

Manure: Something new to swear by

Animal wastes can be recycled into livestock feed. But will the public buy?

by Joan Arehart-Treichel

If there is anything humanity has downgraded it is waste products from living organisms. Waste products are described in pejorative terms in virtually every language. Such expletives are used to express revulsion, to expunge the most abominable situations possible. Even Dante, in his *Inferno*, makes part of the eighth circle of hell a stew of excrement. Flatterers are plunged there to simmer for eternity.

Waste products, however, may be in for a renaissance, an era of unprecedented esteem. A band of intrepid scientists visualize the potential of converting livestock wastes into livestock feed. Such recycling might solve several serious problems for mankind.

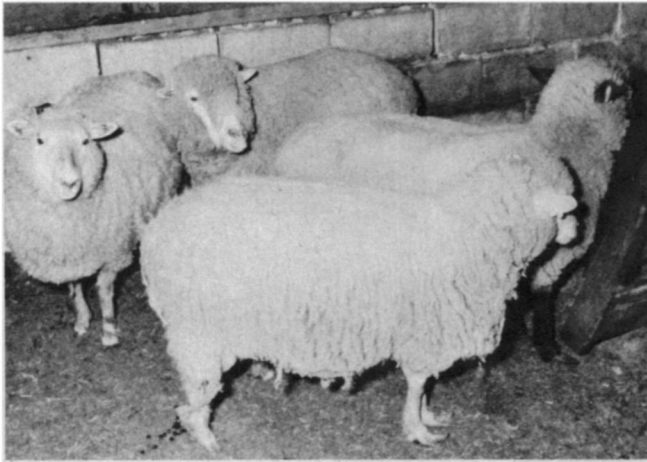
For one, it might eliminate much of the livestock wastes that are polluting feedlots and pens. Although a lot of

the human population." Warns W. B. Anthony of Auburn University: "Unless rapid changes in management of this waste are put into practice, it very likely will create major damage to man's environment and could be a serious hazard to man's health."

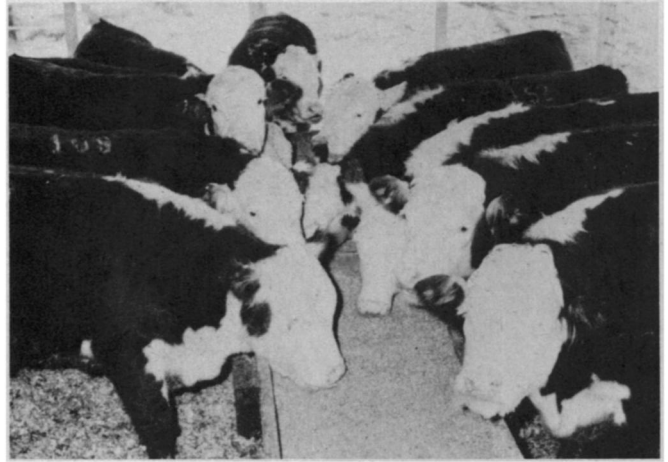
Recycling animal wastes as livestock feed might also provide more nutritious and economic feed than that now commercially available. One of the reasons the costs of beef and poultry have skyrocketed in recent months is a shortage of soybeans and other ingredients used in livestock feed. The amount of soybeans that will feed a person for 2,200 days, says Anthony, is consumed by a steer in 70 days. Livestock compete for cereal crops that people in developing countries desperately need. Waste recycling should also help hold down

ess. C. C. Calvert of the U.S. Department of Agriculture in Beltsville, Md., is using algae and yeast to convert nitrogen in chicken waste into high-quality protein. The yield, he says, is sometimes good. He has also seeded housefly eggs on poultry manure to convert nitrogen in the waste into protein. Anthony and his team are removing cattle manure from concrete feedlots and putting it with corn and hay in a silo, to ferment for about 10 days. The fermented mixture is then fed to cattle.

Since these results look promising, one may ask, why stop with manure? Why not feed other kinds of wastes, such as wood, straw and newspapers, to livestock? P. J. Van Soest of Cornell University has been probing these possibilities, but he says they don't look as good as using animal wastes. Although



Healthy breeding ewes fed wastelage for more than year.



Photos: W. B. Anthony

Cattle feeding on a mixture of fortified corn and manure.

waste is spread on crops as fertilizer, there is not enough land to spread it on. The waste is also less uniform than commercial fertilizer. So the farmer is not sure what chemicals he is putting on the soil. Animal waste disposal has only become a problem during the past few years as more and more livestock are managed in total confinement. Two billion tons of manure grace American farms annually.

"Animal wastes in some feedlots in the West are stacked as high as convention hall," says J. P. Fontenot of the Virginia Polytechnic Institute. Robert Blair of the Poultry Research Center in Edinburgh, Scotland, attests that the United Kingdom is faced with a similar livestock waste disposal problem. "An enormous amount of waste," he asserts, "needs to be disposed of. Animal wastes create a sewage need four times that of

prices of livestock feed and meat.

Research into recycling animal wastes as livestock feed has only been undertaken intensely for several years now, but the initial results look promising, both as a means of eliminating pollution and in providing nutritious feed. Investigators say it is too soon to say whether converting wastes will be as economic as, or more economic than, preparing available commercial feeds.

Blair and his co-workers have turned chicken excreta, which is about 11 percent protein, into chicken feed. About a third of the wastes are disposed of in the process. Fontenot and his colleagues have extracted the nitrogen in chicken waste so that the nitrogen can be fed to cattle and sheep. Ruminants are able to convert nitrogen into protein. Fontenot anticipates that 60 percent of chicken waste can be disposed of with this proc-

bacteria can easily extract sugar from cellulose in wood, paper and straw, cattle and sheep have trouble digesting the cellulose. Inks in newspapers can also be toxic to ruminants. "Our efforts to feed newspapers to dairy cows," Van Soest admits, "have been discouraging."

On the whole, investigators in recycling animal wastes as feed are encouraged. But several tough questions still have to be answered. Are recycled wastes safe for livestock to eat? Calvert and his co-workers have found that the only chemical difference between manure from cattle fed fermented manure and manure from cattle fed commercial feed is that the former contains more iron. Tissue samples from both groups of cattle also show the same chemical content. Blair reports that recycled excreta appears to present no health problems for chickens. "The de-

hydration process," he says, "appears to make this material almost sterile." While copper in excreta might be toxic for chickens, Fontenet says, the amounts in the excreta shouldn't be toxic for cattle. Calvert does worry, though, that by using bacteria to convert waste nitrogen into protein, some harmful bacteria might get into cattle.

And what do animals think about feed made from wastes? "Fermented manure," Anthony attests, "smells good. Cattle eat it well."

Might feeding recycled wastes to livestock jeopardize the health of people who eat the livestock? Only a few experiments in recycling animal wastes as feed were conducted before 1966. That year the USDA and the Food and Drug Administration set up a task force to consider recycling animal wastes. The agencies decided recycling was not a good idea from the human health viewpoint and refused to fund recycling research. "But things have changed since then," says J. C. Taylor of the FDA in Rockville, Md., "We have recently been through a week where people refused to buy meat because of its high price." So the FDA is now setting standards that will enable it to evaluate the quality and safety of livestock feed. The FDA wants to know whether such products are really good sources of nutrients, whether they are safe for animals to consume, whether they contain any toxins that might end up in edible tissues of livestock. Taylor is confident that safe ingredients can be made from wastes. He is especially encouraged by some scientists' attempts to upgrade waste materials so they are better sources of nutrients than are the raw products.

The big question is whether the public will buy meat that has been nurtured on excrement. People have been reluctant to buy artificial beef made from soybeans, so it's unlikely that they'll go hog-wild over any product that has any association, however indirect, with manure. Blair is not very optimistic about public acceptance of recycling. However Fontenet and his co-workers rallied 60 courageous persons to eat steaks from cattle fed manure and steaks from cattle that had been fed commercial feed. The subjects did not know which steaks were from which cattle. The steaks from the manure-fed cattle generally received higher ratings from the viewpoint of aesthetics and taste.

As far as nature is concerned, waste recycling is nothing new. Livestock often eat their own manure. Chickens grub along behind cattle, pecking corn from piles of manure. However more research, FDA scrutiny, economic analysis and a strong public relations campaign are probably in order before waste recycling into livestock feed becomes widespread commercial practice. □

films OF THE WEEK

BIRDS IN THE CITY: A FIRST FILM. 16mm, color, sound, 10 min. Many birds are adapted to life in the city. Some build nests in hollow spaces in signposts or in crevices in buildings. Others nest outside the city and visit the city to feed on debris left by man. Ducks, sparrows, swifts, hawks and robins are examples of birds that can be seen in the city. Audience: primary. Purchase \$135 or rental \$8 from BFA Educational Media, Dept. SN, 2211 Michigan Ave., Santa Monica, Calif. 90404.

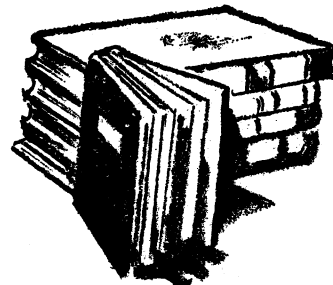
COMPUTERS AND YOU. 16mm, color, sound, 14 min. Through the use of an advanced type of educational computer, the film first introduces us to computers—what they are, their operational functions, and what they can do. It then presents "general purpose computers" and "special purpose computers" and shows applications of each—from calculating the interest on a savings account to navigating a trip to the moon. The film then shows how information is fed into a computer and how this information is translated into computer language. Audience: intermediate, junior high. Purchase \$175 from Journal Films, Dept. SN, 909 W. Diversey Parkway, Chicago, Ill. 60614.

THE LIVING FILTER. 16mm, color, sound, 17 min. Shows how, in the face of severe eutrophication and the resulting pollution of waters, Penn State scientists began experimenting with spray irrigation in 1963. Film shows how the system works, shows advantage obtained in enriched crop and tree growth, effects on animals, and laboratory techniques used to analyze water samples. A spin-off project, now three years old, demonstrates that the living filter can rejuvenate strip-mine soil, getting lush growth of grasses and trees in one growing season in the worst soil in the world. Audience: high school, municipal water authorities, water pollution consultants, environmental protection organizations, general adult. Purchase \$200 from Hornbein-Wood Films, Box 174, Lemont, Pa. 16851 or rental \$5 from Audio-Visual Services, Pennsylvania State University, Dept. SN, Willard Building, University Park, Pa. 16802.

MAKING A SOUND FILM. 16mm, color, sound, 13 min. Shows the different kinds of sound tracks, and explains some of the procedures followed in recording, editing and mixing sound. Synchronized dialogue, voice-over narration, music and sound effects are discussed. The effects of each of these types of sound are illustrated in scenes from a film about a blind woman and a deaf man, and a film editor is shown putting together each track. The film then concludes with an explanation of how the master mix is made. Audience: high school or college beginning filmmakers, general adult. Purchase \$165 or rental \$10 from International Film Bureau, Dept. SN, 332 S. Michigan Ave., Chicago, Ill. 60604.

STRIKING AGAINST OBJECTS. 16mm, color, silent with captions, 3 min. Depicts ways in which workers may injure themselves in striking-against-object accidents. This is made clear in the film, without spoken commentary, as the viewer sees one of the office workers trip up the steps, drop her papers into a fan, fall over several boxes and slip on the floor. Thinking these accidents are the fault of the company rather than the employee, she takes her complaints to the manager's office where she trips over the rug, rests her hand in an ashtray where a cigarette is burning, and hits the wall as she pulls her hand out of the ashtray. She continues this type of accident until she falls on the floor in the arms of another employee. Audience: All types of employees. Purchase \$55 or rental \$7.50 from International Film Bureau, Dept. SN, 332 S. Michigan Ave., Chicago, Ill. 60604.

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