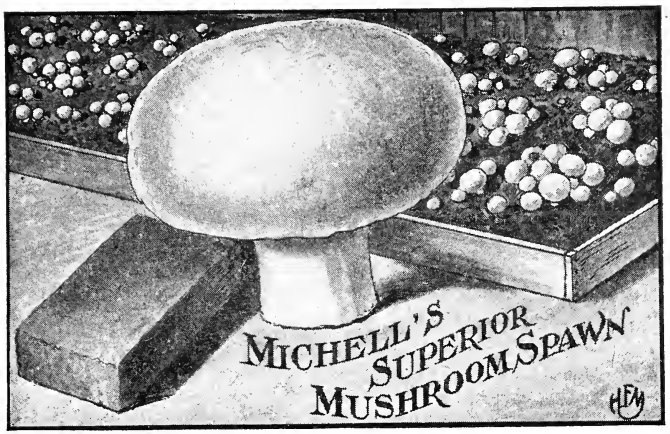
EDITION 2500—8-19—MCM—Noae Plates.

MUSHROOM CULTURE



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Introductory

This booklet has been compiled from a paper read by Mr. THOS. BROWN (*with S. F. Houston, Esq.*) of Chestnut Hill, Phila., *before the Pennsylvania Horticultural Society of Pennsylvania, in which Mr. Brown relates his many years of experience in growing Mushrooms.*

The growing of mushrooms is rapidly increasing in all parts of the country and the demand for them has reached immense proportions, far exceeding the supply. Few people seem to be aware of the fact that by purchasing spawn, a fine crop of mushrooms can be secured with very little labor or expense, provided a suitable location can be obtained. They can be grown just as easily as the farmer raises his vegetables, and there is probably no more interesting pastime for the spare moments.

Where They can be Grown

Cellars, greenhouses and sheds can be used for the culture of mushrooms. The first named is the best of all, as they have an even temperature and moist atmosphere, both of which are prime requisites for success. The cellar of a dwelling house can be made to give as good results as one built especially for the purpose. Beds can either be made on the floor or raised above it in one or more tiers.

Manure beds in the cellar of a dwelling house may seem unsanitary to many people, but if proper precautions be taken there is no danger of any offensive odor. The manure should be prepared away from the house, which, if properly done, will render it cool and sweet. When the coating of loam is put on the bed it effectually overcomes any unsanitary conditions.

The Manure

Of all the materials experimented with for the growth of the Mushroom, horse droppings and short straw have proved the most satisfactory, and easiest to procure. Half droppings and half straw seem to give best results.

The preparation of the Mushroom bed is, without a doubt, a science, and one to be acquired to its fullest depth by observation and experience. Some of the best skilled growers of to-day fail in duplicating all batches alike during the season's work. This accounts, to a marked degree, for different crops of Mushrooms grown from the same Spawn.

It has been proven, beyond a doubt, that the manure requires to be decomposed to a certain point for the growth and development of the Mushroom. Manure decomposed beyond this point not only loses its value for the development of the Mycelium or germ, but becomes productive of foreign fungi detrimental to good Mushroom growing. (Fungi is a growth to which the Mushroom belongs.) Manure used for Mushroom culture being procured from various sources in various stages of decomposition, and according as we receive it so must we exercise our judgment to bring it to the point of decomposition required by the Mushroom, to grow and develop in. To become proficient in the decomposition of the manure without burning it and still retain the LIFE in it, is in general the stumbling block of many and the cause of failures.

It is meant by the life in the manure, its life-giving power. The inefficiency of this knowledge is the grave into which is buried alive tons of the various brands of Mushroom Spawn, never to appear on the surface, as intended.

Without going into detail of experiments made in relation to the fungi-producing power of horse manure in its various stages of decom-

position, I will state that from eight days on until a period indefinitely known, horse manure produces various forms of fungi, according to the different stages of decomposition. To produce Mushrooms, it is necessary to study and learn the point of requirement of the Mycelium or Spawn producing edible Mushrooms.

If we would only observe Nature closely in its production and reproduction of this variety, we would undoubtedly be more successful. In certain corners of fields, meadows, or hillsides we have gathered Mushrooms for years, but suddenly they disappear and are not seen again in the same places for a long space of time. Undoubtedly they grow and reproduce themselves only on ground that is congenial to their growth, and having outgrown the nutriment required they disappear, hence the importance of imitating Nature by bringing horse droppings and straw to the point where the Mycelium or Mushroom Spawn will grow and develop strong, and take possession of the whole bed, leaving no room for any foreign fungi, which is always present and ready to take part possession of the bed on the first symptoms of weakness of the Mycelium of the Mushrooms. Mushrooms and poisonous varieties of fungi are rarely ever found growing side by side or near each other in the open fields. If the condition of the ground suits the one, the others will not be present.

If we make our Mushroom manure right to begin with, we will not be troubled with foreign fungi which often pollutes wrongly decomposed manure. It is impossible to get a good crop of Mushrooms when other fungi than that planted has part possession of the beds.

When preparing the manure for the beds always do so under cover, while manure can be worked in the open, sometimes with success, it is only a chance.

Water is needed, in most instances, for the preparation of the manure, except it has previously had the necessary quantity. Experience is the only

guide as to the quantity required when water is needed, depending entirely on the condition of the manure we are working with; always give enough to keep it from burning, but not enough to make it soggy. The manure is made in a pile, 1½ to 2 feet deep. If the weather is warm, tramp it to prevent burning. Relieve the manure of all the undesirable substances as quickly as possible, turning daily, and giving water if necessary. The quick working of the manure prevents excessive decomposition, while still retaining the necessary life required for growing the Spawn. Burned manure is of little value, and should be avoided.

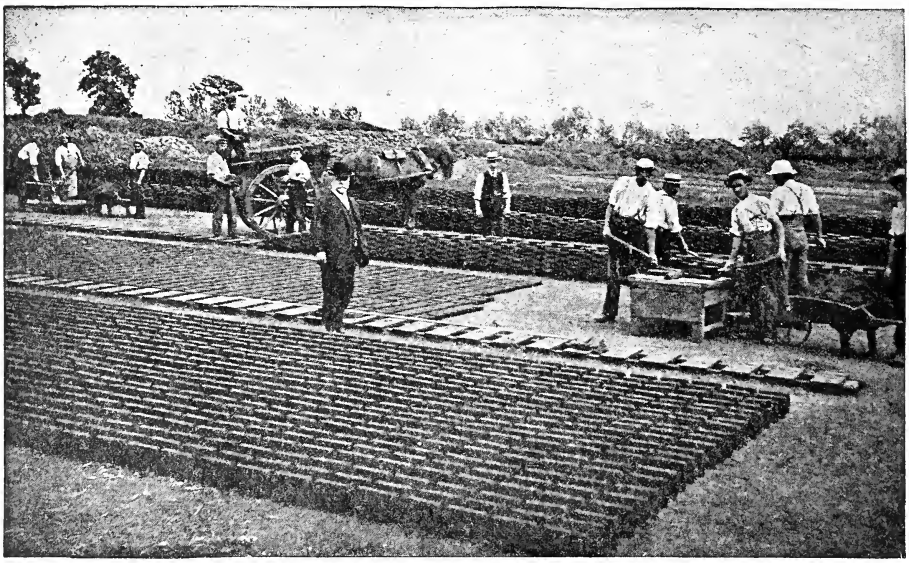
Manure as received in carload lots is almost ready for use when received, and contains about the proper proportion of straw and droppings without any straw being removed. One of the commonest errors among those not experienced in Mushroom growing is to pick out nearly all the straw, when at least one-half of the mixture should consist of same.

It has been found by experience that it is very hard to keep short manure from decomposing beyond the required point. Don't wait until the manure is half rotten, but make it into beds while there is plenty of life in it, and it still retains its yellowish color. In other words, work off the fiery edge of the manure. Have it wet enough so that it will pack together, as good potting soil should.

To grow the Spawn the manure should be wet enough so that at its dryest it will be damp. An addition of cow manure to the material is not necessary, although advocated by some growers. Cow manure helps to prevent burning, being of a much cooler nature than horse manure. Soil used weight for weight with the manure, or one-third of the mixture in bulk, is very good for controlling the heat, and prevents burning.

To those who are not thoroughly experienced in handling the manure, or having the knowledge and not the time to handle the manure, the use of soil is strongly recommended. Good crops are produced with soil added,

BUT IT REMAINS AN OPEN QUESTION whether the Spawn is benefited by its addition. The extra labor incurred does not warrant its use, where large quantities of manure are handled.



Making Michell's Mushroom Spawn

The Spawn

There are, generally speaking, two brands of Mushroom Spawn, the English Mill Track and the Pure Culture Brand.

During the past few years the Pure Culture brands of Spawn have been put on the market, sometimes called "grafted" spawn, or equal to grafted trees in comparison to ungrafted trees.

The Pure Culture Spawn is quicker than the English Mill Track, and under the same conditions beds spawned at the same distance apart will give the crop quicker than English Mill Track. For this reason Pure Culture Spawn would recommend itself to the commercial grower who can have his beds replaced with new material while the English Mill Track would still be producing. Being slower, English Mill Track is better suited for private use, where only a limited quantity is wanted at a picking, as a bed of English Spawn will bear from ten to twelve weeks, while the Pure Culture gives the same weight in one-half the time. In other words, either of the two Spawns keep growing until the nutriment of the material in the bed is used up.

From experiments with the various brands of Spawn it has been found that if the Mycelium is strong their productive power is limited to the square surface of the bed. The Mycelium goes forward into new material, but does not turn back to produce again where it has already produced.

Making the Beds

According to the season of the year depends the depth of material required. Beds made before the last week in August are liable to produce maggots in the Mushrooms. It is not meant to say the beds produce the maggots, because it has been proven that when the natural temperature keeps above 70 degrees for some length of time the maggots will put in an appearance, but should the temperature go down again the maggots will disappear.

Beds made the end of August and up to the middle of September should be from 6 to 7 inches deep. From then on increase the depth until the maximum depth of 9 or 10 inches is reached about October 15th. Still more than 7 inches is not required at any time of the year where artificial

heating is at command, but where plenty of heat is not at command, make the beds to the depth of 9 or 10 inches.

Make them with three layers, tramping or beating down firmly to the required depth. If by putting a thermometer to the depth of from 3 to 4 inches you have 90 or 95 degrees as a maximum temperature in four or five days, the bed is warm enough. Should it go higher, give it another beating down, which will stop it going further. You will find it goes down easily after beating. Rather have 85 degrees as a maximum temperature, because the material of the bed is not so liable to become dry for Spawning.

Beds made on the ground are preferable. For either commercial or private work they give the best results. The cost of lumber required for benches, considering their short life, in contact with Mushroom manure, does not warrant its use.

Spawning

Spawn when the temperature has receded to 70 degrees. Break an ordinary brick of Spawn into six or eight pieces, generally six, and insert it 10 x 10 inches for the early part of the season, narrowing down the distance as the season advances, until in February, then have it 6 x 6 inches. As the season advances the running of the Mycelium is weaker, so by Spawning more closely the same crop is obtained. For a succession Spawn a bed once a month, starting about September 1st and finishing February 1st, or thereabout. This gives Mushrooms from November 1st until June.

According to the temperature of the bed when Spawned will be the bearing power. Spawned at 90 or 95 degrees the Spawn runs more quickly and weaker. The Mushrooms appear in a shorter time and also give out in a shorter time.

Strong Spawn put into a high temperature undoubtedly weakens it, but put into a temperature 68 to 70 degrees develop strong Mycelium with the results of a maximum crop of heavy Mushrooms.

Instead of 30 to 40 days required, as generally given as the time of development, 45 to 55 days will give better results.

When Spawning, put the pieces to a depth of 3 inches, which makes a covering of about 2 inches over the top. Many experiments have been made to determine a method of having the Spawn partially started before putting it into the beds.

Soiling the Beds

The soiling of the bed is another trap or grave in which even well-made beds and strong, vigorous Spawn often meet their doom by premature soiling.

Beds should be soiled according as the Spawn has run or grown therein. As a minimum from date of Spawning, say ten days, while some beds would be benefited by being left unsoiled for eighteen days. At the expiration of eleven days, if the Spawn is running well, soil the bed; if found to be slow in starting, give a few days longer. Beds have been left as long as twenty-one days before soiling, with beneficial results.

Beds made during the winter, as a rule, require longer time for the Spawn to run. The common mistake of the amateur is to Spawn and soil on the same day, or finish up the beds as soon as possible, with the results that the ammonia and other gases, which should be allowed to pass from the bed, are prevented from escaping. *No Spawn* will survive such treatment.

While fairly good results can be had from ordinary garden soil, sod soil is preferred, because the less humus we have in the soil the better. In small gardens, as a rule, manure is supplied in abundance, and fills the

soil with an excess humus which is not congenial to the development of the Mycelium. Sod soil, broken up as for potting purposes, gives good results.

Cover the bed with 2 or 2½ inches. If the soil is light, make it 3 inches and beat down firmly. A mulch of straw spread over the surface of the soil helps to keep in the moisture, thereby preventing evaporation.

Before soiling, should the surface of the manure be found to be wet or rotten, remove an inch or so of the surface. The rotten or decomposed mass which forms from the moisture and gases of the bed escaping, makes a partition between the Mycelium and the soil, and often reduces the productiveness of the Spawn.

Watering the Bed

As a rule, if the material used in making and soiling the bed was moist enough when put into place, no additional water will be required until the Mushrooms appear, but should the bed become dry between the Spawning date and date when the Mushrooms should appear, the Mycelium is arrested, and will remain dormant until enough moisture is supplied to start it up again.

Moist conditions are ideal, and necessary in the bed and atmosphere of the house or cellar, wherever they are grown.

As a rule, Mushrooms need, and are assisted to development by, watering when they begin to show above the surface of the soil. The quantity required from now on depends on the moisture already in the beds, but enough should be given to keep up the moistened conditions present at all times until the crop is over. Another method of watering which gives good results is to allow the surface to become dry and then give an extra supply. Keep up the moistened conditions from beginning to end of the crop.

Water should be supplied through a fine rose or sprinkler attached to the end of a hose, or with a syringe or watering can. When watering

(for some reason or other) they prefer water supplied to them through a litter, rather than applied to the bare surface of the bed. Immediately after gathering the Mushrooms is a good time to apply water.

Gathering the Mushrooms, Etc.

When gathering the Mushrooms, pull or twist them out instead of cutting them. The old stump left in the bed where cutting is practiced positively does no good, the decaying of the part left in having a tendency to do harm.

Fertilizers are not required if good sod soil has been used for soiling. Nitrate of soda will hasten a crop, but won't increase its weight. Common table salt at the rate of a tablespoonful to an eight-gallon can of water supplies a deficiency of inland soil. This is not necessary along the seaboard.

The top dressing of old beds is not worth the time and labor bestowed on the operation. If more Mushrooms are wanted, clean out all the old material and replace it with a new bed. This pays better.

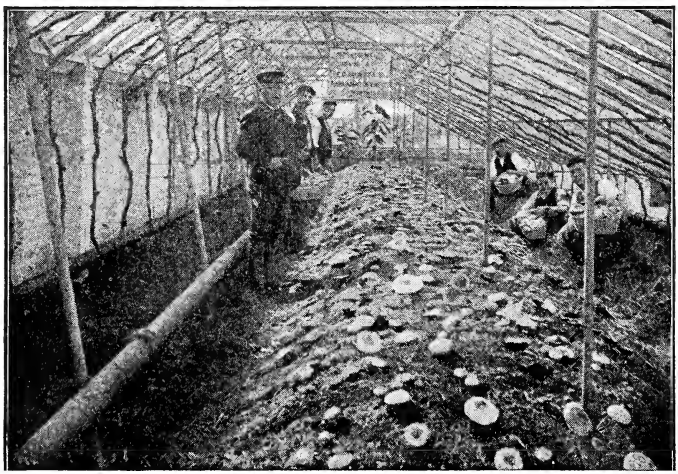
Temperature and Ventilation

For a continuous growth while the crop lasts, from 55 to 58 degrees gives the best results. A lower temperature retards, but produces heavier specimens, while a higher temperature forces but produces lighter specimens.

A bed made dormant by a low temperature will start to bear again when it rises to 45 degrees. The effects on the Mushrooms, or the Mycelium, from temperature produced under different atmospheric conditions, are numerous. One, in particular, which many have had experience with, is the maggot, or worm. A natural temperature of 70 degrees continued for some time will produce maggots, or worms, while the same temperature produced artificially shows no signs of maggots.

Ventilation is of no less importance for Mushrooms than for any other plant grown artificially. To produce Mushrooms of a high quality, control of pure air is absolutely necessary. While fields or caves produce fair Mushrooms, keeping the buildings above ground is better. Low buildings with one bed on the surface of the ground will give best results. Where five or six benches are built, one on top of the other, they are not all ventilated alike, where heat is radiated from a pipe system of any kind.

Light or darkness has no direct effect on Mushrooms, with the exception of the coloring of the skin. Darkness keeps them white, while light makes them brown.



Reproduced from a Photograph of a Crop of Mushrooms produced from MICHELL'S ENGLISH MUSHROOM SPAWN

MICHELL'S MUSHROOM SPAWN

Our Mushroom Spawn is used by the leading growers throughout this country on account of its superior quality.

BRANDYWINE PURE CULTURE SPAWN

This is an entirely new strain, originating in the section of Pennsylvania that supplies New York and Eastern markets with mushrooms. It appears to be especially full of life and we can recommend it as an early and prolific producer; mushrooms are uniform and almost pure white in color.

Per Brick	$0.35	Per 10 Bricks	$2.75
Per 5 Bricks	1.50	Per 25 Bricks	6.50
Per 50 Bricks	$12.50		

AMERICAN SPORE CULTURE SPAWN

This type produces larger mushrooms than the English, coming into bearing somewhat earlier, and continuing to crop for a long time. This spawn is produced by the spore process, now regarded as the very best method of making. Pure culture bricks of spawn, which, when planted, produce mushrooms all of one type.

Direct No. 8. Cream White. For use from April to October.

Direct No. 9. Pure White. For use from October to April.

Per Brick	$0.35	Per 10 Bricks	$2.75
Per 5 Bricks	1.50	Per 25 Bricks	6.50
Per 50 Bricks	$12.50		

Books on Growing Mushrooms

Pamphlet (gratis for a postal card asking for it).
Robinson's Book (postpaid) $0.60
Falconer's Book (postpaid) 1.10

MUSHROOM OR HOT BED THERMOMETERS

Heavy Galvanized Iron Point $2.25

Thermometers should, wherever possible, be sent by express. We do not guarantee safe arrival if forwarded by parcel post.

SPECIAL NOTE

We are prepared to quote low prices on large quantities of Mushroom Spawn to those who make a business of growing for market.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It will produce a lawn in from four to six weeks.

PRICES: 25c. per quart; 4 quarts, 65c.; $1.00 per peck; $4.00 per bushel of 20 lbs.

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