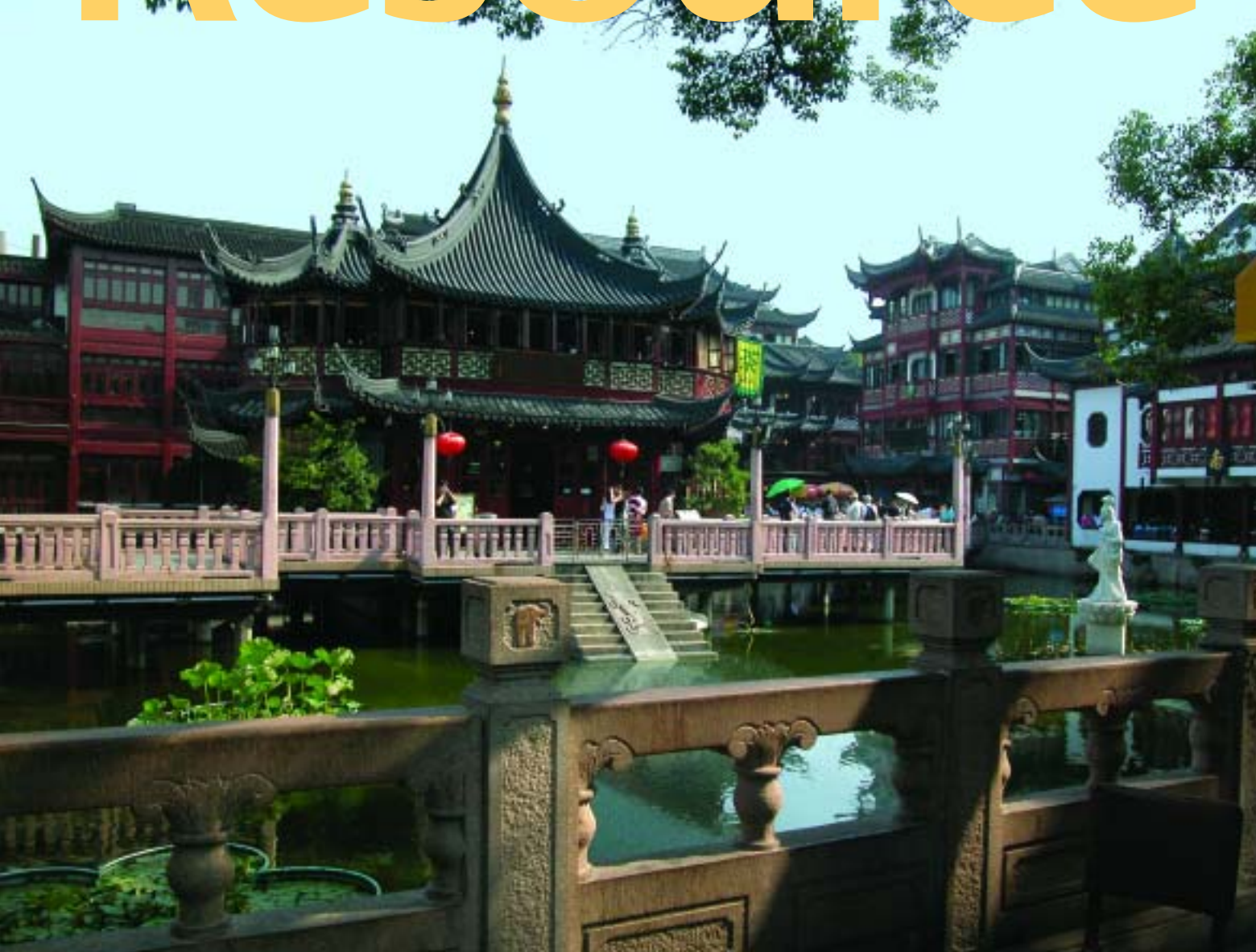


August 2005

Resource



Engineering & Technology for a Sustainable World

Pondering China's Past and Future

**Society Name Officially
Changes to ASABE**

2004-2005 Annual Report

Events Calendar

ASABE Conferences and International Meetings

To receive more information about ASABE conferences and meetings, contact ASABE at 800-371-2723 or mcknight@asabe.org. For the complete list, see www.asabe.org/resource/asaevents.html.

2006

April 8-12 **International Symposium on Hydrology and Management of Forested Wetlands**. New Bern, North Carolina, USA.

July 9-12 **ASABE Annual International Meeting**. Portland, Oregon, USA.

2007

June 17-20 **ASABE Annual International Meeting**. Minneapolis, Minnesota, USA.

ASABE Section and Community Events

For more information, contact the person identified in each listing. For the complete list, see www.asabe.org/resource/community.html.

2005

Aug. 7-10 **NABEC Section Meeting**. University of Delaware, Virdon Center, Lewes, Delaware, USA. Contact Ken Lomax, 302-831-2468, kml@udel.edu.

Sept. 22-24 **Pacific Northwest Section, 60th Annual Regional Conference**. Lethbridge Lodge, Lethbridge, Alberta, Canada. Contact Lawrence Papworth, 403-329-1212, lawrence.papworth@gov.ab.ca or Reed Turner, reed.turner@gov.ab.ca.

Sept. 29-Oct. 1 **North Central ASABE/CSBE Conference**. Student Union, South Dakota State University, Brookings, South Dakota, USA. Contact K. Muthukumarappan, muthukum@sdstate.edu.

Oct. 12-13 **Texas Section Meeting**. Grapevine Convention Center, Grapevine, Texas, USA. Contact Kenneth Klanika, kklanika@bexp3d.com.

Oct. 14 **Kansas Section Meeting**. Kansas State University, Manhattan, Kansas, USA. Contact Ronaldo Maghirang, rmaghir@ksu.edu.

ASABE Endorsed Events

For more information, contact the person identified in each listing. For the complete list, see www.asabe.org/resource/endorsevents.html.

2005

Aug. 21-24 **International Conference on Environmental Effects of Agricultural Practices: Remediation, Prevention, and Sustainability**. Hilo, Hawaii, USA. Sponsored by U.S. EPA Office of Science Policy and the Center of Hazardous Substance Research at Kansas State University. Contact Jeffrey Field, 913-551-7548.

Sept. 7-8 **IUV Technology 2005**. Denver, Colorado, USA. Sponsored by Industrial Utility Vehicle and Mobile Equipment Magazine/Webcom Communications. Contact Nick Depperschmidt, 720-528-3770, nickd@infowebcom.com.

Sept. 12-16 **Frutic 05. Information and Technologies for Sustainable Fruit and Vegetable Production**. Montpellier, France. Contact www.frutic05.org.

2006

TBD **5th International Conference of the Asian Federation for Information Technology in Agriculture**. Bangalore, India. Sponsored by the Asian Federation for Information Technology in Agriculture.

Other Events

For more information, contact the person identified in each listing.

2005

Sept. 7-9 **American Feed Industry Association Liquid Feed Symposium** Omaha, Nebraska, USA. Contact AFIA, 703-524-0810, www.afia.org.

Sept. 19-21 **American Feed Industry Association Expo 2005**. Kansas City, Missouri, USA. Contact AFIA, 703-524-0810, www.afia.org.

Sept. 25-29 **Dam Safety 2005 National Conference**. New Orleans, Louisiana, USA. Sponsored by Association of State Dam Safety Officials. Contact 859-257-5140, www.damsafety.org

Oct. 14-16 **2005 International Lawn, Garden and Power Equipment Expo**. Louisville, Kentucky, USA. Sponsored by the Outdoor Power Equipment Institute. Contact www.expo.mow.org.

Oct. 17-20 **21st Annual International Conference on Soils, Sediments and Water**. Amherst, Massachusetts, USA. Contact www.UMassSoils.com.

Oct. 17-21 **Society of Fire Protection Engineers 2005 Annual Meeting**. San Diego, California, USA. Contact Julie Gordon, 301-718-2901, jgordon@sfppe.org, www.sfppe.org.

Oct. 26-29 **SCADA and Related Technologies for Irrigation District Modernization**. Portland, Oregon, USA. Sponsored by USCID. Contact www.uscid.org/05scada.html.

Oct. 27-28 **2005 ABET Annual Meeting**. San Diego, California, USA. Contact www.abet.org/AnnualMeeting/2005AnnualMeeting.html.

Nov. 4-5 **Agricultural Engineering 2005, High Tech for Sustainable Agriculture**. Hannover, Germany. Sponsored by VDI-MEG and EurAgEng. Contact www.vdi.de/landtechnik.

Nov. 5-11 **2005 ASME International Mechanical Engineering Congress and Exposition**. Lake Buena Vista, Florida, USA. Sponsored by the American Society of Mechanical Engineers. Contact Kim Punter, 212-591-8258, punterk@asmc.org.

Nov. 15-18 **XII International Rainwater Catchment Systems Conference**. Vigyan Bhawan, Delhi, India. Sponsored by International Rainwater Catchments Systems Association. Contact www.ircsa2005.org.

2006

March 8-10 **Integrated Solutions to Manure Management III**. London, Ontario, Canada. Contact www.istmm.com.

Aug. 15-17 **National Conference on Sustainable Agriculture**. Oconomowoc, Wisconsin, USA. Contact www.sare.org/ncrsare.

To have an event listed here, send information to Suzanne Howard, 2950 Niles Road, St. Joseph, MI 49085, USA; fax 269-429-3852, howard@asabe.org. Information must reach us *at least* two months before the event.

Resource

Engineering and Technology for a Sustainable World

Vol. 12 No. 6

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FEATURES

5 China Odyssey

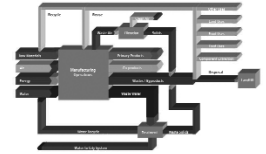
Launching a new series, the “Marco Polo Narratives,” Otto Loewer gives an account of overseas adventures. Not unlike the Polo who journeyed over the Silk Road centuries before, Loewer returned packing more than souvenirs. “China fascination” continued long after passing through Customs. “This journey profoundly impressed me, not as a tourist but as an agricultural and biological engineer,” says ASABE’s new president. He thus embarked on another quest: interviews of Asian travelers and Chinese engineers.



page 5

9 Harvesting Value

In order to effectively recover, recycle, and either add or extract value from organic residues, five key questions must be answered: How much residue is produced? Can it be reduced? What are the properties of the organic stream? What can be done with the stream? What will it cost? Kurt Rosentrater provides an intriguing assessment and answers, particularly for ASABE members actively involved in residue management and utilization.



page 9

11 Blooming Possibilities

“The nursery industry sorely needs automation and mechanization,” say Mississippi State researchers. An “unsophisticated but significant” project aimed at improving plant container lifting and moving by mechanized gripper may ease back strain and boost worker efficiency and safety as well.



page 11

2004-2005 ASAE Annual Report

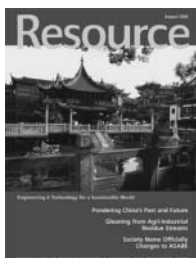
The profession has evolved and expanded over the last, almost 100 years, bringing change and new beginnings. The most obvious change was a strong vote by the membership to modify the Society name to be more representative and descriptive of the breadth and depth of the profession. That is not the only positive change or new beginning happening within ASAE. Learn more in reports written by volunteer and staff leaders. See insert.



DEPARTMENTS

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Personnel Service	17		

ON THE COVER



Shanghai, called “Hu” for short, is a bustling metropolis at the mouth of the Yangtze River. With a population of over 13 million, the city is among the world’s biggest, most booming urban areas. While Shanghai epitomizes modern China, intriguing features of its ancient history are prominent in new construction and architecture. In traveler Loewer’s cover photo, “the old world meets new” as reflected in this pond-and-garden shopping and restaurant complex in the downtown area.



Society Name Officially Changes to ASABE

13 We are now the American Society of Agricultural and Biological Engineers. The name change has the potential to benefit all segments of our membership. The complex task of transition in name now begins. Learn more about this process and how it affects you and your Society.

The Marco Polo Narratives, new to **Resource** this month, opens with our first occasional installment in the series:

“China Odyssey”
by Otto Loewer

The cover-feature article, which begins on page 5, excerpts Loewer’s travelogue and subsequent interviews initiated after his Asian odyssey.

To read the interview dialogues in their entirety, log on to

www.asabe.org/resource/OttoLoewerChina.doc.

Have you taken a journey related to your biological/agricultural engineering career? Are you the next Marco Polo to be featured?

Please contact Sue Mitrovich, mitro@asabe.org.

We’d like to share the membership’s professional travel sagas!

1/3 OF AMERICA’S LAND IS YOURS. CONSIDER SPENDING 1/365 OF YOUR TIME PRESERVING IT.



And Saturday, September 24, 2005 is the 12th annual National Public Lands Day, a day when you can help spruce up your beautiful lands. Last year on this day, nearly 80,000 volunteers built trails and bridges, planted native trees and removed trash.

To find out how you can help, go to www.publiclandsday.org or call 800-VOL-TEER (800-865-8337).

HELPING HANDS FOR AMERICA’S LANDS



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Resource

Engineering & Technology for a Sustainable World

VOL. 12 NO. 6

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AGRICULTURAL AND BIOLOGICAL ENGINEERS

Resource: Engineering & Technology for a Sustainable World

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Magazine staff: Donna Hull, Publisher, hull@asabe.org; Sue Mitrovich, Features Editor, mitro@asabe.org; Suzanne Howard, *Inside ASABE* and Update Editor, howard@asabe.org; Pam Bakken, Advertising Sales Manager and Production Editor, bakken@asabe.org.

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American Society of Agricultural and Biological Engineers

2950 Niles Road

St. Joseph, MI 49085-9659, USA

269-429-0300, fax 269-429-3852

hq@asabe.org, www.asabe.org



Drainage system cuts nutrients in lakes, rivers

Researchers at the University of Illinois are evaluating a modified drainage water management system that reduces the amount of nutrients moving into rivers and streams.

The modified system has reduced nitrates flowing from drainage tile into streams by 46 percent and phosphorus by 80 percent. These nutrients are two leading sources of contamination in U.S. rivers and streams.

The new system works by reducing the volume of drainage water flowing from a tile outlet, says ASABE

member Richard Cooke, University of Illinois agricultural engineer. An automated control structure placed at the outlet of a tile system controls the level of the water table in the soil. By adjusting the opening of the gate on the structure, researchers can control the rate at which water flows out.

Cooke has several structures on sites located around Illinois. His goal is to have 12 sites located on the 12 major soil types in the state. He also hopes to combine the structures with other drainage water management practices he has developed, including shallow tiles and bioreactors. A shallow drain tile is placed 0.76 to 0.9 m

(2.5 to 3 ft) deep instead of the traditional 1.2 m (4 ft), which reduces the water flow coming from the tile. A bioreactor is an underground trench filled with carbon material (such as wood chips or corn cobs) that may be mixed with gravel.

Cooke plans to place the new control structure at the outlet of a shallow drain tile system. The drainage water from the control structure would pass through the bioreactor, and bacteria in the soil would break down nitrates in the tile water, greatly decreasing the nitrate concentration in the effluent.

For more information, contact Cooke, 217-333-0944, rcooke@uiuc.edu.

Sensors cast light for nitrogen use

Using the right amount of nitrogen fertilizer to obtain desired corn yields can be a challenge for both economic and environmental reasons.

University of Missouri (MU) researchers are using sensors called light emitting diodes (LEDs) to accurately measure the color of young corn and apply rates of nitrogen according to plant needs.

The researchers are in their second year of testing this technology on Missouri farms. They hope this LED approach will not only increase profits for Missouri producers, but also create a healthier environment includ-

Extending vegetable shelf-life

When the world's sporting elite gather in Beijing in 2008, they will be crunching on vegetables sourced by the Beijing Vegetable Research Centre (BVRC).

The BVRC was a partner in an Australian Centre for International Agricultural Research (ACIAR) project to examine post-harvest management of several key vegetables in China, resulting in improved handling, packaging, and transit technology being adopted by the industry. These improvements to extend the shelf-life of vegetables were an important factor in the BVRC being awarded the Olympics contract.

In China, as in Australia, the factor most limiting expansion of the vegetable industry is the short shelf-life of products.

"Many leafy vegetables, such as pak choy and broccoli, tend to perish quickly after harvest," says Project Leader Tim O'Hare of the Queensland Department of Primary Industries and Fisheries. "Commodities such as Chinese cabbage and oriental bunching onions are storable, but losses during storage can be further reduced."

The project team examined handling and storage methods in China for pak choy, oriental bunching onions, Chinese cabbage, and broccoli. They measured losses for

the four vegetables by sampling at different points in the handling chain and at different times of year.

Physiological factors that limit the post-harvest life of pak choy and Chinese cabbage were identified and used to develop options to extend shelf-life. Some of these options are simple and low-cost measures that have reduced post-harvest losses. For example, the project team bought 1,000 recyclable plastic crates to replace bags for transporting pak choy, which were being crushed.

Another improvement was the introduction of segregation of cultivars and grading. Tomatoes were sorted into three grades to enable improved returns and more targeted marketing. After observing how cabbages were handled at harvest, the scientists were able to recommend that growers remove fewer leaves, resulting in less damage during transport and better returns to the grower.

Since the project, the BVRC has also been involved in the development of handling and cooling systems for suppliers of lettuce to fast-food chain McDonalds in Beijing. Due to the improvement in lettuce quality, McDonalds Shanghai has begun sourcing lettuce from Beijing.

(April 2005, *Partners in Research for Development*)



Buying pak choy at an open-air market; replacing bags with crates has improved the quality. (Photo courtesy of ACIAR)

ing in the Gulf of Mexico where nitrogen runoff carried by the Mississippi River has created hypoxia.

Nutrients such as nitrates and organic nitrogen promote rapid growth of tiny plankton in coastal waters, which then decay and in the process consume oxygen. The resulting low oxygen levels in the water are called hypoxia. Hypoxia stresses or kills bottom-dwelling creatures on which the region's seafood industry depends.

In this research, what has historically proved to be an ample amount of nitrogen used by the farm operator is applied in early spring to only one area of the field. LED devices mounted on a fertilizer applicator measure light reflected from small corn plants in this area, providing a baseline point. The computer-equipped applicator then applies nitrogen fertilizer to the rest of the field. Variable rates of nitrogen are applied to the crop depending on the color or reflective value of corn leaves detected by the LEDs compared to reflectance from amply fertilized corn. Corn that looks similar to the amply fertilized corn means that there is a good nitrogen supply coming from the soil in that area.

Variable rate sidedressing demonstrations last year saw a 33-lb/acre reduction in nitrogen compared to rates used by producers in the same fields, says Peter Scharf, MU nutrient management specialist.

For more information, contact Scharf, 573-882-0777, scharfp@missouri.edu.

Fatter pigs due to cooling

Dutch-sponsored researcher Thuy Huynh has discovered that pigs get stressed if they become too warm. They lie on a slatted floor, wallow in urine, eat less, and grow less as well. With cooling systems, such as floor cooling, sprinkling, or water baths, the pigs remain cool and grow better.



Cooling systems help pigs grow better. (Photo courtesy of USDA-ARS)

Pigs in confinement find it difficult to lose body heat. Therefore their well being is strongly dependent on the ambient temperature. Huynh discovered that they huddled less at a temperature above 16°C (61°F). At a temperature of about 19°C (66°F) the animals sought a slatted floor to lie on. They also wallowed in urine and became less active. If the temperature rose further, the pigs had increased breathing rate and ate less. Finally, their body temperature rose. Thuy Huynh discovered that a high temperature, especially in combination with a high relative humidity, resulted in poor growth of the pigs.

Providing the pig house with extra cooling in addition to the standard ventilation decreases heat stress experienced by the pigs. Cooling the floor of the lying area, providing a water bath to bathe in, or regularly spraying water from a sprinkling installation cools down the overheated pigs. As a result, their feed intake and their growth rate increases. Pigs are highly sensitive to the ambient temperature. They cannot actively sweat and the evaporation of water from the lungs is also limited. Rapidly-growing domestic pigs also produce more body heat than their wild relatives. Moreover, the fact that they are often kept close together in the pens only exacerbates this problem.

For further information please contact: Huynh, +31 (0)317 47 65 96, thuy.huynh@wur.nl.

Biodiesel made from canola oil

North Dakota State University's (NDSU) North Central Research Extension Center in Minot is starting a project to demonstrate that biodiesel made from canola oil works.

"Biodiesel is an excellent renewable fuel for diesel engines," says ASABE mem-

ber Vern Hofman, an NDSU Extension Service agricultural engineer. "It can be derived from almost all oil-producing crops, which chemically are converted into biodiesel."

The demonstration project involves using canola-oil-based biodiesel in one or two tractors during the growing season. The biodiesel was

mixed with diesel fuel at a ratio of 20 percent biodiesel to 80 percent diesel.

Center officials decided to use canola-oil-based biodiesel in its project instead of commercially available biodiesel since the commercial biodiesel is made from soybeans, says Jay Fisher, the center's director.

The Minot area has more acres of canola than soybeans. Archer Daniels Midland Co. provided 1,135 L (300 gal) of canola oil for the project and the NDSU Agricultural and Biosystems Engineering Department converted it into biodiesel.

Canola oil is used extensively in Europe as a diesel fuel extender, but none is used in the United States. The Research Extension Center's project is demonstrating canola-oil-based biodiesel since it is an excellent fuel extender. Center officials also chose it because canola-oil-based biodiesel soon will be available in the United States through the \$50 million biodiesel manufacturing plant being built in Minot.

Canola-oil-based biodiesel is very cost effective to produce, based on its input and output ratio. However, biodiesel has some drawbacks, such as its gelling ability and higher cost than diesel, Hofman says. He recommends mixing biodiesel with No.1 diesel fuel, along with adding anti-gel products and fuel heaters to engines to reduce the gelling problem.

For more information visit www.ext.nodak.edu/extpubs/ageng/machine/ae1240.pdf.

China Odyssey

Globetrotting engineers ponder China's past and future

Otto J. Loewer

Marco Polo first arrived in China in 1275 A.D. I arrived in the summer of 2004 and doubt that Marco Polo was any more amazed. This journey profoundly impressed me, not so much as a tourist but as an agricultural and biological engineer. I saw sustainability in action in competition with a rapidly growing economy; the effect of population density on energy, environment, food production, and transportation; and the critical importance of agricultural and biological engineering to the future of our planet.

My 16-day trip included eight days of touring: from the Great Wall near Beijing to the ancient Silk Road in Xian to a modern city of skyscrapers, Shanghai. I tramped large cities, major tourist stops, university campuses, and several hundred miles of countryside, albeit never far from a major city. I saw a race between a people striving to obtain a higher standard of living and their ability to sustain it. For the last eight days, I was a guest

of the College of Biosystems Engineering and Food Science, Zhejiang University, Hangzhou, where hospitality abounds.

There is little in the plant or animal kingdom that the Chinese can't tastefully prepare as a food source – food engineering in action! And it is true: the national bird is the construction crane. But can rapid economic growth coupled with an increasing population be sustained in the long run?

I am no expert – only a first-time-in-town Marco Polo. But ASABE members have had extensive experiences in China; what do they think? And what about those who were born, raised, educated, and have leadership roles in agricultural and biological engineering in China?

In this, the first of occasional features with travel narrative and reflection as theme, the American analysis is

given by two adventuring “Marco Polos” like myself. Then, the other side of the yen: the Chinese perspective by three “homegrown” analysts.

Norm Scott

Former ASAE president Norm Scott has made 18 trips to China seeing many changes that will impact sustainability. He believes agricultural and biological engineers must play an increasing role if China is to raise her standard of living while improving its natural environment.

“Air quality and smog are extremely bad at times, especially in cities where a huge amount of coal is burned,” Scott says.

“Some restrictions are now coming into play, and China is moving to nuclear and, perhaps, natural gas.

“Untreated point and non-point sources of water discharges have existed too long. Industrial, agricultural, and municipal resources have all been contributors. China is currently being challenged to implement treatment processes, and its version of the Environmental Protection

Agency is getting stronger.”

Scott is intrigued by China's “agro-eco villages,” designed to create an integrated energy and living environment with an agricultural focus. “These villages use waste to produce methane mostly for cooking and some heating with the possibility for conversion to electricity. The heating and electrical component is provided centrally to the village using a combined heat-and-power approach. The agro-eco village is where our profession could play an important role, but there are many forces at work that will increase the importance of our profession in China.”

Bill Stout

ASABE member and former CIGR president Bill Stout attended the October 2004 CIGR International Agricultural Engineering Conference in Beijing.



“... the national bird [of China] is the construction crane,” comments Loewer. Above: Ever-ongoing construction in the city center of Xian.

“The Chinese national economic growth rate is about 9 percent per year and has been growing at this high rate for quite a few years,” says Stout. “Impressive office skyscrapers, apartments, and shopping malls offer a spectacular variety. Superhighways connect many of the major cities. However, while traveling into deeply rural areas by train, I observed farmers tilling the soil with water buffalo and primitive implements. Fields are small, averaging only a fraction of a hectare. Chinese leaders are well aware of the problems and have plans to strengthen the farm economy. Agricultural engineers will have a major role to play.

“While I cannot speak for all Chinese universities, the three agricultural engineering departments I have visited are better funded than many American counterparts, with well-equipped laboratories and computer facilities with cutting-edge research underway. Great emphasis is placed on the English language. My guest lectures were all in English with no interpreters, and the student groups seemed to understand. The culture does not encourage student questioning of professors and interaction is limited, but with prodding we achieved a reasonable level of discussion.

“I think China will become the world’s economic leader in the next few decades, displacing the United States and Europe. They are well on their way to achieving that goal. With more emphasis on rural development, including expanded input from agricultural engineers, I see no reason for their economy to stop growing at a rapid pace.

“My message to American agricultural engineers: if you are not already working with our Chinese colleagues, by all means do so. They are eager to work with you, and you can develop a mutually beneficial collaborative relationship. Both sides will be stronger as a result.”

Yibin Ying

ASABE member Yibin Ying is executive associate dean of the College of Biosystems Engineering and Food Science at Zhejiang University. He has spent considerable time in the United States sharing a research interest in biosensors.

“In China,” says Ying, “agricultural engineering is classified as a Class 1 discipline under an engineering

branch. It contains four Class 2 disciplines: agricultural mechanization, water and construction engineering, bioenvironmental and energy engineering, agricultural electrification and automation – four undergraduate majors in agricultural engineering. There are more than 70 universities with agricultural engineering colleges or departments. Thirteen offer a Ph.D., 11 have postdoctoral programs, and five Class 2 disciplines in four universities are listed as national key disciplines.

“The realization of agricultural mechanization, electri-

fication, hybridization, and chemicalization in the past century laid the foundation for the rapid development of agriculture. Since the late 1970s, there has been rapid development in the fields of biotechnology, computing and information technology, new energy resources, and material sciences.

Agricultural engineering in China entered a new era as a result of four major trends: improvement and reform of agricultural engineering curriculum, broadening scope of research, acceleration of research and extension of application technologies, and development of research and teaching dependent on the support of other related sciences and technologies.

“There has been significant change in the development of the social economy and science and technology. Thus, the position, scope, and clients of agricultural engineering curriculums have also changed significantly. The modern agricultural engineering discipline not only serves production and processing, but it also relates to bioproduction and bioprocessing. The end result: our program is becoming one of basic science, and engineering disciplines need to support the continuous development of our country.

“Every two years, the Agricultural Engineering Society in China holds a national forum on the reform of the agricultural engineering discipline. In 2002, the forum was renamed ‘Agricultural and Biosystems Engineering.’ An influencing factor was what was happening elsewhere in the world regarding agricultural engineering.

“Agricultural engineering is becoming multidisciplinary by its emerging first into biology and then into other new technologies. Research and extension of application technologies are accelerating. Application technologies play an important role in assisting modern agricultural businesses,



“Air quality and smog are extremely bad at times, especially in cities where a huge amount of coal is burned,” says Norm Scott. Loewer captures the haze on his digital canvas: a typical off-to-work morning of vehicular travel and combustion on a side street in Xian.

developing modern agricultural communities, and enhancing the agricultural economy.”

Yun Zhao

Yun Zhao is a leader of the Chinese Society of Agricultural Engineers and president of Zhejiang Sci-Tech University. His campus was filled with visitors and recent graduates with no shortage of social activities on the day of my interview. Added to this was massive ongoing construction. Zhejiang Sci-Tech University occupies a new campus, with over 600,000 m² (6.5 million ft²) of space.

“The role of engineers depends on the education they can obtain from the college or university,” says Zhao. “There are two important things in undergraduate programs: to give students a good foundation and broad knowledge that includes both arts and sciences. What students take from a university are the tools that create an environment sufficient to make them ready for their continuing education after graduation. The second is that a university should offer the curriculum that reflects the major tasks and problems in the future work of agricultural and biological engineers, an example being the continuous development of post-harvest processing.

“At the same time, there is also the need in China for agricultural engineers to have the basic ability for research and development of agricultural equipment.

“There is a Chinese saying, ‘One’s contribution makes one’s position.’ Compared to other disciplines, Chinese experts in agricultural engineering have not contributed enough to the development of agriculture in China for the past several years. Some problems should have been solved, but have not, and this has resulted in not enough support from the government. In comparison, some disciplines, such as breeding science, have obtained more support in funding and higher ranks in national research needs. Considering the limited cultivable land per person and limited natural resources (except human resources), we must ensure the availability of food and clothing for the world’s most populous country. Then we are faced with needs for better food and clothing, requiring more advanced science and engineering.

“Large-scale agricultural production is found mainly in countries in North America, Europe, and Australia, whereas small-scale agriculture is found mostly in Asia and Africa. Therefore, there are many differences in agricultural products and equipment, depending on the stage of development. Yet we have common concerns, and we can cooperate to work on the need for continuous agricultural development and full use of agricultural resources.”

Yanbin Li

Yanbin Li, a University of Arkansas professor, grew up in China where he obtained an undergraduate degree. He left China in 1983 for a University of Nebraska-Lincoln ag engineering M.S. and Penn State University Ph.D. “At that

time,” says Li, “the major tasks for Chinese agricultural engineers were agricultural mechanization and agricultural electrification with the initiation of agricultural energy resources and food processing engineering.”

“For the past decade, I traveled to China almost every year to give a short lecture or seminar or to attend an international meeting. But this last four-month teaching stay made me realize the changes in agricultural engineering. Agricultural engineering is now a major university department and covers all applications of engineering to biology and agriculture.



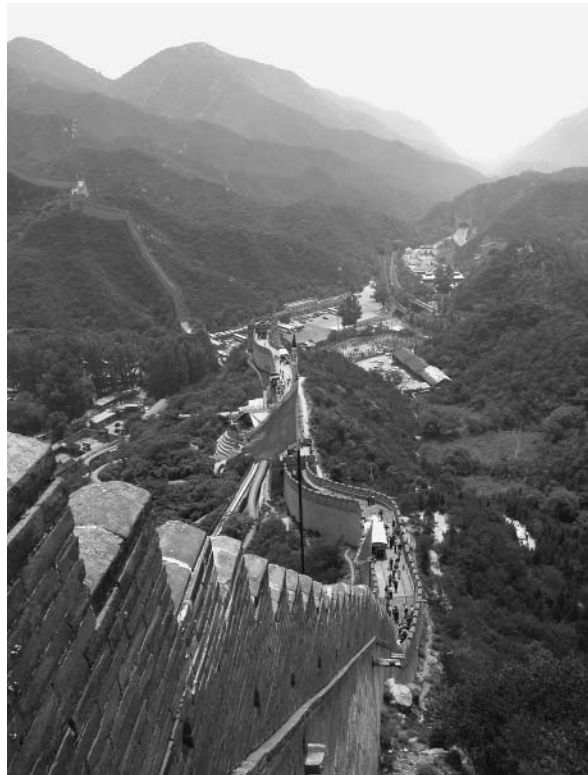
Zhejiang Sci-Tech University President Yun Zhao (left) and Yanbin Li (right) flank Loewer on a stroll through the expansive new campus.

“The number of agricultural engineering students in China graduating in 2004 numbered more than 11,000 with B.S. degrees, 1,200 with M.S. degrees, and 80 with Ph.D.s, and enrollment is increasing every year. China is currently producing four times the number of agricultural and biological engineers as the United States. There are a lot of exchange activities between China and other countries, with more than 427,000 Chinese studying or doing research overseas, and more than 25,000 returned to China in 2004.

“With a population of 1.3 billion, the life support system is a top issue in the society. Population keeps increasing, and resources keep decreasing. The Chinese have more and more waste to manage and more and more pollution problems. Agricultural and biological engineering has a unique role in modernizing our current life support system and in envisioning our future life support system. In fact, this is the most important issue on our planet for next century. Agricultural and biological engineers in China have a great opportunity to make contributions to the development of the national economy and the whole society.

“Chinese agricultural and biological engineers have learned a lot from developed countries in the past 20 years, but they will face their own unique challenges due to the specific features of agriculture and the economy in China, as well as Chinese culture. The agricultural population in China is estimated at 800 million, but more and more are immigrating to urban areas. This results in a shortage of human resources and educated people in remote areas. Second, the economy of remote farming regions is far behind that of the coastal regions, presenting a highly unbalanced agricultural system. Third, the economy has been growing continuously. Annual growth in GDP exceeded 8 percent for the past 20 years, and was 9.1 percent last year.

“World Bank President, James Wolfensohn, says, ‘The Chinese have gained achievements in only 20 years that would take many other countries two centuries to accomplish.’ Agricultural and biological engineers must work in a very dynamic situation with a lot of new problems to solve in a very short time, and there are no examples to follow in many cases. But challenge is opportunity. China needs not only to learn more from the developed countries, but also needs to incorporate unique features into its educational system and associated applications based on the situation in China. Chinese engineers need not only to reform their own discipline, but to work closely with people in other disciplines in research, education, and extension. China provides a great opportunity for agricultural and biological engineers in China, in the United States, and throughout the world. If we look at what agricultural and biological engineers can do in China, we can better understand the future needs of our world and our profession’s role in it.”



Above, the stone and earth Great Wall in the north — an amazing 2,414 km (1,500 mile) long — was built in the third century as a defense against intruders. Today, the welcome mat is out, and airports are bustling with student/academic travel opportunities. “There are a lot of exchange activities between China and other countries, with more than 427,000 Chinese studying or doing research overseas, and more than 25,000 returned to China in 2004,” says Lanbin Li.



China, no longer isolationist, remains a constant contrast in old world and new. Loewer stands amidst the bustle of the main shopping area of busy Shanghai’s high-end department stores.

“I did not tell half of what I saw”

When Marco Polo returned, few believed his stories of the riches he found in Asia, though his souvenirs made him famous. Near death, a priest asked if he’d like to confess some false tales. Not recanting, his purported last words were, “I did not tell half of what I saw.”

In looking back at my experience in China, I see no conflict between what I saw and the opinions of those interviewed — the American as well as the Chinese perspectives on China. I’ve seen agricultural and biological engineers in the United States and Canada address a wide range of problems using a variety of technologies depending on the value of the end product. Using crop production as an example, a lot more technology and investment per unit area can be applied to the production of high-value horticultural crops than to non-irrigated grain production.

But what if the investment is literally in life support systems — where the final product is the sustainability of human life itself at an increasing standard of quality? I see this as the dominant issue in China. And I see the people of China turning increasingly to agricultural and biological engineers to provide technological solutions to the challenges that face them. In a shrinking world, the problems of China become those of the rest of the world, whether those problems manifest themselves as technological, economic, or political. Indeed, these are going to be exciting times for the world in general and for our profession in particular. I imagine that Marco Polo would have thought the same thing. **R**

ASABE president Otto J. Loewer is director and professor at the University of Arkansas Economic Development Institute, 226 Engineering Hall, Fayetteville, AR 72701 USA; 479-575-5118, fax 479-575-2412, ojl@uark.edu.

Harvesting Value

Gleaning from agri-industrial residue streams

Kurt A. Rosentrater

The flow of materials and energy in industrial systems has important implications for economic efficiencies, pollution controls, and environmental impacts. One of the larger categories of material flows is renewable organic matter, including agricultural and forest products such as food, clothing, paper, building materials, as well as crop production itself. These sectors generate large volumes of pre- and post-consumer organic residuals, which have potential value as energy, nutrients, fiber, and industrial chemicals. The USDA Economic Research Service indicates that the food and fiber system in the United States represents about 12.8 percent of total U.S. GDP. In 2001, the U.S. Census Bureau stated that there were 29,993 food, beverage, and tobacco manufacturing facilities in the United States and 13,991 wood, leather, and fiber processing operations. Each of these facilities generates organic processing byproducts. In order to effectively recover, recycle, and either add or extract value from these resulting organic residues, five key questions must be answered.

How much residue is produced?

In recent years, several surveys of agri-industrial processors have been conducted in order to determine the extent of residue generation. Specific byproduct streams have been identified and quantified in Iowa, Kansas, Nebraska, and Washington. Generation rates vary between plants and over time due to many factors: equipment, personnel, operating procedures, seasonality, and raw material variability.

Can this be reduced?

It is vital to examine production processes in detail to determine if alterations could improve process efficiencies and thus reduce the quantity of waste materials produced at

the source. Not only can this reduce waste remediation or remanufacturing costs, it can also increase production profitability, and it should be an integral component to a manufacturer's continuous quality improvement program.

What are the properties of the organic stream?

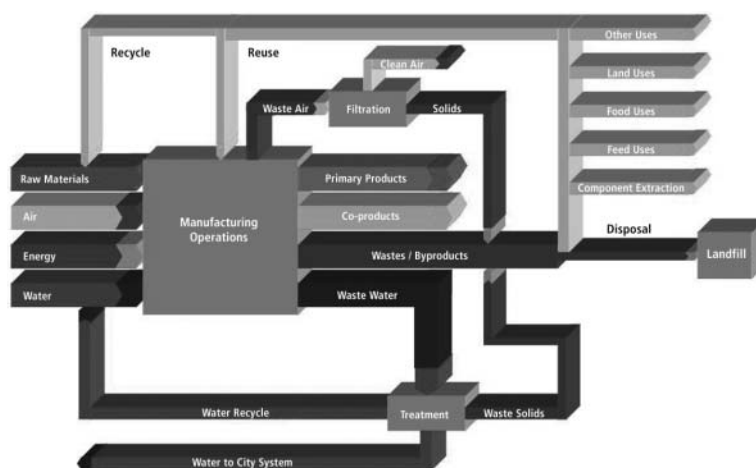
The ultimate utilization of residues will be dictated by their physical and chemical properties. Key physical properties include moisture content, water activity, density, yield stress, apparent viscosity, thermal conductivity, thermal diffusivity, heat capacity, and drying behavior. Essential chemical properties include pH, protein, carbohydrate, fat, ash, fiber, vitamin, and mineral contents.

Characterization of byproduct materials is important because it provides data that are required for livestock diet formulation, design of equipment and processing facilities, and optimization of unit operations such as

blending, mixing, separating, drying, extruding, heating, freezing, pumping, and conveying. Over the last several years, many studies have been conducted to quantify properties of various organic products and residues. In fact, several online databases have been constructed that summarize these properties. Some of the most popular include BIOBIB (www.vt.tuwien.ac.at/biobib/oxford.html), CSIRO (www.det.csiro.au/science/energyresources/biomass.htm), Kansas solid waste (public1.kdhe.state.ks.us/landfills/landfills.nsf?opendatabase), NEL (www.nelfood.com/), Phyllis (www.ecn.nl/phyllis/), and US-DOE (www.eere.energy.gov/biomass/feedstock_databases.html).

What can be done with the organic stream?

Developing value-added uses entails investigating potential manufacturing or remanufacturing processes for these byproduct materials, and this is at the heart of dispos-



Potential value-added disposal alternatives for pre-consumer organic wastes.

al alternative efforts. Activities during this phase could employ multiple unit operations, such as blending with another material, extruding or drying the byproduct, or shipping it for use as a livestock feed additive. This phase may involve composting for later use as a soil conditioning amendment. It might even encompass developing an entirely new industrial product, and an associated market outlet, for the organic residue.



Post-consumer organic wastes are typically mixed with inorganic materials, which can be problematic when trying to develop utilization strategies.

What will it cost?

No byproduct development study is complete without analyzing the economics associated with each proposed reprocessing or reuse alternative. Ultimately, potential disposal and reuse techniques can be attractive to processors if they are not more expensive than traditional disposal mechanisms, including landfilling, for these byproducts.

Over the years, numerous byproduct development efforts have been successfully conducted on a variety of organic residue streams. Landfilling, the traditional disposal method for many agricultural and food processing waste materials, has declined over the last several years due to both increased environmental awareness and economic constraints and/or penalties. Alternative recycling, utilization, or disposal strategies for these residues have been increasingly implemented. Popular options include reprocessing and recycling within the manufacturing plant itself, resale for other end-uses, incineration, biomass energy production, and use as a nutrient source for fermentation.

Composting, yet another byproduct recycling option, converts organic waste streams into soil conditioning and fertilizing amendments. It has gained popularity in recent years as an effective disposal method for organic and food residuals. Composting has been successfully used for a variety of food wastes, including gelatin extraction residues, cranberry mash residuals, tomato processing byproducts, brewery sludges, grape pomace from wineries, and food service organics.

Some processing waste streams are not composted but, instead, are directly land applied. Examples of noncomposted organic materials being recycled by direct land application include dairy processing waste sludges, brewery sludges, newsprint, and paper mill wastewater. Several concerns exist regarding land application, however, such as odors, waste drift, pollution, and heavy metal contamination.

While composting and other innovative approaches have clearly demonstrated their applicability, one traditional approach that should not be overlooked is the use of processing residues as livestock feed. The economic value of

organic residuals is higher in feeding applications, where both the energy and nutrients are used, than in conversion to fuels or fertilizers, which typically utilizes only one of these categories at a time. Many research efforts have focused on incorporating byproduct streams into livestock diets. One aspect of this work has included the direct feeding of food service and food processing wastes. Another area has included the development of feed ingredients from slaughterhouse byproducts. Additionally, many livestock feed materials have been developed in the grain processing industry, especially within the corn dry milling, corn wet milling, and corn alcohol distillation sectors.

Moreover, several recent studies have applied life cycle analysis, simulation modeling, and other analytical industrial ecology tools to recycling opportunities for post-consumer organic residuals, including waste paper, packaging, and other organic materials. Studies of pre-consumer residuals are typically less comprehensive since system boundaries are smaller, but these analyses can provide important information about trade-offs among alternative processing and utilization strategies.



Corn stover, an agricultural residue, has much potential for value-added utilization, including conversion into ethanol.

Many ASABE members are actively involved in these efforts, especially through affiliation with technical committee FPE 707: Food and Organic Waste Management and Utilization. Its primary mission is to foster interest in organic residue management and utilization options. Additionally, the committee is trying to fill the knowledge gap in the processing industries by increasing the research base regarding the physical and chemical properties of the residue streams, as well as quantifying the effects of various processing and conversion technologies. Each year, it sponsors technical programs at the annual summer meeting for discussion and presentation of technical papers on food and organic waste management and utilization topics. If you have an interest in processing organic residuals, you are invited to participate in the committee's activities.

As it always has been, ASABE is well-positioned to continue to make significant strides in improving agricultural and food processing residue management and utilization. This could become a pressing issue in the near future, especially if the USDA's prediction of a 26 percent growth in U.S. food consumption, and thus organic processing, over the next 15 years is realized. **R**

ASABE member Kurt A. Rosentrater is a bioprocess engineer with the USDA-ARS Northern Grains Insects Research Laboratory, 2923 Medary Ave., Brookings, SD 57006 USA; 605-693-3241, fax 605-693-5240, krosentr@ngirl.ars.usda.gov.

Blooming Possibilities

Automating and mechanizing container nurseries in Mississippi

J. Alex Thomasson, F. Paul Lee, Changying Ji, and Ruixiu Sui

The American nursery industry sorely needs automation and mechanization to improve work quality, efficiency, and worker safety. Researchers in the Agricultural and Biological Engineering Department at Mississippi State University have been working with Jeff Howell, the owner of Rocky Creek Nursery at Lucedale, Miss., on a project aimed at improving plant container-lifting and



Figure 1. Layout of container plants at Rocky Creek Nursery, Lucedale, Miss.

-moving operations. These two activities encompass a major part of the work done at container nurseries and both are typically done by hand. A mechanized container gripper is in development, and an automated container transport trailer is ready to be tested.

Container nurseries require frequent moving of plant containers for various purposes: preparing for shipment, spreading out to provide more room as plants grow, etc. Automation and mechanization technologies to assist laborers in these operations would greatly benefit them and the industry by improving effectiveness and safety, particularly in terms of lower-back injury prevention. To be successfully utilized, such technologies must provide the following: demonstrable worker benefit, ease of installation and use, and cost effectiveness. Recent attempts at developing robotic devices for the nursery industry, unfortunately, have resulted in equipment that is too expensive to be practical.

Researchers at Mississippi State University seek to develop a practical, worker-assistive, automated plant-handling system, which targets the movement and placement of plants in large containers [31 L (7 gal) or more] normally moved by hand. The system is composed of two parts: a plant handler with sufficient capability to safely load plants from ground level for short-distance transport to and from an existing conveyor system, and a dual-conveyor tracking

trailer with integrated conveyors to receive the plants from and deliver them to the existing conveyor system.

Plants at the nursery are positioned in blocks of containers separated by walking lanes as shown in Figure 1. It is important that the plant handler be able to work with containers in this configuration.

A prototype container handler (Figures

2 and 3) was designed to be added as an attachment to the front of a small hydraulic loader like a Toro Dingo, because of the Dingo's maneuverability and small size, and because an operator can ride on the unit during transit. To move plants with the device, the operator drives the loader towards the plants until a group of containers is engaged in the container handler, and then lifts the attachment. Once the attachment has secured the plants, the operator then maneuvers the loader to a new location and positions the

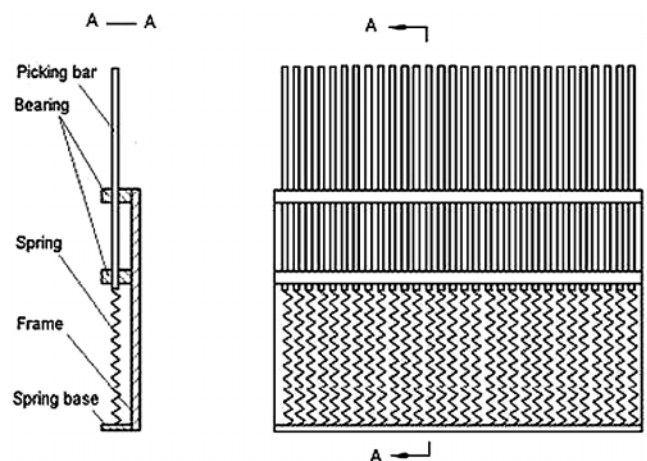


Figure 2. Structure of the container handler.

attachment such that it can place and release the plants appropriately.

A series of spring-loaded rods or “fingers” can engage multiple containers at once depending on container size. As the driver edges the loader forward, the fingers retract if they strike a container. Fingers that miss a container remain extended. The extended fingers grip the sides of the containers and are used to lift the containers from the ground. This design allows plastic lining material on the ground to be used without damage since the surface under the plants is not disturbed by the plant-lifting process. Furthermore, this design accommodates a range of container sizes and regular or irregular spacing. When the loader sets the containers on a conveyor surface and then edges backward, the retracted fingers extend and are, thus, ready to lift more containers.

The dual-conveyor plant trailer is based on a 1.8×3.6 m (6×12 ft) agricultural tracking trailer (Mitchell Ellis Products, Inc.). It was designed with two conveyors, as opposed to a smooth floor, for simplifying moving plants (Figure 4). The first conveyor receives plants from the field conveyor system at the side and front of the trailer and conveys plants to the other conveyor, which operates along the longitudinal axis of the trailer. Plants are diverted from the first conveyor to the second by way of a roller-lined curved barrier. Plants move into place, filling the trailer floor from back to front. The conveyor belts are designed such that the plants slide once they have encountered resistance to move-

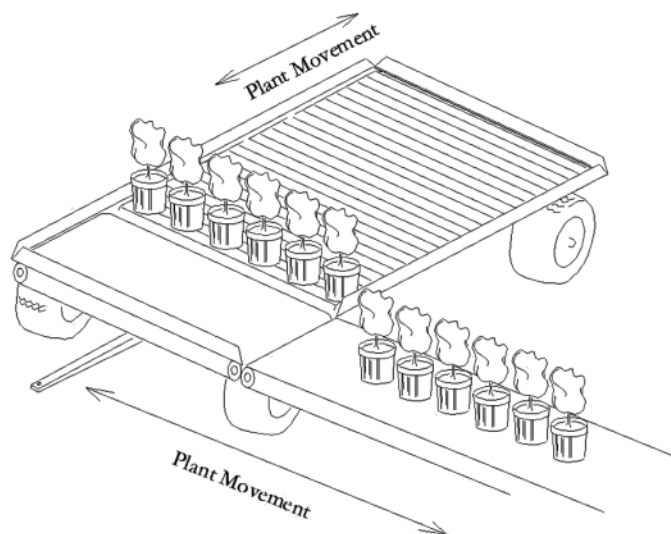


Figure 4. Dual-conveyor tracking trailer.

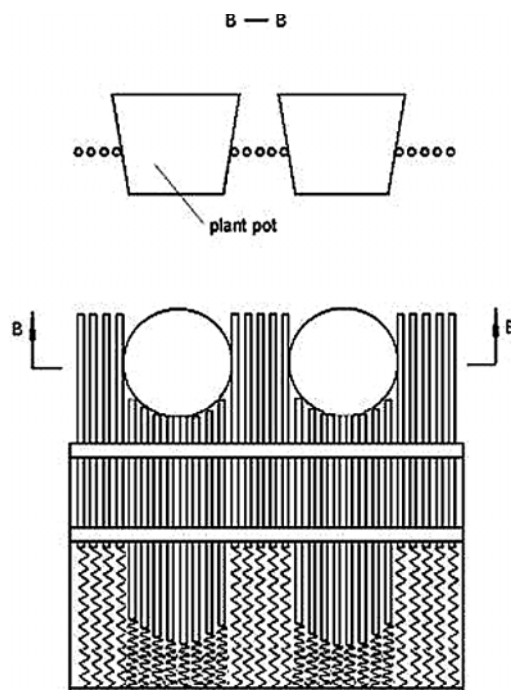


Figure 3. Working principle of the container handler.

ment. This feature allows the conveyors to continue to load more plants even as the trailer is getting full. The unloading process works in reverse. Support platforms for both conveyors were designed and constructed in-house and fitted to the trailer frame. Hydraulic servo-valves and motors were installed and configured to power and control the conveyor drive systems.

The trailers and conveyors used at the Rocky Creek Nursery are designed so that their heights are compatible. In order to modify the dual-conveyor trailer to suit the needs of the project, it was necessary to insert the conveyors in the bed of the trailer so that the top surface of the conveyors interfaces with the existing conveyor equipment. This required removal of significant portions of the bed and reinforcement of the structure afterward.

The system that has been described is not terribly sophisticated in regard to automation and mechanization technologies, but it can have a significant impact on one of the main areas of work at a container nursery. The system could be greatly improved if sensing and control technologies were integrated into its design, assuming this could be done cost-effectively. Ultimately, the use of automation and mechanization technologies like the container plant handling system will result in improved worker safety, improved work quality and efficiency, improved skill and job satisfaction of workers, and an overall significant benefit to nursery industry. **R**

Alex Thomasson is a professor in the Department of Biological and Agricultural Engineering at Texas A&M University (formerly with the Department of Agricultural and Biological Engineering, Mississippi State University), 2117 TAMU College Station, TX 77843-2117 USA; 979-458-3598, fax 979-862-3442, thomasson@tamu.edu.

Paul Lee is a research associate in the Department of Agricultural and Biological Engineering, Mississippi State University, Box 9632, Mississippi State, MS 39762 USA; 662-325-3282, fax 662-325-3853, plee@abe.msstate.edu.

Changying Ji is a visiting professor in the Department of Agricultural and Biological Engineering, Mississippi State University, Box 9632, Mississippi State, MS 39762 USA; 662-325-3282, fax 662-325-3853, chyji@sohu.com.

Ruixiu Sui is an assistant research professor in the Department of Agricultural and Biological Engineering, Mississippi State University, Box 9632, Mississippi State, MS 39762 USA; 662-325-3282, fax 662-325-3853, rsui@abe.msstate.edu.

Inside ASABE

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Watch for the September issue of *Resource* magazine, which will highlight automation in agriculture/robotic technology.

Society Name Officially Changes to ASABE

It's official. We are now the *American Society of Agricultural and Biological Engineers*. First, let us say, as emphatically as the printed word can convey it, that our name change has the potential to benefit *all* segments of our membership. This organization was founded with the mission of serving members of a profession. It is not a static profession. Its existence is justified, indeed *fueled*, by the advancements it makes, and advancement always creates change. Some will welcome it, others will find it challenging and difficult, but change is inevitable in any growing and evolving professional society. We have already made many programmatic changes that make our new name appropriate. Our tasks are to continue to take advantage of our heritage, our current strengths, and our future opportunities.

With the vote of the Society, we now begin the complex task of transition in name. Your Society leadership and staff have been giving this careful consideration and plan to move both as carefully and expeditiously as possible. Your input will continue to be important to us as we progress. There is one thing, however, that you can be confident will never change – *cannot* change – and that is the commitment of this organization to respond to your professional needs.

First among the tasks is to answer the many questions you may have about what exactly the transition will comprise. The following is an attempt to provide some basic information about the process and what will and will not change among all things related to your professional Society.

Only two things have been determined. The first is our official name. This is the constitutional change that was voted upon by the membership last January. Obviously, many other items will flow from this constitutional change. Many are issues related to the Bylaws of the Society and therefore under the direction of the Board of Trustees. As for the second, the Board of Trustees at its spring meeting made the decision on the abbreviation of our name, which is now ASABE. It is pronounced with its individual letters, "A-S-A-B-E." These two changes led to the change in our Web site and e-mail addresses, now www.asabe.org and name@asabe.org. The Board also decided to keep the tag line, "The Society for engineering in agriculture, food, and biological systems."

During the discussion of name change, the Society logo was found to be an important issue to many members. The Board decided to seek further input from members of the Society regarding a future logo. Those who were able to attend the Annual International Meeting in Tampa had the opportunity to give feedback on several ideas.

Numerous other activities are necessitated by the name change, among them: amending our Bylaws and Rules and our Articles of Incorporation; filing for trademarks and copyrights; and the development of an overall transition plan. The transition plan will include timelines for these and other activities and will encompass all areas of the Society.

Efforts are already in progress to ensure that others are aware of the change. Headquarters is disseminating information to peer and related societies and trade associations worldwide, as well as the press, libraries and universities, the corporate world, government offices, and others who should be aware of our new name. The occasion of our name change is being used as an opportunity to raise the visibility of the organization and to set the stage for upcoming centennial announcements.

For the benefit of those within the Society who use our name and logo – our sections and student chapters, for example – we are devising a toolkit. It will comprise usage guidelines and graphics standards, and also tip sheets, sample press releases, and sample "op-ed" text that members can use to promote the Society with its new name, both regionally and locally. Materials developed for this purpose will be made available, wherever possible, on the ASABE Web site.

It is anticipated that the transition will take 12 to 18 months. Watch our Web site for transition details, and let us know if you have questions or comments as we move forward.

Jerry Wille, 2004-2005 President
Melissa Moore, Executive Vice-President

Oklahoma State Takes Top Trophy for the Second Year in 1/4-Scale Student Design Competition

For the second consecutive year, Oklahoma State University has won the ASAE 1/4-Scale Tractor International Student Design competition, topping 24 other collegiate teams from across the United States and Canada.

Rounding out the top five spots were, in order, Kansas State University, University of Kentucky, Purdue University, and, in a fifth-place tie, the University of Illinois and Pennsylvania State University.

It was a consistently strong showing across all points categories – Written Design Report, Oral

Presentation, Maneuverability, Safety and Performance – that sent Oklahoma State home again with the Wehner-Detra traveling trophy. They also claimed the top award for Safety.

In the Written Design Report category, the University of Nebraska placed first, followed by Kansas State, and then Purdue. Making top Oral Presentations, in which teams must “sell” their designs to a panel of judges, were California Polytechnic State University (first place), Penn State, and the University of Wisconsin–Madison.

In the Performance competition – the entertaining tractor pulls, Kansas State and the University of Arizona took first and second place, respectively. Third place went to the University of Illinois, which also earned a trophy for Best Appearance, an award voted on by the teams themselves.

Another team-balloted award, the Teamwork trophy, went to rookie contenders from the University of Wyoming, who took home the Craftsmanship award as well, for their superb attention to product detail and manufacturing.

There is no overall winner for Design, but individual components of that category are recognized. In addition to Safety and Craftsmanship, awards were given to Texas A&M for Manufacturability, University of Nebraska for Serviceability, and Michigan State for Ergonomics.

The fifth element of the competition, Tractor Maneuverability, was won by the University of Kentucky.



Oklahoma State University team wins the 1/4-Scale Student Design Tractor Pull competition for the second year. Shown left to right are: Curtis Johnson, Buck Melton, Kristin Stephens, Justin Street, Joe Biggerstaff, Adam Gossen, Ryan Haar, Dustin Holden, Cheyenne Courtney, Levi Johnson, Jacob Hamburger, Advisor Wayne Kiner, and Advisor John Solie.

Nicholls State University was named Rookie of the Year.

Sponsored by ASAE and drawing teams from universities across North America and beyond, the 1/4-Scale Tractor Student Design Competition is held annually in East Moline, Ill., and seeks to advance the technical and personal skills young engineers and technology students will need for success in the workplace.

The 2005 contest was made possible by AGCO, Bridgestone/Firestone, Briggs & Stratton, Case, Caterpillar, Deere & Company, Kubota, and New Holland. Additional support was provided by Campbell Scientific, Central City Scale, Claas of Omaha, Great Plains Manufacturing, Miller Electric Manufacturing, RCI Engineering, and the Kentucky Corn Growers' Association.

Eight Teams Enter 2005 1/4-Scale Web Site Design Contest

The fifth annual ASAE 1/4-Scale Web Site Design Contest gave teams entered in the 2005 competition a creative way to showcase their talents on the net as well as on the track.

Eight universities from across the United States and Canada entered the contest and took advantage of the opportunity to promote their team, the competition, and ASAE. The Badger



Twenty-five teams representing the United States and Canada participated in the eighth ASAE 1/4-Scale Tractor International Student Design Competition held at the Quad City Downs in East Moline, Ill.

Pullers from the University of Wisconsin-Madison took top honors with their innovative Web site design. Rounding out the top three winners were Oklahoma State University in second place and tying for third, Iowa State University and Texas A&M University.

Participants were given a set of basic guidelines to follow and the rest was up to them. As in years past, the competition was tough. The winning teams were awarded cash prizes and certificates.

This year's contest was judged by Jerry Wille, ASAE President, Curry-Willie & Associates; Trisha Neff, Computer and Design Administrator, VIKTOR Incentives and Meetings; and Akil Spooner, Assistant Information Systems Specialist, ASAE.

To see all the entries visit the ASABE Web site at www.asabe.org/students/tractor/asaecomp.html.

1/4-Scale Web Site Design Winning Entries

The winning Web site design entries may be viewed at the following sites:

University of Wisconsin-Madison
<http://bse.wisc.edu/badgerpulling>

Oklahoma State University
<http://biosystems.okstate.edu/cowboymotorsports>

Iowa State University
www.abe.iastate.edu/cyclonepowerpullers

Texas A&M University
<http://aggiepullers.tamu.edu>

1/4-Scale Student Design Competition Winners are ...

Top Five Finishers

- 1st Oklahoma State University
- 2nd Kansas State University
- 3rd University of Kentucky
- 4th Purdue University
- 5th Penn State University
- (tie) University of Illinois

Overall Performance

- 1st Kansas State University
- 2nd University of Arizona
- 3rd University of Illinois

Oral Presentation

- 1st Cal Poly San Luis Obispo
- 2nd Penn State University
- 3rd University of Wisconsin-Madison

Written Design Report

- 1st University of Nebraska
- 2nd Kansas State University
- 3rd Purdue University

Performance Competition (pull)

- 1,000-lb. class – Kansas State University
- 1,250-lb. class – Ohio State University
- 1,500-lb. class – Kansas State University
- 1,750-lb. class – Ohio State University

Best Appearance

University of Illinois

Craftsmanship

University of Wyoming

Ergonomics

Michigan State University

Maneuverability

University of Kentucky

Manufacturability

Texas A&M University

Most Improved (tie)

Penn State University
Ohio State University

Rookie of the Year Award

Nicolls State University

Safety

Oklahoma State University

Serviceability

University of Nebraska

Sportsmanship

University of Arizona

Teamwork

University of Wyoming

IN MEMORIAM

ASAE Fellow Gail E. Janssen P.E., 74, of Kaukauna, Wis., and ASAE



president from 1994-1995, died June 2, 2005.

Janssen earned a degree in agriculture from the University of Wisconsin-Madison. After graduation, he was

employed by Wisconsin Public Service in Green Bay. He later went back to the University and earned a second degree in mechanical engineering. Janssen then served as a design engineer and assistant chief engineer with the Gehl Company in West Bend, Wis. In 1968, Janssen began his career with Badger Northland as chief engineer and vice president of engineering. In 1971, he was named president and general manager and served on the board of Massey Ferguson.

Janssen will be most remembered professionally for his position as president and chairman of the board of the F & M Bancorporation. Janssen facilitated and over saw the growth of F & M Bancorporation from one location in 1977 to more than 80 locations when he retired in 1999. A 43-year member of ASAE, Janssen was a past treasurer and president of the Society. He was elected an ASAE Fellow in 1989.

Janssen is survived by his wife, Janice, two sons, Gary of Waupaca, Wis., and Joel of Kaukauna, Wis.; and four grandchildren.

Memorials may be made to Fox Valley Community Foundation KEEN - Gail and Janice Janssen Family Education Fund or UW-Madison Foundation - Gail E. and Janice F. Janssen Agricultural and Life Sciences Scholarship Fund.

ASAE Fellow Robert H. Tweedy, P.E., 77, of Dunedin, Fla.,



and ASAE president from 1981-1982, died June 28, 2005.

Tweedy was a retired equipment manager and had worked for AGCO, Allis Chalmers, U.S. Steel, and

John Deere companies. He graduated and received a citation in engineering from Iowa State University. Tweedy held several patents on farm equipment and was a Navy veteran of World War II.

A member of ASAE for 53 years, Tweedy was elected ASAE Fellow in 1976, and was awarded the ASAE McCormick-Case Gold Medal in 1989 for exceptional, meritorious engineering achievement in agriculture.

Survivors include his wife, Genevieve; two sons, Bruce of Eugene, Ore., and Mark of Valencia, Pa.; a step-daughter, Mary Gehring of Prairie du Sac, Wis.; and three grandchildren.

Memorials may be made to The Kirk of Dunedin, 2686 Bayshore Blvd., Dunedin, FL 34698 or Hospice of Florida, 300 E. Bay Drive, Largo, FL 33770.

ASAE Fellow Galen K. Brown P.E., 67, of Winter Haven, Fla., died



June 8. He was elected ASAE Fellow in 1985 and was a 44-year member of ASAE.

Brown earned his bachelor's degree in agricultural engineering at Michigan State

University (MSU) in 1961, his master's degree at the University of California-Davis, and his Ph.D. in 1972 at MSU. He began work with the Agricultural Research Service (ARS) of the USDA in 1961 as a research engineering and research leader. During this period, he worked on harvesting and handling projects for a variety of fruits, vegetables, and nursery crops. In 1995, he retired from the ARS-USDA and joined the Florida Department of Citrus as the harvesting program administrator, working cooperatively at the University of Florida Citrus Research and Education Center at Lake Alfred, Fla. Brown retired again in 2003 after cooperative work to develop commercially viable mechanical harvesting systems for processing citrus. He also initiated research and development projects on fruit abscission and automated robotic harvesting for citrus.

Survivors include his wife Ann; two daughters; and two granddaughters.

Memorials may be made to MSU, Galen K. Brown Endowment Fund, University Development, 4700 S. Hagadorn, Suite 220, East Lansing, MI 48823.



The Agricultural and Biosystems Engineering Department from Iowa State University had a large contingency at the ASAE International Livestock Environment Symposium held in Beijing, China, May 18-20. The conference addressed issues related to animal production efficiency, environmental impacts of animal production, and animal welfare. Shown here enjoying a Chinese tea room are: (l to r) Jacek Koziel, assistant professor; Barry Green; Angela Green, Ph.D. student; Jeremiah Davis, Ph.D. student; Jay Harmon, professor; Jerry Wille, ASAE president; Jane Wille; Hongwei Xin, professor; Rachel Cook, Ph.D. student; and Brian Cook.

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Back Track on Dual Track

Art Johnson

A May 2004 *Resource* had been lost on my desk. After liberating it from beneath unruly and obsolescent detritus, I read with interest the interview with ASAE Past President Harmon Towne. Asked what he would do if he were chairperson of an agricultural engineering department and had to plan for the change to biological engineering, Towne responded that he would propose parallel tracks of agricultural engineering and biological engineering. Coincidentally, in the same issue was an article by Ajit Srivastava in which he discussed agricultural engineering at Michigan State University. One of the lessons learned from his MSU experience was that “a department cannot be everything to everybody.” Another was that a transformation of agricultural engineering into a biology-based discipline was underway. It seems to me that these two lessons auger against the parallel track approach.

Although there are universities that maintain dual tracks of agricultural and biological engineering, there is also indication that such dual tracks are part of the transition from one to the other, and that the one will supplant the other in many locations. In these days of limited resources, and with the need to have an easily identifiable identity on campus, agricultural engineering departments simply cannot afford to maintain dual-track diversity.

If we truly believe that agricultural engineering is an application of biological engineering, then agricultural engineering should be a graduate-level option just as other applications are. At the graduate level, specialized knowledge is absorbed and small class sizes are expected. There is the possibility that specialized agricultural engineering classes could be given in the last year or two of the undergraduate curriculum, but graduate-level offerings could be attractive for students coming from other degree programs.

There is nothing like farm experience for an agricultural engineer. For years, agricultural engineering programs assumed that their students had farm experience. That experience contributed to educational efficiency, because practical aspects of crop harvesting, animal husbandry, irrigation, and machinery did not have to be taught at the elementary level. That efficiency is rapidly being lost as ever-smaller proportions of matriculating students possess practical farm experience. So, even if ag engineering were maintained as an undergraduate track, courses would have to change to accommodate backgrounds.

One important attribute of the old ag engineering curricula, and one I appreciate to this day, is the range of technical topics. That same broad outlook is what makes agri-

cultural engineers well suited as biological engineers. There is nothing as broad and pervasive as the field of biology. There are no more diverse opportunities than those ranging from electrophysiology of individual cells, to toxic reactions, to environmental contaminants, to prosthetic limbs. From imaging to harvesting, from swarm intelligence to bioreactors, from individual strands of DNA to macroecological systems, there is diversity, if nothing else. No matter what strengths or interests are expressed by a student, there is a biological engineering topic that can fit, and agricultural engineers should be able to appreciate that better than anyone else. We should be careful to maintain that broad and fundamental view as the transition to biological engineering unfolds.

Assuming the role of biological engineers means much more than just a shift of technical focus, we must embrace many potential applications areas traditionally ignored. Fortunately, many departments are doing just that by including human medicine, biotechnology, and ecology within their domains. We must also reach out to new associates and encourage new approaches. While we maintain our ties with traditional agricultural organizations and personnel, we must also find opportunities with those working in other applications of biological engineering.

Perhaps the most radical change of association will be the colleges administering our departments. As long as we are administered in colleges of agriculture, we will be agricultural engineers. Our transition will not be complete until we change our affiliation to the colleges of engineering where our fellow engineers are all located. This change does not mean abandonment of ag engineering, but establishing new ties and accommodation to new educational cultures. This will not be an easy transition, but it will be necessary. Without it, the transition to biological engineering will be stuck halfway, and we know from biology that organisms that cannot adapt are eventually replaced and forgotten.

If I had been coaching Mr. Towne, I would have urged him to consider all of the above. Unfortunately, his answers would not have fit in the required space. But, then again, how can you explain a vision in a few short words?

ASABE member Art Johnson is professor in the Biological Resources Engineering Department, University of Maryland, Room 1429, College Park, MD 20742-5711; 301-405-1184, fax 301-314-9023; aj16@umail.umd.edu.

Views expressed in this article are those of the author and do not represent the official position of ASABE.

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