—and as always we are hoping for more rain! I will be taking this message to the North American Mycological Society meeting in Colorado

where we hope to engage 200 Citizen Scientists in our hunt for these fungi.

If you are interested in more information, here are two resources:

Whitebark Pine Ecosystem Foundation online at: <http://www.whitebarkfound.org/>

Schwandt, J. 2006. Whitebark pine in peril: a case for restoration. USDA FS R1-06-28, August 2006.

Diagnosticians Attend Tree Pest Workshop

Ruth O'Neill and Linnea Skoglund attended a workshop on Tree Pests of the Great Plains on July 14 and 15. The workshop took place in Chadron, Nebraska, and was put on by the Great Plains Tree Pests Council (a group of foresters) and the Great Plains Diagnostic Network. There were six diagnosticians there and about 20 foresters. It was nice to get a different slant on things.



Linnea and Ruth on the campus of Chadron

There were presentations and discussions about Emerald ash borer and mountain pine beetle. The most important thing we learned about identifying EAB is to make **sure the tree is an ash**. Homeowners don't know their trees and commonly think mountain ash (*Sorbus* spp.) is ash (*Fraxinus* spp.) We also discussed the actions that are taking place to curb the interstate movement of fire wood, especially by campers and hunters, and the experimental data concerning the insect populations in

fire wood.

On the pathology side, there was a presentation and discussion about 1000 cankers disease. This is a disease of black walnut that is decimating the tree population in Colorado. There are areas of the western US that do not have black walnut anymore due to this disease. It is definitely something to watch for in our few native black walnuts. This is a devastating fungal disease (*Geosmithia* sp.) that is vectored by a beetle. There were discussions about Ash Yellows, a phytoplasma disease that has been found in Montana by Jim Walla of NDSU, and Pine Wilt nematode, detected in Billings for the first time this year. It is always great to talk with the guys with all the experience to get tips and pointers about these diseases.

Our entire group went to Fort Robinson for a hay ride and cook out. This is a beautiful area in Western Nebraska. The fort was important in the Indian Wars. It was the home of Red Cloud of the Ogalala and the Red Cloud Agency and is where Crazy Horse surrendered and was killed. The fort was important during WWII for dog training as well as soldiers. It also served as a remount station. As the Army dismounted, the horses and mules were shipped here and eventually dispersed. The area is well worth a visit and is a great place to camp, especially with a horse.



The view from Ft. Robinson in Western Nebraska

The highlight of the workshop was the Pest ID Quiz. Fresh samples of disease and insects (15 each) were on display. We are proud to announce that Ruth and Linnea tied (no we did not collaborate) at 5th place, behind the diagnosticians from CSU and KSU and a couple forestry folk. We would **have smoked 'em if we had collaborated.** Ruth got a book on spiders (her favorite) and Linnea got an NPDN bucket hat to keep that sun off her head.

Both of us feel we got something from the cross-disciplinary workshop that will make us better diagnosticians and better at knowing when to consult each other.

Bob Gough Retires



Bob Gough has retired after fifteen years of service to MSU and nearly 40 years of service in academia. Bob began his professional career as a county agricultural agent in Virginia, then became a tenured faculty member in the Department of Plant Sciences at the University of Rhode Island, where he held teaching, research, and extension appointments. There Bob also served as Vegetable and Fruit Extension Specialist for the state and as the Highbush Blueberry Specialist for New England. Although Bob was trained as a pomologist and plant anatomist he spent most of his time at MSU in Extension as a horticulturist in high demand around the state. With his split appointment Bob also taught courses in Fruit Production, Vegetable Production, and Landscape Management. During his 5 year tenure as our college's Associate Dean for Academic Affairs Bob grasped the changing demographics of our freshmen who had a poor knowledge of agriculture in all of its facets. To ameliorate the problem, Bob developed a new and highly popular course, AGR 101, an Introduction to Agriculture and Natural Resources. Bob has witnessed much change over the years. "It's all for the better." says Bob. "When I started out academia was a rather stodgy empire inhabited by World War II veterans who enforced a command structure that fortunately has

eroded. If you wanted to get tenure you kept your head down and didn't question anyone with higher rank. Happily, there is far more openness now, far greater opportunity to discuss variant ideas with your colleagues." But with that openness and increased comradery Bob finds a diminution of rigor in many programs. "In too many cases we do not hold our students to high standards of achievement. For whatever reason (and there are many) we have dumbed-down some courses and curricula. This is certainly not the case in all areas but examples are plentiful enough throughout the university for concern. I am confident the Plant Sciences and Plant Pathology faculty will strive to maintain the highest academic standards and that is why I am proud to call your department MY department. I can no longer be there with you in person, but I will always be there with you in spirit."

New Employees Jennifer Britton



We would like to welcome Jennifer Britton as the newest member of the PSPP faculty. She will be teaching Planting Design and Landscape Architecture fall semesters and Site Development and Landscape construction spring semesters.

Jennifer received her Master's in Landscape Architecture and Certificate in Historic Preservation from the University of Georgia (2006), where she taught Planting Design and provided graduate assistance to the Center of Community Design and Preservation. She received her B.S. in Environmental Design and B.A. in Studio Art from the University of California, Davis (1996).

Prior to accepting a position at MSU, Jennifer worked as an Associate Transportation Planner for the City of Seattle, overseeing pedestrian/bike and stormwater

improvement projects throughout the city. She has also worked in mid-size design firms where her project experience included campus planning, streetscapes, historic parks, plazas, private residences, and art direction in graphic design.

Her current research interest centers on enabling communities to preserve their sense of place while grappling with the realities of a living working landscape. Toward that end, she has engaged her research in methodologies for site analysis, planning, and interpreting cultural landscapes.

She spends her free time with her husband, Aaron Britton, and their two cats. When **she's not hunched over an illustration or a potter's wheel, she enjoys trying her hand** at writing children books and gardening. She also maintains a creative journal blog at <http://jdwbritton.wordpress.com>.

IT Update By Matt Rognlie



As mentioned in my previous column, the College of Ag IT world is a bit busy at the moment. The busy part was compounded with the finalizing of Animal Bioscience and the move of the department. As such, I didn't have time to write a column. **But, lucky for you, I'm providing a link to an article that I think you'll find well worth your time to read.**

The article was published this spring in the bimonthly EDUCAUSE Review. EDUCAUSE is the professional society for higher education information technology, and serves **constituents from CIO's (Chief Information Officer)** to computer support technicians. I attend the annual meeting almost every year and it always exceeds my expectations.

The article "Individual knowledge in the Internet" was written by Larry Sanger, the co-founder of Wikipedia, who has strong interests in educational philosophy, policy and higher education. Since we are all obviously immersed in the educational environ-

ment I strongly encourage you to read the article. Those with school-age kids will find it especially interesting, and I would venture to say that it is required reading for faculty.

The article is hosted locally at <http://ag.montana.edu/ERM1020.pdf>. Any questions or discussion regarding the article is welcome.

Cheers,
Matt

Master Gardener Topic of August 7 Farmer's Market Booth By Toby Day

Every Saturday since June 19, Master Gardener volunteers Paul and Sandra Joubert have driven to Bozeman at 6:30



*Paul and Sandi at
Phoenix Botanical*

a.m. from Central Park, Montana, (between Belgrade and Manhattan) to bring materials to set up the MSU Extension and Master Gardener booth at the Gallatin County **farmers' market.**

The market begins at 9 a.m., but at 7:30 a.m. with coffee in hand, Master Gardeners set up the canopy, table, signs, and all the displays and Mont-Guides. so that they are available to the public when the market opens.

Everything needed for the market will fill **the back of a Paul and Sandra's suburban,** and they graciously help set up, take down and even store the materials until **the following week's market.** Joined by other Master Gardeners throughout the morning, they help answer questions, fill out forms, take in plant material or insects for the Schutter diagnostic lab, and assist the special guests and pest specialists who volunteer for the booth each week.

We have had some exceptional guests and specialists from Extension, Plant Sciences and Plant Pathology, and from the community, thanks to Mary Burrows, who schedules the guests and is the person credited for getting the market booth up and going. People from all over the valley bring their questions, plants and even some insects to have identified and talk with the specialists. It has been a wonderful experience and very successful, with an average of more than 150 people visiting the booth each week.

On Saturday, Aug. 7, the topic of the Extension booth will be the Master Gardener Program. Come meet the Master Gardeners and see how volunteering through MSU Extension can benefit the people of the Gallatin.

Master Gardeners usually volunteer from 20 to 50 hours as part of the program. However, Master Gardeners such as Paul and Sandra Joubert volunteer much more than that. They have built more than 20 community gardens in Belgrade, volunteered at the **farmers' market booth, and participated in** many other projects. There are many stories about people like the Jouberts and the projects they ,and other projects Master Gardeners, are working on.



Paul and Sandra Joubert, Melissa Graves, Toby Day, and Jane Mangold answering questions at the Farmer's Market booth.

Recipe of the Month

No Bake Peach Crisp

- 1/2 c Grape Nuts
- 2 T sugar
- 2 T butter

- 1/3 c sliced almonds
- 1/4 c brown sugar
- 1 T cornstarch
- 1/4 t cinnamon
- 1/4 c water
- 2 t lemon juice
- 4 medium peaches, peeled and sliced



For topping, in medium bowl combine cereal, 1 Tbsp. sugar, melted butter and almonds and toss to coat. Set aside.

In a large saucepan, combine brown sugar, cornstarch and cinnamon and blend well. Add water and lemon juice and mix until smooth with wire whisk. Add peaches and cook over medium heat for 5-10 minutes or until mixture boils and thickens. Boil 1 minute, stirring constantly and remove from heat.

To serve, spoon hot filling into 8 serving dishes and sprinkle reserved topping over filling. Serve warm. 8 servings.

August Birthdays

Jinling Kang	1
Susie Couch	2
Mary Burrows	7
Andy Hogg	8
Susie Siemsen	22

