

MINUTES OF THE 1987 MEETING OF THE AFRC CE USERS GROUP

A meeting of the AFRC CE Users Group was held on Thursday 24 September at the University of Reading, Plant Environment Laboratory (P.E.L.).

Chairman : R.J.Summerfield

Professor E.H.Roberts (Director of P.E.L.) welcomed participants to the University and the P.E.L. He described recent and proposed changes at Shinfield Grange, expressed his best wishes for a successful and productive meeting, and apologised for not being able to remain and to participate in the Group's discussions.

1. MINUTES OF THE LAST MEETING.

The Minutes of the 1986 meeting held at the Institute of Horticultural Research, Wellesbourne, were approved.

2. MATTERS ARISING.

There were no matters arising from the minutes.

3. MANAGEMENT, STAFFING AND RUNNING COSTS.

Dr Summerfield (P.E.L.) outlined the management and staffing of the P.E.L. for the benefit of those who had not visited before, and because the Laboratory was funded almost exclusively from sources outside the University. He highlighted the fact that since the Laboratory was engaged on contract research, it was possible to arrange and plan for a shut-down of the physical plant during mid-winter (when the cost of electricity is most expensive) not only to carry out preventive maintenance but also to give time to prepare data for publication.

He pointed out that sponsors had to accept the fact that a period of maintenance would be included in the time for which they were hiring the facilities, since we could not pass on the cost of maintenance to a future sponsor.

The meeting was asked at this point if preventive maintenance was a widespread policy, or was maintenance usually only possible during management breaks?

Mr Hole (Littlehampton), stated that preventive maintenance was policy with regard to their C.E. facilities, as it was at the P.E.L.

A.N.Other (Littlehampton), interjected by pointing out the fact that although it was possible to undertake preventive maintenance on a large proportion of the electro-mechanical plant, this was not possible on items such as computers (i.e. that it was necessary to replace the computer as a unit whenever a fault arose).

R.Cox (Littlehampton), then asked what were the running costs per Cabinet at the P.E.L.? Dr Summerfield explained that we did not cost a Growth Cabinet as a separate item. The costs could vary due to factors such as time of year used, the temperature regime/irradiance/photoperiod used and the "unknown factor" in all experiments, i.e. how long the experiment would run: P.E.L. was "hired-out" as a package of C.E. facilities - devoted usually to no more than two, and often a single, research project.

He stated that 65% of the running costs went on emoluments. The costings were based now on the history of a long experience of previous experiments, where detailed records of costs of items such as Electricity, Oil, Materials (and including items such as Postage) and Travel were known and could be checked. Then, new estimates would be prepared after assessing previous costs plus an element for inflation - based on Government figures. It would be possible to give an estimate of a cost equivalent to a "Cabinet day", but it was pointed out that this should include every item, even the smallest, e.g. pencils and Biro's, to give an accurate estimate for the customer.

Because of the increasing pressure to take on contract work, the Group discussed whether a form of insurance should be taken out, to ensure that in the event of a major breakdown of or damage to the facilities, at least the cost of renewing the experiment for the client was met, if not the time lost. The general feeling was that it would be a good idea for individuals to make enquiries regarding insuring against the loss of a contractual experiment.

4. MAINTENANCE, SERVICING AND SPARES.

John Abbott (Long Ashton), reported that their six Fisons 2340 Cabinets were originally fitted with alloy door hinges. However, one door had fallen off, due to hinge fracture. Fisons "seem" to have accepted some form of responsibility; they are replacing the hinges, with heavy-duty steel ones, without charge. However, it was pointed out that the youngest cabinets were six years old (i.e. out of guarantee). A similar problem was also reported from W.P.B.S. where the cabinet had to be redrilled to take the new hinges.

It was reported that the flat terminal blocks on the "Saxcil" cabinets were causing problems at Littlehampton and that staff were concerned both with replacing the blocks and separating-out the low from the high voltage, within the current terminal blocks.

The main problem was due to an insulation failure.

The Welsh Plant Breeding Station have recently had two Saxcil cabinets completely refurbished for work on Nitrogen Fixation experiments at the cost of £15,000 each. Details of specification with photographs are available from:-

T.E.WILLIAMS
Welsh Plant Breeding Station
Plas Gogerddan
Nr,Aberystwyth
Dyfed SY23 3EB

P.Tyson (Long Ashton), reported taking delivery of a Fisons 2340 Cabinet and that the rate of cooling was not acceptable; this was being rectified.

It was reported that Long Ashton now has 20 growth cabinets and 12 growing rooms of various sizes.

5.NEW EQUIPMENT.

Mr Randall (Littlehampton), reported that the Swedish Company "Votsch" was entering the market again with new Growth Cabinets. He had no further details.

6.MICROPROCESSOR (mP) CONTROL.

The system comprising individual mP Controllers on each cabinet and a B.B.C. P.C. which is used to down-load programmes to each cabinet and to collect data. was not yet fully operational at the P.E.L., although it was now operating in a monitoring mode. [Since the meeting this system has been used in a control mode, and we have been ramping temperature and lights]. It was also explained that our progress had been slow to fully ensure that the system could operate in both the digital and analogue mode again (using the existing controls), should any fault develop on any part of the mP hardware. Reliability is essential in customer - contract research.

A demonstration of the P.E.L.mP system was arranged during an afternoon tour. The demonstration also included the control by the same system of a Thermal-Gradient Plate. This system is also used to control and monitor glasshouse environments elsewhere at Reading University (Dr A.Murdoch).

On the subject of mP controllers on cabinets, it was stressed by D.Dickinson (P.E.L.), that the development of custom-built systems using "in-house" labour could take considerable time. Mr Randall (Littlehampton), then told the meeting that "Veiss" had no spares on items such as PRINTED CIRCUIT BOARDS for the controllers on their cabinets. This means that these users will either have to spend much more time maintaining these

digital controllers than with the past generation of analogue controllers, or expand their "Stonefield" system or spend considerable capital in order to purchase fourteen new controllers. This state of affairs has arisen due to the rapid rate at which computers and controllers now become obsolete. One comment made was: "Saxcil cabinets have lasted twenty years, but the present generation of computers have a very short life".

However, there was a feeling of general agreement that a system based on separate mP controllers for individual cabinets was the best strategy.

6. AUTOMATIC IRRIGATION.

Experience among the Group was that most automatic irrigation systems (either standard drip or flow types) were usually too large for controlled environments or small glasshouses, because they had been designed for commercial scale operations. Details of the system used in the P.E.L. glasshouse can be found in Laboratory Practice Vol.31, 728-732 (1982).

7. INSTRUMENTATION AND SENSORS.

Mr Cox (Littlehampton), reported that they had installed a self-regulating heating tape in the humidity trough (adjacent to the return air opening in Saxcil cabinets) to help produce higher humidities, when used in conjunction with their original wet-wick system.

It was possible to achieve 96% r/h with a dry-bulb temperature of 18-20°C.

They had also been successful with bubbling air through the water in the troughs, but since this method needed air lines it was easier to install the heating tape.

The humidity calibration facility at Littlehampton (reported at the last meeting) was now in operation. It has been found that the most expensive probes were no better than the cheaper ones (when considering hysteresis, there was still a 3-5% difference when cycling from high to low to high humidity).

A.N Other (Littlehampton), reported that they have a new CO2 analyser on test which should be of interest to those employing mP control. The complete item cost approximately £800.00 but it was possible to purchase the detector and a board that would accept B.B.C. Basic for £400.00. The system is said to be very sensitive. For details:-

International Gas Detectors Ltd
Sandbeck Way
Weatherby
West Yorks

The summary of a test report (not for Publication) produced at (Littlehampton) on the above detector states :-
"The unit performed well within the specification laid down by the manufacturers and with its BBC computer interface should combine with any system".

It was pointed out by Prof. Moorby that Ted Boarman (Silsoe) had carried out research on using an Infra Red method of measuring moisture in soil, which may have an application to Humidity measurement.

Late news - via Roy Randall, is that A.D.C. has produced a model WA456 Solid State Mini CO₂ Detector with a claimed accuracy of 2%, over the range 0-10% CO₂; the size of the detector for this range is 25 x 25 x 75 mm and its associated amplifier (on the end of a Flying lead) is 140 x 65 mm. However, it is possible to provide a range of 0-1% CO₂ by increasing the length of the detector ten times.

The standard detector is non linear and costs approx. £600. However, output can be linearized. Input is +/- 15 V at 30 mA and Output 0-10 V.

For more information :-

A.D.C
Pindar Road
Hoddeston
Harts EN1 0AQ Tel. 0992-469638

7. PLANT GROWTH PROBLEMS.

Participants from Wye reported that while refurbishing some of their growing rooms to a limited budget they had repainted the walls using Vinyl paint. It was found on testing the rooms later that sensitive plants (e.g. tomato and cabbage) showed signs of damage within a few days, and were dead within the week. The paint used was "SIGMA Brilliant White Vinyl Silk". It is thought that the constituent "Texanol" is the cause of the problem; this constituent is not, however, present in the Matt paint. The general feeling of the meeting was that caution was essential whenever paints, adhesives and plastics are used in controlled environments. Always test for phytotoxicity in preliminary trials.

Professor Moorby (Wye), also cautioned that contamination was possible via the water system per se, leaving aside the potential problems from the materials the water delivery system was constructed of.

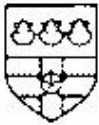
8. ANY OTHER BUSINESS.

Participants were asked for their opinions on the 25mm fluorescent lamps that some users were now installing in place of the original larger diameter lamps. Most users were satisfied with the new lamps, but workers at Rothamsted, it seems, are querying the specification of lamps with the manufacturers. Unfortunately, no representative was available to comment. D. Dickinson (P.E.L.), reported that "Thorn" now indicated on the lamp boxes that their 25mm x 65 watt lamps could be used on 80 watt control gear.

9. TIME AND PLACE OF NEXT MEETING.

D. Dickinson asked if we might hold the next meeting at LEEDS UNIVERSITY; the Group had not previously met there. Colleagues at Leeds University have now agreed to host the next meeting (which may be opportune since it may be the last chance to see their facilities before reorganisation takes place). Date to be announced.

Dr Summerfield thanked all participants for their contributions to a very enjoyable and informative meeting. P.E.L. staff had organised a buffet-lunch and all were welcome to tour P.E.L. facilities that afternoon. "External funds" permitting, we hope to see you at Reading again.



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LIST OF PARTICIPANTS

AFRC CE USERS GROUP MEETING, 1987
AT THE PLANT ENVIRONMENT LABORATORY
UNIVERSITY OF READING

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R. COX	IHR LITTLEHAMPTON
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