The Mushroom Journal

JULY 1987
Number 175
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Official Journal of the Mushroom Growers' Association

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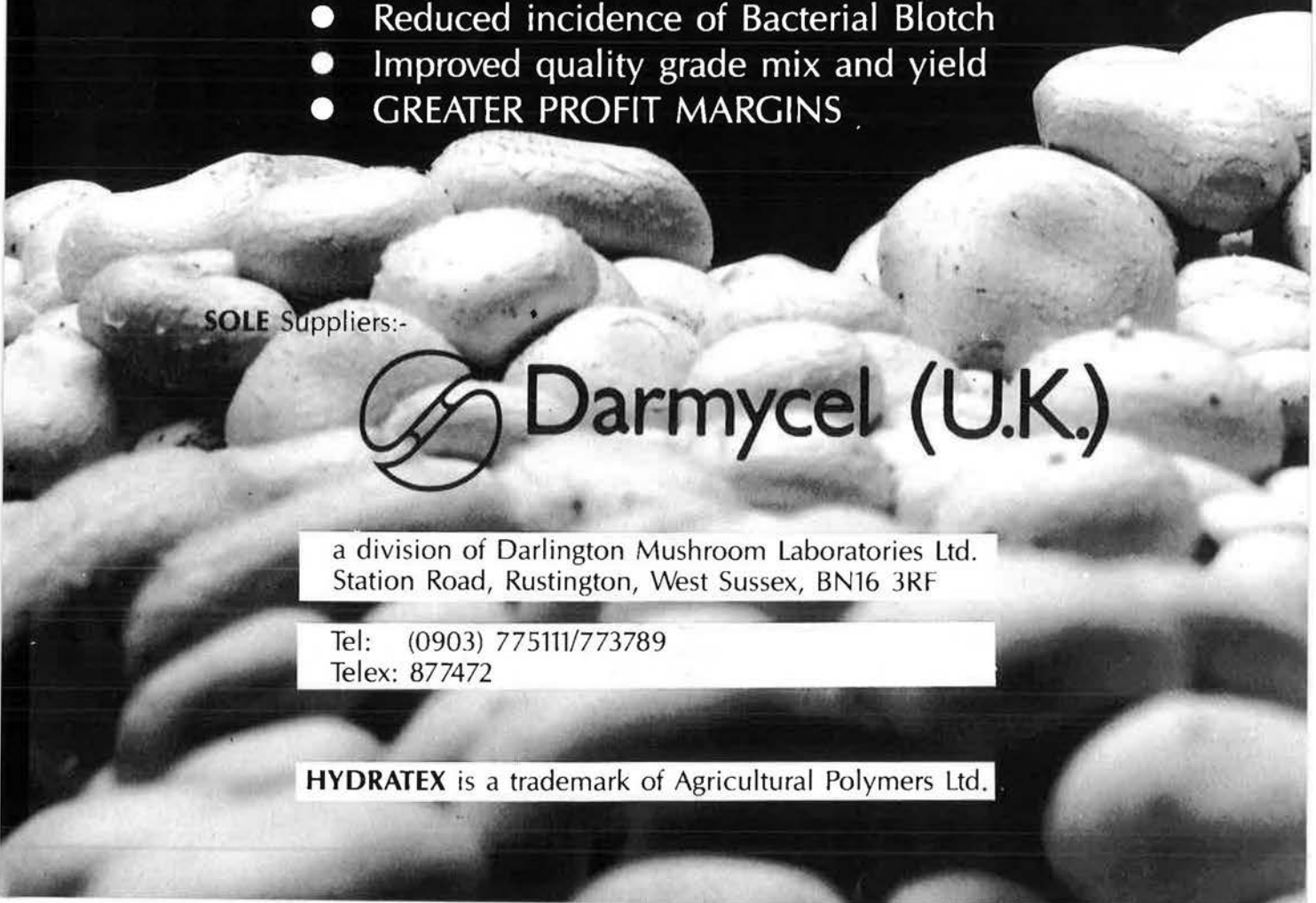

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The Mushroom Journal

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Articles submitted for inclusion in the Journal *are always welcome. Whilst the Editor cannot undertake to publish all the copy received, submissions will be acknowledged. Originals, wherever possible, will be returned to the contributor, who will also be notified as to if and when the article will appear.*

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KEITH WILLOUGHBY

Internationalism . . . home and abroad

The small team of MGA staff is once more complete. Nicky Bone was with us only a short while before deciding she wished to leave secretarial work to start a career on the stage. Orla Mongey joined us this month to take over from her the task of Advertisement Secretary.

She comes to us from Ireland, and as Sharon Brook has similarly settled here from New Zealand, we are developing something of an international flavour within the MGA office. The UK half is maintained with Sarah Watson who comes to us from Hempstead, near Gillingham in Kent. This is the home county also of our new PRO — Lucy Unwin. Lucy is a doctor's daughter from Canterbury but currently lives in London. She came to us following a career teaching with Prue Leith and publishing with *Cordon Bleu*. They all look forward to playing their part in providing an ever improving service to members.

The International aspect of the MGA was further featured last month with visits to Ireland and Italy.

Organised from this office, 51 UK growers spent a very interesting and enjoyable few days as guests of the Irish industry. Darmycel arranged a study tour for a similar number of UK growers to Northern Italy. This took in the Tecno-Mico exhibition in Verona where the MGA took a stand. Both of these events are written up elsewhere in the *Journal*.

Back at home, the main event has been the meeting of the R & D Committee. This covered a wide area of interests from the latest position regarding new legislation for pesticides, to definitions of organic mushrooms. Staff from ADAS and the IHR reported on current activities, and substantial discussion took place on the nature of future research most needed by the industry. This will guide the working party in their scheduled meeting with Professor Bell next month. Bearing in mind that the Dutch have a long established research programme and that the Irish Research establishment benefits from a levy on all compost supplied to growers deducted at source, there is clearly a need for the UK industry to ensure its own facilities are properly established.

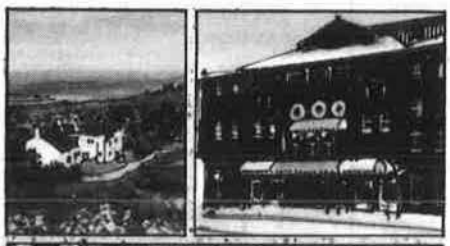
Left to right: meet Orla, Lucy, Sarah and Sharon.

Conference Report

by **Sarah Watson**

Golden Valley Thistle Hotel, Cheltenham
7th to 9th October, 1987

Cheltenham lies on a shelf between the highest of the Cotswold Hills, and the Severn Vale. It is renowned for its elegant floral gardens, rivalling Bath as a Garden City and for its splendid architecture. Many fine Regency buildings remain to remind us of that period. If its background is historical, the town is now lively with festivals and cultural events. You can visit the Pitville Pump Rooms and taste the waters, or admire the architecture along the Promenade and Montpellier Walk. There is also the Cheltenham Museum and Art Gallery, as well as the Gustav Holst Birthplace Museum.



During our conference, the Cheltenham Festival of Literature takes place from 4th to 18th October and if you like the horses, horseracing at Prestbury Park is on 7th and 8th October.

To register as a delegate, please fill in the form enclosed in this month's *Journal* and return it to the MGA office as quickly as possible.

If you have not already booked your accommodation with the Golden Valley Thistle Hotel, you should do this now. Even though we have taken over the whole hotel, they are getting full already. Contact the Golden Valley Hotel with your booking and if they cannot fit you in they will book you into the Crest Hotel, which is only a 10 minute drive away, where we also have a block booking. The bed and breakfast rates for the Golden Valley Hotel are £49.75 per person in a single room and £59.75 per night for a twin room. The Crest Hotel rates at £50.00 for a single and £65.00 for a twin, are a little higher. The address and telephone number is The Golden Valley Thistle Hotel, Gloucester Road, Cheltenham GL51 0TS. Telephone: 0242 36291. Telex: 43410.

The programme has been finalised and is printed alongside.

The ladies outing will take place on the Friday morning leaving at 10.00am. A separate article on this appears below. As last year, there will be a golf competition on the Wednesday. Unfortunately, we could not find a suitable venue for the clay pigeon shoot. Final details, including costs and how to order tickets, will be given in next month's *Journal*.

Ladies outing

No doubt the highlight for many ladies who attend our Annual Conferences is the ladies outing. This year will be no exception — we have arranged a full days tour to include the most interesting sights and beautiful scenery in and around Cheltenham. Participants will explore some of England's finest culture, history and heritage. The highspots of the day will include calling in at the stately home of Wormington Grange and the manor house of Kingham House.

The tour will be on Friday, 9th October, with ladies being picked up from the Golden Valley Thistle Hotel.

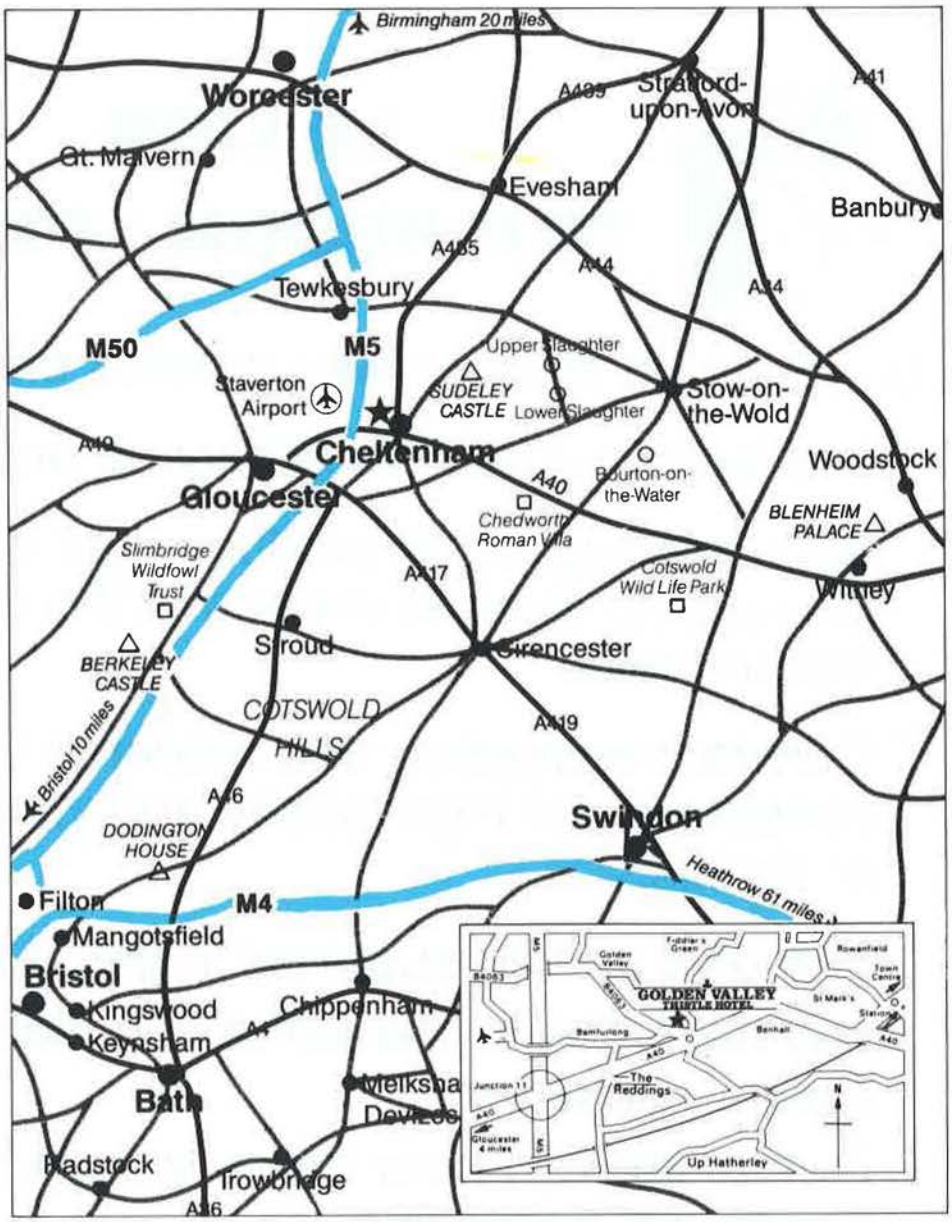
10.00am
Guests will be collected in a luxury continental coach, and with the services of our hostess/guide the party will be driven through Cheltenham with the history of the town being explained.

Programme

Wednesday, 7th October, 1987
13.00-17.30 Golf competition.
14.30-20.00 Registration in foyer of hotel.
19.00-20.00 Chairman's private reception.
Evening Free.

Thursday, 8th October, 1987
08.15-09.00 Registration in foyer of hotel.
09.00-09.15 Chairman's opening address
09.15-10.05 Speaker: Mr. Mike Allison, Divisional Director, Asda.
10.05-10.55 Speaker: Mr. Jim Dicks, Tongaat Mushrooms, South Africa.
10.55-11.15 Coffee.
11.15-12.05 Speaker: To be confirmed.
12.05-12.55 Sinden Award session.
13.00-14.30 Buffet luncheon.
14.30-18.30 Farm walk at Aylesbury Mushrooms Ltd., Black Bourton, Oxon.
Evening Free.

Friday, 9th October, 1987
10.00-15.30 Ladies outing.
09.15-10.05 Speaker: Dr. Murray O'Neil, Highline Produce Ltd., Canada.
10.05-10.55 Speaker: Dr. David Seaby of Agriculture, Food Science Centre, Belfast.
10.55-11.15 Coffee.
11.15-12.55 Joint session by ADAS and GCRI representatives.
13.00-14.30 Buffet luncheon.
Afternoon Free.
19.00-20.00 Banquet reception.
20.00-24.00 Banquet.



How to get there

They will then travel through the glorious Cotswold countryside passing through Stanton and Stanway, two of the least known, yet prettiest villages of the area.

10.30am
Arrive at Wormington Grange near Broadway, the small stately home of Colonel and the Honourable Mrs. Michael Evetts. Mrs. Evetts is the daughter of the late General Lord Ismay who was Churchill's Chief of Staff and Secretary General of NATO. A fascinating collection of Churchill and Ismay memorabilia can be seen including Christmas cards from Clemmie, Dickie and Edwina, Mamie and Ike, Douglas Fairbanks junior, the Greek and British Royal Families. An original Churchill painting is on display as well as Mrs. Evetts' parents Coronation Robes, and perhaps best of all are private letters from the Queen to Lady Ismay in her own hand. Your main hostess will be Mrs. Caroline Evetts, and Albert Hodges, the family butler, will serve coffee and homemade biscuits.

11.15am
Leave Wormington Grange, and drive through the famous village of Broadway, and then to Chipping Campden which is one of the best known "woollen" towns of the area. A history of the Cotswolds will be explained and interesting buildings pointed out. The party will then continue to Broad Campden, Blockley, Stow on the Wold and finally to Kingham.

12.45pm
Arrive at Kingham House, the Georgian manor house home of Mr. and Mrs. Grenville Collins. He is an art dealer and his wife, Sue, is a member of the Sitwell family. She is a renowned Cordon Bleu cook and interior designer, as her delicious food and beautiful home reflect. The house is filled with fine works of art and antiques, and a visit here for a light buffet lunch complete with sherry and wine, should be the highspot of the day.

2.00pm
The party will then drive back to Cheltenham, passing through Lower Slaughter which is a most attractive village where the River Windrush meanders through its main street.

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EXPORT ENQUIRIES WELCOME

Summer POS kit launched

Mushroom consumption still shows good volume growth. The UK mushroom market has grown by 20% in value in the last year, compared with 15% for all vegetables and 7% for all fresh foods.

Penetration levels are growing. 45.9% UK households purchased mushrooms in March, an increase of 2.3% year on year. This represents 9.2m households purchasing compared with 8.7m a year ago. Mushroom consumption is now 5lb per head per annum.

The Mushroom Growers' Association continues its national PR and promotional support this summer with major mushroom salad and cookery features in womens magazines, promotion and sales of the Mushroom Cookbook, a strong programme of activity in schools and colleges throughout Great Britain, and extensive promotion of recipe leaflets to housewives.

Requests for the POS kits should be sent to the MGA Office, or telephone the 24-hour answering service on 01-235 0732.

Journal — extra

If you would like extra copies of the *Journal*, they are available at a special price to members of one pound per copy (UK rate). Details from MGA Office.

Advertising opportunities

Turn that redundant machinery or growing equipment into cash — put a small ad in the *Journal*.

Something that's no use to your business any more may be just what another grower is looking for.

Contact MGA Office for details and rates.

New members

Welcome to this month's crop of new members. From the UK we welcome **P. McCormack** and **J. Rimmer** and **Nivako Services**. From further afield welcome to **Dr. D. C. O'Donaghue-Maguire** of Eire, **Chemicals Bra SNC** from Italy, **Upali Morogemant Services** of Sri Lanka and **Centrala Kolportazu Wydawnictw** from Poland.

Diary dates

1987

September 20-27. 12th International Congress, Braunschweig, West Germany.

October 7-9. MGA Annual Conference, Thistle Hotel, Cheltenham.

October 28-31. Australian National Mushroom Industry Conference — Ramada Hotel, Surfer's Paradise, Queensland.

1988

March 6. North American Mushroom Conference, New Orleans, Louisiana.

Irish Study Tour

18th to 20th May, 1987

With a limit of just over 50 places, this tour was oversubscribed and some members were therefore unfortunately unable to participate in what proved to be a very enjoyable and informative visit.

Of those who did, some chose to arrive early, enjoying the benefits of special reduced rates to spend the weekend in Ireland. The official programme, however, started on Monday with the early arrivals being collected from Jury's Hotel to meet up with those arriving mid morning at Dublin airport.

Marlfield House, Courtown.

A drive south, skirting the Wicklow Hills, brought both parties to the delightful Marlfield House Hotel for a pre-tour lunch. This mansion built around 1850 originally as a dower house of the Courtown Estate, became in later years the residence of the Earl of Courtown. After an excellent lunch, the

A top quality lunch to start the tour at Marlfield House.

programme continued with a tour of the Pat Walsh Mushroom operation in and around Gorey.

This business began in 1980 by introducing the system of small scale growers being supplied with spawned compost from a central compost yard. By also offering a marketing service for the mushrooms then produced, this combined package of compost and marketing has now become known as the "satellite bag system".

Pat Walsh welcomes members to Marlfield House.

Having started with one pasteurising tunnel only and a limited size compost shed, the company has grown over the years at a remarkable pace. The compost shed has been extended, new pasteurising tunnels installed, and in 1985 the purchase of the TPQ tray farm in Gorey brought with it a brand new pack house. In this has been installed a vacuum cooler and whilst the TPQ compost and bulk pasteurising facilities have been continued, their old tray system has been converted to individual growing houses on the bag system, leased out to local growers.

The bulk pasteurising rooms are built on the basis of a concrete pit, to retain the compost, with a slatted concrete floor. A polythene superstructure has proved most effective in allowing expansion or contraction during the process without cracking and the subsequent loss of insulation previously experienced with brick built rooms.

600 tonnes of compost is manufactured each week which equals 400 tonnes of spawned compost. The raw materials of straw, horse and poultry manure are collected by the company-owned fleet of vehicles. A typical schedule involves:

Monday: break out straw and wetted with run off, 450-500kg of chicken manure per tonne of straw.
Thursday: horse manure broken out — straw turned
Saturday: straw turned
Tuesday: mix straw and horse manure
Thursday: stack
Saturday: turn, add 25kg of gypsum per tonne
Monday: turn
Tuesday: fill

Inside the covered compost area at Gorey.

10 plastic pasteurising tunnels (two double tunnels) take 60 tonnes each on a floor surface 60 × 13 feet with 10%

openings in the floor. The compost is filled about two metres high by means of a Hoving filling line. The whole tunnel process is controlled by a Gicom computer. Moisture content is at 72-74% with a pH of 8 at filling. Temperatures are levelled for 8-10 hours before being raised to 56.5°C inlet air temperature giving 58-60°C in the compost. Pasteurising takes eight hours. Conditioning takes place over 3½-4 days with an air inlet temperature of 45°C and compost temperature of 47-49°C. Normally the compost is ready for spawning within six days. The tunnels are emptied with a Bobcat skid loader using a grab type implement to take the compost from the tunnels to the hopper in the bagging shed.

A Lochon bagging machine with two bagging heads, fills 75kg of spawned compost per bag (12 tonnes per hour). Hybrid spawn is used, the strain being at individual growers request. This is added at the rate of 7½ litres per tonne of compost, with supplementation being done at customers request only. As most satellite farms are three-house units, a load every month of 20 tonnes (850 bags) is normal. Each load of compost has a sample taken and sent to Kinsealy Research Station for analysis.

The covered composting area at Gorey.

A further 180 tonnes of green compost (120 tonnes spawned equivalent) are also manufactured each week at the old TQP plant. Here, two plastic tunnels are filled by means of a Thilot filling line.

About a third of this compost is delivered to the 27 growing houses on site. These were converted from the old tray houses and are leased to five growers, each being responsible for his particular unit.

Having started with seven growers and some additional sales of green compost, the Walsh operation continues to sell about half of its compost to growers who handle their own marketing, but the other half is for growers within the satellite system. Currently this covers the equivalent of 55 three-house units which have their compost delivered and mushrooms collected for central marketing.

Three-house units are built to an ACOT specification for a capital cost of around £30,000. A typical financial structure for this would be £14,000 loan, £7,500 owner contribution and £7,500 government grant. This reflects the 25% capital grant that has from time to time been available. Additionally the central composting unit has been able to benefit from Industrial Development grants which, where incremental jobs have been created, has been as high as 45% but more recently at a lower level of 35%.

Straw being delivered in one of the P. A. Walsh vehicles.

A Lochon bagging machine in operation.

A satellite grower such as was visited, would fill 20 tonnes of spawned and bagged compost into each house monthly, aiming to produce between 8,000 and 11,000lb of mushrooms per month. A typical house will contain 1,200 bags laid out in rows of 2-, 3-, 3-,

Bagged spawned compost being loaded for distribution.

Graded mushroom ready for the vacuum cooler.

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2-, sometimes with a superstructure carrying a double row of 3- 3 bags over the centre. Whilst these sheds have no cooling facility, there are rarely over-hot days and the amount of airspace helps prevent excessive temperature build up. Some growers fill less compost in the summer months.

John Fogarty — a typical Satellite grower — six unit farm.

Packed in 5lb plastic chips, mushrooms are stacked on trollies in the growers' cold room until collected, six days a week by refrigerated vehicles. After arrival at the pack house in Gorey, the mushrooms are checked to ensure they are weighed and graded properly. They are then vacuum cooled and moved either into a holding cold room or directly into a refrigerated lorry. Each day's production is despatched to catch an 8.00pm boat in order to service markets in UK the following morning.

On the second day of this tour, Bord na Mona took over. Leaving the hotel at 8.00am, we arrived some hour and a half later at the Coolnamona Moss Peat works in Portlaoise.

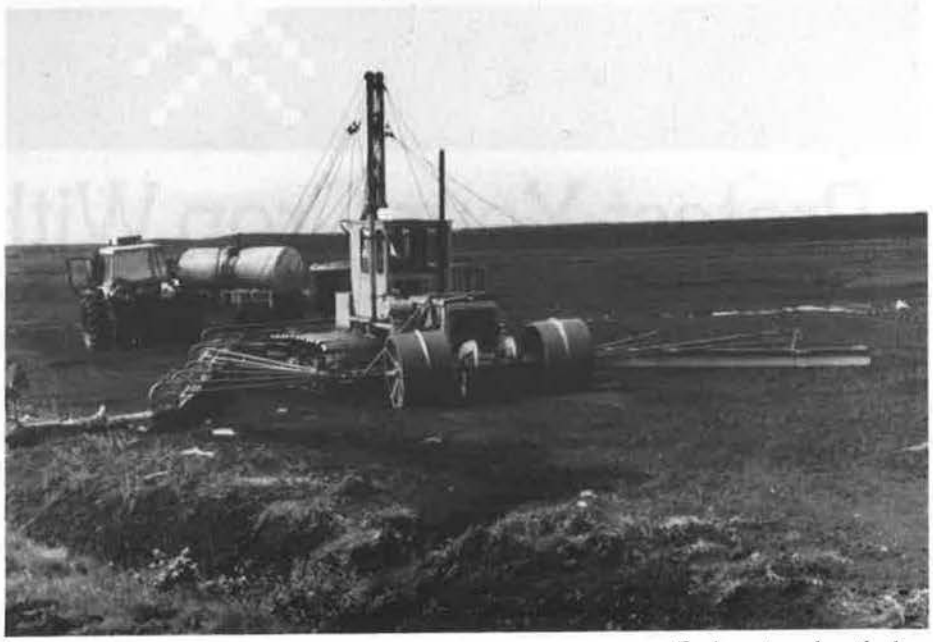
During a trip around a major bog, by the light railway normally used to bring in the peat, inspection of the processing and packaging plant and over lunch, there was ample opportunity to hear all about the Irish Peat Development Authority.

Although moss peat has been produced for centuries and state development of the bogs began in a small way in 1933, Bord na Mona was set up by Act of Parliament in 1946. It operates on a commercial basis, receiving no subsidies or tarif protection, with capital derived from interest-bearing loans, all repayable in full.

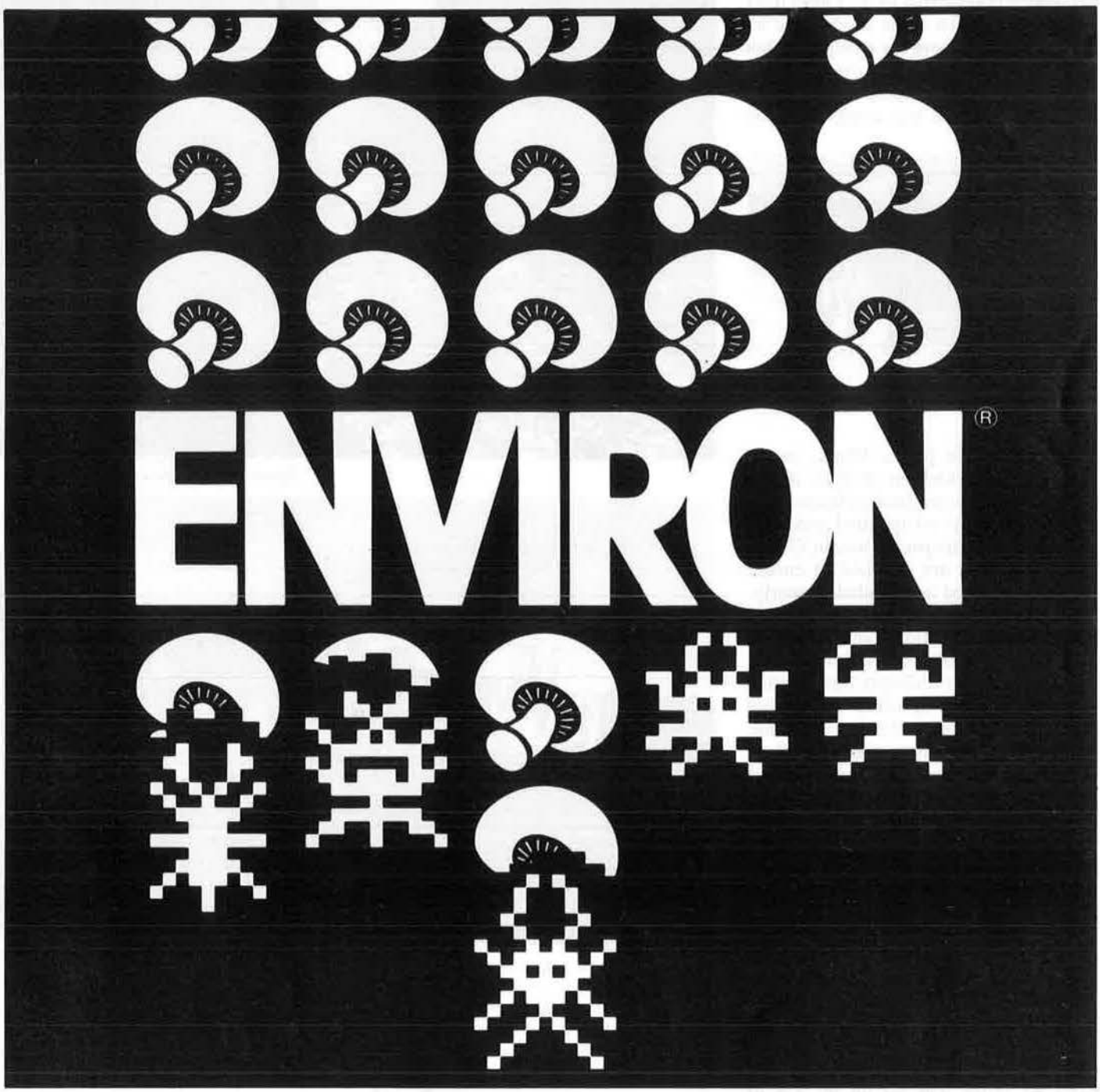
Inside the vacuum cooler in P. A. Walsh pack house.

Typical layout inside a bag growing house.

A temporary "lock-in" for one carriage load on the light railway.



Equipment used on the bog.



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Peter Cracknell and Adrian Sampson before the finished products.

Since its creation. Bord na Mona has developed more than 200,000 acres of bog land and now employs 7,000 people in 23 different locations. Five million tonnes of peat are marketed each year and one sixth of Ireland's electricity is generated from peat.

The great bogs of Ireland began at the end of the second ice age from dead vegetation decaying under water. After centuries, the build up of decayed matter

Inspecting the peat.

reaches a point when the layer of peat breaks the surface of the water and then goes on spreading upwards and outwards carrying with it, a top layer of living vegetation.

The depth of such bogs, on which the modern peat industry is now based, averages about six metres. At the top is young peat with a loose open structure moving down through the layers to the dark, dense black peat at the very bottom. At all levels, raw peat contains

The group discussion spawned compost production methods.

an amazingly high proportion of water — about 95%. This represents one part solid to nineteen parts water. In order to work the peat, this moisture level has first to be reduced by comprehensive

Inside the peat processing plant at Coolnamona.

draining. Using machines whose weight is carefully spread over a wide area, drains are laid which over five to seven years, will reduce the moisture content to about 90%. At this level, the ratio is one part solid to only nine parts water. The bog is next levelled so that the peat produced can be air dried on the bog itself.

Milled peat, sometimes transformed into briquettes, and machine turf, are the forms in which peat is used as a fuel. Over half of Bord na Mona's output is

Discussing casing materials.

turned into energy in seven peat-fired power stations on the edges of the bogs.

In contrast to peat fuel, which is sold entirely within Ireland, 90% of horticultural peat is marketed world wide under the brand name of Shamrock Irish Moss Peat. The top layer of many Irish bogs consists mainly of sphagnum moss

One of Monaghan's Satellite growers.

whose spongy texture makes it an excellent soil conditioner, adding body to light soils or porosity to heavy ones. The cellular structure of this peat gives it a high absorption capacity of up to ten times its own dry weight of water.

For the mushroom industry, Bord na Mona are working with the Kinsealy Research establishment to develop a product that will most closely match the existing Dutch casing material.

The three days ended with a visit hosted by Ronnie Wilson to Monaghan Mushrooms. Along the drive from Dublin almost to the border of Northern Ireland, there was plenty of evidence of three unit growing operations dotted about the countryside. It was also interesting to note a large number of similar satellite turkey farms. Clearly the agricultural industry in Ireland has started to recognise the difficulties of continuing a dairy-based industry and is prepared to invest in disciplined and organised marketing approaches for alternative farming enterprise.

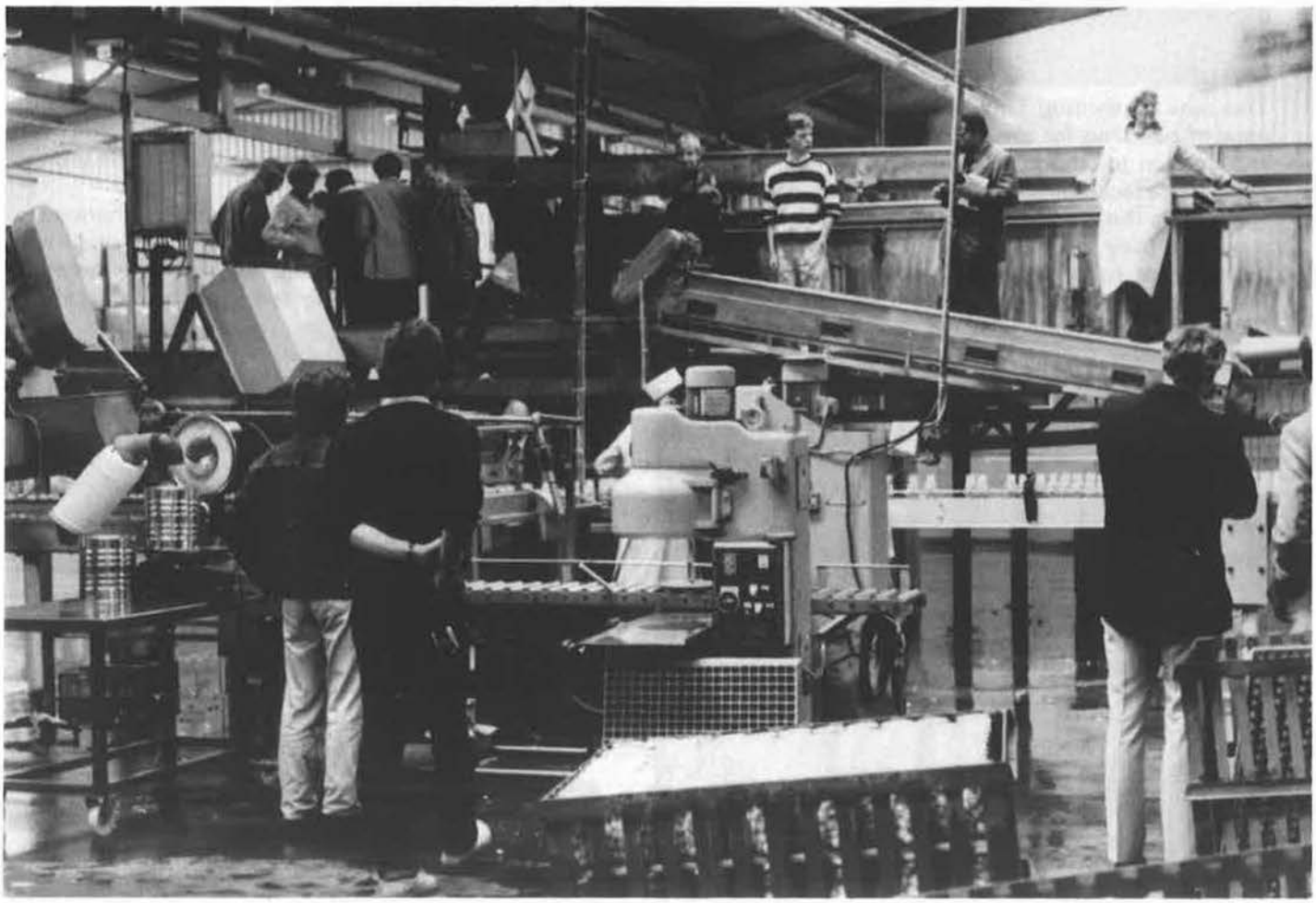
Monaghan work with 110 satellite growers. A central composting yard processes some 72-73 tonnes of wheat straw per day. Nine pasteurising tunnels open on to the bagging area where spawn is added and ready-spawned bags despatched to the satellite growers, all within a 40 mile semi-circle of the plant. All compost produced is synthetic and Phase 2.

Apart from being larger than Pat Walsh's operation, the principle difference lies in the fact that traditionally a third of production has gone into an on-site processing operation. With the declining market for canned and bottled mushrooms however, the earlier peaks of 100 tonnes per week have more recently been falling to a level of around 40 tonnes with more emphasis therefore being placed on the fresh mushroom market.

Cool storage rooms in the Monaghan pack house.

Once more however, the very informative time spent at Monaghan Mushrooms showed how efficiently the system of central composting and central marketing worked on behalf of all concerned.

Very sincere thanks are due to the three companies that between them created this successful Study Tour. It was also most generous of the Irish Mushroom Growers Association to provide a cocktail reception on the Tuesday evening and thereby an opportunity for all the participants to meet and talk with the Chairman and other members of our counterpart in Ireland.

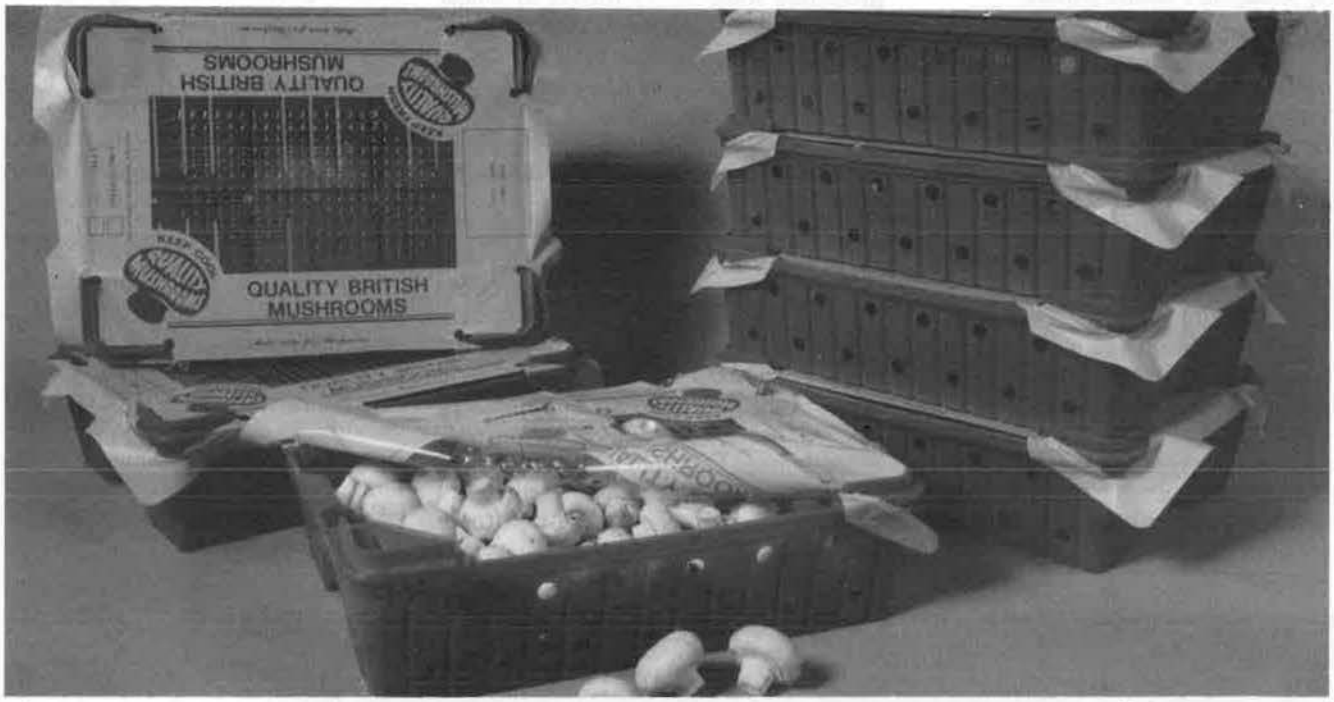


Inside the Monaghan canning and bottling plant.

LOOK

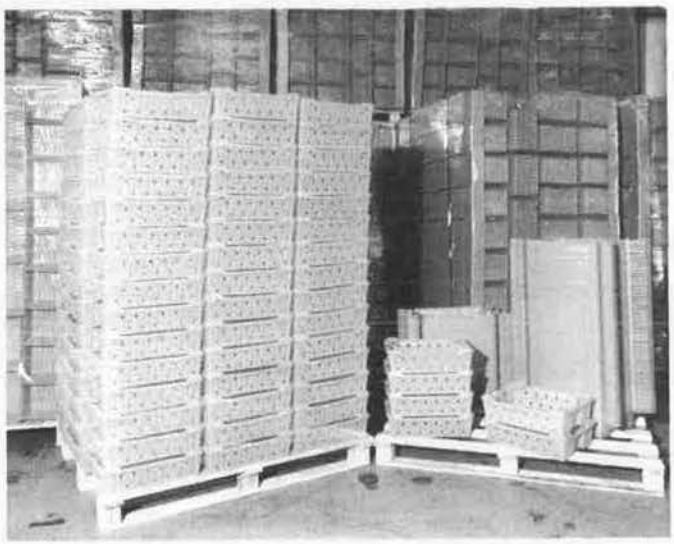
— New from TEMPODEW LTD —

One trip — Disposable 5lb or 6lb or 2½kg all Plastics Mushroom Tray with ventilated stretch film cover



This new Mushroom Tray has been designed to meet the requirement of good marketing of Mushrooms and ease of handling for the grower. The Trays are delivered in the nested form and by the simple operation of folding over four hinged corner flaps, that snap into position with a non return snap fastener, the Tray is then ready for stacking.

Not only is the presentation of the Mushrooms improved but the storage life of the produce is also enhanced providing they are kept in a cool store or fridge. The Trays are moulded in polypropylene and do not absorb moisture or harbour bacteria. The openwork on the sides and base give maximum ventilation thereby preventing "Sweating" of the Mushrooms and prolonging their life. It also allows chilled cooling to operate more efficiently by improving air flow around the Mushrooms.



The Tray size is 300 × 400 × 100mm and can be stacked 10 on a layer by 10 to 15 high, strapped or netted to produce a unit load that can be handled by fork lift truck. Of course they can be stacked loose in your van.

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Background issues for the Braunschweig Congress

by **W. A. (Fred) Hayes**

The stage is now set for the Twelfth International Congress on the Science and Cultivation of Edible Mushrooms, which will be held at Braunschweig, near Hannover, West Germany, from 20th to 26th September, 1987. It is now six years since the world's scientists, advisers and growers gathered in Sydney, Australia, for the eleventh congress and during this unusually long time interval between congresses, we have seen many major technological advances in production methods, together with an unabated continuation of world wide expansion of mushroom production.

In many countries there are clear signs of overproduction and the bleak prospect of having to contend with a so called 'mushroom mountain' is becoming a reality for some countries. Significant also in this respect, are the recent advances in the processing technology of mushrooms. For example, treatments which in a major way, reduce weight loss during canning and the almost inevitable acceptance of irradiation as a means of extending shelf life. Such technological innovations clearly must be matched by corresponding "quantum" increases in consumption in order to maintain the necessary stability in supply and demand.

Is it not time that the scientific and technological effort should give more emphasis to aspects which relate to the consumption and increased utilisation of mushrooms? A recent article by Dr. Jan Lelley "Edible mushrooms as a weapon against starvation" is both timely and relevant to this issue. Despite the startling and possibly overstated title, it correctly draws attention to the value of mushrooms as a food. The mushroom industry worldwide does not, in my view, sufficiently exploit the role of mushrooms in nutrition. Similarly, outlooks on the health-giving properties of mushrooms need to be emphasised and the Braunschweig congress once again, may reveal new findings which should give a further impetus to the projection of mushrooms as a health food.

The congress will meet in the wake of substantial "cut backs" in the funding of research and development work. This, it would appear, is a universal trend and the consequences have yet to be fully realised. It means that radical new approaches may be necessary to ensure that resources are more efficiently utilised for the benefit of cultivators and the progression of mushroom technology into the future. Within the general area of mushroom science there are, I am sure, many areas in which international understanding and collaboration could prove beneficial and fruitful.

Now to a less important issue, but one which I find a constant irritation and nuisance. It is not unusual to have disagreements among scientists, but the disagreement over the correctness of the name for the common cultivated mushroom, which accounts for three quarters of the world's production, deserves some attention by mushroom scientists and cultivators.

For about thirty years, the entirely appropriate name *Agaricus bisporus* has been universally used and accepted by all. Lately, the name *Agaricus brunnescens* has been adopted by some scientists. A name may be unimportant, but for those who report, write and communicate, the use of two such contrasting names creates much confusion and uncertainty, especially with the non-scientific, lay public.

It is worth noting that the hitherto accepted name, *A. bisporus* was agreed upon at an International Conference of Botanists in 1951 and is regarded as one of the historical landmarks, clarifying, what was before, a state of even more confusion, when four or more names were used for the cultivated species.

While I accept that there may be valid reasons for the correctness of both names, it would be in the interest of everyone to conform to one universally accepted name. It is not unreasonable to suggest that an International Congress of mushroom scientists and cultivators is perhaps the most appropriate group to agree on the use of one name or the other. At least we should be satisfied that there is sufficient justification in using both names for the one species.

The twelfth congress, like all previous congresses, promises to be yet another memorable and stimulating occasion. The formal proceedings cover subjects on virtually all aspects of mushroom cultivation, including contributions on mushroom farm management. There will be a large trade exhibition and visits to local West German mushroom farms and FAL, Biological Research Institute.

An international congress is much more than just another mushroom meeting — it is also a kind of festival. Dr. Klaus Grabbe and his organising committee have arranged for a number of interesting recreational tours, receptions and other events, to divert tired minds from the more serious aspects of growing and science. It is often said that these less formal gatherings are where the real work of a congress if done!

The ancient and picturesque town of Braunschweig with its magnificent modern Stadhalle, in which the congress proceedings and trade exhibition will be held, is another superb backcloth for staging this important event. It will provide the opportunity to update on the latest developments worldwide and benefit from the communication of new knowledge and opinions in comfortable and elegant surroundings. The unique atmosphere and friendships which are generated from such international gatherings, are not only immensely productive, but also are very enjoyable occasions.

Please note: It is not too late to register for attending the Congress. Late registration can be arranged with the:
Institute fur Bodenbiologie, Bundesforschungsanstalt fur Landwirtschaft (FAL), Bundesallee 50, D-3300 Braunschweig, West Germany.
Telephone: (0531) 596304 or telegram FAL — ISMS.

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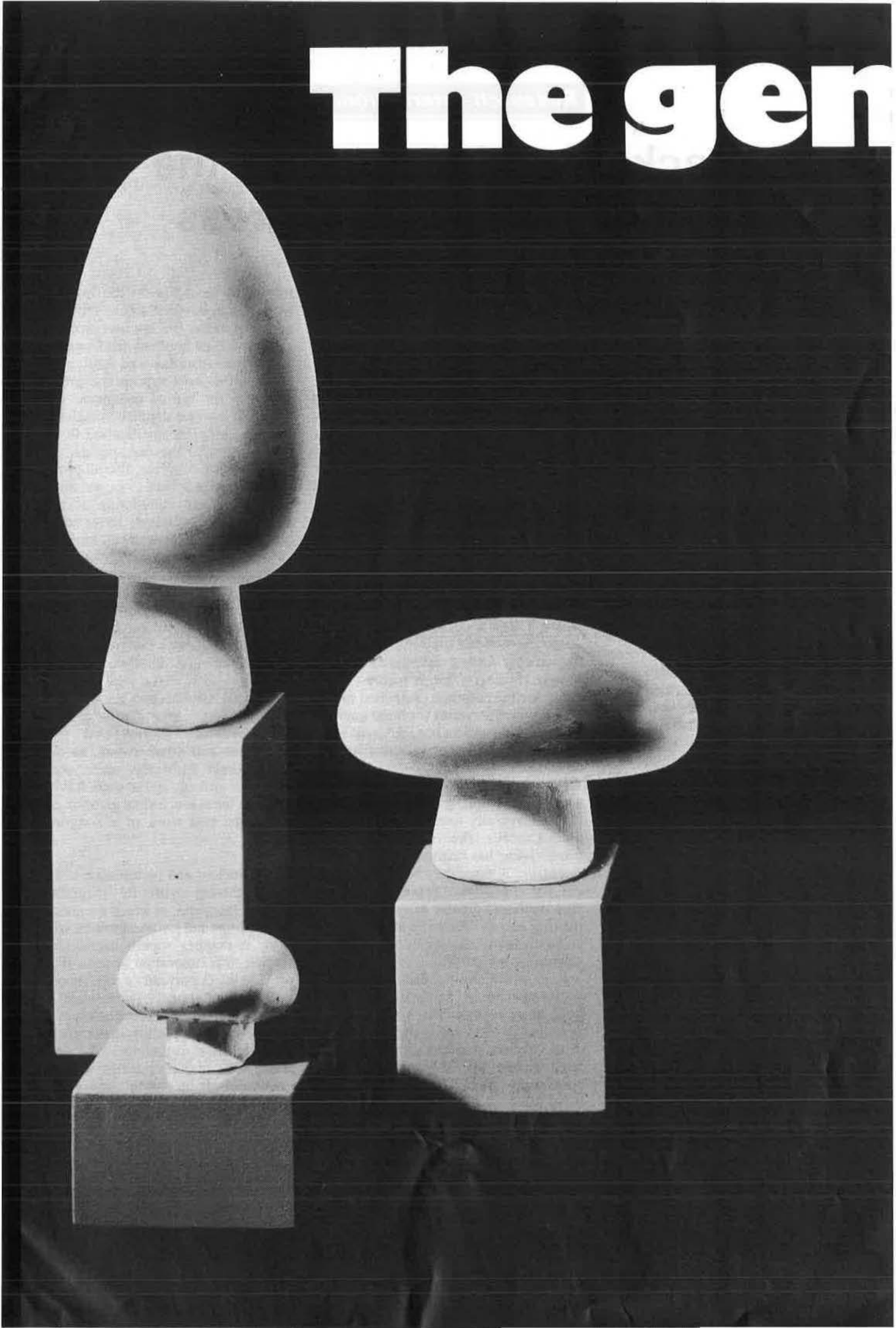

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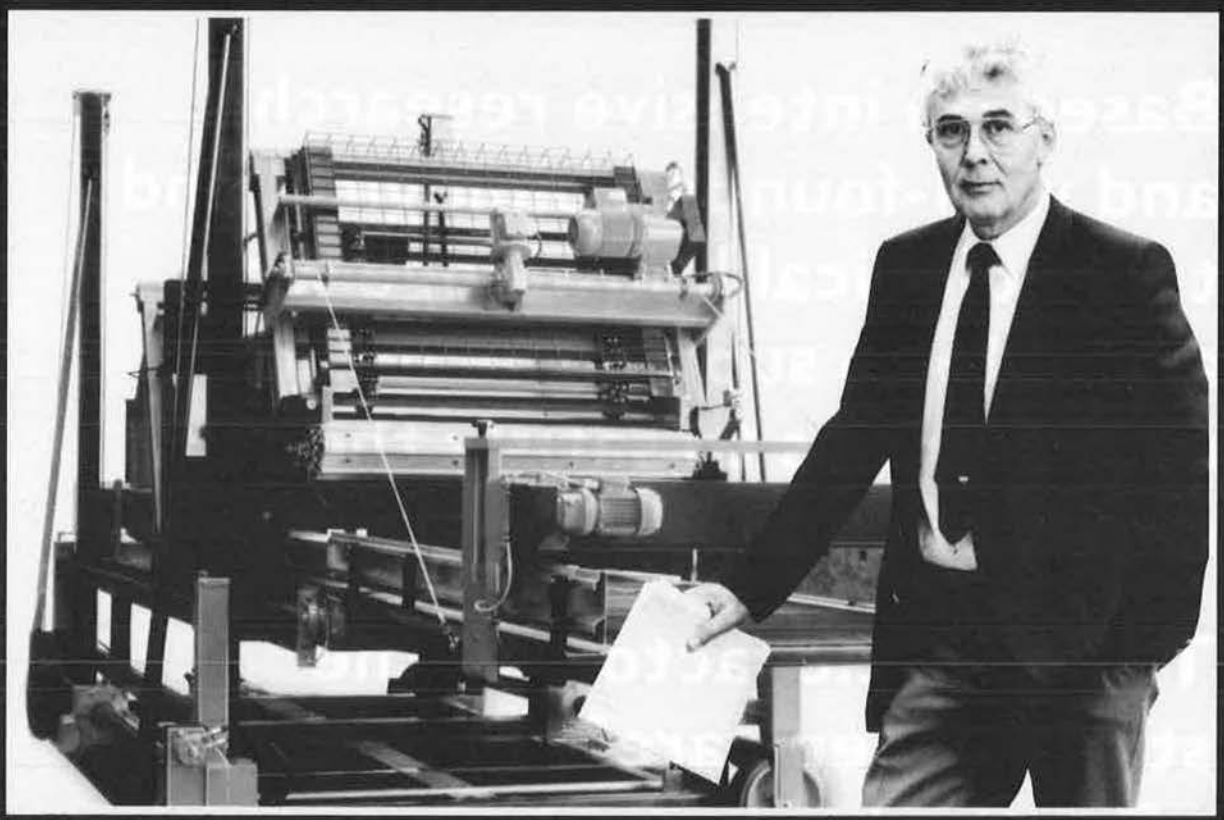

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GEOFF GANNEY'S

GROWING PAINS

1 JUNE

"A brown colour that will grow 18cms wide with thick strong succulent round mussel-formation like caps that becomes oval at the point of fruiting and is succulent and good tasting". All that to describe a Pleurotus strain!

2 JUNE

Adjusting wage rates for yet another annual increase and with the ever increasing need for quality products the labour input has not been "down-adjusted". It is difficult to see how the costs for providing such high quality produce can be met against falling returns. **Surely** there must be a limit to how many more mushrooms can be grown from a system and at what costs of production?

3 JUNE

Lack of sciarid flies for many months at any commercial levels is of great interest and as Joe Hussey used to say, "We should be studying the farms that do not have the flies to find out why!!". Well I don't know about that, but the ever increasing need for vigilance and monitoring is an essential part of pests and pathogen control. I well recall the well known grower who offered his staff a shilling (5p!) for any fly they found! A confident gesture which resulted in many hundreds of flies being found!! The closest mushroom farm in the vicinity was in next village where Mary's sister worked . . . Perhaps it was natural infestation as he had insisted they be caught in his own growing sheds!! I believe he now has a fly problem . . .

4 JUNE

Pre-programme survey with regard to the Seventh North American Mushroom Conference arrived and the immensely diverse questionnaire can only result in a most comprehensive programme. Certainly recipients have every opportunity to indicate their immediate needs whether it be design, finance, growing, marketing or management control. A most sensible approach by the organising committee.

5 JUNE

Crop timing slipping away with movement towards the latter end of the week so resulting in too many mushrooms to pick over three days and the weekends, with pickers going home early on Monday and Tuesday. You mean you have the same problem? When should you take the timing from? Casing date? Spawning date? Date of airing as this would have taken into account the influence of casing moisture/depth and spawning rate! Maybe the date of the last watering prior to pin-up is more critical, even though the peat was too dry at mixing and the casing uneven at application. Perhaps one simply hopes for the best!

7 JUNE

Mushrooms too damp for picking resulting in much enzyme marking or bruising where they have been held during the harvesting operation.

8 JUNE

Dactylium occurring on earlier flushes and with all the rain we have had it is difficult to understand how it could be any dust contamination during the movement of trays. Sometimes you wonder if it could be due to carry over in the sheds!

9 JUNE

Publication of *Pesticide Poisoning* published by HMSO at £2.25 should be kept on all Mushroom Growing Safety Shelves. Being based on recommendations from a Medical, Toxicological and Pesticide Safety Committee it contains specific recommendations to doctors who become involved in such problems.

HMSO address of the London Bookshop is 49 High Holborn, London WCLV 6HB.

10 JUNE

Checked filled weights of compost to see if any reduction could be made to assist summer cool down of peakheats which seems to be a continual problem. Dropping compression would not help and extra ambient air would increase drying out. Undoubtedly winter growing has its advantages!

Two bottom trays showing "Mummy" disease revealed a wet anaerobic layer of poorly spawn run compost.

11 JUNE

Daily Mail reported £16,000 grant to biologists at Bath University to study sex life of mushrooms! Dr. Alan Rayner will work on the behaviour of mushroom cells and their possible relationship to human cells. As an aside it is also hoped to discover a new way of producing edible fungi more cheaply. There is hope . . .

12 JUNE

Severe outbreak of bacterial blotch on a first flush has us totally puzzled. Deep necrotic lesions with nearly black staining giving an appearance of chemical burning made the symptoms not typical of normal Pseudomona damage. Sent a sample away for a second opinion.

14 JUNE

Daily disease level sheets not being completed with enough detail to give sufficient indication of upward trends or disease variation. Identification of various types of mould growths often relate back to being called the **"same name"**. A need for being more specific relates back to training and also breaking the **"Complacency Syndrome"**. Without doubt "CS" is the greatest single cost factor on a mushroom farm and one of which **all** are guilty.

15 JUNE

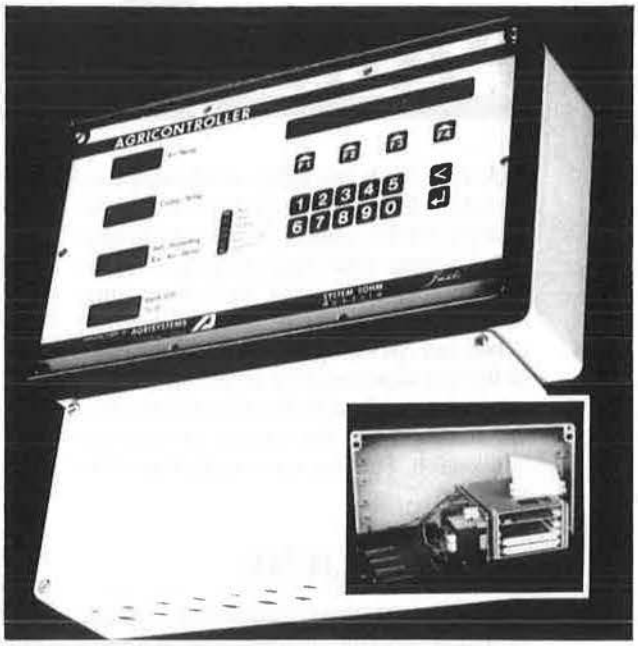
Mushroom size has fallen again, even with the high water levels put into the casing.

16 JUNE

Checked pH of the casing which stood at 7.6 and with the level of chalk going in there should be no problem. But then it is wise to keep a check in a logical manner! It is surprising over the years how many growers have been caught out by someone substituting another brand of ground limestone or chalk for their regular brand. This may result in them puzzling as to why they are not pinning up correctly, quality has fallen or yields are substantially down. Don't call me; check with the supplier!

17 JUNE

Delayed spawn growth throughout the compost has led to high bed temperatures five days after casing! Maybe the correct rate of spawning has got fouled up or even the applicator adjustments changed. More



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simply the applicator rubber control could be worn out? Then again the heat rise could be a result of some other moulds growing in the compost . . .

18 JUNE

Mushroom growing is a complex subject!

19 JUNE

Excessively wet June has put a great deal of leaf on the winter sown wheat and if it continues one wonders what type of straw we shall be working with in a years time? Will it be high in nitrogen, with soft walls that will require extremely keenly adjusted pre-wetting and handling? If so we shall not want to store it too long. But whatever, we certainly will require to think well ahead for formulating programmes next spring. Generally there seems to be not enough management planning put into material programming and that maybe our indepth knowledge of these subjects is not good enough. Or it simply may be that we are always putting out fires . . .

21 JUNE

Transport vehicles need to be cleaner as moving from one farm to another and into sales areas they have constant contact with mushrooms. After all it is the ''mush-room'' that is likely to be the biggest single vector of many pests and pathogens.

22 JUNE

Far too much labour involved in the existing production system and all the head scratching of where it can be reduced is difficult to evaluate. You normally find out when people are away sick and no one ever noticed . . .

Principles of mushroom growing in relation to production methods need to be closely studied in order to formulate new systems and any radical changes take much accepting by traditionally minded growers. Quite right, I hear!

23 JUNE

The new pesticide regulations are going to require some discussion and training to meet future requirements. For example from 1st January, 1989, anyone under 25 years of age must have a certificate of competence if they use approved pesticides. The only exception would be if a person were working directly under the personal supervision of a certificate holder. This will very obviously result in safer use of products and also to the personnel using such products.

From 1st January, 1988, pesticides will be more specifically controlled with users having to comply with the **published conditions** of approval covering features such as: protective clothing, crop restrictions, type of land or premises, rates of use, harvest time, protection of bees, use of materials only by professional operators and many other items.

Undoubtedly with public awareness growing for chemical free products and more natural foods, the mushroom grower has many things to give throughout and provide training for.

24 JUNE

Good straw blaze on the Yax-Pak farm which after all this rain is if not amazing, lightly unexpected!! Must check back on staff records to assess recent dismissals!

25 JUNE

Daily Telegraph reported up to 10,000 people die a year from pesticide poisoning in China every year.

Contacted HMSO re- Chinese edition of *Pesticide Poisoning*.

26 JUNE

Compost being filled was shorter than desired and to stop over-filling the back drum had to be moved up and the press dwell time shortened. Checking back on the compost make up charts indicated less straw had been used and with some heavier loads of horse manure used. Computation and assessment of the fundamental materials used in mushroom growing is essential.

27 JUNE

Been thinking about mushroom virus symptoms in recent days. Comments on mushrooms turning grey and opening from the veil early, coupled with poor keeping quality could be the reason why! Then again the disappearance of hard gill on flat mushrooms of hybrids gives a G2 sound. (Genetical Gingle!). Interesting how gradual changes need very close monitoring in terms of mushroom strains.

28 JUNE

Sent routine samples to ADAS for electro-microscopy tests. Not sure if the analytical fee warrants a conversation on the part of the analyst or adviser? As the information is totally confidential and it would be unwise to divulge purchased data. I would be unhappy to see the returned data sheet marked: cc to **Ian Botham**, **David Frost** and **Prince Charles**. If you cc what I mean . . .

29 JUNE

Mushroom farm discipline is of such **great importance** that the communication of this to all personnel cannot be **over-stressed. Remembering always that this must start at the top.**

30 JUNE

Reply from Lake Garda express positive provided medical certificate gives clearance of normality! Well you can't have everything . . .

---

30 JUNE, 1901

Mushroom growing in Lowestoft is what could be described as the first of the ''Satellite growers'' . . .

Overseas Visit 1

Tecno-Mico '87

Verona 22nd to 25th May, 1987

A bi-annual exhibition of technology for mushroom culture

As the MGA were offered space and accommodation at Verona, we decided to take advantage of this opportunity to evaluate the benefit of participation in this new International Exhibition. Staffing arrangements were eased by sharing a stand with the Glasshouse Crops Research Institute.

Verona Exhibition Centre, on the edge of town, has 34 separate halls together

General view inside the exhibition hall.

with a conference centre containing three fully equipped lecture theatres. Tecno-Mico occupied only half of hall number 37, housing 60 individual company stands. These were primarily equipment suppliers, composters, spawn manufacturers and technical services.

Engineering Design and Production Limited (Traymaster) and JCB were the only English manufacturing companies represented. Kinsealy Research Centre and the International Society for Mushroom Science also had stands.

The exhibition was open for four days from 0900 to 1900. On Sunday, 24th May, a series of nine lectures was preceded by official opening presentations from the Director of *Mushroom Information*, the President of the Italian Mushroom Growers Association, and the Dean of the Faculty of Agriculture at Bologna University.

Saturday, 23rd May, proved to be the busiest day with ten applications for overseas membership resulting from a continuous stream of visitors. Over 150 attended the lectures on Sunday morning, returning to the exhibition stands in the afternoon. Monday's attendance was bolstered by a visiting party of English growers.

This group of 47, organised by Darmycel, had arrived on Sunday afternoon and returned on Monday morning before embarking on a programme of visits in the Verona/Venice area. Useful contact was made with leading MGA members and potential members. Earlier, contact had also been continued with visitors from Ireland including Pat Walsh, Ronnie Wilson and representatives from Kinsealy.

Pleurotus were featured on several stands.

The intention is that this fair shall be held on alternate years to the similar Dutch event and offer a more International collection of exhibitors.

The lecture session on Sunday morning.

Some of the Darmycel UK party in earnest discussion.

Whilst experience showed that the MGA could gain new overseas members, an equal benefit might be in establishing better communication links with existing members — both overseas and visiting UK Grower/Associates.

A notable aspect of this exhibition was the particular emphasis on and interest in "Pleurotus" rather than the cultivated mushroom.

Overseas Visit 2

Darmycel (UK) Study Tour

Geoff Ganney reports

Tecno Mico '87 presented an opportunity to prepare a visit for a UK growers party to see an exciting new exhibition and a selection of North Italian Fungi farms. Alan Benfell and his Darmycel colleagues took up this challenge and organised what I am sure, for all those privileged to attend, was one of the most rewarding and enjoyable overseas visits for many years. Maybe the sunshine, wine, good food and stimulating company had something to do with it. Jim Dumbreck assured me it hadn't, but he may be biased!

Presenting a four day exhibition must be considered very ambitious for what after all is a relatively small industry. Tecno Mico is planned to fit in bi-annually between those ever increasing successful Horst Open Days. It will, in my opinion, grow in size and depth, even if the length is reduced.

Pleurotus are a favourite edible fungi in Italy and several stands had prepared compost blocks in crop with growing *Pleurotus,* ranging from blue to brown and even lighter colours. The air around these exhibits was well polluted with the many billions of spores escaping from the sporocarps. Spawned blocks were being advertised on many stands and with a suggestion that 50% of the edible fungi crop was down to *Pleurotus,* this was understandable.

Major spawn producers and agents such as Darmycel Italia, King Spawn, Le Lion and the home-based Ital had immaculate presentations of the many species available, not only for *Agaricus* but *Pleurotus, Stropharia* and other edible fungi. Perhaps this is a likely trend for the future? Shiitake blocks can take you into a new market place and, may be with ever increasing interest in health foods, there will be demands for such luxuries.

Tony Russell busily answering questions at the Tecno Mico Exhibition.

The economics may require close examination, as do those concerned with any fungi production.

Keith Willoughby was handling the MGA stand, busily recruiting overseas members and spreading the advertising gospel. Aoife O'Brien, Paul Perrin, Jeff Smith and Tim Elliot manfully (well nearly all anyway!!) put over the work of the UK technical services and it was good to see them have the opportunity to travel to such overseas mushroom events.

Tony Russell from Traymaster was deluged every time I passed his stand, as were the many other exhibitors of machinery, cropping shelves, watering trees and ancillary equipment. Gerard Derks on the Derenco stand had six videos showing at the same time, illustrating whole farm projects on a turn-key basis. While studying the Derenco video David Bell spoke of his experiences in building what he feels is, and certainly sounds, to be one of the most modern mushroom units in the UK. Sometimes you dream of what it would be like to build on a green field site being able to install all that is best in modern

Darmycel group closely studying tunnels — or just talking about the weather.

day technology. Inevitably you eventually wake up!

Tony Claxton had us up early for the first farm visit, even to the extent of our Italian host guide Mauro Abbiati missing the coach. He caught up with us at Povegyliano where we were being shown around the *Pleurotus* farm of Angelo and Ivan Dal Ben. An amazing sight to see hundreds of polythene-wrapped, straw blocks stacked three high along a 300 foot long chicken house. It was nearing the end of the *Pleurotus* season, which flourishes in the cooler times of the year, but some good specimens could still be seen. Overhead watering systems saved much time and picking was easy with large clumps being removed from where they had fruited through perforations in the plastic sacks. Other than the effect of the spores, it appeared to be a simple and very sane system, relying on very few people to operate the unit.

A visit to Verona Wholesale Fruit and Vegetable Market prompted Paul Middlebrook to focus his video camera on to the varied fungi being offered for sale. Many forms of *Pleurotus,* some excellent looking Chanterelles, but perhaps the most exciting, common old *Agaricus*. Excellent quality, beautifully sized and all sunny side up in shallow veneer trays. White, cream and brown mushrooms all with the *stipe* untrimmed. How could the UK industry have got it so wrong? Here was the finest looking product with additional untrimmed stem weight including a modest amount of casing! Not trimming appeared to give prolonged shelf life and the crop was harvested at amazing speeds. Paul calculated 15% extra crop weight and half the cost to pick! Something to discuss on returning to Selby. No doubt he will have Mike Lumb working out some machine for pulling mushrooms from the beds.

On arriving at Italian-American Mushrooms, situated in the hills at Casazza, Fabio Nicoli explained he fills 100 tonnes of bought-in compost from Agrifung every week, into a simple bulk pasteurizing tunnel. Using elevators with foreloaders for filling Phase I and then re-filling into spawn incubation tunnels appeared to present few problems. A cattle slat concrete floor system allowed for relatively easy air passage through the compost and as Peter Munns said, "The problem of hygiene seemed to be relative". Fully spawn grown compost, which looked well enough, was then moved to a larger version of the Dutch type head end filler. This moved along a railway line to the desired shed and filling 7,500 square feet with simultaneous casing took place with relative ease. All was very simple, and as Norman House pointed out, "done without any fuss".

Conditions inside the shed were very airy and beautifully cool, with maybe a little more scaling on the mushroom caps than one would normally like. Pickers were self propelled along a gantry at the desired height and in the correct picking position. Harvesting was very quick with top quality mushrooms simply twisted from the beds being placed in shallow veneer trays, cap upwards. Processing quality were literally thrown into 10kg plastic containers. Yields were not quoted as being high at 4½ pounds a square foot but with mainly creams, browns and off-white strains being used this could be expected, as could the scaling. Ken Drinkwater wasn't too keen on the sciarid flies buzzing around the tunnels and felt the spraying of chemicals around the farm was more than liberal.

The cocktail of formaldehyde and chlorine for shed disinfection ensured a quick move from the inside to the outside area!

Cold storage facilities were very comprehensive and studying the pre-packing with Alec Milne showed some 1kg packs in hexagonal paper maché punnets of excellent quality. Emphasis was on a quality product in both *Agaricus* and the few *Pleurotus* that were still being grown. Future plans include turning back to making their own compost, which answered why there were three large composting machines standing on a vast empty wharf. This made Russell Howes' face fall as he anticipated another customer for his recently innovated "Equipment Sale" service. With the array of other machinery around the yard Les Faulkner thought he could make enough compost for most of the Italian industry.

Untrimmed, white mushrooms set out in a shallow tray ready for sending to Verona market.

Disembarking from the coach and entering the restaurant bar found Dickie Lund already ensconced! Had we left him there from the last trip or has he a magic formula? A wonderful Italian lunch of ten courses of pasta and meat dishes, which some managed to cope fully with. As Peter Evis commented, "There's something about this place!"

Fungorobica was a short ride away at Cenate Sotto and director Sergio Amaglio outlined his planned cropping programme which, he explained, was lower at present for the coming summer. Normally 200 tonnes of 100% horse manure compost was made for filling into a Phase I tunnel. The compost wharf itself was very compact, with what Peter Baker described as, "extremely small

Keith Willoughby at the MGA's Tecno Mico stand.

stacks''. As I could see clearly over the top I had to agree!

But the end product was well made with considerable power and as David Reed pointed out a good length for tunnel Phase I.

The tunnels were again simple with aeration holes through the concrete floors 1" in diameter spaced in a logical manner over the floor surface. Bulk spawn running was practised with exits on the clean side of the spawned tunnel so preventing any chance of cross contamination from dirty to clean area. Complete fully spawn grown compost was being taken by foreloader and filled into a modified tray flow line. This handled 18 square feet trays filling 9,000 square feet a week. A further 3,000 square feet was filled into a Dutch shelf system. The automated flow line crossed over the compost into an area where supplementation could take place and simultaneous casing practised. A simple system with as David Baddeley put it, ''a great emphasis on a hygienic flow system''. Certainly the use of formaldehyde was prodigious, being aimed at either keeping people away or frightening pests and diseases into submission. Tim Cripps certainly came up for air alongside several others who had casually strolled into the sterilized area. I was close behind Dick Fisk and Henry Prior as they shot through the open doorway.

A variation in design of growing sheds existing with some conversion to shelves taking place. Trays were stacked very high in some sheds and plenty of mushrooms were forming on crops in sheds where a white strain was being grown. The profusion of air ensured this. Casing was peat based with the addition of what appeared to be marble type chips resulting in the mix being fairly light and open. Production figures were quoted as 30% of substrate fresh weight, which by any standards is high. Maybe due to some of the advantages of negating loss of dry weight that is normally found in the standard preparation of trays up to casing.

Harvesting was similar to the previous farm. A small processing plant helped with handling the lower quality products. Bob Dumbreck had seen the bottled products at the Tecno Mico exhibition and wondered why this attractive method of processing was not used more widely? Certainly with automated grading an even size out would look good through clear glass and the variations in the shape of containers could be used to advantage.

In the tray emptying area an ingenious flow line was the centre of attraction. It was a pit, it was not working, so all the facets could have been studied. Gerry Parker was of the opinion the casing was tipped separately for saving and reuse. He may be right. The double automated brushing system allowed for a very clean tray and was cleverly designed to handle two trays at a time. Mind you, looking at the acres of concrete, on which thousands of trays were stacked, the economics of tray growing made one shiver. Phil Tindle was in favour of troughs or some simple system!

Untrimmed brown mushrooms carefully set out in pre-pack punnets prior to being wrapped.

Departing towards (under the able guidance of Antonio Lister!) Verona Airport was to all but draw an exciting tour to a close. Nino Abbiati had invited us back to Darmycel Italia for a farewell drink which, as we might have guessed, became several. John Callow well summed up the events by saying ''It beats mushroom growing any day''.

During the whole trip the ladies present had observed, enjoyed, assessed systems and been amazed at the complexities their men folk were involved in, in trying to make a lire or two. Volunteers to assess any forthcoming trips, in order to ascertain if the problem of mushroom pressures is world wide, were asked for. Alan Benfell, Tony Claxton and Alan Lister, as I understand, are closely vetting candidates with a view to eventual industrial potential and applications must be in sealed envelopes.

Many thanks to Darmycel (UK) for providing the means to improve our meagre knowledge of commercial fungi production.

Trimmed brown mushrooms beautifully presented in clear plastic punnets.

Book Review

Cultivating Edible Fungi

A review by **Peter Flegg**

Proceedings of the International Symposium on Scientific and Technical Aspects of Cultivating Edible Fungi (IMS '86) held in Pennsylvania State University, Pa, USA, 15th to 17th July, 1986.
Edited by P. J. Wuest, D. J. Royse and R. B. Beelman. ISBN 0444427473.

This is a daunting read (677 pages) for anyone wishing to take in the contents of the 70 papers comprising this volume. However, specialists and those wishing to browse more selectively may have an easier task. The book is clearly divided up into eight approximately equal sections, grouping together papers on more or less related topics.

Just over 50 of the contributions are concerned, either solely or in part, with some aspect of the mushroom *Agaricus bisporus*. Twelve deal mainly with *Pleurotus* spp. and the remainder with a variety of cultivated mushrooms including *Volvariella* spp., *Lentinus* edodes, *Pholiota* spp., and *Dictyophora indusiata*.

Biology and microbiology

A mixed bag in this group, begins with an encouraging description of experiments with rats showing that most of the important species of cultivated mushroom can exhibit remarkable anti-tumour activity. Two papers investigate the relationships between bacteria and the growth and fruiting of *A. bisporus* and others deal with the effects of vitamins, oils and pH on the growth of *Volvariella volvacea*, the factors affecting colonisation of wood by basidiomycetes and spore germination of *Pholiota destruens*.

Biochemical characterisation of a 35nm spherical virus infecting *A. bisporus* suggests that there may be at least two such viruses, morphologically similar, get biochemically distinct. Clearly further work is needed here.

This section is completed by one paper on the fringes of mushroom growing. It proposes the use of spent mushroom compost in agriculture as a carrier for nitrogen-fixing bacteria. Spent compost could be a useful alternative to peat for this purpose, especially in tropical countries.

Physiology and nutrition

There was a time when mushroom composts and the composting process were a major topic at national and international conferences. While there is undoubtedly much more to learn of this complex subject, commercially, the production of good quality composts producing consistently high yields is now much less of a problem. Nonetheless there is an account of an improved composting method. Also an intriguing report on the effects of adding dried flowers and/or leaves of five plant species to compost seems to open up a whole new field of compost studies. Crop yields were enhanced and the growth of various mushroom competitors and pathogens was suppressed.

Changes in amino acid content of compost during cropping of *A. bisporus*, the effects of growth regulators, of compost supplementation *(A. bisporus)* and of substrate enrichment *(Volvariella)* are expected ingredients of this section. Additionally there are two short papers describing laboratory studies of the carbon and nitrogen nutrition of *Pholioto destruens*.

Genetics and cytology

These working on the "common", "button", "cultivated", mushroom will be interested to learn that the question of its correct taxonomic position has been examined yet again. *Agaricus brunnescens* or *Agaricus bisporus*, seems to be the question? It appears that uncertainty remains, but the investigator favours *bisporus* and recommends that at a future International Botanical Congress a proposal be put forward for the conservation of that name. Clearly we have not heard the last of the matter. It can hardly be helpful that a study of the number of spores on basidia of *Agaricus bisporus* varies between strains and with time. Four-spored species can also show similar variability.

With an eye to the future success of the various mushroom growing industries conservation of genetic resources is discussed and the germ plasm bank of viable edible fungi at the American Type Culture Collection is described. A method of estimating the nuclear ratio of heterocaryotic fungal cells from nuclear distribution is proposed.

Isozyme analysis indicates that the genetic diversity between *Pleurotus ostreatus* isolates is tremendous, useful information for the mushroom breeder.

In a somewhat different vein, one paper in this section produces evidence for the involvement of plasmids in the initiation of sporophores of *A. bisporus*.

Food science and mushroom quality

If interest in compost research has declined then certainly it has increased in the topic of quality. Growing mushrooms is no longer a major problem, the current challenge is to be able to sell them.

Several papers examine the effects of a variety of cultural treatments on mushroom quality and shelf life. Among the factors discussed are compost moisture, cropping temperature, peat types used for casing mixtures, chalk and water content of the casing, adding calcium chloride to the casing layer, watering practices and mushroom pests.

Post harvest factors are also reported on. The effects of washing, cold storage, bacterial populations and gamma irradiation are all considered and the characteristics used to quantify mushroom quality include firmness and toughness, respiratory activity, mushroom weight and colour.

In conclusion there is a study of some recent developments in the processing of mushrooms.

Pathology and entomology

Exciting prospects for biological control of some pests and diseases seem to be in the offing. A biological method of controlling bacterial blotch *(P. tolaasii)* is showing great promise and the use of nematodes to control mushroom flies may soon become a reality, at least in the UK.

Most of the papers in this section are concerned with the *A. bisporus* crop, but one is concerned with fungal competitors

of *Volvariella volvacea* and another with bacterial diseases of edible mushrooms generally. *Pseudomonas* spp. seem to be the major bacterial pathogens.

A computer model simulating pest outbreaks should prove a useful tool in developing pest management programmes on individual mushroom farms and the biology of an important phorid pest in India is described.

Papers on diseases include a study of a newly recorded competitor mould in mushroom composts and two papers give further information on that important disease of *A. bisporus, Verticillium fungicola*. A new virus detection procedure, based on extraction of viral double-stranded RNA from mushrooms has proved very useful in detecting and monitoring virus outbreaks on commercial farms.

Growing mushrooms in caves poses a variety of problems in pest and disease control. The evolution of the phytopathological situation in French mushrooms is described and it is concluded that biological control holds out some exciting and useful possibilities. Biological control for use on mushroom crops seems to be on its way in, at last.

Mushroom production systems

Apart from one on educating mushroom growers in the Netherlands, the papers in this section deal with the production of a wide range of mushrooms in many lands. We are given an overall view of the growing of several kinds of mushrooms in Japan and Hungary, the production of *Pleurotus* growing in Canada and Italy, the cultivation of *Dictyophora indusiata* in China and the development of Shiitake growing on logs and sawdust in the USA.

The University of Puerto Rico seems well placed to develop the production of *Volvariella* spp. and to train growers and advisers.

Mushroom husbandry

Five of the papers in this section deal with evaluating a variety of materials, including tobacco waste and aspen wood shavings, and several cultural techniques for growing *Volvariella volvacea* and *Pleurotus* spp.

Four papers are concerned with growing *A. bisporus*. Among these, of particular interest to me, is one on the use of porous tubing to watch the casing layer and another which examined some of the physical properties of the casing layer in relation to cropping potential.

Pest management and control

In this section the word "pest" is given a wide interpretation. Included are papers about animal pests and diseases. Some papers deal with tackling pests and diseases on a farm scale with discussion of such topics as integrated pest control programmes, hygiene, house construction and the role of farm management. Other papers are concerned with the control of specific pests either under laboratory conditions or on the farm.

One paper describes the evaluation of a large number of chemicals as disinfectants using four test organisms. Only three of the substances tested were able to kill all four test organisms under conditions approaching those found in practice. It seems that most disinfectants provided by industry are not suitable for use on mushroom farms.

Summary

It is highly desirable that the proceedings of symposia should be available as soon as possible after the event. The editors and publisher are to be congratulated on getting this volume out within nine months or so. In view of this some imperfections must be accepted. As the book is based on camera-ready text provided by the authors, differences between papers in the type must be expected. Authors were made responsible for the spelling, style, grammar and appearance of their contributions and a number of typing or spelling errors are evident. One paper is short of a couple of tables. The assiduous reader may find further mishaps. Nonetheless, this must be regarded a a very worthwhile production.

Any organisation involved in serious research and development work on almost any aspect of cultivated mushrooms will surely need access to a copy. The modern mushroom grower wishing to keep abreast of recent developments is also likely to join the readership, but the contents do tend to be rather "technical".

Available in Canada and USA from Elsevier Science Publishing Co. Inc., PO Box 1663, Grand Central Station, New York, NY 10163 or Elsevier Science Publishers, PO Box 211, 100 AE Amsterdam, The Netherlands.

ISMS members should buy through the ISMS Secretary, Dr. R. L. Edwards, 3 Romney Close, Bearsted, Maidstone, Kent ME14 4LU, England.

OBITUARY

DR. PIETER BELS

Pieter Bels, the outstanding figure of the post-war mushroom industry in Holland, died on 28th May, 1987, after a long illness. He was 76.

He started a laboratory with his wife, Dr. Henrietta Bels-Koning, "Jet" to her many friends, to study mushroom growing in Houthem St. Gerlach, Limburg, in 1944. They had very limited resources and lived over the laboratory and test rooms.

I think that was the world's first national research unit devoted exclusively to mushrooms.

Pieter was a great traveller; he came to the MGA's First Annual Luncheon in 1946 and on countless further visits.

In 1952 their laboratory was closed and they went to work with Slack Brothers in Canada.

In 1956 they returned to a new purpose-built Experiment Station at Horst.

Pieter applied his science and what he had seen on his travels to establish a modern mushroom industry in Holland. Until his modernisation started mushrooms had only been grown in Holland on ridge beds on the floors of the caves in Limburg.

The Dutch Experiment Station under his leadership became world-famous.

Other developments in which he played a major role were the co-operative production of compost and casing soil, now CNC, and the mushroom school, now CCO, visited by many British mushroom growers.

Pieter retired from his post as Director of the Proefstation in 1975. He then took an interest in the cultivation of other edible fungi, Paddestoelen to the Dutch and Toadstools to us. He was Diector of the Proefstation voor de Champignoncultuur from 1956 to 1975 and President of the International Society for Mushroom Science from 1965 to 1981. He was created an Officer of the Order of Orange Nassau in recognition of his services to the Dutch mushroom industry.

His funeral took place at Heeze on 2nd June and was attended by about 100 people. They included his wife, Jet, and other members of the family, members of the local community in Horst where he was a popular and respected figure, and many from the mushroom industry in Holland and other countries. These included Jan Pijnenborg, President of CNC, who gave an address on behalf of the Dutch mushroom industry, and members of the staffs of the Proefstation and the School.

Dr. Fred Hayes, represented MGA, of which both Pieter and Jet were Life Honorary Members. ISMS was represented by Dr. Fred Hayes (President) and Dr. Klaus Grabbe (Vice-President).

Many of us in MGA have a keen sense of loss. He was a cherished colleague in our scientific mushroom community, and a dear personal friend to those of us who knew him well, in my case for over 40 years.

R. L. Edwards

OBITUARY

DR. MILOSLAV STANEK, CSc

New has recently reached us of the death of Dr. Miloslav Stanek on 21st February, 1987, at the age of 62.

Dr. Stanek was a member of the Microbiological Institute of the Czechoslovak Academy of Science. A recognised specialist in cultivated fungi, phytopathology and soil microbiology, he had recently been awarded a G. J. Mendel Silver Medal. He was indefatigable, devoting long hours, including weekends, to his scientific work. During his working life he produced over 200 scientific publications. He was also a chairman and member of many important Czechoslovak scientific organisations and received many awards.

Mushroom growers and scientists will remember particularly his important publications on several microbiological topics. These are concerned with mushroom composts and composting and on the growth of mushroom mycelium.

Forklift safety

. . . Every year an average of 20 people are killed and over 10,000 suffer some form of injury as a result of forklift truck accidents. In order to try to reduce this unacceptable toll, Norsk Hydro Fertilizers, in conjunction with the Agricultural Training Board, have produced a practical forklift truck training video entitled *The Correct Approach*.

Although designed primarily with the agricultural industry in mind, the 30 minute video is suitable for use as a training aid for anyone operating forklift trucks. It provides an ideal way for all new operators to be made aware of the hazards involved and it lends itself for use as a timely reminder for experienced drivers.

The price of the video £40 (including VAT and postage and packing), is being kept to a minimum in order to encourage its use as widely as possible, and it will be available at an introductory price of £32.50 at the Royal, Royal Highland and Royal Welsh Shows. Information about purchasing the video is available from Lisa Dolan, ATB, Bourne House, 32-34 Beckenham Road, Beckenham, Kent BR3 4PB.

Gas analyser

. . . Testing the CO_2 content of fresh food packages supplied to supermarkets is a function of quality control carried out by growers and packers as part of their marketing. Packets selected at random from batches going through the production line are tested to check the integrity of multi-gas atmospheres injected into the packets by automatic wrapping machines at the moment of sealing.

Analysing the gases within the package ensures that:

★ The packaging machine is working properly.

★ The correct gas mixture is being used.

★ The packaging material and seal are of good quality.

The Servomex PA404 Infra-Red gas analyser has been launched to measure low volumes of CO_2 in food packages, and a variety of sampling arrangements are available.

The instrument utilises the same single beam, dual wavelength technique as other Servomex infra-red analysers. Narrow band interference filters and a solid state detector provide a measurement which is inherently less affected by cross-sensitivity than are condenser microphone detectors. Also, there are no problems of deterioration or leakage of reference gas fillings.

Institute of Horticulture

. . . Are you a member of the Institute of Horticulture? Some grower members are and the MGA has access to its publications. Issue 10 of the Institute's Newsletter, has a short report on a one day seminar held in March at Pershore on "Irradiation and horticulture" as well as other information and branch news.

Details on membership can be obtained from the Institute, PO Box 313, 80 Vincent Square, London SW1P 2PE.

Correction

A typographical error crept into the May *Journal*. On page 151 the units in the caption to Fig. 4 should read millibars × m/min, not millibars km/min. Our apologies.

'We have achieved what everybody has been trying to achieve – a consistent blend with a controllable moisture content every time.'

Mr. Colin Moore, managing director of Shepherds Grove Mushrooms Ltd., ordered a new TRAYMASTER Phase I Straw Processing Machine 'straight off the drawing board' – so confident was he of our ability to convert our design concept into working machinery. Shepherds Grove Mushrooms Ltd., situated in Suffolk, England, and part of the go-ahead RHM Group, had recognized the advantages to be gained from a machine that could provide consistent straw processing for the Phase I operation.

Working closely with Colin Sturgeon, engineering manager of Shepherds Grove Mushrooms, who provided precise process requirements, test materials, etc., we undertook a research, design and development programme aimed at achieving the recognized advantages. His own words tell how well we succeeded:

'We have achieved what we set out to achieve and in fact what everybody has been trying to achieve – a consistent blend with a controllable moisture content every time.

'We are able to vary the ratios between straw, horse manure, chicken litter and water very easily and accurately, the TRAYMASTER Straw Processing Machine gives you fine tuning and takes the guesswork out of total quantities required for each batch. We can also achieve a far higher moisture content – even 80% is easily attainable.

'Look at a heap created by conventional methods, there's loose straw in places and varying textures. Now go to the heap created by our TRAYMASTER Straw Processing Machine – you honestly can't see any variation, it's consistent all the way through, and the straw is bruised as we want it without being shortened.

'It's very, very noticeable how evenly the compost in the piles is reacting between turns. Phase II is improved of course – especially in tunnels.

'Our old pre-wetting/mixing operation used to be spread over a few days – breaking the straw bales, adding the water, mixing in the chicken litter and horse manure. With the TRAYMASTER Straw Processing Machine we can achieve everything with one run through at around 20 bales per hour – which creates approximately 120 tons per hour. We can now do our 550 ton batch of Phase I comfortably in a day.

'We are getting benefits throughout production.'

TRAYMASTER Straw Processing Machines can be of various configurations and throughputs to suit farm requirements. They are just part of a complete range of equipment designed to improve profitability in the Mushroom Industry. For advice and information please contact:

GREAT BRITISH MACHINERY

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The TRAYMASTER Bale-Breaking/Straw Processing Machine installed at Shepherds Grove Mushrooms Ltd.