

CONTROLLED ENVIRONMENT USERS GROUP

**BUSINESS MEETING
28TH SEPTEMBER, 1993**

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CONTROLLED ENVIRONMENT USERS GROUP

**MEETING AT THE UNIVERSITY OF LEICESTER
BOTANIC GARDEN
28TH - 29TH SEPTEMBER, 1993**

*"LIGHTING IN CONTROLLED
ENVIRONMENTS"*

PROGRAMME

28th September 1993

- 12.00 -14.00 Registration (Entrance Hall, Beaumont House)
Buffet Lunch (Dining Hall, Beaumont House)
- 14.00 -14.05 Opening Remarks (T.V. Room, Beaumont House)
- 14.05 -14.35 Professor Harry Smith (Department of Botany, University of Leicester) — Light Quality and Plant Response
- 14.35 -15.05 Dr. Ian Gilbert (Department of Botany, University of Leicester) — Light Quality in Controlled Environments
- 15.05 -15.30 Afternoon Tea (Foyer, Beaumont House)
- 15.30 -16.00 Dr. L. D. Incoll (Department of Pure and Applied Biology, University of Leeds) — Nits, photons, einsteins, intensity, fluence and various other beasts that plague the terminology and units of measurement of radiation.
- 16.00 -16.30 Mr. Chris Lakwijk (Horticultural Lighting, Phillips, Eindhoven) — Lighting for plants: A Manufacturer's point of view
- 16.35 -17.05 Dr. Alan P. Gay (Environmental Biology, AFRC IGER, Aberystwyth) — The effects of light quality on clover growth, an example of how simple modifications of standard C.E. facilities can be used in light quality studies
- 18.30 Dinner (Dining Hall, Beaumont House)
- 20.00 Business Meeting (Dining Hall, Beaumont House)
- As required Accommodation in Beaumont Hall

29th September 1993

- 08.00-09.00 Breakfast (Beaumont House)
- 09.00 Assemble T.V. Room, Beaumont House
- 09.00 -10.00 Tour of facilities and demonstrations
Red Group to Hastings House
Blue Group to The Knoll
- 10.00 -10.30 Coffee and changeover (The Knoll)
- 10.30 -12.00 Tour and demonstrations (continued)
- 12.00 Return Room Keys to Conference Desk (Entrance Hall, Beaumont House)
- 12.00 -14.00 Buffet Lunch (Dining Hall, Beaumont House)

MINUTES OF THE 1993 BUSINESS MEETING OF THE CONTROLLED ENVIRONMENT USERS GROUP

The annual meeting of the CE Users Group was held on Tuesday, 28th September 1993 at the University of Leicester Botanic Gardens.

The meeting opened at 2040 hrs.

The Chairman, L.D.Incoll, welcomed new attendees and explained that the purpose of the meeting was for users, managers, engineers, and suppliers to share problems and experiences.

1. Minutes of Previous Meeting

The minutes of the 1992 meeting, held at the University of East Anglia, were approved.

2. Matters Arising

There were no matters arising from the previous minutes.

3. Management, Staffing, Running Costs

No points were raised.

4. Maintenance, Servicing, Spares

K.Chivers of Reading University asked if anyone knew of a suitable replacement for the Nobel dew-point controller for use on Saxcil cabinets because the Nobel units were no longer obtainable. R.Randall of HRI, Littlehampton, offered to contact Nobel to determine whether they were likely to resume production of this item. G.Crowhurst stated that at HRI, Wellesbourne, they had recently purchased Satchwell controllers, valve actuators, valves and accessories at a cost of approximately £500 per cabinet. He offered to pass details on to K.Chivers.

5. Control Systems

- a) G.Taylor of Sanyo-Gallenkamp, reported that they have a new programmable controller (Type 550) which, as well as controlling temperature and humidity, can give lighting profiles when used in conjunction with their 'dimnable' electronic lighting system.
- b) Prof. H.Smith of Leicester University and L.Incoll of Leeds University discussed the usefulness of full lighting variability including red/far red ratios and generally imitating natural daylight.

6. Humidification and Irrigation

- a) The chairman asked if there were any comments on ultrasonic humidification. A.Nichols of JII had successfully used ultrasonic humidification for some three years. A.Roylance said Vindon Scientific had brought a unit to demonstrate at the meeting. The Chairman enquired about the periodical draining of water reservoirs to avoid *Legionella* problems. G.Taylor asked whether anyone had experience of *Legionella*

testing with humidifiers generally, whether ultrasonic or otherwise. B.Wilson of Wye College had used contract testing. C.Dudley of Dow Elanco advised using regular drainage and avoiding atomization systems.

Discussion followed regarding the ability of the bacteria to survive in the ultrasonic systems. C.Lakwijk of Philips asked if anyone had used UV-C for cleaning humidification water and said that if they did, they should be careful to ensure that the size of lamp was compatible with the cooling effect of the water. He added that there were also ozone methods but they were very expensive.

- b. In answer to an enquiry about automatic irrigation systems in growth chambers, G.Crowhurst of HRI stated a preference for avoiding any system which might cause spillage or overflow into the chambers.

7. Lighting

- a. Prof.H.Smith enquired about the availability of high output Light Emitting Diodes (LEDs) with far-red (730 nm) output. C.Lakwijk said that LED power was too small and suggested the use of small filament lamps. Prof Smith explained that they wanted to obtain the far-red without the heat associated with filament lamps, and that Hansatec had built a unit of 200 LEDs in 2 arrays to give $300 \mu\text{mol m}^{-2} \text{s}^{-1}$. R.Young of Glen Spectra thought that a division of Plessey's should be able to assist.
- b. I.Pearman of Rothamstead had tried High Frequency (HF) control gear for 8 ft fluorescent lamps from a supplier who claimed a 25% energy saving with no loss of light output. He reported that they actually achieved a 50% energy saving but at the expense of a 33% loss of light output. He has also obtained a number of "Longlife" tubes which he wishes to test. These are from Sweden and have a 3 year or 30,000 hour guarantee. C.Lakwijk queried the declared lumen output deterioration during the guarantee period. He also warned that carrying out spot replacements gave rise to non-uniformity of light distribution. J.Weir asked if there was yet a European standard for specifying lamp quality. A.Nicols said JII had been running 400 watt HQI-WV lamps in cooled lamphouses for up to 38,000 hours with a drop of output from 320 to $280 \mu\text{mol m}^{-2} \text{s}^{-1}$ but they had also suffered early failures with type TL lamps.
- c. L.Incoll asked for some clarification of the standard and 'slimline' fluorescent tubes and of high frequency operation. C.Lakwijk explained that the slimline (26 mm dia.) tube is an improvement on the older standard (38 mm dia.) tube but the high frequency operation of slimline tubes gives further benefits in energy saving and stable, flicker free, light output. They had the added advantage of simple dimming control using their low d.c. control voltage. I.Pearman reported that Rothamstead has one Saxcil cabinet fitted with HF fluorescents and needs to change lamps only every two years. G.Taylor said Sanyo use HF as standard and also use 'compact' type lamps.

- d. L.Incoll asked if reflector tubes were still available. C.Lakwijk felt that the market potential was not sufficient to warrant manufacturing slimline tubes with inbuilt reflectors. R.Woodfin of Imperial College asked if it was feasible to 'DIY'-fit reflecting strips onto standard tubes. C.Lakwijk did not consider this to be practical.
- e. C.Lakwijk said that Philips has now developed an 80 watt teflon-coated lamp suitable for outdoor use such as production growing of chrysanthemums. The lamp is virtually unbreakable but expensive. J.Weir of Farm Electric added that this type of lamp needed to be mounted higher than earlier types because of its light distribution.
- f. C.Dudley of Dow Elanco said that they return lamps failing early to the manufacturers for replacement. They have experienced igniter problems on high pressure sodium lamps and wanted to determine whether they were faulty or subject to design errors. C.Lakwijk suggested they check that the ambient temperature is not too high for the capacitors. I.Baker said Vindon used internal igniters rather than external whereas J.Franklin of Rothamstead successfully used remotely mounted igniters and ballasts for ease of maintenance. A.Nicols added that they do the same in the glasshouses at JII. A.Canham from Lincolnshire asked if anyone had experience of a 250 watt 'Wotan' iodide lamp but no-one knew of it. C.Lakwijk indicated that Philips were producing a QL lamp with 60,000 hours life but with an efficacy of 60 lumens/watt.

8. Instrumentation, Sensors, Monitoring

C.Lakwijk emphasised that light sensors should be of the 'cosine corrected' type for effective light measurements. L.Incoll invited comment from meter suppliers present, and suggested that they might like to carry out comparisons in a Vindon cabinet next morning and to produce the results at lunch.

C.Lakwijk expressed his confidence in the quality of 'LI-Cor' sensors. D.Lovell from Long Ashton reminded all users of light sensors of the need for regular calibration whereupon both M.Vosloo of Glen Spectra and B.Trotter of Skye Instruments declared that they seldom get sensors returned to them for calibration.

G.Taylor of Sanyo asked what sort of a standard is used for calibration. B.Trotter replied that Skye use a spectroradiometer in conjunction with a QI lamp which is, in turn, calibrated by NPL. K.Parkinson of PP systems regretted that there seemed to be no consistency in cosine correction.

9. Heat Reclamation and Energy Management

B.Wilson of Wye College asked if anyone was in the process of arranging replacements for R12 refrigerant systems because he was in touch with a company called "Gu Thermo Technology" who could offer a 25% energy saving with their 'drop-in' replacement for R12.

10. Fabric, Glazing, Reflective Materials

During discussion of the relative merits of "white painted" versus "polished metallic

reflecting" surfaces it was pointed out by A.Gay of IGER that it was the National Institute of Agricultural Engineering in conjunction with R.K.Saxton Sax-Air Ltd. who introduced the self-adhesive aluminised 'Melinex' for optimum light reflectivity in their Saxcil cabinets. C.Lakwijk was convinced that a white surface was better than aluminised Melinex or polished aluminium or stainless steel. G.Taylor added that, for white finishes, they at Sanyo found that 'electrostatic powder coated' systems proved most practical, especially for ease of maintenance.

11. **New Equipment, Recent Advances**

No points were raised.

12. **Plant Growth Problems**

- a. G.Taylor reported that Sanyo had experienced the need for some growth rooms to obtain their fresh air supplies from outside the building in which they were installed, because phytotoxic materials, especially vinyl flooring, had been used in the building.
- b. R.Woodfin from Imperial College asked which white paint is safe from a phytotoxicity point of view. G.Taylor replied that their 'powder coated' systems were preferable because they used no solvents. M.Vosloo of Glen Spectra suggested that sheet PTFE should provide a safe white reflective surface.

13. **Safety**

C.Lakwijk reminded users that mercury lamps must be safely enclosed.

14. **Any Other Business**

- a. Funds The group's nominated treasurer, A.Nichols of JII, told the meeting that a credit balance of some £465.28 was held in a JII account.

Proposition It was proposed that L.Incoll of Leeds University, A.Nicols and J.Aldous, both of John Innes Institute, be appointed joint signatories to an account to be opened in the name of UK CE Users Group in a Norwich branch of Barclays Bank, the monies to be used to promote the scientific use of controlled environments through meetings of the Group.

Proposed by: G.Crowhurst HRI, Wellesbourne
 Seconded by: J.Franklin Rothamstead Experimental Station
 Carried unanimously

- b. The Chairman, on behalf of the group, thanked Professor Harry Smith of Leicester University for hosting the meeting and Carol Webster and Malcolm Pratt for their organisation of the event.

15. **Date and Place of Next Meeting**

- a. Place & Date: IGER-WPBS were prepared to host the 1994 meeting at a date to be decided. It was suggested that, due to possible travel difficulties, the format might need to be changed to a one-day event.

- b. Theme: The Chairman suggested bringing a speaker from the North American CE Users Group. C.Dudley of Dow Elanco suggested the theme be based on the application of Good Laboratory Practice (GLP) to CE use. G.Crowhurst of HRI Wellesbourne suggested CE facility specifications.

The meeting closed at 22:30 hours.

G.E.Crowhurst & A.Morgan (HRI Wellesbourne)

Recorders.

21 October 1993

**LIST OF PARTICIPANTS
CE USERS GROUP MEETING 1993
AT THE UNIVERSITY OF LEICESTER**

Baker, Ian	Vindon	Roberts, Bernard	HRI-East Malling
Barrett, J. C.	Zeneca Agrochemicals	Ross, John	HRI-Littlehampton
Boner, Gerry	Jencons Scientific Ltd.	Roylance, Alan	Vindon
Canham, A.E.	16 Woodland Drive, Lincs	Sim, Allan	Macaulay Land Use
Chivers, K.E.	University of Reading		Research Inst.
Clifford, Sean	University of Nottingham	Smith, Prof. H.	Leicester University
Collinson, Sarah	University of Nottingham	Smith, Sandra	Leicester University
Cranston, Stuart	HRI-Wellesbourne	Steed, D.A.W.	Cranbrook, Kent
Cross, Tony	IIBC Silwood Park	Stratton, Peter	Zeneca Agrochemicals
Crothers, S.H.	Dept of Agriculture NI	Taylor, Gail	University of Sussex
Crowhurst, George	HRI-Wellesbourne	Taylor, Garry	Sanyo Gallenkamp
Curtis, P.	John Innes Institute	Townson, Jane	Zeneca Agrochemicals
Dixon, Keith	Dow Elanco Ltd.	Vanderpump, S.A.	Zeneca Agrochemicals
Dudley, Chris	Dow Elanco Ltd.	Vosloo, Mark	Glen Spectra Ltd.
Eagles, C.F.	IGER-Aberystwyth	Weir, J.A.C.	Farm Electric Centre
Franklin, Julian	Rothamsted Exp. Station		National Ag. Centre
Gay, A.P.	IGER-Aberystwyth		Stoneleigh
Gilbert, Ian	Leicester University	Welling, John	University of Sussex
Gill, Peter	Scottish Crop Res. Inst.	Trotter, Belinda	Skye Instruments
Gray, David	Scottish Crop Res. Inst.	Wilkins, Diana	HRI-Littlehampton
Hamilton, W.D.O.	Agricultural Genetics Co.	Williams, Alan	Sanyo Gallenkamp
Hands, D.W.	HRI-Efford	Wilson, Brian	Wye College
Hetschkon, Helen	Brooms Barn Exp. Sta.	Woodfin, Richard	Imperial College,
Hughes, R.F.	Long Ashton Res. Station		Silwood Park
Incoll, Lynton	Leeds University	Young, Richard	Glen Spectra Ltd.
Kelly, B.	Long Ashton Res. Station	Wilkinson, J.R.	Lancaster University
Lakwijk, Chris	Phillips, Eindhoven	Morgan, C.	John Innes
Lappage, M.G.	University of Leeds		
Lovell, D.	Long Ashton Res. Station		
Maclellan, Chris	Macam Photometrics		
Macrae, Neil	Jencons		
McLeod, A.R.	ITE Monks Wood		
McNaughton, Ian	Scottish Crop Res. Inst.		
Morgan, A.	HRI-Wellesbourne		
Naeem, Shahid	Imperial College, Silwood		
	Park		
Newell, Christine	Agricultural Genetics Co.		
Nicols, A	John Innes Institute		
Oughton, J.	Leeds University		
Parkinson, R.G.	Long Ashton Res. Station		
Parkinson, Keith	PP Systems		
Pearman, I.	Rothamsted Exp Station		
Pierce, R G	HRI-Littlehampton		
Potter, Edmund	Delta-T Devices		
Pratt, Malcolm	Leicester University		
Rafarel Ray	Inst. of Terr. Ecol.		
	Bangor		
Randall, Roy	HRI-Littlehampton		
Reay, M.J.	HRI-Littlehampton		