

More On Methane

Al Rutan, the Methane Man

©1992 Al Rutan

First printed in
Home Power #27 • February / March 1992 Alternative Fuels



Al with a small Digester

In the last issue of ESSN, Al's first article 'Prologue to Methane Gas' praised the ease with which methane is used – merely turning a valve to have instant vapor fuel. It takes so little effort. If gas is so easy, how does fifty pounds of stuff get pushed around without any effort? Aw...you caught the inconsistency!

That article says that we need about 50 pounds of waste daily, a mixture of manure and carbon material to feed the digester that will turn this material into about 200 cubic feet of gas.

The focus of this article is just this problem. As anyone who has done any kind of homesteading knows, there is a hard way and an easy way to do every job. Part of the endearing quality of American ingenuity is to see how people can approach a task that is downright tedious, and by some clever manipulation, make it easier.

Easy is Better

This really became a lesson taken to heart while living at Red Lodge, Montana. I was in the middle of a project raising rabbits for market – lots of them, about 200 breeding does producing litters.

Feeding and watering this number was a time-consuming chore. I made hoppers for the hay and feed pellets early on, but providing abundant water was a drag. I upgraded from water dishes to water bottles with a valve. This was an improvement in cutting down the labor. The big jump was to a system of watering valves fed by little plastic lines from a central tank with a float valve to control both the water level and pressure on the water lines.

In one situation, the water was put into 200 little water bowls which were constantly being spilled or fouled with waste. In the other, water was supplied by a small pipeline with drinking valves in each cage. The result was the same – water to drink, but the effort needed was totally different. The two situations accomplished the same effect – abundant fresh water.

Consider the Critters

There is another consideration that must be brought to mind at this point. In the methane process, we are working with living creatures. Therefore a moral dimension must be considered if we are going to achieve a measure of serenity for ourselves in this whole process.

To have a genuine sense of well-being about the entire operation, the animals and the space for which the person is responsible must have an ongoing atmosphere of serenity. If this sounds a little bit like St. Francis of Assisi, well, so be it and no apologies. The purpose of life is not merely accomplishment, but accomplishment in a caring and respectful way.

As people, we harness the work of creatures. Some may maintain this is not right. I don't agree. I do feel strongly that the animals with which we work and upon which we depend do have the right to a reasonable quality of life. So at this point we are talking about animal rights. The concept of animal rights means different things to different people. To me, it means that an animal has a right to a reasonable quality of life. An animal has a quality life when it feels good about itself. This is most clearly evidenced by grooming. Animals, if they feel good about themselves, groom themselves and their friends.

Quality of Life

Death for an animal, or a person for that matter, is not the worst thing that can happen. Quality of life while something is alive, be it plant, animal or person, is of major importance in the scheme of things. One who homesteads can not be mentally well off if such a person is not sensitive to the quality of life of the living things around the homestead. Are the animals feeling good, as evidenced by their grooming?



Continued on next page

A Dilemma

Now, why make a point of this if we are talking about methane and manure? We are faced with a dilemma. On the one hand we want to collect waste with the least effort possible and do it as automatically as possible. On the other hand, we need to have a measure of sensitivity to the needs and quality of life for the animals on which we depend.

If the animal wanders about freely, it will be very difficult to collect its waste. On the other hand, if the animal is tightly caged or tied, its quality of life is virtually nil. So what's the answer?

Somewhere there is a middle ground. Chickens, for instance, do most of their pooping while they are perched at night. Milk cows leave a quantity of used grass in the gutter while being milked or held in the barn during the night.

Hogs that are totally confined don't have much of a life. Hogs that are confined only through the night will leave a good share of their waste behind when penned only part of the time.

Chickens do not do well housed on hardware cloth because their natural inclination is to peck and scratch. I've seen a roost system where the area under the roost was wired with large chicken wire mesh. The chickens could not get to the manure to disturb it after a night of roosting. They were free to roam at will during the daytime.

Slatted floors are useful for both hogs and cattle from the standpoint of cleanliness if the animals are not required to stand on them at all times. In all these design considerations for an enclosed area, the needs of the animal must be considered if we are to have happy animals.

Moving the Material While It's Warm

It is the matter of manure itself. How can a person move it with the least effort possible? Manure delivery systems have been devised for various types of critters, except the horse. To my knowledge, there is no device more automatic than a scoop shovel for cleaning out a horse stall.

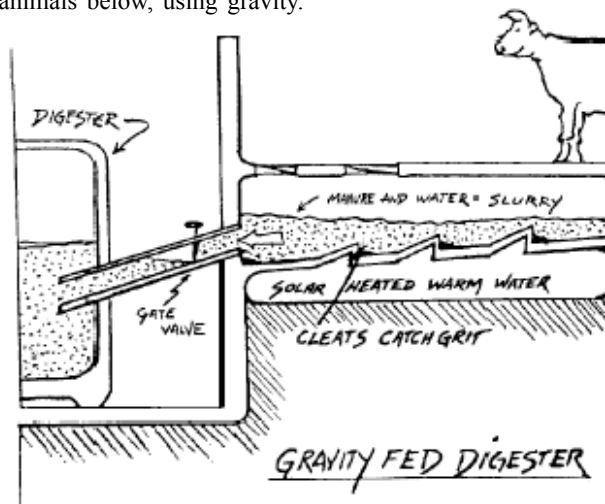
If one DOES have animals, the feces HAVE to go somewhere. So at that point it makes a great deal of sense to turn the waste into vapor fuel (methane) and compost.

When the waste comes out of an animal, it is at exactly the right temperature – body temperature. As it lies on the ground, it cools off. This cooling during the cold time of the year is severe. The sooner the waste is transported from the animal to the tank the better. If the waste loses heat, then the heat must be restored to have the methane digestive process occur in the best manner possible.

This brings us to the biggest challenges in the entire methane procedure. How do we gather the manure to begin with? How do we gather it as soon as possible after it leaves the animal and before it cools down?

Gravity Works for Free

There are two natural forces that work well for us. One is gravity and the other is water. In rolling countryside, barns are commonly built on hillsides. The hayloft is easily accessible by simply driving in rather than having to go through the labor of hoisting every bit of hay with some kind of sling mechanism. The hay is forked down to the animals below, using gravity.



The more that gravity can be utilized for tasks the better. The animal walks around. It can walk up as well as down. If the housing for the animals can be above the digester, then this saves work.

Water has long been used for transport. Since the development of the flush toilet, in the 1850's in England by Mr. Crapper (no kidding...that really was his name!), we have been using water to move feces.

Using water has a problem. What I am going to say now is exceedingly important. Many an engineer and university professor working with the methane concept cannot seem to grasp a simple fact. It is the nature of liquid – especially water – to release heat. When water is heated, it will not retain its heat. We say, "It cools down."

Water Must Be Warm

If we are going to use water in the process of transporting manure, and have it work well, we must understand that water cannot be allowed to stand around waiting for the waste. Warm water can and certainly should be used to wash down a gathering point below a slatted floor. The gathering point had better not be a holding pit in the ground because the whole thing will cool off to ground temperature. Another consideration is that in a pit the methane activity begins right away, so animals above a pit are breathing contaminated air. This is why holding pits MUST have ventilation fans if they are under confinement areas.



Continued on next page

Think in Terms of Free Energy

How does one have warm water with which to transport? Each location will have its own plusses and minuses in working out this design problem. A person has to consider all the ways of capturing "free" thermal energy – solar, wind, whatever, and applying it to the situation at hand.

We're most likely looking at periodic washing down of a gathering area with warm pressurized water. This will both increase the force of the wash and cut down on the amount of warm water needed. The more automatic the concept can be and the less labor intensive, the more of a ideal situation a person can enjoy.

Do We Really Need Animals?

So just how practical is the thought of having animals around a homestead? The trend is increasing for relying less and less on animal parts for human food. Folks tend to become more and more vegetarian. We still need the family mule to plow the garden, a few milk goats for the delicious and healthful treat of fresh goat's milk, or a few sheep to produce wool for hand spinning and the cottage loom. There is wisdom in involving some kind of animal support in our homesteading.

Farmers who raise nothing but corn are still hooked into the food "grid" when they drive to the store for their butter, milk, and eggs. Our great grandparents would shake their heads!

Al Rutan



Al Rutan – RJP