

**Meeting of the NCR-101 Committee
for
Controlled Environment Technology and Use
6th - 9th April, 2002
Durham, North Carolina**

Attendance: (in alphabetical order of last name, left to right)

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| Wade Berry – UCLA | Conrad Bonsi – Tuskegee University |
| A.J. Both – Rutgers University | David Brault – Conviron |
| Chris Brown – North Carolina State U | Bruce Bugbee – Utah State University |
| Mike Dixon – University of Guelph | Robert (Jack) Downs – North Carolina State Univ |
| David Fleisher – Rutgers University | Johnathan Frantz - Utah State University |
| Susan Frantz – Apogee Instruments | Gary Gardner – University of Minnesota |
| Richard Gladon – Iowa State University | Royal Heins – Michigan State University |
| Joe Hildebrand – Conviron | Norman Hill – Duke University |
| Gary Jacobs – Env.Growth Chambers | Ramesh Kanwar – Iowa State University |
| Meriam Karlson – University of Alaska | Donald Krizek USDA, ARS |
| Chieri Kubota – University of Arizona | John Lea-Cox – University of Maryland |
| Chuck Leibert – Iders Engineering | Peter Ling – Ohio State University |
| Cary Mitchell – Purdue University | Desmond Mortley – Tuskegee University |
| Genhua Niu – Southern Sun Bio Syst. | Robert Pauls – Enconair |
| Robert Pollock- S'thern Sun Bio Syst. | Reg Quiring – Conviron |
| Glen Ritchie – Utah State University | Mark Romer – McGill University Phytotron |
| A.O. Rule – Env. Growth Chambers | Erik Runkle – Michigan State University |
| Corinne Rutzke – Cornell University | Carole Saravitz - N. Carolina State U. |
| Rich Schloft – Southern Sun Bio Syst. | Daniel Schmoldt – USDA/CREES |
| Todd Smith – Duke University | Marc Theroux – Enconair |
| Ted Tibbitts – University of Wisconsin | David Tremmel – Duke University |
| Alex Turkewitsch – Greenhouse Eng. | Marc Van Iersel – U of GA, Dept of Horticulture |
| Raymond Wheeler – NASA | Marty Winkler – North Carolina State University |
| Allen Wright – Columbia University | Neil Yorio – Dynamac Corporation |
| Yobin Zheng – CES, Univ. of Guelph | |

Executive Committee

Dr. A. J. Both, Chair
Dr. David Tremmel, Vice-chair
Mr. Reg Quiring, Secretary
Dr. John Lea-Cox, Past-chair

2002 NCR-101 Business Meeting

Dr. A. J. Both opened the NCR-101 Business meeting at 8:30 AM on Sunday, April 7.

1. Opening remarks:

Opening remarks were offered by Dr. A.J. Both. He reminded members to submit electronic station reports via e-mail to the web master (Dr. David Tremmel) and the Secretary (Mr. Reg Quiring). Mr. Mark Romer stated that it is desirable to have all representatives submit reports, not just those representing official member Agricultural Experiment Stations.

2. Welcome by Organizers and Introductions:

Dr. David Tremmel of Duke University welcomed attendees on behalf of himself and Dr. Carole Saravitz, of North Carolina State University, co-organizers of the conference events in Raleigh-Durham. He invited all present to fill in the attendance sheet and to introduce themselves and indicate their affiliation.

3. General Announcements:

Dr. A. J. Both called for any general announcements.

-Dr. Both asked members to consider nominations for incoming executive.

-Dr. Ted Tibbitts informed the group of an upcoming crop science symposium to be held in Indianapolis November, 2002.

4. Administrative Advisor's Report:

Dr. Ramesh Kanwar (Administrative Advisor to the NCR-101) expressed his admiration for the ongoing efforts of the NCR-101 membership, noting that this particular committee has become the most "international" in terms of membership and attitude. He observed that three important aspects stood out:

1. Good Leadership
2. Good Participation
3. Good Co-operation.

He said the consistency of a core group of members over a long period has contributed to the quality of the committee. Specifically, he mentioned Don Krizek, Wade Berry and Ted Tibbitts, who are founding members that still participate actively. This is unique to this group.

Dr. Kanwar said the potential joint meeting proposed for Australia in 2004 is a worthwhile goal in light of the success of last year's joint meeting with the CEUG group in England. He made the following key points:

-Recommendation that 3 or 4 NCR-101 members co-ordinate efforts with the Australian group soon.

-USDA could be approached for a block grant to assist with travel expenses

-National Science Foundation should be approached with a proposal for a block grant.

Time will be important.

-CSIRO may also have funds available to fund travel grants for international conferences.

Dr. Kanwar reviewed the budgets. Most Experiment Station Directors are faced with budget cuts. However, this does not mean funding will not be available for important activities like international conferences. Any proposal should include possibilities for international exchange of research or other activities that enhance the growing scope of this group.

Dr. Kanwar reported that the National Research Initiative program has a recommended funding increase from \$120 Million US to \$240 million US for 2003. Other items of special interest include a budget amount for Global Change -UVB Monitoring that is relevant to this group. Also, graduate fellowship funding for University students has increased from \$2.9 to 3.5 million. Please review the budgets for funding opportunities that may not be so obvious.

Dr. Kanwar also discussed a handout on Investing in Agro-Security. Particularly since the events of September 11, closer attention will be paid to all plant and animal areas in the food chain that could be potential targets for tampering etc. State-of-the-art sensors will be a key element of increasing importance.

Also, the new Farm Bill and Home Security department will have funding available for research in the area of food safety and security.

Dr. Kanwar then asked if there were any questions. Dr. John Lea-Cox questioned the funding levels for active members of the NCR-101 committee to attend the conference. He personally found himself in a position of being under-funded after having the understanding that Station Managers have funds allocated for designated members to attend the meetings. Dr. Kanwar did comment that usually all travel costs are covered 100% as long as they are within reason. He went on to say this group does all it can, including meeting on the weekend, to minimize costs. Another member commented that travel outside the designated region may only be covered to a maximum of \$600. After short discussions, Dr. Kanwar said he would send a note to all Experimental Station Directors encouraging them to review and commit full support to fund

designated members attendance to the NCR-101 meetings. He reiterated his position that this group is a valuable one and should not only maintain but grow in the future.

5. CSREES Report: (Cooperative State Research, Education and Extension Service) Report:

Dr. Dan Schmoltdt, the National Program Leader of Instrumentation and Sensors, questioned if there would be interest within the NCR-101 group to participate in a national program to develop sensor technology and applications, at least at a common-interest level.

Dan distributed additional budget information and briefed the group on the IFAFS and NRI funding processes, such as the fact one is from the Farm Bill and the other from the President's budget and are discussed separately by Congress.

Regarding NRI, a recent National Research Council report recommended that the NRI have a nano-technology program. Dan has been asked to work with another Program Leader to draft a request for application for a nano-technology program in the USDA. Nothing would begin until fiscal year 2004. Dan also explained the NRI has more flexibility now to re-organize budget line items to suit changing priorities from year to year.

Regarding agro-security, Dan also reported that the National Association of State Universities and Land Grant Colleges has focussed completely on agro-security as it lobbies Congress for what it feels is an important budget item. Typically, NASULGC has four or five items for consideration. Dan commented that the USDA has always been concerned with agro-security but the recent increase in concern that intentional harm, in addition to unintentional error, raises the security issue to a higher level. He said it is still unclear if any funding from the Homeland Security Department will be forthcoming. His department and the USDA will be, he said, "Including agro-security and bio-security in a big way in our request for the 2004 budget which is what our agency is working on right now".

Regarding possible funding for the 2004 proposed joint meeting in Australia, Dan indicated his agency has internal innovation grants that National Program leaders can apply for. A simple 2-page proposal including one or more outside partners could be made. Dan especially recommended working with CSRIO in this matter and including in any proposal that we are working internationally with "sister agencies". These innovation grants are limited to \$25,000 but that could be put in a "pot" to help fund travel to Australia. Proposals are due in February.

6. Minutes, 2001 Meeting

To save time, Dr. A.J. Both requested (given the Minutes were distributed by e-mail and posted on the NCR-101 web site) that the traditional summary need not be made by the Secretary, David Tremmel.

Acceptance moved by Dr. Don Krizek, seconded by Mr. Mark Romer.

At this point, Dr. Gary Gardner, University of Minnesota, commented that the NCR region directors need to "champion" the committee and ensure the meetings are supported and held in the region at least once in four years. Dr. Kanwar replied that concept is gradually disappearing. Gary stressed that "politically" it may still be important to have the meeting reflect the regional title for a while. Mark Romer offered that the location of a meeting is less important than having representation from the region itself. In fact, Mark reports that four of the North Central regions (including North Dakota and Nebraska) have sent no representative for some time. Gary reiterated that (after having spent some time on an NCR administrative committee) it is important for the NCR-101 group to have a strong, visible, champion in the region. He further suggested that meetings be held in the region (at least once in four years) and that a real effort be made to get representatives from across the region to those meetings. This should raise the value of the group in the region, he felt.

A. J. Both agreed and reminded everyone that meetings are held in the region at least as often as Gary Gardner recommended. **Dr. Both then asked for a vote on the Minutes' acceptance. Motion carried; Minutes accepted.**

Morning Break

7. Proceedings from the 2001 Joint Meeting

Dr. A. J. Both introduced the topic of publication of the proceedings of the joint meeting in England and turned over the floor to Dr. John Lea-Cox. John is working with Dr. Lynton Incoll of the CEUG on this task.

Dr. Lea-Cox explained that a decision has been made to publish the proceedings electronically. Dr. Incoll had investigated the possibility of a printed version but the costs and timing with self-publishing electronically were definitely preferred. Dr. Lea-Cox added that the original format of many of the presentations lend themselves to electronic publication over traditional methods.

With that, Dr. Lea-Cox reported he is working on a web site to collect the proceedings with assistance from Dr. Incoll. The work will be eventually posted on the Duke NCR-101 web site. He presented the basic outline of the proceedings and went on to discuss concerns that authors have expressed over security. Dr. Lea-Cox said the actual authors' documents are set up as PDF type. Specifically, it was decided to use Version 5 of Adobe Acrobat because it allows 128-bit encryption. This allows greater control over editing and copying of files, he said. Essentially, the file may be printed only when downloaded but not edited or copied. Previous versions of Acrobat did not have this level of protection. Therefore, it will be necessary to use Version 5 (free download) to view these files since they will not open in earlier versions. He added this needs to be clearly pointed out to avoid frustration by web site visitors.

At this time, Dr. Lea-Cox said the abstracts of all presentations have been put up. In addition, most of the authors have submitted PDFs of their presentation. Some PowerPoint presentations have been submitted, and steps are being taken to enable this method smoothly (such as opening PPT files in a separate window so one does not have to back track through all the pages to return to the main area of the web site). Dr. Lea-Cox has all the session panel discussions on audio tape and may transcribe these into simple text documents.

All participants have been listed as part of the proceedings. Trade booth display participants have links provided to a contact name and e-mail address. Listed also were the conference tour itinerary. Dr. Lea-Cox hopes to add some photographs, which have been submitted as part of the record.

Dr. Lea-Cox hopes to complete the work within two months and suggested it may become a part of any proposal requesting support for the proposed Australia meeting. The floor was then opened to questions.

Mr. Mark Romer raised the issue of citation. Dr. Lea-Cox outlined a layout for web page format to list citations in an accepted format.

Dr. Cary Mitchell asked if this would be archived "for all time". John replied that the Internet likely won't be going away. Mark Romer added that he would take a CD-rom copy of the proceedings and physically place them in the NCR-101 collection he is archiving.

Dr. Ray Wheeler asked about PowerPoint formatting and if any post editing would be done. John was inclined to leave all files as presented but commented that Dr. Incoll would like to edit basic things like incorrect units or obvious errors to deliver a more consistent proceedings. In the end, these will not be peer reviewed.

Dr. Bruce Bugbee thanked Dr. Lea-Cox and Dr. Incoll for their effort in preparing the proceedings. He stressed that being able to access these from any computer will be a great convenience.

Dr. Cary Mitchell questioned if persons who need this information, could find it easily without specific prior knowledge of its existence and web location. An effort should be made to modify key words (such as controlled environments) so search engines will find NCR-101 related topics with more certainty.

Mr. Mark Romer suggested that an "official press release" to journals, libraries etc. should be delivered.

Dr. Bruce Bugbee said Internet proceedings etc. are accepted by journals as sufficient without a paper copy required.

As a final comment, Mark Romer suggested there be a homepage button from the proceedings to the NCR-101 web site.

8. International Reporting Guidelines for Reporting Research

Dr. A. J. Both opened a discussion on reporting guidelines. He referred to a handout from ANSI/ASAE on the topic. He explained that he has been involved over the last year in updating this draft. A. J. went on to say several groups are working on guideline documents at this time. The ASAE draft is scheduled for publishing the summer of 2002. It will be in effect for 3-4 years. Any suggestions made at this time will not catch this edition but will be considered for the next version. Dr. Both went on to say the goal of the NCR-101 group is to integrate a set of standards that would be more universally applied by researchers around the world. Dr. Both introduced Dr. Ted Tibbitts who is working with an international group who have volunteered to develop a current set of guidelines derived from experience of controlled environment users around the world.

Dr. Tibbitts began by saying guidelines have had some history beginning with the ASHS in the late 1960s. When the NCR-101 committee was developed in 1976, they took over updating measurement and reporting guidelines. At the 2001 CEUG/NCR meeting in Norwich, Dr. Lynton Incoll challenged the lack of guideline use by authors in papers from a variety of journals he examined. These represented a great deal of research in North America where most of the guidelines have been developed.

As an outgrowth of the 2001 joint meeting in Norwich, Drs. Tibbitts and Incoll initiated a group of 15 truly international members to work on a guideline set. A closed web site has been established for this group to use during the development.

Dr. Tibbitts stressed that the goal of this current group was to revise present guidelines to a level that must become the minimum necessary reporting detail for research. Any article reporting research should adhere to these guidelines if they are to be meaningful. To paraphrase Dr. Incoll, "guidelines that are not used are of no use".

Dr. Tibbitts said that if anyone at this meeting was particularly interested in becoming involved, they should contact Dr. Don Krizek at the USDA.

Dr. Tibbitts passed out questionnaire forms and asked that any suggestions for the guidelines committee be written down and the forms would be taken to the committee. A draft of minimum guidelines was included. Dr. Tibbitts said Dr. Incoll suggested that these new international guidelines be delivered for approval at the proposed 2004 joint meeting in Australia. Dr. Tibbitts went on to say he hoped they would be ready before that time.

Dr. Tibbitts also reported Dr. Keith Ingram from University of Georgia is working on reporting guidelines on behalf of the Crop Science Society of America, which reinforces the need for guidelines that will be used by the larger community. Dr. Mark Van Iersel, also from Georgia, strongly encouraged the NCR-101 group to co-operate and communicate with the Keith. He emphasised how senseless it would be for different societies to have unique guidelines. This

would lead to greater confusion in the research community. How would one choose which guidelines to follow? Mark said Keith is very willing to work with this group.

Dr. John Lea-Cox added that discussions from the ASHS meeting indicate they have a similar problem. While publication guidelines exist, there doesn't seem to be the capacity to define all of the units that should be taken care of. John questioned if it wasn't up to the NCR-101 to ensure a central "repository" of common guidelines accessible to all.

Dr. Don Krizek commented that the Council of Biology Editors Style Manual has contained information since 1983 on NCR developed guidelines that Don contributed on. Dr. Krizek suggested new input into the manual is required. He commented that the ASAE guidelines can only be downloaded for free by ASAE members so universal access is not possible.

Dr. Tibbitts stated that placing an entire set of guidelines in the ASHS style manual, or other publication for that matter, may not be possible. However, all relevant societies and journals should have consistent references to the NC-101 web site, which will contain the detailed and simplified versions of guidelines. He then made the point that web based guidelines may be updated or revised more frequently and easily than ones published in paper references that may only be revised once in several years. Once a printed reference is made to NCR-101 web-based guidelines, it remains accurate as long as the information can be found.

Mr. Mark Romer questioned if the current guidelines put out in Biotronics could be placed on the NCR-101 web site. The value would be as a reference tool for those researchers intent on "doing the right thing". Dr. Tibbitts replied he has contacted Biotronics and they will permit this use. He added they are quite similar to A. J. Both's update of the ASAE guidelines.

Dr. Mark Van Iersel suggested that all controlled environment facilities should put links on their web sites to the NCR-101 guidelines. Dr. Gary Gardner said to make sure the guidelines are only two clicks away. Dr. Bob Langhans questioned how to enforce the guidelines.

John Lea-Cox stressed that the central repository for guidelines must be addressed and that Gary Gardner's "two clicks away" could be realistic. Dr. Peter Ling made the point that groups like ASAE must publicize their guideline efforts to relevant committees and sub-groups.

Dr. John Lea-Cox raised the question as to whether ASAE may have an intellectual property claim and copyright to these guidelines. Dr. A. J. Both replied he thought they might, to which Lea-Cox replied that may be a problem. Dr. Tibbitts and others felt this would not be a serious issue in the end and could be worked out without great difficulty.

Dr. Royal Heins questioned how realistic it would be to include all the details laid out in the guidelines for every publication. Could many otherwise fine papers be rejected for not including a particular detail that wasn't known at the time? Dr. Cary Mitchell added this will be one of the key issues with guidelines. If they are deemed too demanding, acceptance will be grudging. He emphasized the need for a simplified minimum set that would encourage compliance.

This discussion ended with several comments expressing various thoughts on what specific items were important to report. Mark Romer reiterated how suitable a web-based guideline resource could be insofar as the ability to revise as use expands and naturally elicits more feedback from the research community.

9. Instrument Package Report:

Dr. Bruce Bugbee began by explaining this report covers the last two year's as this topic was not included at the joint 2001 meeting. He reported this last year's activity was very low (two uses) so income from rental was meagre.

Dr. Bugbee updated the group on additions made to the package. The Instrument Package balance two years ago was \$5000. Since then, a number of instruments have been added, the

most significant being a portable spectrometer (which was upgraded to a radiometer). The present balance is approximately \$1000. He said while the original intent of the package was to provide calibration standards, it now provides unique instruments that researchers generally do not have access to.

The traditional rental fee has been \$300. With the addition of new instruments and support items like shipping cases, the total package has grown to the point where Dr. Bugbee suggested the instruments should be divided into three smaller groups as follows:

1. The basic radiation sensors (Epply) to characterise a growth chamber with a given set of lamps, barrier etc. A Skye red-far red sensor and an Apogee UV meter are also included in this group.
2. The second group is intended as the primary calibration reference for PAR. It includes three Licor Quantum sensors and an Apogee data logger to read them along with inputs for five more Licor sensors. This standalone group is very useful for calibrating quantum sensors. Bruce stated it is vitally important that quantum sensors be frequently calibrated. He made it clear that plants integrate PPF better than the best instruments.
3. The third package would be the Stellar-Net spectrometer that, with Dr. Bugbee's modifications, now qualifies as a full spectral radiometer providing accurate "absolute measurements" of light quality. Bruce stated this instrument is so good and cost effective that Licor has stopped selling their radiometer which was the standard for years.

A general discussion followed touching on:

The fact that the instrument package needs to be promoted to station directors which in turn would remind them of the positive benefit of the NCR-101 Committee in general.

Rather than just one user putting the package to use at a site, it is important, and economical, to ensure it makes the rounds while at a given location. Dr. Ted Tibbitts encouraged users to split costs with other departments.

To add better equipment, Dr. Dan Schmoltdt said Farm Bill funding could be approached with a proposal for more expensive instruments with "integrated purpose".

Further discussion led to the conclusion that the second (Licor) and third (Stellar-Net) groups should be joined. The resultant pair of packages would be rented for \$300 each. It was suggested that if both were booked at the same time, the combined rate would be something less than \$600.

Suggestions to improve visibility included a descriptive web page listing in detail what each package contains. Dr. Bugbee said this could be done out of Utah State with a link from the NCR-101 site. Chieri Kubota asked if the packages could be booked over the net. This was deemed too much effort to set up but the idea of posting bookings so that one could determine availability was seemed reasonable. E-mail requests would be the method to actually book.

Mark Romer speculated that linking to the instrument package web page could be expanded to include links to reporting guidelines and examples of reports made by users of the packages. The added value of accumulated experience and guidelines would encourage the use of the instruments.

The discussion came back to the new fee schedule. Dr. Bugbee restated the two package format and proposed that rental rates be set at \$300 per group or \$450 for both for a period up to two weeks. A 10% discount would be awarded for returning it early. Dr. A. J. Both preferred that a late penalty be charged rather than an early return bonus. The group quickly moved with this suggestion and the idea of some type of penalty was acceptable.

Dr. Bugbee officially moved to set the rates at \$300 per package or \$450 for both for up to two weeks. After two weeks, the penalty would be 10% of the initial fees per week. Mr. Mark Romer seconded the motion. Motion carried.

9. Request for Instrument Package By CEUG:

Dr. A. J. Both reported that a request had been made by Dr. Lynton Incoll to obtain the instrument package for use by the UK based group. The use will be during a workshop being planned for 2003 or 2004. Dr. Incoll thinks the package will be of great benefit in explaining lighting characteristics of chambers and to learn what measurements are possible with the instruments used by controlled environment users in North America. Also, calibration checks could be made against the instrument package, as is one of the primary uses here.

Dr. Both explained that the CEUG would pay for rental, shipping and insurance. The idea has been discussed by the executive, and Dr. Both asked the general membership if this would be acceptable. When asked how long it would be gone, Dr. Both thought three to four weeks including the shipping time would be likely.

It was suggested that we stipulate airfreight to minimize time away. Dr. Ted Tibbitts commented that it might be a good idea to send a person along with the package to avoid the possibility of tying up the instruments in customs for weeks.

The group agreed to the possibility of sending the package and Dr. Both indicated he would communicate with the CEUG and let them know.

10. Mailing List, Membership and Web Site Report:

Mr. Mark Romer reported that the web site needed an update but the actual e-mail list was up to date and as accurate as possible. Any bounced e-mails are investigated and either amended or deleted.

Mark said several new international members as well as groups such as the Biosphere contributed to the broader scope of the NCR-101.

Mark passed around an update sheet in case any information needed revising. For the most part, information is very up to date as members are very good about passing along information. He indicated he would contact any new members to verify all information is accurate.

Regarding the NCR-01 web site, Mark reminded the group that at the 2000 meeting at Purdue, it was decided that official representatives of the agricultural experiment stations be listed as contacts under the section titled Member Agricultural Experiment Stations. In most cases there are web links to the stations. One challenge is that Mark has been unable to get a list of the officially designated representatives of all the stations. Mark distributed a list of those persons he believes to be the representatives for correction or verification. Dr. Ramesh Kanwar said he should be able to obtain an accurate list of all stations including those that do not send representatives to the NCR-101 meetings.

The other item Mark raised was reference information. He indicated Ted Tibbitts has permission to put up reporting guidelines. Dr. Gerry Dietzer has agreed to work with Mark to post the quality of light information he has amassed over the years. This information with recommendations on how to measure light etc. would be useful additions to the web site. Mark asked that any input or information useful to the site be submitted. He and Dr. David Tremmel (web master) do not have the time to develop material for the site without input and contributions.

Dr. Tremmel stated that he has had very little feedback on the web site with respect to what should be included. He has developed the web site and placed the minimum information up and is basically waiting for comments and suggestions of what to include next. Dr. Tremmel reported

that Dr. Incoll questioned why the officers' contact information was not posted. This will be considered. Mark said, in the past the Secretary contact information was available.

A comment was made that all facilities in the US should be approached and reminded of the NCR-101 group. A discussion followed with Dr. Kanwar offering to revisit the issue of NCR-101 representation with all Station Directors. Gary Gardner suggested that a more targeted approach may have more effect. That is, contact individuals who we believe would like to participate and have them lobby their Station Directors for the support to attend.

Dr. Tremmel pointed out that there is no indication on the web site of how to join the NCR-101 or, for that matter, what constitutes a member. Mark Romer said he believed membership is generally open but funding is limited. Gary Gardner commented that the web site should state that membership is indeed open but only official representatives of State Agricultural Experiment Stations are eligible for funding.

Luncheon Break 12:35 – 1:35 PM

11. Old Business:

Dr. Don Krizek mentioned that the publication Biotronics was alive; with recent renewed vigour.

Dr. A. J. Both referred to the upcoming evening's special awards presentation for several long-standing members whose contributions helped shaped the very nature of this committee. With that in mind, he raised the issue of a more permanent awards committee to routinely evaluate and recommend individuals that merit recognition. He asked for any volunteers interested in this task. Mr. Mark Romer volunteered to work with any special committee from the "historian's" perspective. Dr. Royal Hines suggested the primary responsibility of this task rested with the executive committee. Dr. Both replied that he wanted to make sure this process was not a "last minute" thing and hoped that due consideration would be given to recognition of deserving members.

Dr. Both asked if there were any other items of old business. None were raised.

12. New Business:

Dr. Both opened a discussion about the future of the Growth Chamber Handbook. In order to remain relevant, ongoing revision of the publication should be undertaken. The concept is to take a new chapter each year and revise it, then publish it on the NCR-101 web site. A person would be assigned to collect edits and present them at a special technical review session at the annual meeting. Dr. Both thought an hour should be dedicated to the review. At the end of the discussion, approval or amendments would be included and placed on the web site.

Dr. John Lea-Cox suggested the chapter for revision should be made available electronically during the editing period. Dr. Both said the original authors would be consulted for their input.

Dr. Bruce Bugbee thought that allowing only one hour to review the technical content of an entire chapter could be daunting. He speculated half a day would be more likely. Dr. Gary Gardner added to this, pointing out that historically, agreeing on the handbook content has taken longer than estimated. Mark Romer added that the basic content is still quite valid and that if it were written today, the main difference would be information on new sensors or discoveries made since the original was published. He doubted that significant debate would occur for most chapters. Dr. Both added that the intent was not to revise an entire chapter in one hour from scratch. The hour would be used to present the already complete revision for comment and approval.

Mr. Romer pointed out the Growth Chamber Handbook is not well promoted. To get information to people who could benefit from it, web publishing is the best approach. He said a minor revision would allow publishing without infringing on copyright. A brief discussion ensued about whether copyright would be a problem at all since members of the NCR-101 were the authors and that Iowa State University Press is the copyrighted publisher. Dr. Ramesh Kanwar informed the group that Iowa State University Press is no longer attached to the university; they are totally private. A clear consensus on what copyright issues may arise was not possible. Dr. Gary Gardner recommended that an advisory committee be established to investigate the proper approach. Dr. Ted Tibbitts thought the original authors should not be the primary authors of the revision. Dr. Bob Langhans agreed, but maintained that the original authors should be involved in a limited way. Dr. Royal Hines suggested first refusal to revise a chapter should be offered to the original author.

Dr. A. J. Both called for volunteers to form an editorial committee. Dr. Gary Gardner motioned to establish this committee. Dr. Don Krizek seconded. Motion carried.

Dr. Both again called for volunteers and then volunteered himself. Dr. Mark Van Iersel then offered followed by Dr. Corinne Rutzke.

After brief discussions focussing on how to proceed, Dr. Gary Gardner made a new motion to grant the Editorial Committee be empowered to implement a revision plan and present revised material for approval by the members. Seconded by Dr. Wade Berry. Motion carried.

Dr. Both asked if there were any other items of new business. None were raised.

13. Election of New Officers:

Dr. A. J. Both briefly explained the traditional appointment of new officers was for a three year term beginning as Secretary, moving to Vice-Chair and then Chair. After that, as Past-Chair, minimal duties are required to assist the new officers serving on the Executive Committee. Dr. Both called on any person interested in becoming an officer while indicating the Committee had a person in mind. No new individuals stepped forward.

With that, Dr. Both was pleased to announce that Dr. Chieri Kubota from the University of Arizona had offered to be the next incoming Secretary. No discussion was required.

Dr. A. J. Both moved that Dr. Chieri Kubota become the incoming Secretary. She accepted graciously. Dr. Cary Mitchell seconded the motion. Motion carried.

Chieri expressed her gratitude for the opportunity to serve this long-standing committee. She expressed some trepidation since English is her second language. Dr. Both said with the international meeting set for 2004 in Australia, Chieri's appointment was timely since we hope to see many attendees from Asia as well.

14. Next Meeting, 2003:

Dr. A. J. Both introduced two persons representing facilities that had expressed an interest in hosting the NCR-101 Committee meeting in 2003. Dr. Mike Dixon represented the University of Guelph in Ontario, Canada. Allen Wright from Tucson, Arizona represented Biosphere 2 and the University of Arizona jointly. Each gentleman presented a brief outline of the nature and amenities of their locations. Both offered unique controlled environment facilities. Guelph, with a new suite of controlled atmosphere chambers, would be available around April 20. Tucson, with its unique Biosphere 2 glass enclosed environment, would be available from mid to late March.

The group agreed that both locations are excellent sites. After a brief discussion, it was suggested that the facility with the most votes would host first and the other hosting the next

North American meeting. **Dr. Both called for a vote. Guelph garnered 17 votes while Tucson had 10 votes. Therefore, Guelph will be the meeting location in April, 2003. Tucson will host in March 2005, unless the 2004 Australian meeting fails to materialize, in which case Tucson would host a year earlier.**

15. Brisbane, Australia 2004 Meeting Update:

Dr. A. J. Both reported that he had requested an official invitation to the 2004 Brisbane meetings from Drs. Rob Kerslake and Dennis Greer. Rob Kerslake has replied by e-mail with the official invitation.

Dr. Both asked for volunteers to form a group to work on issues leading to the Australian meeting. Mr. Reg Quiring, Dr. David Tremmel and Dr. Don Krizek came forward. Mr. Mark Romer suggested that, in addition, an NCR-101 representative familiar with the funding aspects of such an opportunity also be involved. Dr. Both said it would be advantageous for this person to work directly with Dr. Ramesh Kanwar to draft a funding proposal. Dr. Kanwar generally agreed and added that Dr. John Lea-Cox did something along these lines for the joint UK meeting in 2001. Dr. Kanwar said both the USDA and CSIRO should be approached. John Lea-Cox said he had spent considerable time trying to secure some funding and would help where he could. Dr Dan Schmoltdt said he would check possibilities from his CSREES position. Mr. Reg Quiring will chair this group.

Brief discussions followed regarding other funding options and strategies. Dr. John Lea-Cox may check in to NSF guidelines. Dr. Kanwar indicated that the NSF prefers to fund activities that have mostly US participants, but also considers support for international workshops with a scientific purpose. Unlike the USDA, Dr. Kanwar said the NSF might not restrict funding only to official NCR-101 members.

It was agreed that a formal presentation outlining the 2004 meeting in Australia be made at the 2003 meeting in Guelph. Proposed topics, costs, professional tours and schedule would be covered. NCR-101 members would be asked to indicate their interest in attending based on this presentation. The degree of participation at that time would be the basis of a decision to attend or not. It was agreed formal information on the Australian program is needed as soon as possible to prepare for this.

Dr. Ted Tibbitts added that any industry support would add flexibility to a funding pool as it could be distributed to non-US individuals that could not qualify for other funding.

This was the last topic to be addressed at the NCR-101 2002 Business Meeting. **Motion to adjourn made by Mr. Mark Romer. Seconded by Dr. Peter Ling. Motion carried.**

16. Station Reports:

Station reports were presented after the business meeting by the following individuals (in no particular order):

| | | | |
|--|--|--------------------------|---------------------------|
| Dave Fleisher (Rutgers) | Corinne Rutzke (Cornell) | Peter Ling (Ohio) | Cary Mitchell (Purdue) |
| Ray Wheeler (KSC) | Gary Gardner (Minn) | Bruce Bugbee (Utah) | Jonathan Frantz (Utah) |
| John Lee-Cox (Maryland) | Mike Dixon (Guelph) | Ted Tibbitts (Wisconsin) | Don Krizek (USDA/ARS) |
| Mark Romer (McGill) | Chieri Kubota (Arizona) | David Tremmel (Duke) | Mark Van Iersel (Georgia) |
| Reg Quiring (Conviron) | A. O. Rule (Environmental Growth Chambers) | | |
| Royal Heins and Erik Runkle (Michigan State) | Robert Pollock (Southern Sun Biosystems) | | |

17. Awards Ceremony

At the special awards ceremony, the following five founding members were honoured for their many years of dedicated service to the NCR-101 Committee (which started in 1976): Wade Berry, Don Krizek, Bob Langhans, Art Spomer (who was unable to attend), and Ted Tibbitts.

A Significant Contributor Award was presented to Jack Downs in recognition for his many contributions to controlled environment technology and research.

Each awardee was presented with a unique plaque and each addressed the membership to express their thanks and stated they had received many years of personal and professional satisfaction from participating in NCR-101 activities.

Respectfully submitted,

Reg Quiring
NCR-101 Secretary

Attachments:

2002 Meeting Schedule (incl. Tours)
NCR101 Membership Summary April 2002
Report - International Committee on CE Guidelines

NCR-101

Committee on Controlled Environment Technology and Use

2002 ANNUAL MEETING SCHEDULE

| TIME | EVENT | LOCATION IN HILTON |
|------------------------------------|--|-----------------------|
| Saturday, April 6, 2002 | | |
| 2:00 – 7:00 PM | Registration | University Lobby |
| 3:00 – 5:00 PM | ASHS GCWG Meeting | University 3 |
| 6:00 – 7:00 PM | Reception | University Lobby |
| 7:00 PM | Dinner | University 1,2 |
| Sunday, April 7, 2002 | | |
| 7:30 – 8:30 AM | Breakfast & Registration | Trinity Lobby |
| 8:30 – 10:15 AM | NCR-101 Business Meeting | Trinity C/D |
| 10:15 – 10:45 AM | Morning break | Trinity Lobby |
| 10:45 – 12:30 PM | Business Meeting continues | Trinity C/D |
| 12:30 – 1:30 PM | Lunch | University 1,2 |
| 1:30 – 3:15 PM | Business Meeting/Info Exchange | Trinity C/D |
| 3:15 – 3:45 PM | Afternoon break | Trinity Lobby |
| 3:45 – 5:30 PM | Info Exchange continues | Trinity C/D |
| 7:00 PM | Dinner | University 1,2 |
| Monday, April 8, 2002 | | |
| 7:00 – 8:00 AM | Breakfast | Trinity Lobby |
| 8:00 – 9:50 AM | NCR-101 Info Exchange | Trinity C/D |
| 9:50 – 10:10 AM | Morning break | Trinity Lobby |
| 10:10 – 11:30 PM | Info Exchange continues | Trinity C/D |
| 11:45 – 1:30 PM | Duke Gardens Tour and Lunch | |
| 2:00 – 3:30 PM | Tour of Duke FACTS I Site | |
| 4:00 – 5:30 PM | Tour of the National Phytotron at Duke University | |
| 7:00 PM | Dinner - Tosca Restaurant | |

TIME**EVENT****LOCATION IN
HILTON**

**Tuesday, April 9,
2002**

| | | |
|------------------|--|--------------------|
| 7:00 – 8:00 AM | Breakfast | Trinity Lobby, C/D |
| 8:30 – 9:30 AM | Tour of Syngenta – Research Triangle Park | |
| 9:45 – 10:45 AM | Tour of Paradigm Genetics – RTP | |
| 11:15 – 12:00 PM | Tour of NCSU Horticulture Glasshouses | |
| 12:15 – 1:00 PM | Box Lunch in NCSU Arboretum OR NCSU Phytotron | |
| 1:15 – 2:30 PM | Tour of NCSU Phytotron | |

International Committee on CE Guidelines

At Norwich last September, NCR-101 and the UK CEUG held a combined business meeting. NCR-101 asked the UK CEUG to interact with them on a project to enable international standardisation of terminology, measurement and guidelines for reporting and monitoring. UK CEUG supported the proposal. T. Tibbitts (University of Wisconsin) proposed to take some initiative in this. He proposed to attempt to rewrite the guidelines with the help of members of the CEUG / NCR-101 and other groups worldwide.

The following members of UK CEUG, NCR-101 and ACEWG volunteered to form a committee with T. Tibbitts for this purpose:

1. I. Pearman (IACR Rothamsted),
2. R. Kerslake (CSIRO, Brisbane),
3. D. Krizek (USDA, Beltsville),
4. G. Taylor (SANYO Gallenkamp),
5. D. Greer (HortResearch, NZ, now at Charles Sturt University, Wagga Wagga),
6. L. Incoll (University of Leeds),
7. D. Pilbeam (University of Leeds)
8. M. Romer (McGill University, Montreal),
9. A-J. Both (Rutgers University),
10. A. Agostino (CSIRO, Canberra)
11. P. Austin (HortResearch, New Zealand)
12. Changhoo Chun (Chiba University, Chiba)
13. Y. Kitaya (Osaka Prefecture University, Osaka)
14. M. Kitano (Kochi University, Shikoku Island)
- [15. T. Tibbitts (University of Wisconsin, Madison)]

L. Incoll has set up a private i.e. closed, mailing list for the Committee through the UK National Academic Mailing List Service. This Service provides administrative support for the list, enables messages to be despatched automatically to the whole committee and provides a central archive for files.

T. Tibbitts has drafted a proposal with help from D. Krizek and L. Incoll that has been distributed recently for comments and revision by the committee members.

T. Tibbitts
L.D. Incoll
28th March 2002