

DEPARTMENT OF PURE AND APPLIED BIOLOGY,  
THE UNIVERSITY OF LEEDS

CONTROLLED ENVIRONMENT USERS GROUP MEETING

Thursday, 29th September 1988

PROGRAMME

- 10.00 Coffee: Foyer, Psychology Building
- 10.30 Welcome. Chairman L.D.Incoll. Psychology L.T.
- 10.35 "The Use of Controlled-environment Facilities for the Growth of Genetically-engineered Plants" a discussion led by A.Cuming, Dept. of Genetics, Leeds University.
- 11.05 "The UCPE Temperature Gradient Tunnel" - R.Hunt, NERC UCPE, Sheffield University.
- 11.25 Users Group Discussion (agenda see page 2).
- 12.45 Buffet lunch: Dining Room 4, University House  
(cash bar available, menu see page 4)
- 14.00 Tour of Facilities: Agricultural Sciences Annexe; 12 Rorison Shell Cabinets, installed 1974, construction AFRC grant-aided.
- Demonstrations: Basement, Agric. Sciences Bldg
1. Computer-controlled mineral nutrition: F.E.Sanders, D.J.Pilbeam, G.Alloush, J.Le Bot
  2. Controlled water-stress system: P.C.Jewer, J.Ray, F.C.Lightbound, L.D.Incoll
  3. Computer-controlled monitoring (under development)  
J.Oughton
  4. UCPE Sunfleck Simulator: R.Hunt (Sheffield)
- 15.30 Afternoon Tea: Basement, Agric. Sciences Bldg

MINUTES OF THE 1988 MEETING OF THE  
CONTROLLED ENVIRONMENT USERS GROUP

The annual meeting of CE Users Group was held on Thursday 29 September, 1988 at the Department of Pure and Applied Biology, University of Leeds.

Chairman: L, D. Incoll

Apologies: A.J. Abbott, J.R. Aldous, J. Moorby, J. Weir,  
G.E. Wilson

1. MINUTES OF LAST MEETING

The minutes of the 1987 meeting at the Plant Environment Laboratory, University of Reading, were approved.

2. MATTERS ARISING

There were no matters arising from the minutes.

3. MANAGEMENT, STAFFING AND RUNNING COSTS

Charging: The meeting discussed the problems of setting charges for contract work in CE facilities. Wellesbourne (C. Hole) contracted Saxcil cabinets at £20 per day to cover administrative and running costs, whereas Littlehampton charged £26 per day in 1983 and Rothamsted (I. Pearman) £120 m<sup>-2</sup> month<sup>-1</sup> in 1987/8. P. Blackman observed however, that experiments in CEs were cheaper than small-scale field experiments.

4. MAINTENANCE, SERVICING AND SPARES

Spares: C. Hole reported that the special fan motors in Saxcil cabinets were no longer obtainable and had to be rewound on failure.

A. Nicholls drew the attention of users to the 220 V rating on many motors sourced overseas. As the UK rating is 240 V ± 6%, these motors fail after about 2 years and have to be rewound.

Refrigerants: The problems of handling refrigerants containing

CFCs were discussed. Refrigerant can be removed into cylinders, but disposal still remains a problem. G. Crowhurst observed that the refrigeration industry was working on the problem of disposal of CFCs.

#### 5. CONTROL SYSTEMS

Fitronic: Shell (P. Blackman) had lots of problems with Jumo programmers and Fisons had offered replacements. P. Blackman noted that Format 400 controllers will be able to be connected to personal computers.

CO<sub>2</sub> supplementation: ADC have developed a new controller (to  $\pm 1$  vpm), the same as the John Innes pulsed solenoid system, at £10,000 for controller and valves but without pipework or electrical leads. (G. Crowhurst).

#### 6. HUMIDIFICATION AND IRRIGATION SYSTEMS

Water supplies: The observation of T.E. Williams (Aberystwyth) that a Fitronic cabinet required replacement of 4 boiler heating elements per year when using water from an ELGA deioniser led to a discussion of water supplies. Long Ashton at present use an ELGA 800 deioniser in a continuously recirculating system. This relatively aggressive water has corroded chromium-plated boiler elements; LARS will use an ELGA RO plus 810 deioniser. The RO unit uses mains water in large quantities (4:1:: water in: pure water out). Rothamsted uses reverse osmosis (RO) maintaining that it is 3 to 4 times cheaper than deionisers and there is no handling of heavy barrels; the membrane is sterilized once every 2 weeks. At Hurley, rainwater followed by deionising gave a good supply though C. Hole observed that control of microorganisms was a problem in rainwater supplies.

Humidifiers: J. Ross drew the attention of the meeting to ultrasonic humidifiers (Energy Technique Ltd., Brookwood

Industrial Estate, Brookwood Avenue, Eastleigh SO5 4EY; Model ES4, 2.5 kg h<sup>-1</sup> capacity, £797), recommended for use with demineralized water only.

#### 7. LIGHTING

Lamps: I. Pearman reported on automatic dimmable, high frequency fluorescent tubes (Phillips) that reduce the initial output by 10% and then adjust the ballast to maintain a constant light output for the life of the lamp. Consequent savings were £600 per annum per cabinet and reduced the frequency of changes to 1 per 18 months. (Thorn dimmable tubes are not automatic.) A Nicholls advised that Thorn have developed a fluorescent tube with more far-red radiation.

Wiring: G. Crowhurst warned that lamp to ballast wiring should be kept away from mains wiring.

#### 8. INSTRUMENTATION, SENSORS, AND MONITORING

Humidity: R. Abrahams drew attention to Viasala's new RH probe which can cope better with rh > 75% because it has a membrane over the sensor.

Miscellaneous: C. Hole noted that the sensor module and associated electronics of the ADC/Parkinson leaf chamber were available from ADC (Transducer kit complete @ £350 + VAT). Output is 0-5 V linearized for each sensor.

#### 9. HEAT RECLAMATION AND ENERGY MANAGEMENT

Load shedding: Pressures from engineers for load shedding in CE facilities was discussed. It was agreed that peaks in consumption were associated with other variables like coffee time, and that load shedding was not applicable to CE facilities.

#### 10. FABRIC, GLAZING, REFLECTIVE MATERIALS

Saxcil ceilings: G. Crowhurst asked if anyone had successfully renewed any Saxcil ceilings without having to lift off the lamp

housing, but no-one had apparently done so.

Reflective materials: J. Ross reported on perforated aluminized films (e.g. Product No. S-2015045 porosity 11%, Stork Perforated Products, P.O. Box 47, 5830 AB Boxmeer, Holland).

Double-glazed panels: L. Incoll reported that replacement double-glazed toughened glass panels 1.5 x 1.5 m cost £250 in 1988, whereas VA Perspex panels of similar size as fitted in Saxcil cabinets cost £250 in 1980 (ordinary perspex, though cheaper, goes milky as it ages). Wellesbourne practice (G. Crowhurst) was to vacuum clean perspex panels first to prevent scratching during cleaning.

R. F. Hughes reported that Serac panels (Melinex film) in Long Ashton's new Fisons rooms were yellowing, particularly under each HQI lamp. This may be a temporary problem caused by spasmodic overheating during failures of lamphouse extract system in the early 'proving' tests.

#### 11. NEW EQUIPMENT AND RECENT ADVANCES

Cabinets: Long Ashton Research Station has had some problems of phytotoxicity in the new Fisons rooms. It has been largely eliminated by running high temperature cycles.

Programmers: It was agreed that programmers on commercial cabinets (Weiss, Fisons and Conviron) were over-engineered and that they were not particularly "user-friendly".

#### 12. PLANT GROWTH PROBLEMS

Rothamsted had found that fumes from floor paint from ICI, though supposedly safe for plants, was phytotoxic and such risks had led them to include a protective clause in contracts that involved CEs.

### 13. SAFETY

Closed rooms: R. Randall warned users that the Health and Safety Executive (HSE) was clamping down on working in closed rooms where O<sub>2</sub> depletion was possible and prohibition orders could well be issued.

Genetically-engineered organisms: Before the business meeting, Dr. A. Cuming (Genetics Dept., Leeds University) spoke on "The Use of Controlled-environment facilities for the Growth of Genetically-engineered Plants".

Discussion ranged from problems caused by sheer bulk of material (compared with micro-organisms) and the good practice of clean-up after experiments to containment of drainage water. A Cuming noted that the HSE would be looking to Institutes and Laboratories for devising appropriate guidelines.

### 14. NAME AND SCOPE OF GROUPS

L. Incoll reported that the Tansley Fund of the New Phytologist Trust had been prepared to grant £100 to the Group to enable a guest speaker to be invited to this meeting though it had to be assured that the Group was not run by the AFRC. (This meeting and that in 1987 had not been supported financially by the AFRC.) This grant was unused and would be available for the 1989 meeting. He suggested that although the membership of the Group was already wide, it could be wider e.g. to include Scottish Institutes and to include NERC Institutes and Laboratories; the meeting agreed that AFRC should not be included in the name of the Group.

### 15 NEXT MEETING

Rothamsted Experimental Station, Dept. of Crop Production offered to host the 1989 meeting of the Group on Thursday 14 September.

L. D. Incoll  
Recorder  
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LIST OF PARTICIPANTS  
CE USERS GROUP MEETING, 1988  
AT THE DEPARTMENT OF PURE AND APPLIED BIOLOGY  
UNIVERSITY OF LEEDS

R. Abrahams	IHR (Glasshouse Crops), Littlehampton
P. Blackman	Shell Biosciences, Sittingbourne
S.H. Crothers	Northern Ireland Dept. of Agriculture
G.E. Crowhurst	IHR(NVRS), Wellesbourne
D. Dickinson	Reading University
D. Edwards	UC Wales, Aberystwyth
J. Franklin	IACR, Rothamsted Experimental Station
C.C. Hole	IHR(NVRS), Wellesbourne
R.F. Hughes	IACR, Long Ashton Research Station
R. Hunt	NERC UCPE, Sheffield University
A. Kendall	IACR, Rothamsted Experimental Station
A. Larke	John Innes Institute
A. Morgan	IHR(NVRS), Wellesbourne
A. Nicholls	John Innes Institute
I. Pearman	IACR, Rothamsted Experimental Station
R.E. Randall	IHR(Glasshouse Crops), Littlehampton
J. Ross	IHR{Glasshouse Crops), Littlehampton
F. Sutton	NERC UCPE, Sheffield University
J. Toler	Welsh Plant Breeding Sta., Aberystwyth
B.A. Williams	Animal and Grassland Res. Inst., Hurley
T.E. Williams	Welsh Plant Breeding Sta., Aberystwyth
L.D. Incoll	University of Leeds
J. Oughton	University of Leeds
P. Scholefield	University of Leeds
A.J. Smith	University of Leeds