PRESS BULLETIN No. 54—November, 1910

The Agricultural Experiment Station
FORT COLLINS, COLORADO

A PARAFINE-LINED VINEGAR CISTERN

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During the past two years several inquiries have been received by the Farm Mechanics Department of the Colorado Agricultural College in regard to the possibility of storing cider and vinegar in cement cisterns. While several contradictory statements have been received upon the subject by the department, nothing definite could be learned. Laboratory tests conducted by the Chemistry Department showed that four per cent acetic acid readily acted upon porous cement work. While several reports to the effect that cider and vinegar had been stored in cement-lined cisterns were received, the fact that acetic acid readily acted upon some of the material in the cement was considered sufficient reason for considering cement an unsatisfactory lining for vinegar cisterns. For this reason it was deemed advisable to try other lining materials than neat cement.

The following experiments or tests were begun October 12th, 1909: First, a cement tile of very rich mixture was stopped at one end by means of a cement plug and the whole covered with four coats of neat cement in water. Fresh cider was placed in the tile, and it was stored in a warm cellar. For a time everything went well; but at the end of a month the cider began to leak thru the tile. Later the vinegar contents of the tile turned black, and a thick, mouldy scum formed over the top. Of course, in case of the tile, more surface of the vessel was exposed per gallon of vinegar than would be exposed in the case of the large cistern. Nevertheless, had the vinegar in the tile contained a far smaller per centage of impurities it would still have been unfit for use.

Second, at the same time that the tile experiment was started, a small cement cistern, lined with two coats of neat cement and a thin coating of parafine was filled with fresh cider. Monthly tests were made to determine whether or not the contents were leaking out. There was no leaking, and each month the samples showed an increase in the acid content of the cider, which was rapidly turning to vinegar.

September 30th, 1910, Professor Bainer and the author dug up the cistern and removed its contents to other receptacles. The cistern was opened and a careful examination was made in order

to determine the condition of the parafine lining. It was found to be intact. The vinegar, when compared with that stored in barrels, showed a favorable test, both as to acidity and flavor. In fact, the Domestic Science Department of the college pronounced the vinegar superior to other samples which had been stored in barrels by orchardists, who make vinegar on a commercial scale.

The process of lining a cement cistern with parafine is so simple that any one with ordinary ability can easily obtain the desired results. In case an old cement-lined cistern is to be coated with parafine, it must first be cleaned thoroly. Then it should be given at least two coats of neat cement and water. The coats need not be applied more than twenty-four hours apart.

The cistern is now ready for the parafine coat. The parafine is heated by means of a small blow torch or gasoline stove until it is a very little above the melting point. It may then be applied to the inner surface of the cistern with a cloth or paint brush. In case a cloth is to be used, the hand should be protected by a heavy leather glove. The parafine should be put on in a thin layer and thoroly rubbed while hot. It should not be rubbed after it starts to solidify. The operator must necessarily work rapidly in order to get the coating well rubbed before the parafine begins to harden. The coating will not allow of bruising, and for this reason it is suggested that the bottom of the cistern be left until last, and the work of coating be done from a suspended platform rather than a ladder placed upon the bottom. Great care should be taken not to drop any objects upon the coated parts of the cistern.

In case a new cistern is to be made, the walls may be constructed of one part Portland cement to four parts clean, sharp sand. The wall should be made of a wet or "slush" mixture. The wall should be thick enough to insure it against cracking.

When the forms are removed, the inside of the cistern may be coated with neat cement in water, the same as in the case of the old cistern.

The parafine should not be applied until the second coat of neat cement has had time to harden for at least twenty-four hours. This provides a solid wall to which the parafine will readily adhere.

All cider cisterns should be built so as to provide plenty of space above the cider to allow the necessary air to come in contact with the surface of the vinegar which is being formed.

It has also been suggested that iron pipes might be coated with parafine and thus protected from the action of the vinegar which is sometimes passed thru them.

While the experiment has been carried on in a small way at the college, the results are so satisfactory that parafine-lined cisterns are now being built for cider storage by practical orchardists. The results of the tests indicate clearly that it is not advisable to attempt to store cider or vinegar in cisterns lined only with cement.