CCEA Newsletter

Volume 9 # 3 & 4 **September 2000**

CCEA is a research organization dedicated to the improvement and vitality of the Controlled Environment Agriculture Industry. CCEA is funded by Industrial and Grower Partners who contribute a yearly partnership fee. Satellite partnership is available to growers for a modest fee. Information about CCEA is available from: **Dr. A.J. Both**
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Vision Statement

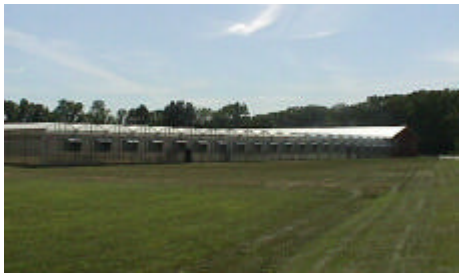
CCEA, The Center for Controlled Environment Agriculture of NJAES at Rutgers University, a partnership among growers, industry and researchers, will devote itself to research and transferring information required for an economically viable and environmentally aware controlled environment agriculture industry. We will particularly strive to identify future trends, critical issues, appropriate emerging technologies and provide leadership for opportunities which challenge world-wide controlled environment agriculture in the 21st century.

Outstanding Agricultural Achievement of the 20th Century

Recently the Horticultural Engineering program at Rutgers was recognized as one of the five outstanding achievements in agricultural Engineering for the 20th century. ASAE recently conducted a nationwide survey to determine the outstanding achievements for the 20th century among the areas in which Agricultural engineers have traditionally worked. Our program was recognized in the area of Structures and Environment. The following text is from the Agricultural Engineering Society Journal, Resource, the March 2000 edition.

"Integrated System for Low-Cost and Low-Energy Greenhouses"

"Three concepts have been integrated to develop low-cost greenhouse structures and environmental control systems that require little energy for winter heating relative to classical systems.(1) the air-inflated double-layer polyethylene greenhouse;(2) movable thermal insulation for greenhouses and (3) root zone heating systems for production greenhouse. Work on the air-inflated double-layer polyethylene system was initiated at Rutgers University in 1965. The innovation was quickly adopted for commercial use and became the basis for a rapid expansion in plastic greenhouse acreage. Today about 64 percent of commercial greenhouses in the United States and Canada utilize this system, and all major greenhouse structure supply firms offer frames designed for double-polyethylene covering. The studies on the effects of greenhouse curtain materials for energy conservation were conducted in the late 1960's. By the end of the 1970's, several commercial suppliers were providing greenhouse curtain materials and the mechanisms to deploy them. It was also in the late 1960's that research was undertaken at Rutgers on the methods of using relatively low temperature but warm water for the beneficial heating of the root zone of the plant. A number of systems were designed to utilize various heat sources and warm water distribution systems in greenhouse floors or under benches. Today all three systems are in wide-spread commercial use, not always as a totally integrated system, though it often is the case."



EcoComplex Research Greenhouse which features the three innovations mentioned in the achievement article

What's Up - Down at Bioresource Engineering

Dr. A.J. Both Director

Department Changes

As you may know, as of July 1, 2000, the Department of Bioresource Engineering at Cook College, Rutgers University, no long exists. The undergraduate teaching program in the Horticultural Engineering Option was mothballed (the remaining seniors will be allowed to graduate in May 2001), while the graduate program will be continued. The former Bioresource Engineering Department is now part of the Plant Science Department and we are still located at the same address on the Cook College Campus (20 Ag Extension Way, New Brunswick, NJ 08901-8500; phone: 732-932-9753).

What Happened?

After the retirements of Professors Bob Wolfe and Bill Roberts, only three faculty members remained in the department in the summer of 1999: Professors Gene Giacomelli, Dave Mears, and K.C. Ting. Professor George Nieswand became the department chair while he remained actively involved in teaching and research in his own department: Ecology, Evolution and Natural Resources. The department was in the process of hiring a new extension faculty member to continue with Professor Roberts' activities.

In the fall of 1999, Professor K.C. Ting was offered to chair the Department of Food, Agricultural and Biological Engineering at Ohio State University. He accepted. At that point it became clear there were not enough faculty to teach all the required undergraduate courses. The remaining faculty decided to suspend admission of new undergraduate students into the Horticultural Engineering Option, effectively mothballing the program. A.J. Both was hired as the new assistant extension specialist. He hired Eugene Reiss as a program associate to help with research and extension activities.

In the spring of 2000, Professor Gene Giacomelli was offered a professorship at the Department of Agriculture and Biosystems Engineering at the University of Arizona in Tucson. He would also become the Director of a newly developed Controlled Environment Agriculture Center. He accepted. The Department's secretarial staff was reduced from three to one when Marilyn Dominiecki accepted a position elsewhere in the University and Pearl Switlyk retired. Wei Zhao's appointment through Cooperative Extension was not renewed and he left Rutgers University.

As of July 1, 2000, Bioresource Engineering became part of the Plant Science Department chaired by Professor Chee-Kok Chin. Only two faculty remain in Bioresource Engineering: Dave Mears and A.J. Both. Provisions will be made for the remaining three seniors allowing them to fulfill all requirements needed to graduate in the Horticultural Engineering Option. They are expected to graduate in May, 2001.

What's next?

Plans have been developed to bring the number of faculty back to 5 people. The Cook College administration has given tentative permission to hire three new faculty in the coming years, one of which will be hired in the next twelve months. With a total of five faculty, the undergraduate teaching program can be revived and new students would again be allowed to major in Horticultural Engineering.

The former Department Shop will expand its activities to include servicing the Plant Science Department as well as the larger University community. All future

shop activities will be performed on a for-fee basis. The goal is to eventually recoup all material and equipment expenses.

The Center for Controlled Environment Agriculture (CCEA) will remain active under the leadership of A.J. Both and Bill Roberts. Initially, the main research focus will be on the recently constructed open-roof greenhouse. Discussions with CCEA's membership and advisory board committee will result in a renewed focus for CCEA.

The current graduate students and Post-docs (most of them are funded through the NJ-NSCORT project related to the challenges of continuous plant production during long-duration space missions) are continuing with their research. Several of them are still supervised by Professors Gene Giacomelli and K.C. Ting who have been appointed Visiting Professors at Cook College.

Some of the former department's office and lab space is now shared with other researchers at Cook College. The main building still houses only Bioresource Engineering students, staff, and faculty. Please feel free to drop by or give us a call and tell us about your suggestions for the future of Horticultural Engineering at Cook College. Change is often difficult, but it usually opens up a whole new set of opportunities!

Progress on the MX II Research Greenhouse

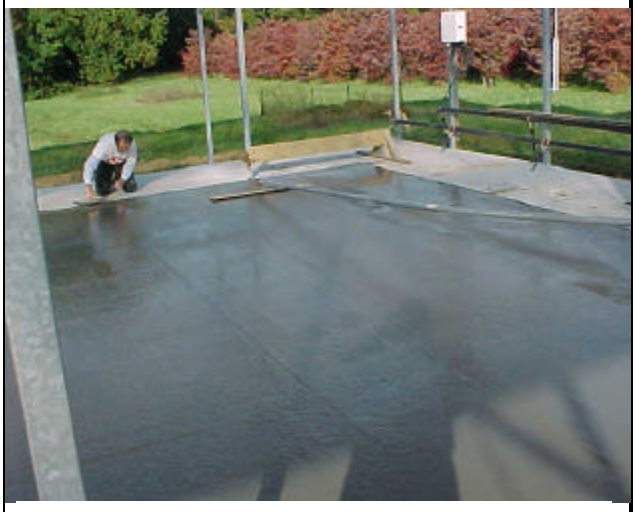
Recently, Eugene Reiss, Program Associate for Dr. A.J. Both, supervised the installation of a floor heating system in the new facility. At the same time, an ebb and flood irrigation system was installed which provides for two storage tanks and two separate growing areas.

The concrete pouring operation was an outstanding team effort of faculty, staff, and graduate students. Even your editor and ex-CCEA Director was allowed to get in on the action.

The next phase of construction will be the installation of rigid glazing on the side and end walls. A hot-water heating system is also being installed to supplement and complement the floor heating system. An Argus environmental control system will operate the heating and open-roof ventilation systems.

The research team is very excited about the progress to date and looks forward to a very modern and cutting edge greenhouse research facility.

View showing the floor heating system and the concrete forms which were kindly loaned to us by a local grower.



View showing the finished floor and CCEA Faculty member Dave Mears doing an edging procedure.

Design of Greenhouse Systems
January 8 and 9, 2001

This popular greenhouse engineering and environmental control short course will again be offered. Dr. A.J. Both, your Director, is the course coordinator and will be giving several presentations during the 1 1/2 days of lectures and demonstrations. The course will feature a one-half day tour to our new open-roof research greenhouse, Kube Pak Corporation, and the Burlington County Resource Recovery Greenhouse which is operating on methane gas produced at the adjacent landfill

Greenhouse Short Course Program

Monday January 8, 2001

8:00 am Arrival and Registration
8:30 am Introduction and Overview of Major Greenhouse Components
Dr. A.J. Both
9:30 am General Design and Glazing Choices
Professor Emeritus William Roberts
10:30 am Break
10:45 am Heating
Professor Emeritus William Roberts
11:30 am Ventilation and Cooling
Dr. A.J. Both

12:15 pm Lunch
1:00 pm General Crop Issues
Professor George Wulster
2:00 pm Irrigation and Watering
Mr. Ralph Freeman
3:00 pm Break
3:15 pm Supplemental Lighting and Shading
Dr. A.J. Both
4:00 pm Open-Roof Greenhouses
Professor Emeritus William Roberts
4:30 pm Building an Open-Roof Greenhouse with Heated Ebb and Flood Floor Irrigation System
Mr. Eugene Reiss
5:00 pm Adjourn

Tuesday January 9, 2001

8:30 am Root Zone Heating
Professor Emeritus William Roberts
9:30 am Developing a Master Plan for Greenhouse Expansion and Orderly Growth
Mr. John Hoogeboom
10:30 am Break
10:45 am Insect Screening
Professor David Mears
11:30 am Controlled Environment Agriculture Abroad
Mr. John Hoogeboom
12:00 pm Greenhouse Bus Tour, Lunch on the Bus
Open-Roof Greenhouse
Kube Pak Corporation
Burlington Tomato Greenhouse
5:00 pm Tour returns, **Adjourn**

Mark the dates on your calendar and plan to attend this very informative course.

To register call Margaret Stegmann
732 932 8451

ACESYS IV

Dr. Sadanori Sase kindly invites all to attend the Structures and ACESYS (Automation, Culture, Environment & Systems) IV Conference which will be held December 4 - 5, 2000, at Tsukuba International Congress Center in Tsukuba, Japan.

The title of the Conference will be, ***Environmentally Friendly High-Tech Controlled Environment.*** Several members of CCEA's faculty and Scientific Advisory Board will be presenting lectures, including Dr Ting, Dr. Giacomelli, Dr. Mears and your editor. There is no cost to register. The limit of participants will be 250. You may request an application form from the address below:

Mailing address: Secretariat of International Workshop National Research Institute of Agricultural Engineering (NRIAE) 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8609, JAPAN Fax: +81-298-38-7609
E-mail: naiofuji@mail1.accsnet.ne.jp