

Taking the Odor Out of Manure

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is high in oxygen. This operation is considered as Stage 1 of the Penn State System.

The cost for electricity to operate the manure drying fans and stirring mechanism runs about \$3/ton of manure containing 30 per cent moisture. At this stage the manure is dry and crumbly and is in excellent handling condition for field application without serious odor problems.

However, Dr. Bressler feels that by further drying the manure to less than 10 per cent moisture with a commercial dryer the manure may have new potential uses.

With offensive odors eliminated, even when the dry manure is re-wetted the product has shelf life and can be used on gardens, flowers, and lawns.

It has a potential use as a soil builder and revegetator of spoil banks and strip mining areas.

It is being sought by mushroom producers for use in their compost mix.

This second stage drying adds another \$3/ton cost to cover fuel and electricity, but the returns may be far greater than both operating and capital costs once the value of the new product finds its place in the market.

In the summer of 1969 one Cloisterdale house 40 feet wide and 488 feet long was converted to the Penn State system. The house had three pit areas separated by posts about 13 feet wide running the length of the house. An circulating fans were mounted about 20 inches above the floor level down the center of each pit and spaced 25 feet apart. A stirring, cleaning gadget was constructed and installed in each pit.

With an uneven number of pits two power units were required to pull the stirring and cleaning mechanism. The takes a few driven periodically the entire length of the house scraping, pulling, spilling, mixing, churning and aerating the raw droppings. The fans above the droppings circulate the air which picks up moisture from the raw droppings.

In contrast to the Penn State system where semi-dry manure is drawn from the house and fed automatically into a commercial dryer the procedure has been to periodically (about every five days) remove the semi-dry manure (28 to 35 per cent moisture) from the house. The manure is drawn to the end of the house where a conventional chain barn cleaner conveys it to a truck or dry spreader.

This 28 to 35 per cent moisture product is very similar to dry



Herr demonstrates the texture of the 30 per cent dry manure which leaves the hen house under the new system. The manure feels flaky and crumbly; it has very little odor.

most manure. You can pick it up in your hands and dust them off. None will stick. There is very little odor—a chicken odor, yes, but not a manure odor.

A number of advantages have been gained to this point the greatest being that of volume handled. Instead of 28 tons of raw waste (70 to 75 per cent moisture) or 35 tons of liquid waste (90 to 95 per cent mois-

ture) to remove or haul in a miserable fashion we now have in exchange each week 10 to 12 tons of a very easily handled product with some yet un-established value, little or no odor, no restrictions on weather or seasonal disposal, and no great labor problems.

What about the economics of all this? There are three areas to be considered:

1. Remodeling—The house we remodeled cost approximately 50 cents per bird. I believe the next house would cut this by 20 to 30 per cent. With new construction, I would expect the cost to be 25 to 30 cents per bird. (And I just pulled this figure out of the air.)

2. Operating cost is approximately 12 cents per hen housed; reduced to 20 dozen eggs per hen, this is equal to 6/10 cent per dozen eggs produced.

a. Electricity—dependent upon electric rate, is approximately 7 to 8½ cents per bird annually, \$7 per day per 30,000 hens.

b. Labor—for removal to truck, 3½ to 4 cents annually per bird (8 hours per week at \$3 per hour).

3. Maintenance and Repair—No figures available to date.

We have been able to recover some of this cost by selling this semi-dry (30 per cent) manure, thus reducing the cost to about 1 cent per dozen.

What is being accomplished at Cloisterdale can apply to many poultry and livestock operations (large or small) in this area. The principles of stirring manure and blowing air across it can be applied to the varied egg production systems.

The mechanics and physical adaptation of these principles becomes an individual farm situation. Penn State researchers and Extension personnel are ready and willing to assist poultrymen in planning installations.

The cooperative efforts of Dr. Bressler and his staff and the men of Cloisterdale, Ed Bowser and Clarence Spatts, not only prepared the way in odor control

for Cloisterdale but also for the industry as a whole. Dehydration can be an economical solution to the farm odors problem.

But Dr. Bressler is of the opinion that the future method of manure handling lies in adopting Stage 2 of the Penn State system. Selling the dry powdery manure containing less than 10 per cent moisture will turn farm manure problems into an asset.

Dr. Bressler is gratified to see developments of a research project so quickly adapted to solution of a major poultry industry problem and the groundwork laid for controlling odors from all kinds of livestock.

Had it not been for the financial support (\$30,000 annually for three years) given to the research project at Penn State by the Pennsylvania Department of Agriculture through its Harness Racing Funds, the rapid progress in developing the drying system would not have been possible.

This is an excellent example of government, university, and industry cooperation in seeking an answer to a problem quickly. The project has attracted considerable attention from other groups.

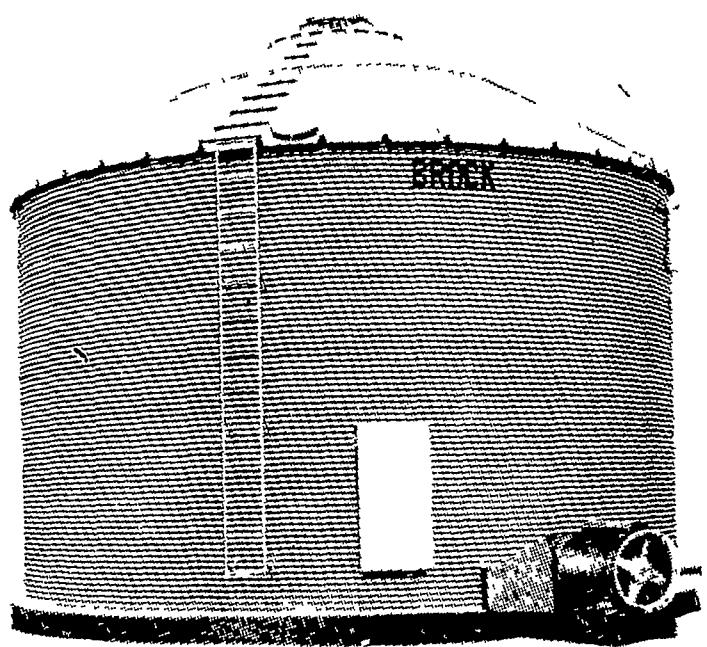
The Coal Research Board of Pennsylvania has given a grant of \$12,000 for each of the past two years to determine the value of the dehydrated product in revegetating spoil banks and strip mines in Pennsylvania.

The Pennsylvania Poultry Federation is supporting the project with a grant of \$1,000 this coming year. These grants will give considerable assistance to the research program in waste management.

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