January 1979

Jaargang 1979

Number 73

The Mushroom Journal

THE OFFICIAL JOURNAL OF THE MUSHROOM GROWERS' ASSOCIATION OF GREAT BRITAIN AND NORTHERN IRELAND

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Index to Advertisers

DIARY DATES

1979

January 24: Fourth Seminar: Mushroom Diseases. Aston University.

April 2–5: Short Course, including study of Dutch techniques and the control of *Verticillium* and Blotch. Bath University.

April 3–5: 'British Growers Look Ahead'. Brighton.

June 18–20: 22nd Short Course. Pennsylvania State University.

October 11–13: MGA Annual Meeting and Conference. Great Yarmouth, Norfolk. Headquarters: Carlton Hotel.

1981

August 14–19: Eleventh International Conference on the Science and Cultivation of Edible Fungi. Sydney, Australia. (Why not ask the Secretariat, GPO Box 2609, Sydney, NSW, Australia 2001, to add your name to the mailing list?)

August 21–28: Provisional date for Botanical Congress in Sydney, Australia.

THE MUSHROOM JOURNAL No. 73 JANUARY 1979

Editor: Fred. C. Atkins, O.B.E., 11 Apsley Way, Longthorpe, Peterborough PE3 6NE

Editorial . . .

Don't Rock the Boat

My impression is that in general the production of mushrooms in the UK in 1978 was 15–20% below expectations. Yet we are now reading headlines in the trade press such as 'Mushroom Recession' in the wholesale vegetable markets. We are indeed walking the high wire.

The first note of warning was sounded by *The Grower* on 28th September: 'So far this week, demand has been slow for average supplies of mushrooms . . . The market started to slip in London before the week-end, which meant carryover which in turn means poorer quality and lower prices until the backlog is cleared'.

Two weeks later the *Fruit Trades Journal* commented: 'With the market well supplied, the demand in mushrooms is not as good as some salesmen had perhaps hoped for. Demand remains fair, however; but there are still too many supplies on the market to clear daily'.

In November, as I write this Editorial, I read in *The Grower* that, 'along with the rest of the vegetable business, the mushroom market is in the doldrums, and this week's trade so far shows little change on last week, when fairly heavy supplies met little or no demand'.

In these circumstances it is not surprising that one or two members ask me whether the MGA should discourage dramatic expansion such as has been rumoured in the West Country. The MGA has no such authority, but must be concerned over such possibilities. The *Journal* reported in September that 'a spokesman for the Darlington organization has already made it clear that any expansion in mushroom production would depend on market forces'.

This sensible, businesslike approach was supported by Peter Middlebrook at the AGM in Southport when he said 'we have no information of any large-scale expansion in the UK; in any event we hope it would be geared to market requirements'.

Words of wisdom came from Marsh Lawson, immediate past president of the Australian MGA: 'The Mushroom Industry in the UK has been buoyant for the past two years, mainly because growers have been consolidating rather than expanding'.

As my old friend Guy de Man would say: 'Don't make waves'!

MUSHROOMS EXPENSIVE ?

Congratulations to Chairman **John Bradfield** for the following statement he made at a press conference during Mushroom Week:

'I would like to refute the allegations made in a well-known consumer magazine that the price of mushrooms is high compared with that of other vegetables.

'In 1947 the average price the grower received was 7/– (35p) per lb., and the selling price in the shops was 10/– (50p) per lb. Thirty years later the grower was receiving 44p per lb. and the maximum selling price was 68p.

'If we compare this with the retail price index in this same thirty years we have a very interesting picture. In 1947 the retail price index was 31.4 and in 1977 was 184.7. This means an inflation in thirty years of 488%.

'If this is equated with the retail price in 1947 and thirty years later, mushrooms which were selling for 35p per lb. in 1947 should today be selling for £2.44 per lb. They are not; in 1977 they were selling for 68p, just 36% more than in 1947, while inflation is 488% more.

'This is the way the British Mushroom Industry has improved its efficiency over the last thirty years; and if some of the other industries in the country had done the same, England would be a far stronger country today'.

ARTHUR HOVELL DIES

We learn with sorrow of the death of Arthur DeB. Hovell, Chairman of the MGA in 1949–50. Aged 73, he used to grow mushrooms with his brother Charles on what was then a considerable scale at Church Farm Nurseries in Rustington.

He was a great innovator. In 1951 he described in *MGA Bulletin* 23 his ingenious conversion of a muck-spreader into a compost turner; and in 1956 he built his first plastic house.

I first met Arthur when he led a Worthing & West Sussex Growers' delegation to Bedford Square in 1945 in an attempt to persuade the NFU that there was no need for an MGA; but we won our case, and thereafter he was a keen and loyal MGA member until his retirement.

Sincere sympathy goes out to Stephanie and the family.

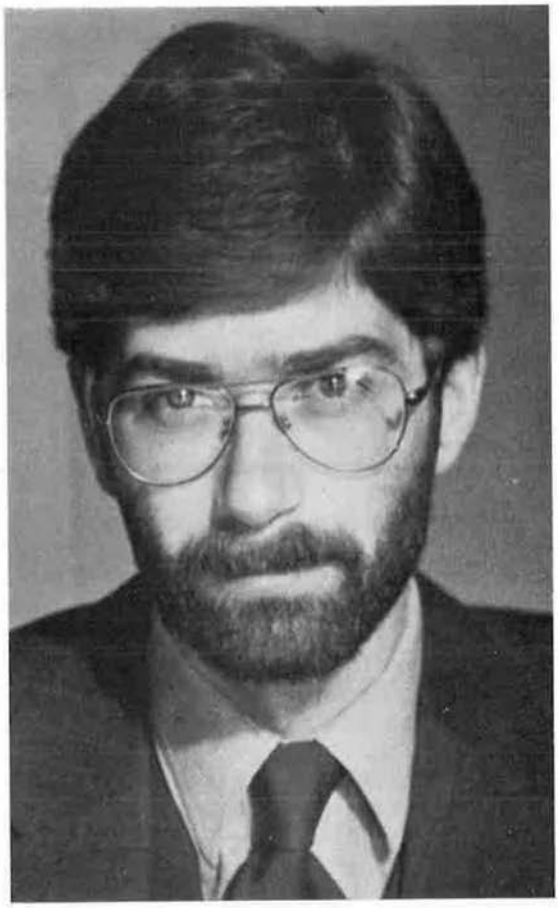
FCA

THE KNEEBONE BEQUEST

A room is being set aside in the main Pattee library at PSU to house all the books, journals, reprints etc. of Dr. Leon R. Kneebone, Professor Emeritus of Botany and Plant Pathology, as 'a mushroom industry working collection' available for reference by students, faculty, and the general public.

TECHNICAL ADVISER FOR SPORAVITE

Shane Deaville has been appointed Technical Adviser for Sporavite, Rumenco's unique mushroom compost activator. He attained his Honours Degree in Agriculture at Reading University and joined the Rumenco Technical Division two years ago to work on product research and development.



Shane Deaville

Sinden on Mushrooms

All the papers on mushrooms and mushroom growing written by **Dr. James W. Sinden,** alone and in association with others, have been collected together and will shortly be published in one handsome, hard-back, limited edition.

The price will be £15.00 (or 50 Swiss francs) per volume, packing and postage extra. Distribution in the UK will be from White Queen Ltd., Yaxley, Peterborough, and for the rest of the world from Hauser Champignonkulturen AG, 8625 Gossau-Zurich, Switzerland. It is suggested that those who wish to purchase copies should write to one or the other distributor who will submit a pro forma invoice including the cost of packing and posting.

Fred. Atkins, who was entrusted by the Hauser Organization with the editing of *Sinden on Mushrooms*, relates in the Introduction that it had been **Mrs. Erica Hauser**'s intention to present Dr. Sinden on his 70th birthday with his entire (mushroom) literary output in one presentation volume 'as a gesture of appreciation of his incomparable service to the Mushroom Industry'.

The Editor was able to persuade her that this would be unkind to the industry at large; very few of us have read all that Dr. Sinden and his colleagues have written, because some of the papers were in German or appeared in journals which normally do not come our way; it was agreed to have all the papers published in English in a volume available to growers and researchers everywhere.

Dr. Sinden was reluctant, partly because he prefers to look ahead but also because in some of the papers he had played 'a rather minor part, providing guidance rather than day-to-day participation'. But all those associated with papers in which he is listed as a co-author immediately welcomed the idea, and all copyright was waived.

This is a most exciting publishing event.

John Bradfield rarely misses an opportunity to publicise Catfield mushrooms in the press and on television
(Photo by courtesy of *Great Yarmouth Press Agency*)

DUTCH STUDENTS VISIT ENGLAND

Students at the Dutch Training School in Horst were so interested in their discussions with the UK party which attended the last English-speaking course that a number of them decided they would like to see how we grow mushrooms over here.

The trip was organized by three teachers — Toon van As, Martin van Lieshout, and Pieter Rechsteiner — for 26 'students' aged between 18 and 30, working on mushroom farms in Holland, some owning their own plants, and all attending an 18-months course involving one day each week at the School. What they were

particularly keen to see was bulk pasteurization and spawn-running and the different strains we use.

The first day, Monday 16th October, was organized by John Bradfield. Michael Hopper, technical manager, took the party around the Middlebrook farm in Cromer. John showed them (and press and TV) Catfield, with some Traymaster equipment, and then led them to brother Donald's Broadlands farm in nearby Martham.

The visitors were impressed by the size of the English operations — all of them much bigger than is usual in Holland, and more labour intensive. At Catfield, a 3½-acre site employs 65 full-time and 30 part-time workers to yield 1.8 million lb. mushrooms p.a. Broadlands is much the same size, while Cromer is larger and uses some of the Dutch production techniques.

For relaxation after an exhausting day John organized a remarkable dinner party in 13th-century style at a Suffolk pub which specializes in mediaeval banquets.

On Tuesday the Dutchmen visited Bob Pinkerton's Magees Nursery in Essex; and on Wednesday they were shown round the Darlington farms at Angmering (orthodox trays) and Poling (bulk pasteurization and bags).

Toon van As, on behalf of the visiting group, expressed thanks to everyone for opening their farms and for such generous hospitality.

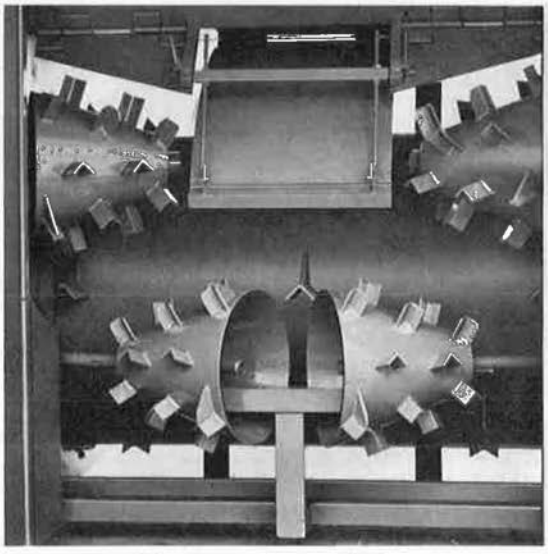
Michael Hopper, Middlebrooks' technical manager at Cromer, indicates the pre-wetting area
(Photo by courtesy of *North Norfolk News*)

CROSS-MIX COMPOSTING MACHINE

The Cross-Mix composter, designed by Gordon Griffin, opens a new era in this field, says the **Paul Engeler** factory.

The mechanical handling of compost in Phase One is called 'turning'; the compost is lifted, watered, and put back again. Experts know that this is not sufficient for the composting process. They know that it is very necessary to mix the diverse parts of the compost heap. Only if the compost is mixed in a criss-cross pattern can one expect the best results.

This very important criss-cross mixing is achieved by the arrangement (illustrated) of the four bulbous drums behind the big loading drum. The split, rear, spinner shafts, which are set at an angle, force the compost to be cross-mixed with ease at high speed so the compost is not too chopped up. The cool and dry parts are



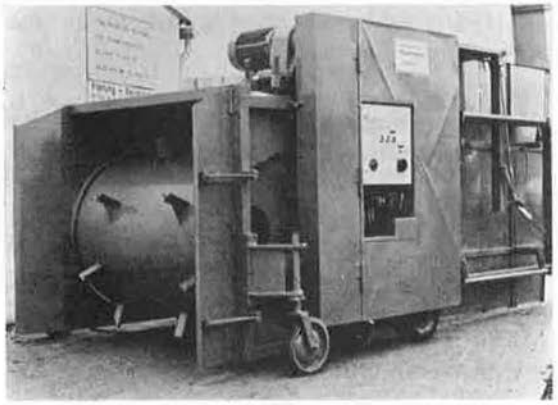
The cross-mixing mechanics

forced from the outsides to the middle of the stack, and the middle portions to the outside.

The special features claimed for the Cross-Mix are:

1. Enforced diagonal mixing of compost.
2. Great working capacity, gentle handling of compost.
3. Long-lasting rugged parts.
7. All hydrostatic powered.
5. Only routine maintenance.

No skilled driver or operator required.



Engeler's new cross-mix composting machine

Letter to the Editor

You will understand that your 1978 choice of Southport for the second time for your Conference affected me particularly, for my journey there to present a paper in 1957 was a very special experience for me.

I came by air from Berlin via Hamburg to London and Manchester, and then travelled by train to Southport, where I arrived far past midnight, one day too early. At Delphin-Hotel everybody had already retired to rest. But then, immediately, they were at my disposal and I was treated delightfully. Hardly ever have I experienced such an overwhelming hospitality!

At the Conference I was treated as a prominent guest, even the press informed the public of my arrival and my intention to report on our work at the meeting.

It was Gordon Schaffer who interested himself very much on my behalf. In later years he visited me several times. Unfortunately, I have lost any connection to him now. Werner Helm (born in Saxony, Germany), too, also came several times to see me, but now I have not heard from him for many years.

After that interesting meeting at Southport I travelled, together with Miss Gandy and Peter Flegg (who visited me also once), to Glasshouse Crops Research Institute, invited by Director Toovey. There they received me kindly and hospitably and we had a valuable discourse. After this I was a guest of Dr. Klein who was working at Darlingtons. He is descended from Austria, I believe, whence he had been exiled. We understood one another very well and have kept in contact.

On the occasion of the tragic death of George Powl and his sons I wrote to his widow. I had a letter of thanks from Ruth Powl, who is herself German; her letter is very precious to me. I am still in touch with some of the MGA members — Doris and George Baker, for example.

You know how I appreciated the high distinction of being appointed an Honorary Member of your Association. I am so glad that the second Southport Conference was another success.

Werner Arnold

Dr. W. Arnold

GEOFF GANNEY and his

'GROWING PAINS'

3rd October

At long last we have completed our two new peak-heat rooms; it seems we have been all year trying to hurry the operation along. Really are palatial buildings, and it seems a shame to knock hell out of them with steam and ammonia. We spent a great deal of time investigating the best vapour seals and the most flexible insulating material. Earlier experiences at 'Marigold', where we rebuilt peak-heat rooms, helped us find two extremely good, commercially acceptable, materials.

What about the 'tunnels'?

4th October

Compost extremely heavy at filling so decided to take the dwell off the press. No run-out underneath the trays but really too greasy to push down too hard. Must look into random weighing as too much variation will give us very uneven peak-heating — but new rooms should help with more even air and temperature distribution. What a year for composting!!

6th October

Block of plastic-clad spawn-running rooms nearing completion. Very pleased with extra plastic netting used and feel sure these sheds should be storm-proof. Can't make up our minds on heat input through black plastic outer layer or if this should be sprayed — last ones we sprayed the aluminium all came away in a thunderstorm.

9th October

Looking into renting overalls for pickers in order to step up hygiene awareness. Have to try to get them to pay half the weekly costs. Never sure how much clothing can spread *Verticillium*, but this should help anyway.

11th October

Odd sciarid adult on the wing in covered areas. Used normal DDT/Lindane smokes to bring them down. Have had some doubt at times as to efficiency of kill, but often the females bury their heads in the casing layer to get protection from the smoke. Tried playing Radio 1 to get some movement but only succeeded in the smokes not igniting properly!

Friday the 13th

Normal day for a mushroom farm!

15th October

Growth rapid over the week-end, and short Sunday pick will not cope this week, so we can look forward to a good number of flats on Monday. Had to water on large mushrooms in order to support the rest of the flush; hope they don't blotch too much. We have had less blotch in recent months but have heard disturbing reports of very severe outbreaks in the North-West.

17th October

Experimenting with a new strain and so far extremely pleased with breaks 1 and 2, easily producing 3 pounds, but then falling away. Casing tending to pan could be the problem; we shall have to change the technique to secure a good third break.

20th October

Beds picked down nicely for the week-end and we should be on top of picking on Monday — be good to have a clear week-end. Prices up to 70p a lb. for closed cups today, probably be similar tomorrow morning. Can't last, but higher returns are needed if we have any hope of re-investing in new equipment. Stop replacing for a couple of years and the farm very quickly begins to look 'tatty'.

22nd October

Extremely warm weather, and growth rate has suddenly gone mad; comments on prices must have been heard — bound to fall next week. Going to be a mass of opens early in the week; suppose we should learn and pick every Sunday. What it would cost as opposed to too many opens, loss in revenue for lower grades but an increase in output, would make a worthwhile budgetary exercise. Have to change casing date and solve the problem! Every time we do this, crops come in late and we are back at week-ends again . . .

24th October

Checked prices before departing to West Sussex; wish I hadn't bothered.

Had most interesting afternoon looking at Darlingtons Lucksfield farm and the excellent crops forming up. Always good to see old

friends again and to discuss the mass of mutual problems we continually have to endure in this mushroom business. Still, with a group of us trundling around under the guidance of Norman Barnard and Keven Jamieson, with John Bleazard keeping a low profile, Jim Gooding and Paul Middlebrook sucking hard on their pipes with their heads in the compost heap and Fred. Atkins profusely writing his shorthand notes, and yours truly asking obvious questions, we were in for a long session. A session, in fact, that ended up in the early hours of Wednesday morning at the Beach Hotel in Worthing, where sad farewells were paid to our good friend Geoff Emden. Many thanks, Geoff, and good luck with the painting. Our thanks to our hosts for a memorable visit to what is always a professionally-run farm, where one can always find mushrooms in profusion and can depart with the conviction that the little devils will grow if the formula is right.

25th October

A GCRI mushroom day is always an occasion to remember, maybe because there are too few study days, or perhaps it is the gathering of grower friends and old colleagues of the past that I enjoy. To cock an ear to the 'babble' of data converted from scientific findings to grower sense by my old friend (he says he's not so old) Joe Hussey is something to treasure. Great to tell him you've got phorids resistant to dichlorvos and to watch the disbelief on his face. 'You mean sciarids, boy; phorids don't get resistance' — Joe, what about the pyrethrum at the end of the summer? Not sure about continual spatial concentration of pesticides from safety and resistance angles. In summer we have so much fresh air at spawn-running there's no point in using it.

Jim Sinden's presence at any mushroom meeting can result only in that meeting being all the more worthwhile. It was tremendous to meet him once again and find him in such active form. I learnt more in twenty minutes' discussion than I have over the past year! Be fantastic if we could invite this great man to an annual conference again.

The facilities have multiplied at the GCRI as have the people involved in research; Parkinson would have been proud.

The sessions were varied with the major emphasis on pests and pathogens as would be expected — we as an industry have much to thank the Institute staff for in these fields. Much has progressed in the last fifteen years and normal day practice was not so normal before such work reached a conclusion.

I don't recall seeing too many mushroom crops or mushroom farm activities!

Didn't have much time to talk to Peter Flegg; he was furiously busy with the general organization, but wish him luck with progressing along the mushroom trail. Many thanks to the Director and Institute staff for a grand day; perhaps we can look forward to another next year.

26th October

Not sure should have gone away for two days. Atkins said it has broadened our minds — sure Jim's is broad enough, and I'm too slow to grasp this technical stuff! Did recognise the problems on return, and the operations not completed or slipped over — you know — watering on *Verticillium* before proper diseasing, uneven casing due to poor mixing, slack picking in not clearing flushes properly, building work slow due to lack of rollockings at builders etc.

27th October

Price increases: Spawn (sure this is due to a new growing medium based on All-Bran as it is becoming so regular), composts, baskets, concrete, hardcore, washers, nails, rubber bands, gypsum, toilet rolls, and now wages, of course — 1974, here we come again!!
Price decreases: Mushrooms.

29th October

Heavy fog at Market Harborough kept half the pickers out — superb first flush to pick — well up to those in the Home Counties — will be completely flat on Monday. Really must change the casing date!

30th October

Been wondering about the MGA Literature List published each month in the *Journal*. Very interesting to research workers (they have their own monthly abstracts from world literature, I have no doubt), but I wonder how many growers make use of it. Perhaps we could hear from enthusiasts?

31st October

Caught two witches in the pre-filters (snobbery really, as that's all we have as NOBODY CAN TELL US WHAT TO USE). One named INFLATION, the other (Bureau)CRACY.

Southport Conference, September 1978

THE CONSUMER'S VIEW OF MUSHROOMS

Nesta Powell

Publications Consultant

It is not often that a consumer is presented with the opportunity to have her say to a captive audience of producers!

In case you wondered, I am very fond of mushrooms and I do in fact buy them quite frequently. Whether my rate and volume of purchases, however, help you meet your production and marketing objectives, that could well be another subject for consideration.

As I said, I am fond of mushrooms, but it doesn't always follow that fondness equates with need. Maybe it's because we housewives do not necessarily look upon mushrooms as a food which we need. Some housewives I have spoken to recently appear to look upon mushrooms more as a decoration or a sort of garnish to add a spot of colour and taste to a dish. If they do, then I feel that it is your fault because of the way you promote your produce.

Knowing I had to face a technical audience the first thing I had to do was to find out something about mushrooms. The *Oxford Dictionary* was not very helpful — 'Edible kind of fungus — proverbial for rapid growth — sudden development or thing suddenly developed' — I began to wonder what it was talking about.

So then I studied the Ministry of Agriculture and Fisheries Manual of Nutrition — published by the Stationery Office. This was very helpful and interesting because here I learnt that mushrooms contain no carbohydrates whatsoever. They are rich in vitamin B, have 7 calories per 100 grammes, 1.8 grammes of protein per 100 grammes and only 0.6 grammes of non-cholesterol fat. They also contain 91% water and 75% of a mushroom is edible — 100% if you don't peel them.

I think this is a wealth of information that I have been lucky enough to stumble upon but I'm sure 'Mrs. Average Housewife' doesn't know all this.

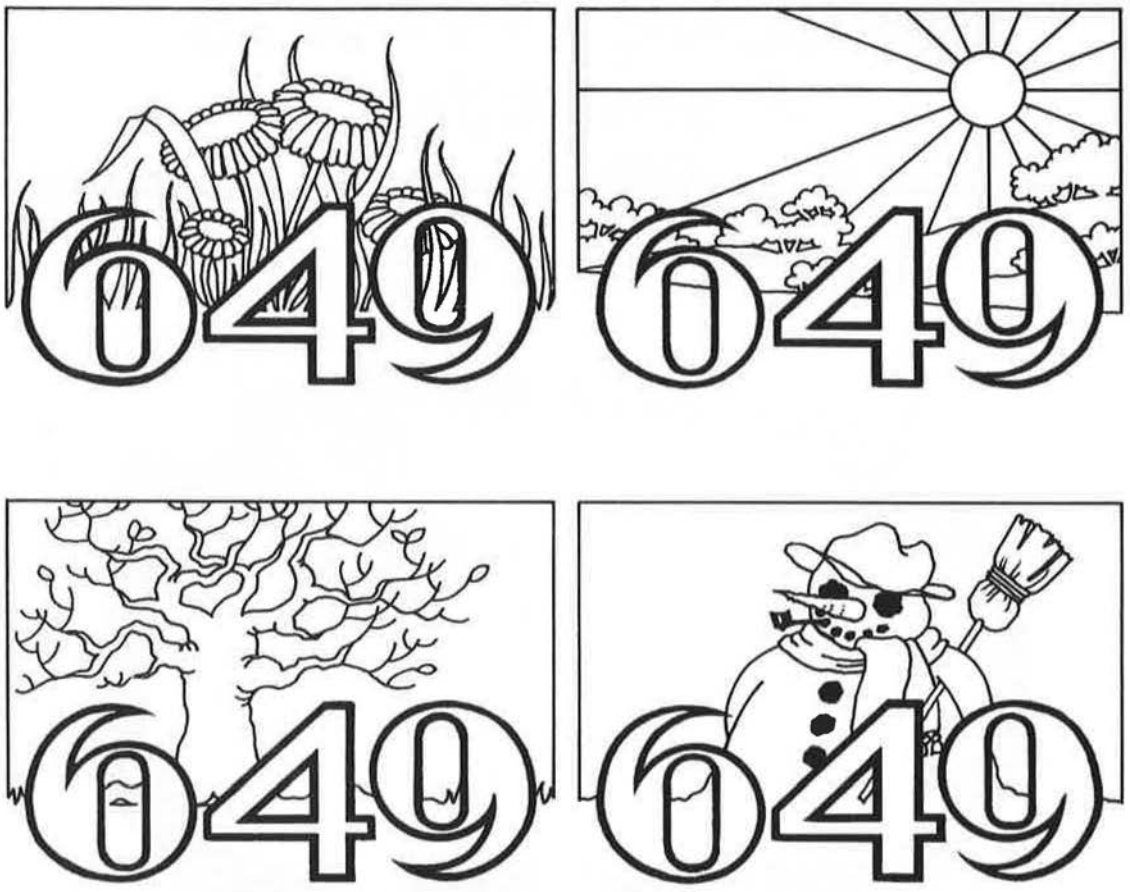
It is a sad thing, but really and truly I could manage without mushrooms. When I go shopping I'm not likely to forget my meat, potatoes and greens — eggs or biscuits. Only as an afterthought do I buy mushrooms — and that is if I see them.

Nesta Powell

I, like most families, have dieting and cholesterol 'fads' to cope with — maybe the people I cater for are peculiar, but teenagers are looking for foods that do not encourage spots, men are conscious of the danger of consuming too many high-cholesterol foods — and all my female friends are definitely dieting. So the produce I buy must cater for all these little whims.

But why do people eat mushrooms, and how many don't purchase mushrooms because in their opinion they are merely a delicacy?

> How many housewives realize that by eating mushrooms for breakfast or lunch they have filled their hunger pangs without increasing



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Recent side-by-side tests from our R & D department comparing the original 649 strain with present supplies show an increase from 5.04 to 5.45 lbs per square foot. For consistent quality control and increased yields choose 649 — the strain for all seasons.

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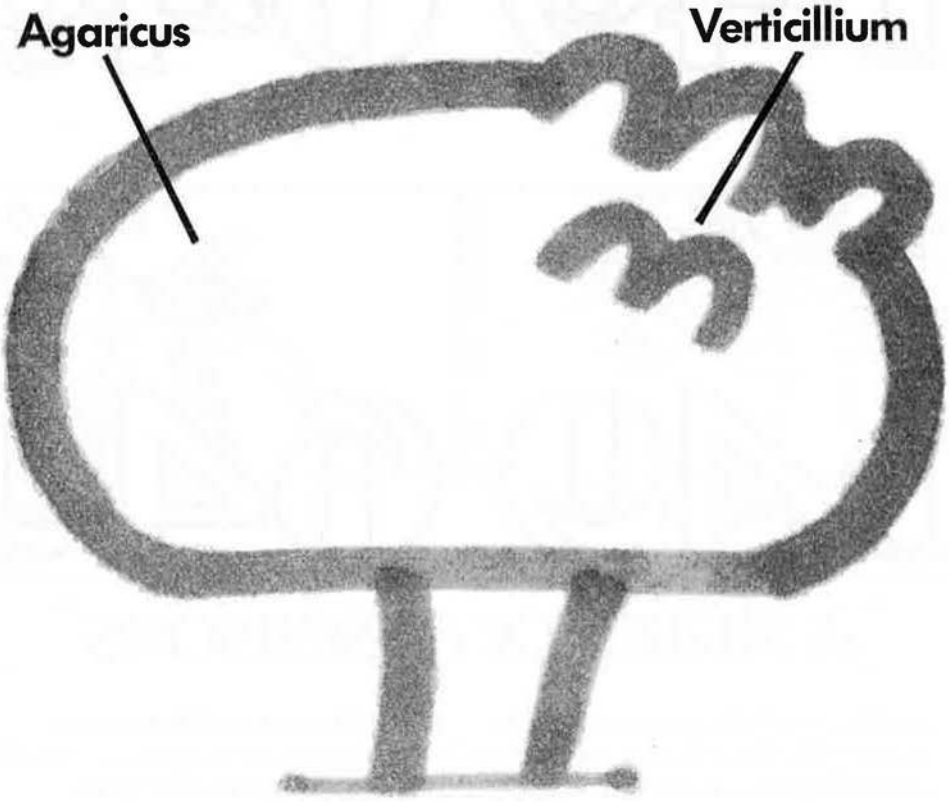
DACONIL 2787 W.75 from Midox can tell the difference between fungus and fungus



Verticillium (dry bubble) feels very much at home on a mushroom.

After all, they're both fungii together.

One you want. One you don't. But there are few efficient fungicides selective enough to discriminate between them.

So to keep your mushroom crop bubble free, you need something more effective. Daconil 2787 W-75, from Midox.

In packs of either 2½kg. or 25kg., Daconil is of wettable powder formulation and a broad spectrum, non-systemic fungicide. It combines a wide spectrum of crop safety when used as recommended. So harvesting could take place 24 hours after spraying.

Best of all it gives you highly effective control of verticillium and all its works.

So your mushrooms will never be seen in bad company.

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Tel: Smarden 541/2/3.

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their weight? How many housewives will replace the breakfast egg with mushrooms to reduce cholesterol intake? How many housewives realize that mushrooms should be an everyday purchase? They are inexpensive and should be part of a normally balanced diet. Why is the housewife so ignorant of this excellent vegetable?

I'll tell you — because you the mushroom grower, having gone to a great deal of trouble and expense to produce them, take it for granted that your job is finished and that it's up to the wholesaler and retailer to get over to the public the many values that mushrooms have to offer the housewife. She just doesn't realize what a good bargain is hers for the taking.

I know that a large number of housewives buy on impulse. They see attractive produce on the shelves — in the windows of fruit shops and supermarkets — fruiterers are skilled craftsmen in their trade — they have to be. It is just unfortunate that so often when it comes to mushrooms all you see is just a little basket on a shelf, near the scales.

Strong presentation and promotion of any product is a 'must' these days and even more so for an item such as mushrooms, which may not appear on the housewife's shopping list which she made out at home. If you are to sell all the mushrooms you produce — at a viable price — and expand the mushroom industry as a whole, you have no choice but to give retail selling extra punch and power. Your job, if you'll forgive my impertinence, doesn't finish when the mushrooms are grown and ready for distribution. Your responsibility is to grow the mushrooms, as you do today (and, may I say, excellently?) and your job is finished only when the mushroom is on the dining-room table.

It is indeed sad for us poor housewives that our view is so different from yours. You see mushrooms in the superb, pristine condition that I was also lucky enough to witness when I visited growers in Norfolk. I don't know what happens along the line, but it can be a different looking vegetable when I come to make my purchase. Now, I've been wondering, how do mushrooms get to the wholesale markets? When I travel around the country — driving along the motorways — I've never seen a mushroom van on the roads. There are Walls sausage vans — Geest lorries seem to be continually on the move — Scottish beef transport — in fact most transport designed and equipped specifically for the produce they are carrying.

As most of you know, in the States and other efficient countries, their transport is a priority for the produce they are shipping. Well, where are all our mushroom lorries — refrigerated with a well-advertised nom-de-plume, a brand name, or a pictorial view of your mushrooms displayed on one of the best advertising mediums in this country? I don't know what distance your lorries have to travel to the markets but the Norfolk people tell me they send deliveries to Borough and Spitalfields. And with use made of this free advertising medium your ad. could well be seen by hundreds perhaps tens of thousands of housewives — it's just as good as taking space in Women's Magazines.

May I suggest that you speculate to accumulate? It has been proved that promotions at retail level really do create customer awareness of a product — stimulate interest and increase sales.

Your 3 lb. and 1.36 kilogramme containers are too large for the quantity of mushrooms that I wish to buy. I am aware that to pre-pack puts up the price of the commodity, but since by just touching a mushroom you turn it brown, it seems sensible to produce containers that will hold the quantity that our friend, Mrs. Average Housewife, will buy.

It is obvious that mushrooms would be best packed by the producer in the same take-home package offered to the housewife at retail level. This would eliminate excessive handling in the supply line and allow *you*, the producer, to have a greater say in the method of presentation and at the same time establish your own brand identity.

Not many months ago — around March — I purchased from my local fruiterer a little basket of strawberries — Californian and expensive. How did I know they were Californian? Because it said so on the handle. Could we have something similar for mushrooms? The handle could carry the grower's name together with the necessary EEC regulations. You could well get kiddies pestering their mothers to buy just for the little basket to play with. It must have considerable potential for supermarket displays and when I'm shopping at my local fruit shop, this

must surely top my bag of potatoes, leeks and sprouts and be as precious to me as my little basket of strawberries.

The size of retail packs is critical, too — the housewife's needs must be considered, but it must be remembered that a popular 'good size' pack would increase the volume of sales and put up consumption whereas a smaller pack would have the reverse effect. The consumer tends to regulate the quantity she purchases by the pack on offer.

There is one spot of advice I can give you and that is to tell you, above all else, what the housewife seeks in all her purchases is VALUE FOR MONEY This means price, quality and presentation all contribute towards consumer loyalty and confidence of purchase.

Not wishing to commit a pun, I hope I have given you food for thought and in the not too distant future I will be able to visit my local fruiterer and purchase an attractive basket of buttons or fresh cups, conveniently priced, to top my basket of fruit and vegetables as part of my everyday shopping list.

If some of my earlier remarks seem highly critical, do please forgive me, because I now want to hand a large bouquet to your Publicity Department. I give full marks for the production of your mushroom wall chart — surely there's nothing more worthwhile than spreading the 'mushroom gospel' to youngsters, and your smiling mushroom on the brown and white poster is certainly attractive and eye-catching. Your Mushroom Week, due to start almost any minute now, sounds a wonderful idea and I shall keep a look out for those shop windows.

But I think I've been serious for long enough. We're told that crusts make your hair curl, spinach makes you strong, and avocadoes are an aphrodisiac. What of mushrooms? I am told on good authority that the French appear to eat more mushrooms per head than we do and are said to be ardent lovers — not that I've experienced this myself, of course, but is this because of their diet? Only by eating more mushrooms will we ever find out!

ADVERTISING IN MOTION

Nesta Powell suggested at Southport that we were ignoring the advertising potential provided by our transport vehicles. 'How do mushrooms get to the wholesale markets?' she asked. 'I've never seen a mushroom van on the roads'. Geoff Ganney's cryptic comment was: 'Try travelling at midnight . . .' It would be interesting to see a few pictures of vans bearing mushroom slogans. The Editor would be pleased to reproduce a selection of them in the *Journal*.

Jim Gooding reports on . . .

MUSHROOM SUBJECT DAY AT GCRI

When the Editor of the *Journal* invited me to write a report on the Open Day on 25th October and I agreed, he must have caught me in a weak moment. Basically I believe his idea was to obtain a grower's view of the proceedings. Bearing in mind that on any subject to do with mushrooms no two growers think alike, these are my own personal views.

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In the invitation to attend I read 'The Subject Day will provide an ideal opportunity for mushroom growers to bring themselves up-to-date on mushroom research'. I felt this must not be missed.

About 150 people consisting of growers, research workers, educationalists and members of ADAS were welcomed by the Director, Dr. Rudd-Jones, in what was to me a new building, namely the Bewley Hall. What a magnificent building and how much better than being welcomed standing out in the open as previously has happened!

After an introduction by Peter Flegg, the mushroom project leader, we were divided into four groups so as to allow us to be spread evenly over the six subjects headed 'Keeping up-to-date'. So off we went, following our guide holding a board, rather like tourists who had just arrived on a package holiday. (Probably I thought this as the weather was so glorious.)

My first subject was named 'A Fresh Look at False Truffle'. This subject I was most interested in as I have just come out of a bad attack of this competitor. Peter Bisset, who dealt with this subject, and incidentally had some good illustrations and photographs, explained to us the probable sources of infection, damage caused and methods of control. What I am sure he did not appreciate is the amount of crop loss one can sustain by bad attacks of this disease. He also tried to convince us that the spores of False Truffle could be killed by far lower temperatures than I for one would like to risk at cook-out. He was certainly enthusiastic but I am sure he will agree that a lot more work needs to be carried out on this subject. I would have liked time to question Mr. Bisset further, but we had to move on.

Doreen Gandy's department had gone to a lot of trouble in producing some good illustrations and masses of figures on various controls for *Verticillium*. From this, apparently only one or two are still viable. I felt that nothing new had come out from a grower's point of view on this subject. I agree that it is important to keep telling growers the same thing on farm hygiene, but personally feel that this is more the duty of ADAS.

Our next subject was 'How Mushrooms Work'. Before either David Wood or John Hammond opened the discussion we had to read all the information on some brightly coloured boards. I felt like a small schoolboy being told to study the blackboard or have the cane. The whole subject was far above my head and the unintended impression that Dr. Wood was talking down to us certainly made sure there were no questions. No doubt more research is essential, but it would have helped if the learned Doctor had come down to my level.

Flies and Insecticides

The next subject 'Trouble with Flies' was nothing to do with fishing or the male members of my group. Philip White took us through the identification of Phorid, Sciarid and Cecid flies and their control. Whilst I was listening to the talk I was trying to identify the flies that kept humming around my head. On the whole this was well prepared and executed, but once again I left feeling that not enough significance was placed on the losses that can result through bad attacks of any of these pests. I still do not feel that the remark that Phorids do little or no damage can be correct.

It was now time for a lunch break and an opportunity for us to talk to old friends and make new acquaintances in the mushroom field. Having not booked the packed lunch, a party of seven of us took off to the nearest hostelry for a drink and a snack and — guess what? Yes, we talked mushrooms.

When we arrived back at the Institute I took a quick look at the lunchtime exhibits but found nobody to discuss them with. No doubt this was my own fault as I should not have spent so much time talking to Dr. Sinden.

The afternoon sessions consisted of 'Insecticides — Mushrooms can Bounce Back' which I found most interesting and evidently much work had been done on this subject which was completely new thinking to me. Maybe there's something in saying 'What you lose on the roundabouts you gain on the swings' as far as additions of insecticides to the growing medium are concerned, as pointed out by Joe Hussey and Ian Wyatt.

The last session for our group was on 'Breeding Methods for Mushrooms'. Timothy Elliott explained to us methods of cross-breeding by spores and by chemical means. This I feel is most important work, the benefits of which will no doubt be handed on to us growers through our spawn suppliers.

ROY SPELLER of Nazeing, Essex, a long-established mushroom grower, says:

'I have been using Weldon's DPM for some years and am very happy with it'

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The day was completed by a look into the future by Philip White and Peter Flegg. The pleasing part of this is that evidently the mushroom scientists are certainly looking to the future, but dare I add that no-one knows what the future holds?

Summing up, I felt that the GCRI had gone out of their way to explain some of the work they were carrying out and they certainly tried to look after our needs. The trouble is that scientists and growers are never quite on the same wavelength, and there is always that small barrier between us called profit. But I am sure that this can be whittled away by more frequent meetings of both parties on farms and at Area Meetings.

Winston Alderton *looks . . .*

TOWARDS STANDARDIZED COMPOSTING

Mushroom growers are continually seeking a more standardized compost and the increasing research and experimentation into straw — the recent conference at Oxford is evidence of this — is just one more effort towards the production of a finished and reliable product.

Weldon's Agricultural Products Limited, of Methwold, Thetford, Norfolk, is one of the firms seeking to increase its involvement in the UK mushroom industry. The firm specializes in straw products and the re-cycling of deep-litter poultry manure for cattle feed and, in addition, the production of Dried Poultry Manure as a fertilizer and an additive to mushroom compost.

Weldon's have been associated with the mushroom industry for some years although a set-back occurred when, a few years ago, arsenicals in the poultry industry raised something of a scare. Nowadays, the use of arsenicals as an aid to rapid growth in poultry is a thing of the past and arsenicals are used only occasionally as a medicant. Says Les S. Pymar, a Weldon director: 'We are advised even when arsenicals are so used and we can now guarantee that such deep litter is never sent to mushroom growers, just to be on the safe side.'

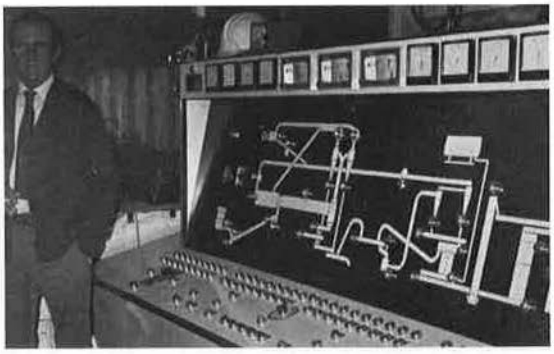
Now turning out 500 tons of Dried Poultry Manure and 300 tons of straw products each week, Weldon's have come a long way since the plant was originally owned by the Ross Poultry Group in the middle Sixties. In 1970 Pymar left Ross to join Derek Weldon, and it was the latter who, following a High Court action over objectionable smells from the plant, devised a system of expensive after-burning which eliminated the problem.

Each consignment of deep litter is subject to a sterilization process involving heat treatment of 700°C, with regular sampling of the raw material on arrival, immediately after heating and at the bagging stage. Packaging is in 25-kilo polythene bags for ease of handling and on-farm storage.

DPM initially has a moisture content of 35–40% but, following heat treatment, this is reduced to 10–12%.

Says Pymar: 'The drying process is somewhat expensive but it does enable us to offer a standardized product with a Nitrogen content of 4%, Phosphate 3.2% and Potash 2.25% and, at £39 per tonne ex-works and £45 per tonne delivered, this means the cost to the grower works out at around 45p per tonne of compost, on the basis of 100 lb. DPM per tonne of horse manure. Our DPM eliminates the need for a grower to collect his own deep-litter and is a

Part of Weldon's processing plant



Les Pymar in the electronic control room

useful contribution towards compost standardization. DPM, as produced by us, is a sterile product as against the possible hazards of using raw poultry manure direct from the farm. It eliminates too the costly business of labour and transport and reduces composting smells.'

A long-established mushroom grower who has used Weldon's DPM for some years is Mr. Roy Speller of Nazeing, Essex. He says: 'I've used Weldon's DPM for some years and am very happy with it.'

SOUVENIR SNAPS FROM SOUTHPORT

Southport in September 1978
Continuous group discussions (*left to right*): Jim Gooding, David Stanley-Evans, Ron and Kathleen Edwards, Jane and Molly Middlebrook, and Connor McNeice

(*Left to right*): John Rodwell and Jon Peterson, both resident in California, joke with Paul Middlebrook

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OTHER WELCOME MEMBERS AT SOUTHPORT

It is always a pleasure to meet the contingent of Irish growers at our Conferences. Pictured here are a few (*left to right*): Eddy Daly, Connor McNeice, Malachy Kernan, Jim Mallon, and Tommy Lappin

Gerard Derks (Italy) could be discussing tunnel composting — or was it spawn? — with Jean Laborde (France)

MGA Literature List

Compiled by Dr. R. L. Edwards

Copies of literature cited are available from the MGA office, Science Reference Library, or Dr. R. L. Edwards, **AS INDICATED.** See *Journal* No. 47, Nov. 1976, page 378.

SRL — Science Reference Library.
MGA — Mushroom Growers' Association.

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Reference number
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Name of Journal, volume (number), pages.

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MGA can supply **only** copies of papers **marked MGA in the List**, and Dr. Edwards **only those marked RLE.**

The field of interest covered by a paper is indicated as follows:

C. Commercial, economic
P. Practical growing
R. Scientific, research, experimental

PR. More interest in research. **Anon.,** 1978 (in Dutch) *Groenten en Fruit*, **34** (12), 73–75 RLE

PR. Traditional tray growing takes a new course. **Anon.,** 1978 (in Dutch) *Groenten en Fruit*, **34** (10), 73–75 RLE

C. South Korean mushroom growing takes off. **Anon.,** 1978 (in Dutch) *Groenten en Fruit*, **34** (9), 59 RLE

R. Growing *Coprinus comatus* (Muller in Fl. Dan. ex Fr.). **S. F. Gray,** 1978 (in Dutch) *De Champignoncultuur*, **22** (7), 237–39 MGA

C. Spanish mushroom production. **M. H. A. Geurts,** 1978 (in Dutch) *De Champignoncultuur*, **22** (7), 247 MGA

P. Dutch mushroom school; adaption of the school mushroom farm. **P. J. C. Vedder,** 1978 *De Champignoncultuur*, **22** (7), 251–55 MGA

R. Micro-organisms and viruses as causes of disease in man, animals and plants, especially in the cultivated mushroom. **G. A. Dutsch,** 1978 (in German) *Der Champignon*, **205**, 9–23 MGA

R. The potassium content of mushrooms. **R. Seeger,** 1978 (in German) *Z. für Lebensmittel-Untersuchung und-Forschung*, **167** (1), 23–31 Includes cultivated and a very wide range of mushrooms. SRL

R. On the nutritional value of edible mushrooms. **S. M. Mäkinen,** 1977 (in English) *Näringsforskning*, **21** (4), 287–89 From Institute für Naringslara, Helsingfors University 007 10 Helsinki 71, Finland. SRL

R. Tin and iron contents of canned mushrooms. **P. Nehring,** 1977 (in German) *Industrielle Obst-und Gemüseverwertung*, **62** (2), 576–78 SRL

R. Exogenous regulators in the mycelium of *Pleurotus ostreatus* after exogenous application. **K. Vinklarkova** and **Z. Zladky,** 1978 *Folia Microbiol.*, **23** (1), 55–59. From Dept. of Biology, J. E. Purkyne Univ. 611 37 Brno, Czechoslovakia.

R. Biochemical induction of fruiting in *Schizophyllum*: Isolation and preliminary purification of an inducing substance from *Agaricus bisporus* mushrooms. **S. Rusmin** and **T. J. Leonard,** 1978 *Plant Physiol (Bethesda)*, **61** (4), 538–43 From Dept. Botany, Univ. Wisconsin, U.S.A.

R. Natural metabolic regulators as anti-tumour agents. **F. S. Vogel,** 1977 *J. Neuropathol. Exp. Neurol.*, **36** (1), i–vi From Dept. of Pathology, Duke Univ. Med. School, Durham, NC 27710. U.S.A. SRL

R. Thermophilic fungi associated with the cultivation of *Agaricus bisporus* (Lange) Singer (Mushrooms). **A. Eicker,** 1977 *J.S. Afr. Bot.*, **43** (3), 193–207 SRL

PR. Ventilation of the growing chamber in relation to mushroom yield. **L. A. Devochkin,** and **I. U. I. Kaozkin,** 1976 (in Russian) *Kartofel Ovoshchi* (Sept. 1976), **9**, 26–27 SRL

PR. Semisynthetic substrate for mushrooms. **L. A. Devochkin** and **I. U. I. Kazokin,** 1976 (in Russian) *Kartofel Ovoshchi* (May 1976), **5**, 32–33 SRL

PR. Substrates and mushroom strains on the 'Leningradsku' State Farm. **V. A. Bryzgalov** and **B. Khalmirzaev,** 1976 (in Russian) *Kartofel Ovoshchi* (Sept. 1976), **9**, 23–25 SRL

R. Preliminary studies on the fructification in culture of *Pleurotus eryngii* (Fr. ex D.C.) Quelet. **R. Cailleux** and **A. Diop,** 1976 (in French) *Rev. Mycol.*, **40** (3), 365–88 From Musée Nationale d'Histoire Naturelle, 12 Rue Buffon, Paris 5.

PR. Cultural peculiarities of strains of higher Basidiomycetes from the genera *Pleurotus* (Fr.) Quel, and *Lentinus* (Fr.) **I. A. Dudka, V. V. Shepa, S. S. Vasser, I. M. Soldatova, I. V. F. Frid, A. A. Isachenko,** and **T. M. Skybits'ka,** 1976 (in Russian, English summary) *Ukr. Bot. Zh.*, **33** (6), 582–96 SRL

R. Microbiological processes during the preparation of mushroom substrates. **A. A. Dvornina** and **M. F. Iakimova,** 1976 (in Russian) *Izv. Akad. Nauk. Mold. SSR. Ser. Biol. Khim. Nauk*, **3**, 80–82.

PR. On the progress in sawdust cultivation of mushrooms in Japan and applied mushroom science. **I. Hiroe,** 1976 *Trans. Mycol. Soc. Japan*, **17** (3/4), 583–86 SRL

R. Studies on cultivation of *Tricholoma matsutake* (S. Ito et Imai), III. Effects of growth-promoting natural products on the vegetative growth of *Tricholoma matsutake* **M. Ogawa** and **M. Kawai,** 1976 (in Japanese, English summary) *Trans. Mycol. Soc. Japan*, **17** (3/4), 492–98 SRL

R. IV. Studies on its spore culture on a solid medium. **M. Kawai** and **M. Ogawa,** 1976 (in Japanese, English summary) *Trans. Mycol. Soc. Japan*, **17** (3/4), 499–505 SRL

Dr. B. B. Stoller describes . . .

A CASING MADE WITH SPENT COMPOST

At the Tenth International Congress in France, June 1978, I presented an article on 'Synthetic Casing for Mushroom Beds'. I described considerable experiments with Synthetic Casing, prepared according to my patent, US 4,079,543, 21st March 1978.

While my patent on synthetic casing covers all water-absorbable materials, plus activated carbon, the one experimented with mostly in earlier experiments was shredded newspaper and activated carbon. The synthetic compost with shredded newspaper gave very good yields, despite the Brown Mould.

As stated in the article presented at Congress, why use shredded newspaper when 'spent compost' is so abundantly available on mushroom farms? In fact, spent compost creates a nuisance on how to dispose of it on many farms.

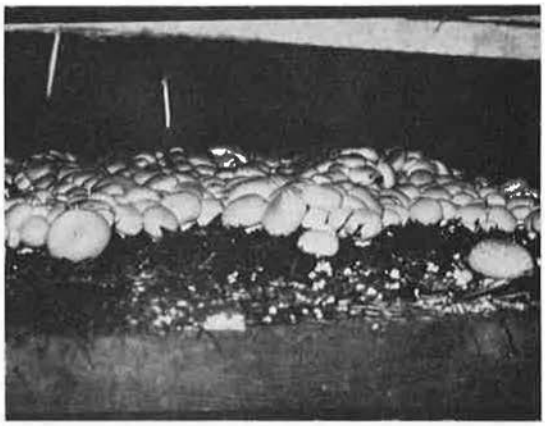
In my article I describe experiments on use of Spent Compost on Casing, and how to increase yields on peat by supplementing it with activated carbon.

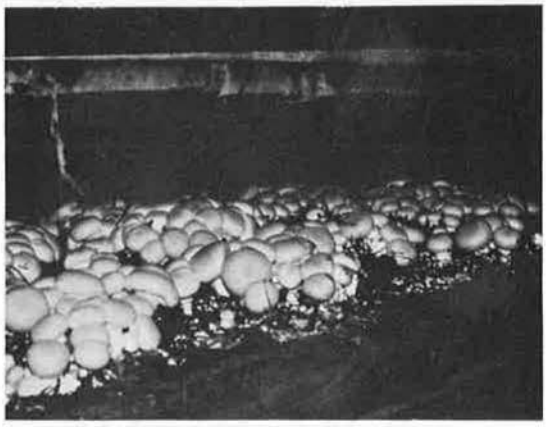
In recent experiments we have attempted to avoid pressing out the wash water through a screen, by merely running off the water from the mixer, then adding again an equal volume of water. This procedure is to avoid the necessity to remove washed compost from mixer and then replace again for mixing with limestone and activated carbon.

The yields from a casing prepared from spent compost as described, with activated carbon and limestone, have been very good. Photos of mushrooms growing on trays cased with Spent-Compost casing at our Ariel Mushroom Farm are shown.

We are now in the process of testing the machinery that will be most efficient for this job. Since the material, spent compost, is of necessity available on all mushroom farms, also *sterilized* before removing old crop from mushroom houses, it is a 'natural' that spent compost will be speedily adopted as a casing for mushroom beds.

Warning in Using Spent-Compost Casing: The moisture content of this casing must be 80 to 90% almost dripping wet when cased on beds. If the moisture content of this Spent-Compost Casing is not very high, then spawn will grow thickly through the casing without producing even one mushroom!

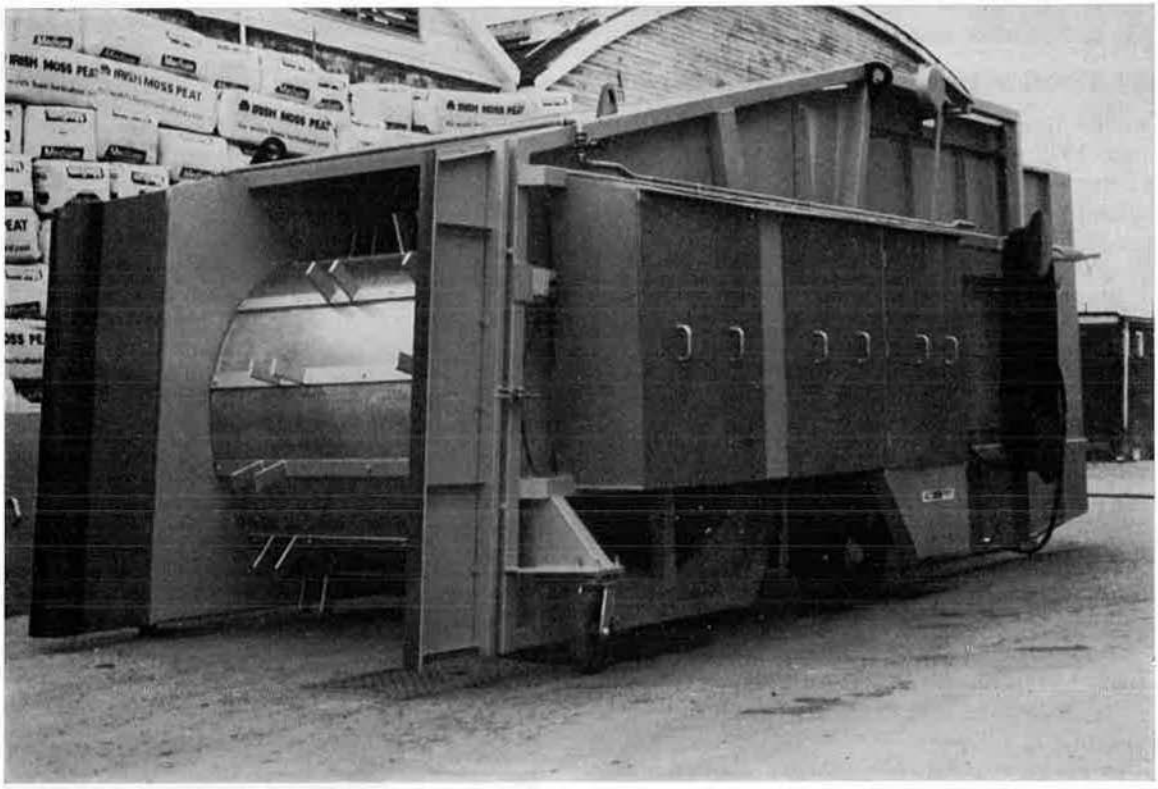




Spent Compost. The compost left after the crop is harvested, so-called 'spent compost', is a valuable fertilizer. But where there is a concentration of growers in a small area, there is a poor, if any, market for this material. Some growers put it out into the field for a few years, then prepare it for casing. The loss in casing material is considerable, so this method of disposal and reuse is unsatisfactory.

It is logical to attempt to reuse it in mushroom growing. Considerable nutrients have been removed, so the 'spent compost' is more suitable as a casing than an additive to compost. Accordingly, I tested its use as a substitute for shredded newspaper. The following procedure was followed:

1. 'Old' house with compost is heated until a bed temperature of 140°F is reached. Then beds cooled. This step is standard procedure in compost removal.



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2. The surface casing of one inch, peat or soil, is skimmed off. In this way, old mushrooms left on bed are removed. This old casing may be pasteurized, so as to compost or destroy mushrooms and stumps left in casing. The casing may be reused. In the past, I have removed this layer; however, it was not practical unless the compost would be used. This is my intention now.
3. The compost is air-dried (but preferably oven-dried), ground up, and reused in place of shredded paper. (In current experiments, we are attempting to reuse spent compost without drying.)
4. The dried, ground, spent compost is then formulated as follows: First, it is fumigated with propylene oxide, at a rate of 10 ml P.O. per pound of dried compost. After aerating and removing P.O., 1200 grammes of spent compost is mixed with 30 grammes of A.C., 500 grammes of granulated chalk, and 500 ml of water. The results of 6 replicates are as follows:

Average of 6 replications of spent compost formulated as casing is 3.7 lb. per sq. ft. in 30 days. From 2 of the 6 pails, the average yield was 5.3 lb. per sq. ft. Accordingly, spent compost could be useful as a substitute for shredded paper. Other tests indicate that spent compost can replace 25% of shredded paper casing without reducing yield.

In re-thinking the value and opportunity for preparing a casing from this so-called spent compost, its use without drying is logical. In fact, several years ago at our Ariel Mushroom Farm we did wash such compost and case trays with it. The crop came in a little slower, but the yield was satisfactory. But there was not enough incentive to go into the engineering of such preparations as long as peat could be bought at a reasonable price. Now, with ever-mounting cost of peat, the time is ripe for using 'spent compost' as a substitute.

As for drying the compost above, the peat casing is stripped off the compost. The peat can be re-used. The compost is dumped into a paddle mixer and mixed with water. After mixing in water 2 minutes, the water is decanted and the wet compost is thrown on to a screen. The excess water is pressed out and washed compost is replaced in mixer again, then sufficient granular limestone is added to increase pH to 7.0 (a little less than a pound of limestone for a pound of original spent compost (3.4)). Then about 1.5 to 2% A.C. is added, mixed one minute, and the material is ready for casing trays or beds.

The water wash is to reduce the conductivity or soluble salts to the same concentration as exists in peat. A wash of 1 : 4 does it. Also, by washing, the finer particles are removed and a more or less fibrous, porous material is left.

So here we have a mushroom farm waste, hard to dispose of, yet valuable for growing mushrooms. The material is pasteurized in cook-out at end of crop, a costly procedure now a wasteful necessity. The A.C. added to the washed compost should increase the yield in proportion to shredded paper, plus or minus A.C.

It is really amazing that it took so long for me to think of this procedure; probably others have not thought of it yet. But, as often said, necessity is the mother of invention. With increasing cost of peat, we need a substitute. Use of spent compost may be more practical and less costly than using shredded paper.

The Addition of Activated Carbon to Peat

To peat as prepared for farm use, activated carbon was added. The pH of the peat was 7.4; moisture was 68%. To 1300 grammes of peat, 10 grammes and another 20 grammes of A.C. were added.

The yields: no A.C. — 3.28 lb. per sq. ft.
10 gr. A.C. — 3.30 lb. per sq. ft.
20 gr. A.C. — 4.13 lb. per sq. ft.

Accordingly, the addition of A.C., at the rate usually added to synthetic casing, namely 20 grammes, increased the yield by almost a pound per sq. ft. At the time we tried adding A.C. at the farm, we had a gnat problem; so at this time, whether due to gnats or not, the manager reported no increase where A.C. was added. There was no urging to repeat these experiments because we are trying to find a substitute for peat.

However, with difficulty of Brown Mould on shredded paper and very little on peat, we decided to test the practicality of adding A.C. to peat.

But despite the Brown Mould on the synthetic casing, 3.6 lb. per sq. ft. was obtained on a 'single' 3,500 sq. ft. But until shredded paper is

abundantly available, peat plus A.C. may be necessary.

'Since this article was written, experiments were repeated at our Mushroom Farms. It was evident from the density of mushrooms on the peat casing, the mushrooms were about twice as numerous on the peat to which Activated Carbon was added. Also, in peat where the pinning was slow, the addition of Activated Carbon stimulated fruiting. So Activated Carbon is useful as an additive to peat casing.'

Editor's note: Sinden has been advocating spent compost as a casing material for many years. In *Mushroom Journal* 32 (August 1975) I suggested trials with surplus, peak-heated compost soaked in water to remove soluble salts and spin-drying it to 75%. Stoller has blended the two ideas.

Stoller comments: I used washed, spent compost, but the mushrooms grew too slowly without activated carbon. You may be interested to know that the researchers at Penn. State College have published that there is no advantage in washing spent compost; they advise composting spent compost in fields for several years, as is the practice in Pennsylvania today.

The Editor asked: Why remove the peat casing before you wash the compost?

Stoller replied: For several reasons:

1. Casing usually has many dead mushrooms or buttons, which would add to soluble material and may harbour diseases as in spores.
2. Peat holds six times its weight in water, whereas compost only about two times. Accordingly it is more difficult to extract solubles. (This is why I warn to keep spent-compost casing saturated with water.)
3. The particles in peat would make the casing more dense, whereas I describe in my article 'by washing, the finer particles are removed and a more or less fibrous, porous material is left'.
4. Removal of peat casing makes for a homogeneous casing of a uniform material. If peat and casing were together there might be uneven amounts of each, producing variable results.

We intend to use the wash water for fertilizing vegetables.

Introducing Other Editors . . .

1. TIMOTHY A. KING

Some people ignore newspapers, relying on radio and television. Some growers take journals and bulletins for granted, and neither know nor care what goes on before as well as behind the scenes to get these periodicals on their desks.

But editors have to care, and as a professional I plan to introduce to you a number of colleagues who produce mushroom periodicals in other countries.

As the USA is the world's leading mushroom producer, it is appropriate that the first in this series should be Timothy A. King, editor of the American Mushroom Institute's monthly *Mushroom News*.

Tim King did not grow up in the mushroom business. He graduated in 1970 with a Bachelor of Arts degree in journalism and immediately became involved in the US Army as an information specialist and was a broadcast journalist in San Antonio, Texas.

Having completed his Army stint he returned to Pennsylvania and began work in radio news with a small Philadelphia-area radio station and as a correspondent with the *Philadelphia Evening Bulletin*.

His association with the mushroom world began as executive secretary of the industry's Action Team — an organization formed to raise funds to improve mushroom promotion. 'There was a declining market', he told me, 'due to FDA recalls and broad-based adverse publicity about canned mushrooms and also as a result of increasing imports of canned mushrooms from the Far East'.

When John Bovenkerk retired as AMI Executive Director nearly four years ago Tim applied for and was appointed to fill the vacancy. 'I have loved the position ever since', he added.

Tim King

The Editor introduces . . .

Dr. Paul J. Wuest

There have been criticisms of the Tenth International Congress in France, and I am sure the organisers realise they were too ambitious; but everything was generous to the point of extravagance, warm, romantic, immensely stimulating and incredibly detailed, and the food and the wine, as well as the ineluctable confusion, typically and beautifully French. And the opportunities to meet old friends were endless.

I was particularly happy to renew my contact with Paul Wuest, Professor of Plant Pathology at PSU, who is to be Guest Contributor to the Hayes Seminar at Aston later this month. I asked him about his career as a mushroom pathologist.

PJW: Although raised in Philadelphia not far from the building that housed our Continental Congress some years ago, my father was and continues to be an outstanding amateur rose grower. As a boy I helped him in the garden, not always with a co-operative spirit, but his roses, vegetables, and flowers offered enjoyable moments. When it came time to choose a college curriculum, I chose horticulture and earned a B.S. degree in 1954 with minors of agronomy and botany. Thereafter, I decided to pursue a graduate degree in plant pathology and it was during this training that I was exposed to mycology. I was awarded a Ph.D. in 1963 for a dissertation dealing with the root-knot nematode. At that time I was fulfilling a military commitment and was assigned to an agricultural laboratory where I conducted research on the epidemiology of a disease that was ravaging tobacco growers in the UK, Europe, and Africa — blue mould. On seeking full-time employment prior to leaving the Army, Penn. State had a vacant faculty position in extension work on mushrooms, and I was invited to apply. I began my work at Penn. State in the Department of Plant Pathology on 15th August 1964. Fortunately for me, Dr. Lee C. Schisler accepted an appointment in the same department but responsible for mushroom research on 1st September 1964; his advice, counsel, and experience were generously shared during my early years, and ever since.

FCA: You are well known throughout North America as a lecturer and diagnostician on mushroom problems. Where and how did you gain such competence?

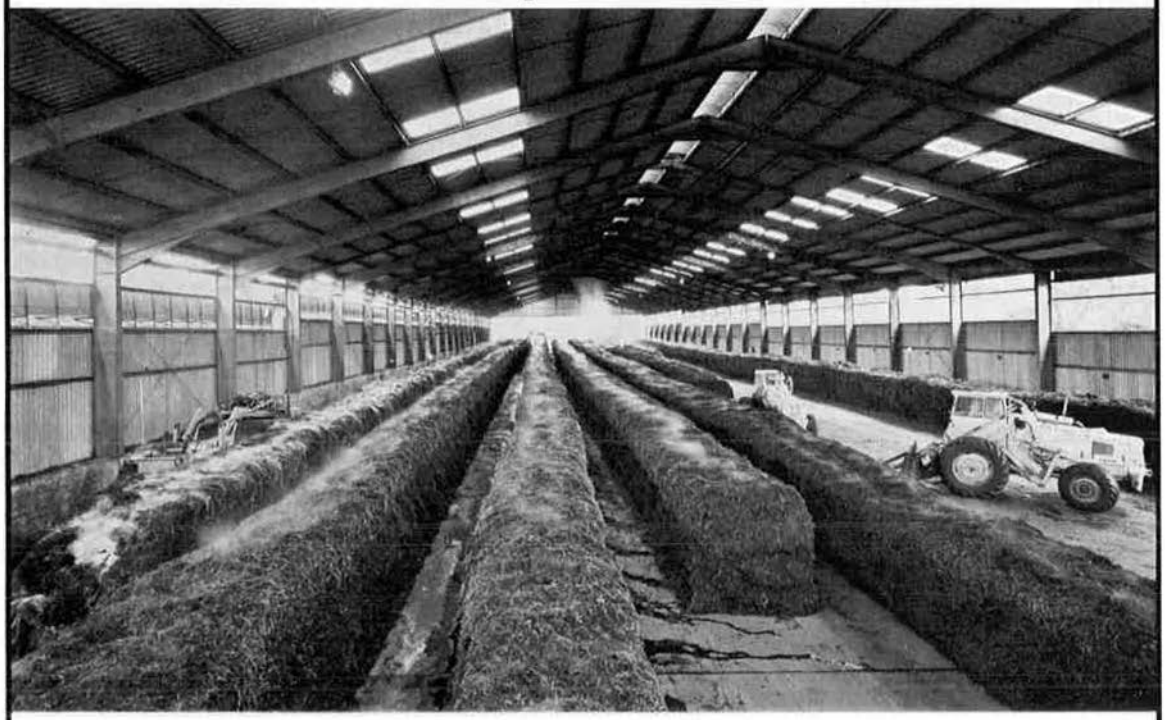
PJW: I read articles and spoke with, or rather listened intently when experienced growers and scientists spoke, sifted through the 'art' and, having an innate tendency for quantifying, came up with a bit of science. As important, and probably more important, was my experience on the long end of a pitchfork at our Mushroom Research Centre and on commercial farms of all sizes. In Extension I learned early on that if I could show someone what would happen if a specific practice was modified or incorporated, a grower would believe my opinion. This approach, though quite fundamental, caused growers to learn and me to gain more experience.

FCA: What do you consider your major extension accomplishments?

PJW: Perhaps the mushroom growers would be the more qualified to answer that question; even so, I'll offer a few opinions. Once I had a grasp of the crop it was evident that composting is where it all begins, so I conducted lecture-type or question and answer-type clinics plus demonstrations on how to conduct a proper Phase II. This emphasis, not only by me but by Dr. Schisler, led us to a joint research venture with Dr. Morris Schroeder which resulted in the design and field evaluation of a forced-air ventilation system for commercial mushroom houses which is referred to world-wide even today.

Another area which needed attention was pest control, both insect and disease. In the late 1960's Dr. R. Tetrault and I published a guide to pest control for commercial mushroom growers which was a first for North America, and perhaps other parts of the world. This guide offered a logical sequence in farmers' language of when, where, and how to apply pesticides. Today's pest management schemes are much more sophisticated, and this is a tremendous amount of progress in one decade.

Watch this space .....



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FCA: Another facet of your work deals in graduate training. Can you tell me something about students who have worked with you?

PJW: Much of the research I've done has been accomplished via graduate education, although not all of it. Normally, a student completes the requirements for the M.S. degree in 18 to 24 months when working under my tutelage. They have worked on *Verticillium* disease etiology, epidemiology, and the influence of other factors — casing treatment with aerated steam — on disease development. Three have concentrated on Virus Disease etiology, two have looked into the nature of compost-invading fungi and the diseases they cause, and one has compiled an extensive bibliographic compilation for a number of major mushroom diseases. Since completion of degree requirements, about half the students have entered the mushroom industry, a quarter have continued in academic positions, and the remaining have devoted themselves to research in areas other than mushrooms.

FCA: That is a rather broad spectrum of research interests, but you indicated that there are some areas where students haven't participated; will you mention a few?

PJW: Certainly. Recalling in a chronological order, my efforts have been devoted to improved or alternative casing material, i.e. spent compost, and improved treatment methods; chemical control of disease with Benlate plus the nature and dynamics of benomyl tolerance in *Verticillium*; alternate hosts, other fungi, which some mushroom pathogens can parasitize; factors affecting symptomatology of Virus Disease; the cause of mummy disease and its nature; storage methods for master spawn cultures; methods to quantify resistance to disease of various pathogens; how different phase II composting systems affect shrinkage; plus a few others.

FCA: You have listed an impressive array of credentials, yet few mushroom growers in the UK and Europe know you. Have you ever visited either of these areas?

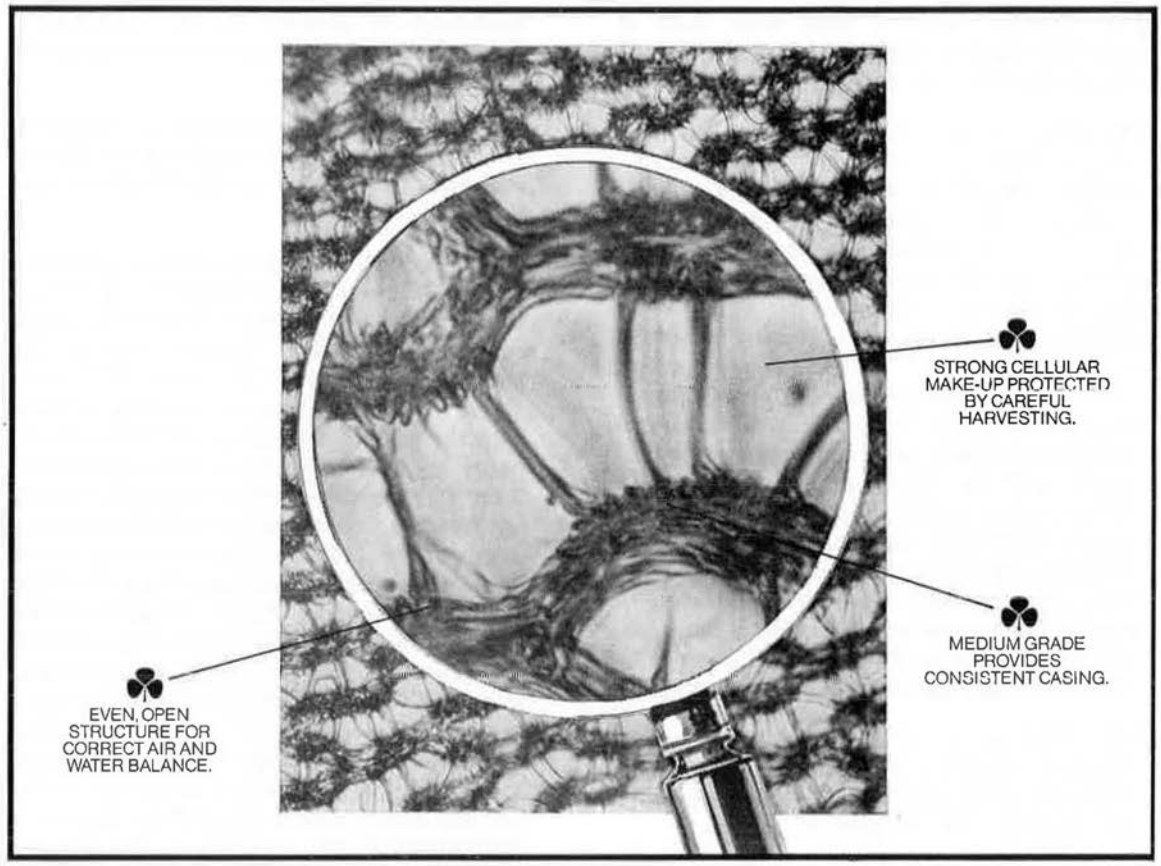
PJW: Only on two occasions, once in 1965 when I attended the International Congress hosted by the Dutch, and now in France. My knowledge of growing on the Continent is limited at best, and I have never been in the UK.

FCA: Although your experience is limited do you have any thoughts regarding mushroom industries or research on the Continent and the UK?

PJW: Indeed I do, especially seeing and hearing what I have during this Congress. There are three areas that strike me as noteworthy when compared to North America. One is the nature and quality of the straw I've seen; North American growers would be ecstatic with the high quality straw, and what Europeans do with the straw is very impressive. Secondly, the commitment of public monies for research and extension activities is noteworthy. The United States grows a lot of mushrooms, but the combined budgets of the few institutions in North America which devote resources to mushroom research and extension probably would not equal the sum invested in a nation where the total pounds produced is modest by any standard. Finally, mechanization in Europe seems much more widespread than in North America, but in the last half-dozen years a tremendous amount of mechanization has occurred in the US and Canada.

FCA: Enough about mushrooms; what about your personal life?

PJW: I was raised in Philadelphia and I've lived in rural central Pennsylvania since I started college at Penn. State in 1954. My wife Jan and I have been married seventeen years, and we have four children ranging in age from 10 through 16, three daughters and a son. My family travelled with me and lived in Guelph, Ontario, Canada, and Davis, California, during my two sabbatical leaves at the University of Guelph and the University of California respectively. Our leisure time has been spent in varied ways over the years: handyman wood-working, swimming, singing, enjoying nature, a bit of tennis or badminton, attending the theatre and ballet or modern dance, socializing for the fun of it, plus wine-tasting whenever the opportunity presents itself. My life and our life-style has only one constant, and that seems to be change.



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Translated by permission from *Der Champignon* **203**, 7–10

FIRST USE OF NEW MUSHROOM GROWING SYSTEM WITHOUT TRAYS

V. Musil

Landwirtschaftskammer Rheinland, Bonn, West Germany

At present methods of growing mushrooms without trays are described in great detail in technical books, as readers already know, but they are of little use to growers with an intensive farm. For this reason growers have turned to tray growing, which in spite of high capital investment is still profitable.

In this article, however, I can describe a new method which has been discovered at a mushroom farm at the border with East Germany. It is a revolutionary invention which presents further possibilities for industrial mushroom production. About a year ago I had a visit from a mushroom grower whose name is known to the Editor (of *Der Champignon*), with a request that I should advise him about the ventilation of a newly planned farm. A whole new development was at stake. I said the matter was interesting and I went for a weekend to see the farm.

After a short talk with the owner it was clear to me that there was an entirely new concept in mushroom growing which represents a direct extension of bulk pasteurization. A startling idea: after bulk pasteurization the compost was spawned in the pile, the spawn grew in the heap and it was cropped on the spot until the nutriment was all used up. According to the height of the pile six, seven, or more flushes could be taken. The investment in trays is superfluous and can be invested in machinery. The belt system is superfluous so a more expensive electronic harvesting machine can be purchased. Wages are reduced to a minimum. That means that even at the same level of production in comparison with a tray farm the cost of production can be appreciably reduced.

The larger the farm the better the utilization of the machinery available. But a further calculation will leave more to be learned about management of the system.

Certainly the reader would be interested to see such a farm. As a patent for the method has been applied for I can now disclose the details.

Figure 1 shows how the house looks from outside. It looks like a simple tunnel which holds three piles of compost 2 m. wide and 2.5 m. high. In Figure 2 the layout is shown in cross section. During bulk pasteurization the piles are aerated from below. The air is sucked in through three ducts over the roof (Fig. 3) and delivered by three centrifugal fans to the under-floor ducts. These three fans (V_1) are used at full power for pasteurization.

The openings for recirculated air (Fig. 2) shown in Figure 3 as Umluft 1, serve with the help of the dampers to control fresh air supply (for

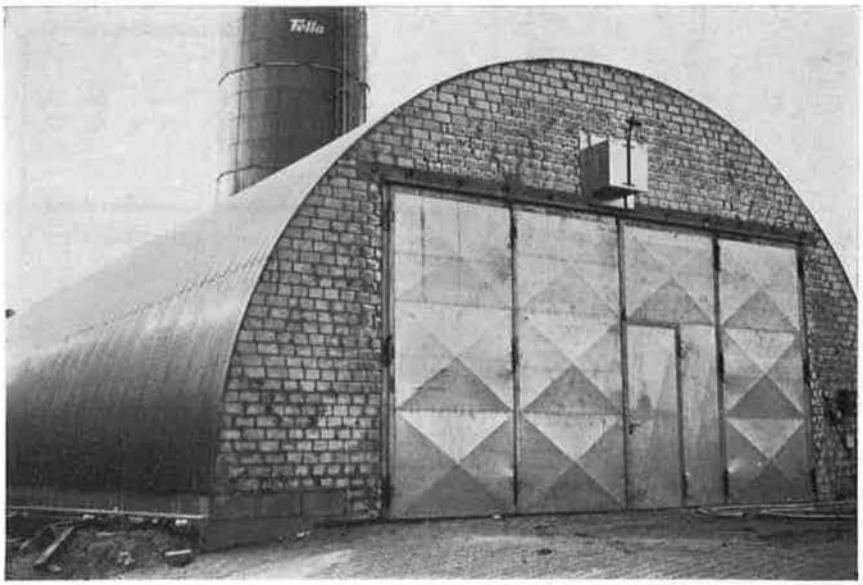

Fig. 1. First mushroom house for trayless mushroom growing

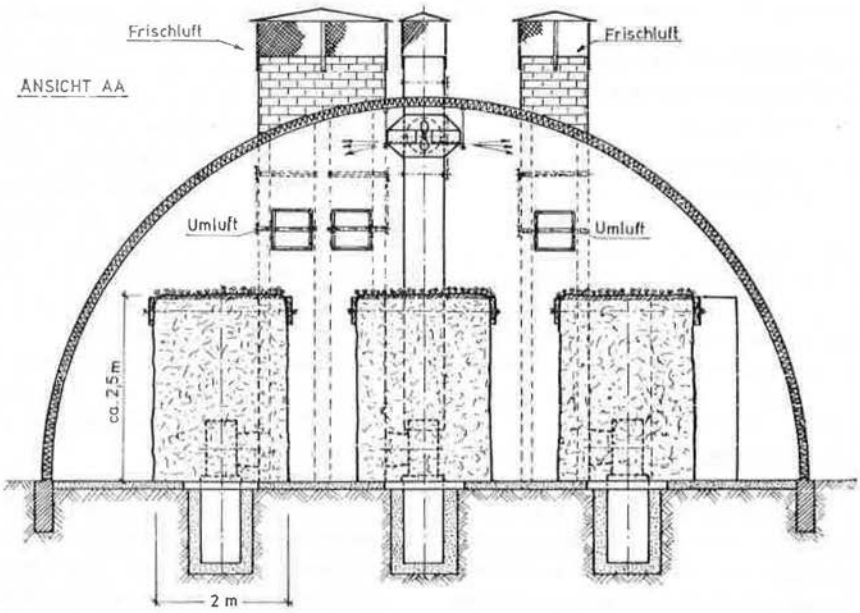

Fig. 2. Section through the mushroom house

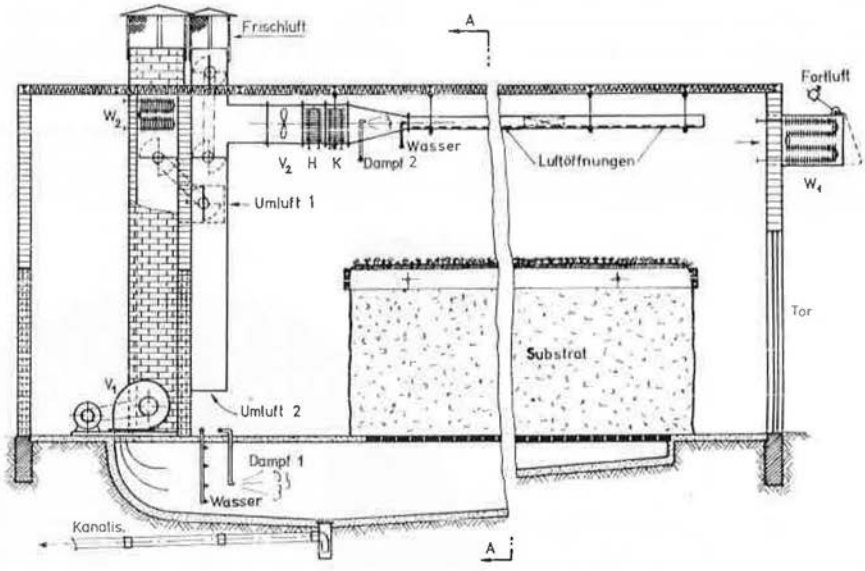

Fig. 3. Longitudinal section through the mushroom house

V_1 = centrifugal fan for pasteurization
V_2 = axial flow fan for house ventilation
H and K = batteries for heating and cooling
W_1 and W_2 = heat exchangers
Frischluft = fresh air
Umluft = recirculated air
Kanalis = drain
Wasser = water
Dampf = steam
Fortluft = exhaust air
Substrat = compost
Luftöffnungen = air openings

details see *Der Champignon*, **176**, pp. 23–26, and **192**, pp. 13–15).

The problem of bulk pasteurization was adequately described in *Der Champignon*, **176**, pp. 23–26.

After pasteurization is completed the pile is supplemented and spawned, using a turning machine.

During spawn growth in the compost the tendency for temperature to rise too high is controlled by using the under-floor ventilation. Otherwise the second system with axial flow fan V_2 (Fig. 3) can take over. The second system for room ventilation consists of an air supply duct which draws fresh air from above the roof through fans V_2 and a damper combination for controlling the quantity of recirculated air from Umluft 2 (Fig. 3). The temperature is controlled by a heating battery (H) and cooler K (Fig. 3) and if necessary by injecting steam or water spray. The water and steam also serve to maintain humidity in the cropping room.

For heat recovery, especially during the energy-producing pasteurization phase, a heat exchange between exhaust and fresh air is proposed. The heat exchangers W_1 and W_2 are for that purpose (Fig. 3).

The building must have good insulation. The K-value should be 0.3 or better 0.25 (metric). That also applies to the underground duct, where humidification with water and steam are used.

What did the first trials show?

In practice the whole system worked very well. After casing it was necessary to support the top of the piles with boards, which was no obstacle to the use of a harvesting machine, which has still to be designed. The mushrooms grew like crazy, they have obviously little room. The danger of disease is reduced to a minimum by the absence of trays.

According to the owner's calculation the same yield as with trays can certainly be obtained, with hopes of even more. In my opinion it is already a success to achieve a yield equal to that from a tray farm.

The use of machines here certainly opens a new way of increasing mushroom production.

I hope that in this article I have set out adequately the technical aspects of this non-tray system of mushroom production, to explain some of the cultural questions as well as the inventor himself would.

Translator's Notes

1. At the 10th International Congress on the Science and Cultivation of Edible Fungi, a poster presentation was made by Detlef Henke, describing this system with what appear to be the same diagrams. It stated that a Patent had been applied for.
2. There is British Patent Application No. 23026, 26th May 1978, by D. Henke entitled 'Mushroom cultivation'.

RLE

BRINSBURY SEEKS HELP

The new mushroom teaching unit at West Sussex School of Agriculture, Brinsbury, has received help with supplies of equipment and materials, free or at reduced prices from many sources, which will be suitably acknowledged in a later publication. The unit is being set up on a very tight budget and the School will be grateful for help with the following:

Fork lift (4 wheel, powered or hand-operated)
Lengths of roller conveyor
Compost mixer — for casing
High pressure washer for box and house cleaning
Hand tools and protective clothing
Steam hose or fire hose.

Secondhand or discarded items might be good enough for any of the above.

Insecticides, fungicides, disinfectants
Market chips and covers.

RLE

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Amateur Gardening, 14th October 1978.

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Instructions and copy for advertisements in the March issue of *The Mushroom Journal* should reach MGA headquarters, Agriculture House, not later than 15th January.

The Occurrence of *Verticillium psalliotae* on *Agaricus bitorquis* in Surrey

M. E. Upstone* and M. A. Carter, *ADAS Sub-Centre, Wye, Ashford, Kent*

Verticillium psalliotae was first recorded in Great Britain in 1946 (Atkins, 1947) and a popular account under the name 'brown spot disease' given by Wood (1958). However, the disease has rarely been seen in Britain and the incidence was described as 'occasional' by Moore (1959). In a recent national survey of mushroom diseases (Gaze and Fletcher, 1975), *V. psalliotae* was not recorded whereas *V. fungicola* was widespread and often prevalent, particularly where benomyl tolerant strains occurred.

The advantages of growing *Agaricus bitorquis* as a means of reducing losses caused by virus disease in Holland have been described (Dieleman-van Zaayen, 1976) and English growers are showing interest in using this species during the summer months. This paper describes the occurrence of *V. psalliotae* on *Agaricus bitorquis* on a farm in Surrey during the summer 1978.

Symptoms and Occurrence

Diseased sporophores of *Agaricus bitorquis* (strain Darlington K32) were received from M. Wright, Broadham Produce Co. Ltd., Oxted, Surrey, in June 1978. Affected caps showed light brown, slightly sunken spots (Plate I) up to 5 mm. diameter and often associated with watersoaked tissue characteristic of brown blotch (*Pseudomonas tolaasi*). At the centre of many of the spots, mould growth was visible and on incubation under damp conditions a white mycelial growth rapidly colonized the entire cap. Isolations made from the mould growth and also the edges of the spots yielded a culture showing white floccose mycelium on potato dextrose agar (PDA), and a deep wine-red coloration of the agar. Spore size, shape and manner of production indicated *V. psalliotae* and the identity of the fungus was confirmed by Dr. B. L. Brady, Commonwealth Mycological Institute, Kew. In addition, the presence of *Pseudomonas tolaasi* was confirmed by the Microbiology Department, ADAS, Wye. Further diseased specimens of *Agaricus bitorquis* were obtained from the farm and *V. psalliotae* were found to be present. Samples of *A. bisporus* from the same farm but growing in other houses showed characteristic symptoms of dry bubble (*V. fungicola*) and this fungus was confirmed by microscopic examination. *V. fungicola* was not found on *A. bitorquis* and *V. psalliotae* not seen on *A. bisporus*.

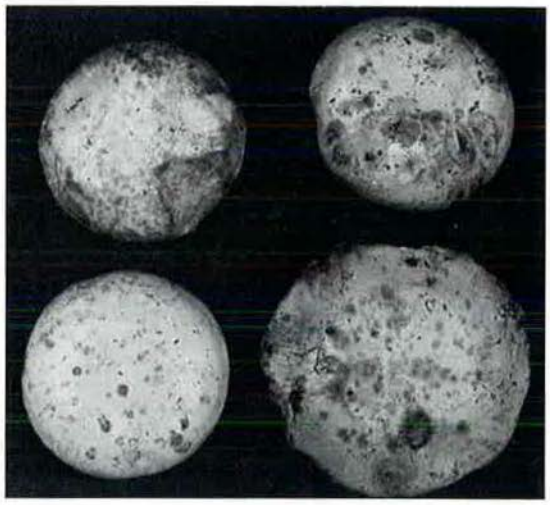

PLATE I Naturally-infected caps showing light brown, slightly sunken spots due to invasion by *Verticillium psalliotae*

The houses in which *A. bitorquis* was being grown were undergoing extensive structural alterations involving the removal of masonry, bricks, etc. The houses are 15–20 years old and as far as it is known *V. psalliotae* has not been recorded on the farm previously. The disease affected sporophores in a number of trays in the second flush and losses may have been two per cent of the crop. However, the disease diminished in prevalence towards the end of the cropping period. Fungicides were not used on the crop until after confirmation of the disease.

Pathogenicity Tests

Polythene bags of compost were spawned with *Agaricus bitorquis* strains K26 and K32 (kindly

* Michael Upstone is joining Du Pont (UK) Ltd. His home address is Chandelle, Burmarsh Road, Hythe, Kent CT21 4NH.

PLATE II Blotches on cap and stipe associated with infection with *Verticillium psalliotae*

supplied by Messrs. Darmycel (UK) Ltd.), and after spawn-run the bags were cased with peat and chalk treated with a spore suspension of either *V. psalliotae* or *V. fungicola*. The bags were allowed to crop as normal, using a cropping temperature in the range 24–27°C. Symptoms of the diseases occurred in the first flush (four weeks after casing) and there were no differences in symptoms between the two strains of *A. bitorquis*. Symptom expression was as follows:

V. psalliotae: large (1–3 sq. cm.) light brown blotches occurred on cap and stipe (Plate II). In some cases the lesion was covered with white mycelial growth which on microscopic examination showed sporing *V. psalliotae*. Distortion of sporophore was rare and only slight and mushrooms were produced as normal though fewer than the uninoculated.

V. fungicola: small (1–5 sq. mm.) slightly sunken brown-grey spots on cap with sporing *V. fungicola* present on microscopic examination. Occasional sporophores with larger lesions and distortion of cap but gross distortion not seen until second flush when very few mushrooms were produced.

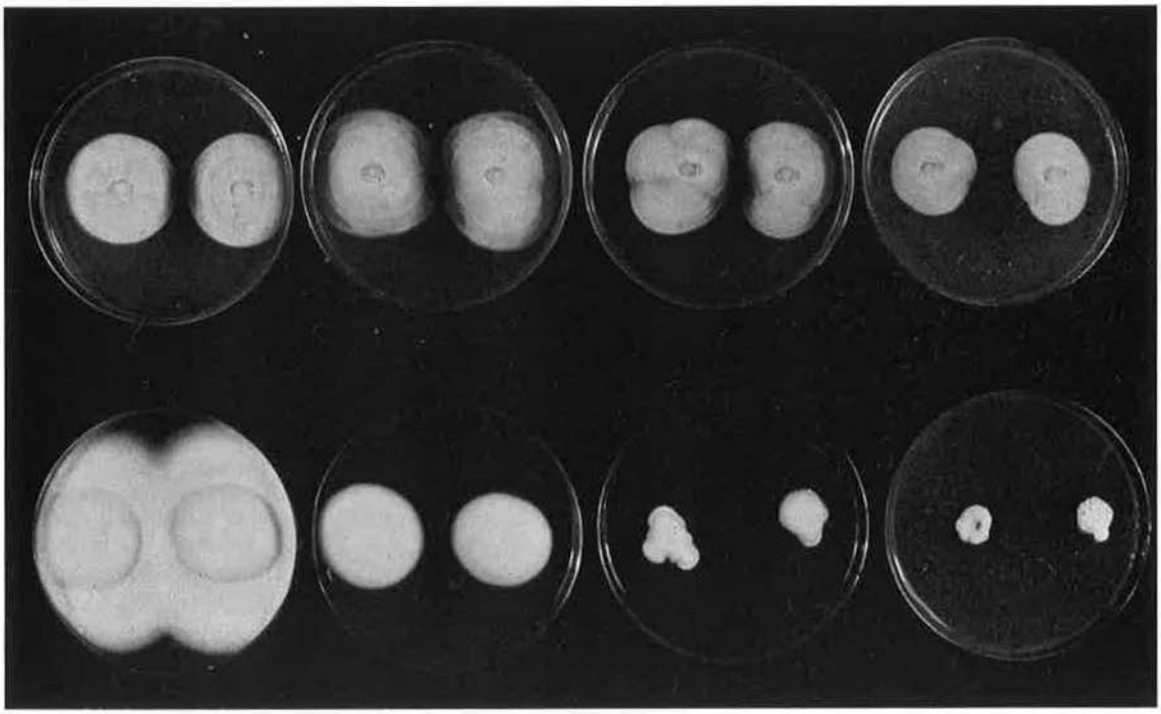

PLATE III

Growth of *V. fungicola* (upper row) and *V. psalliotae* (lower row) on agar containing 0, 5, 50 and 500 ppm benomyl

This inoculation experiment indicates that *A. bitorquis* can be attacked by both *V. psalliotae* and *V. fungicola* though the effects of the former are less severe.

Susceptibility to benomyl

V. psalliotae and *V. fungicola* obtained from the farm in Surrey were cultured on PDA amended with 1, 5, 50 or 500 ppm benomyl. After three weeks at 20°C the mycelial growth was measured and the mean results compared with growth on unamended agar as follows (Plate III):

Fungus	*Comparative growth on agar containing ppm benomyl*				
	0	**1**	**5**	**50**	**500**
V. psalliotae	100	89	37	33	23
V. fungicola	100	124	124	113	87

The results indicate that the *V. fungicola* isolate was highly tolerant of benomyl with $ED_{50} > 500$ ppm, whereas *V. psalliotae* appeared to be sensitive, $ED_{50} < 5$ ppm (see Fletcher and Yarham, 1976). On the farm in Surrey, both Benlate (benomyl) and Daconil (chlorothalonil) were applied subsequent to the disease being identified but there was no obvious immediate reduction in disease incidence associated with treatment.

Discussion

The pathogenicity tests indicate that both strains of *A. bitorquis* are susceptible to both *V. psalliotae* and *V. fungicola* applied to the casing. The occurrence of *V. psalliotae* may be attributed to building repairs in the houses in which *A. bitorquis* was being grown or to an increased susceptibility of this mushroom to natural infection; it is difficult to compare directly the susceptibility of *A. bitorquis* and *A. bisporus* due to the different temperature regimes required for the two species. The *in vitro* susceptibility of *V. psalliotae* to benomyl is encouraging but trials are necessary to determine if natural infection can be controlled; it remains to be seen if tolerance develops in this fungus.

REFERENCES

Atkins, F. C. (1947). A Verticillium disease of cultivated mushrooms new to Great Britain. *Transactions of British Mycological Society*, xxxi, 126–27.

Dieleman-van Zaayen, A. (1976). Immunity of strains of *Agaricus bitorquis* to mushroom virus disease. *Netherlands Journal Plant Pathology*, **82,** 121–31.

Fletcher, J. T. and **Yarham, D. J.** (1976). The incidence of benomyl tolerance in *Verticillium fungicola*, *Mycogone perniciosa* and *Hypomyces rosellus* in mushroom crops. *Annals of Applied Biology*, **84,** 343–53.

Gaze, R. H. and **Fletcher, J. T.** (1975). ADAS survey of mushroom diseases and fungicide usage 1974/5. *Mushroom Journal*, **35,** 370–76.

Moore, W. C. (1959). British Parasitic Fungi. Cambridge University Press.

Wood, F. C. (1958). *Verticillium* brown spot disease. *Mushroom News*, **6,** 318–20.

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The method is probably not much used now in the mushroom industry, but it remains in the reference books. I suggest that for safety and effectiveness users should be careful to ensure:

(a) correct proportions as above; excess of permanganate could be dangerous;
(b) a large enough container to provide plenty of space for frothing of the liquid without allowing it to overflow;
(c) the crystals are added to the liquid — never vice versa.

RLE

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Bristol Evening Post, 16th October 1978.

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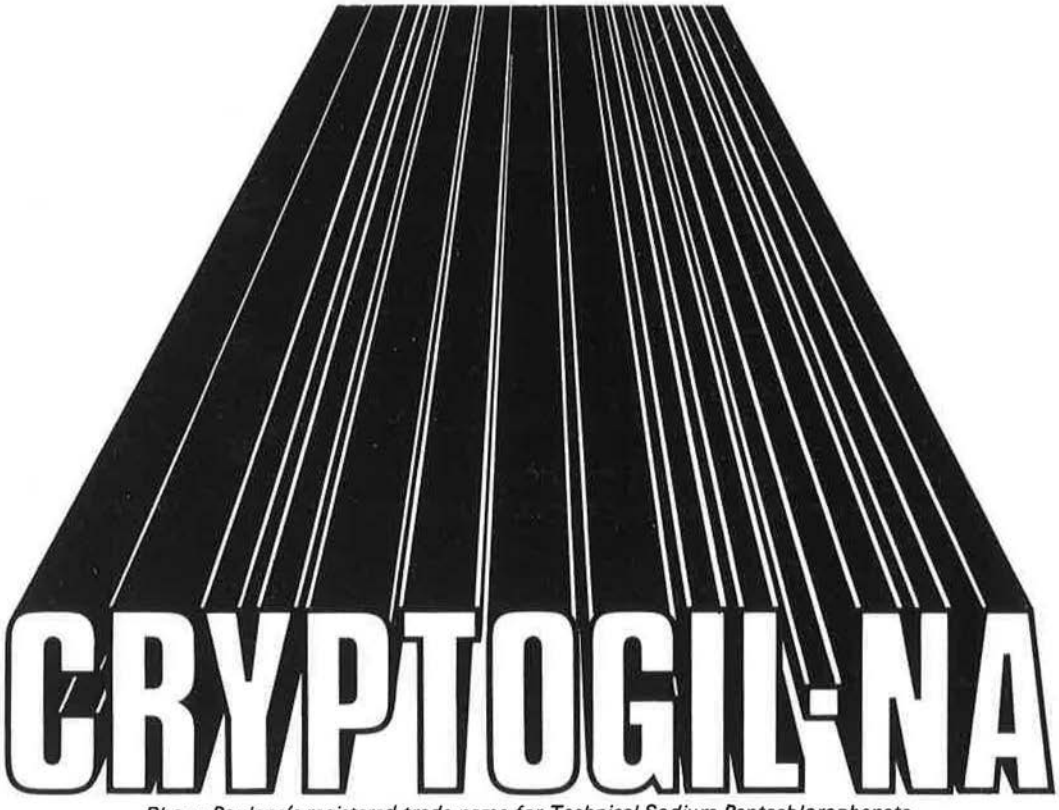

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