

# What's Going On *Inside* the Cow?

## Action Taking Place Within Rumen Is Studied by Sampling Its Contents

By Joe McClelland

What happens inside a cow's stomach is being studied by two departments of the College of Agriculture. They are learning things about what goes on within the cow's rumen. The rumen is the "big stomach" of a cow, and has a capacity of from 30 to 50 gallons of material.

Dr. B. P. Cardon, associate professor of Animal Pathology and Animal Husbandry, is directly in charge of the rumen-study work. He is working with Dr. W. J. Pistor, head of the Animal Pathology Department, and E. B. Stanley, head of the Animal Husbandry Department.

### Rumen Is Pouch

The cow's rumen is merely a pouch, a container, a place where what the cow eats goes first. No digestive juices or enzymes are added in the rumen. The action within the rumen in the way of fermentation is accomplished entirely by action of the micro-organisms already in the rumen and enzymes that are in the feed eaten by the cow.

The bulk of fermentation that takes place within the rumen is produced by these tiny plants called micro-flora. With moisture and warm temperature, these protozoa, bacteria, yeasts, molds, and other micro-flora go to work. About 10 percent of the solid material (chewed-up food) within the cow's rumen is made up of the bodies of these micro-flora.

The cow can digest directly much of the material it eats. But the complex carbohydrates, such as cellulose, cannot be digested. However, the various micro-flora working within the rumen do feed directly on the cellulose and similar materials. Then these protozoa grow and multiply. Their

In the picture at the right B. P. Cardon (left) and William J. Pistor demonstrate how simple it is to get samples of the rumen contents of a cow. A rubber hose is inserted through the "rumen fistula plug" shown in place on the cow. Samples of the rumen contents are pumped out into the glass beaker.

bodies are digested and used as food later on in the intestine of the animal. The animal furnishes these organisms a place (the rumen) in which to live and grow; they in turn become food for the animal.

### Samples Are Taken

To study the actions taking place in the cow's rumen, samples of the rumen contents must be taken at regular intervals and analyzed in the laboratory. Easy access to the rumen was provided simply by cutting a hole into the rumen and inserting a tube through which the rumen contents are "sampled" at will. To be more accurate, a "rumen fistula" was made. That's simply an operation on the side of the cow where the rumen pouch is near the body wall. Into this "hole" is placed a rumen fistula plug—a rubber affair originally designed by Dr. H. H. Cole of the University of California College of Agriculture. Such a plug was made to order by a rubber goods company from specifications furnished by Dr. Cole.

Once in place on and in the cow, the "plug" causes no concern or dif-

iculty to the cow in any way. When samples of the contents of the rumen are needed, it is a simple matter to pump such samples out through a tube inserted through the rumen fistula plug.

### Test Other Feeds

During the experiments, which will be continued for some time yet, different feeds are being tested. These include alfalfa of different protein contents, various grains and range grasses. Also, one feed is used to test results when other factors, such as the salt concentration in the diet, are varied.

It is also planned to study the factors affecting the release of hydrogen cyanide gas. Stockmen well know that the amount of prussic acid eaten by an animal in certain crops is not as important as the rate at which the poison is released within the stomach. Quick release of the gas often causes sudden death, while gradual release may cause no trouble at all.

And so, in the laboratory—and inside the cow—are being found the answers to some of today's perplexing animal-nutrition problems.

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