Free Fatty Acids and the Chemist

by H. L. THOMAS

THIS subject reminds me of a quotation from the Boston News Bureau, when the question was asked "What is Cotton"? The answer was "Cotton is the overcoat of a seed that is planted and grown in the Southern States to keep the producer broke and the buyer crazy."

The fibre varies in color and weight and the man who guesses the nearest length of a fibre is called a cotton man by the public, a fool by the farmer and a poor business man by his creditors. The price of cotton is fixed in New York and goes up when you have sold and down when you've bought. A buyer working for a group of mills was sent to New York to watch the cotton market, and after a few days' deliberation wired his firm to this effect: "Some think it will go up, some think it will go down. I do too. Whatever you do will be wrong. Act at once." Cotton is planted in the spring, mortgaged in the summer and left in the field in the winter.

We are up against just as perplexing a problem—one that I feel is of vital importance to the cottonseed industry. I believe that this subject has had more work done on it with less results than any I know. Would that someone had made a discovery to solve this problem, but such is not the case. There are several points, however, which we can discuss that may help.

First comes the sample which must be as nearly as possible representative. After the sample reaches the laboratory it must be thoroughly mixed; unless this is done all is lost. It seems to me that from the checks on ammonia and oil on the check seed samples that there is no doubt but that the samples were representative, and I think Mr. Law should be congratulated on the samples which he sent out.

Second is the chemist. I believe that in a number of cases the chemist is at fault due to carelessness, or lack of attention if you rather. Sometimes I wonder if Free Fatty Acids aren't just fillers, just some figure to complete a report. Until recently I believe that they have been seriously neglected. I believe that here are some of the causes for the great variation found in Fatty Acids. Some of the chemists are while others are extracting; some are using factor weight 7.05 grams of oil, while others are using a catch weight; some are using 20 grams of meats for extraction, others 60; some are extracting all of the oil, some only part, in other words, some are merely washing the meats while others are extracting; some are using tenth normal caustic, some fourth; some of us are heating the samples in the morning and allowing them to stand until after lunch before grinding and extracting. This is merely a hypothesis, yet I feel certain that just such conditions exist. Is there any wonder that we find such varied results?

These are variations which can be corrected, but there is one variation for which the chemists will be thankful so that his alibi will be effective. I have found that free fatty acids in various seed changed rather rapidly in the course of two to seven days. Suppose one chemist runs a sample on Monday and another Thursday, we may expect to find the difference. I have tried at least a hundred samples this year and found just such changes as these—just a few as an example.

	2-20-32	2-23-32	3-7-32
1	6.8	7.9	11.1
2	9.1	9.3	12.2
3	8.2	10.9	11.3
4	7.3	7.8	10.2
5	8.9	9.7	9.8
6	5.8	8.2	13.1
7	7.2	9.6	11.4
8	8.4	8.6	12.0

Now for a few of the higher fatty acids:

	4-16-32	4-23-32
1	12.6	16.2
2	11.6	13.2
3	12.2	13.7
4	12.1	13.5
5	12.6	16.4

I believe these figures show rather clearly the effect of time. This cannot be helped, but an improvement on the check seed sample could be made by having every collaborator determine the free fatty acids on a set day of the week.

With the present method for determining free fatty acids I have been unable to get good results in my laboratory within the same day. I believe that with a few changes the method may

be helped a great deal. All of my fatty acids have been run this year by a slightly different method—different only in restrictions. From my own personal experience I know that any given laboratory within the same day will be able to check fatty acids within two tenths of one per cent up to 17 per cent by the following method: (I have nothing to do with the origination of this method, and it is merely the same old method with just a few restrictions.)

I would like to give this method just as it is carried out so that there will be no misunderstanding.

The sample is heated at 103-105 degrees centigrade and as soon as cooled or ground and sieved through coarse screen, care being taken to get as nearly as possible all meats separated from the hulls, the meats are shaken in their containers and the loose hulls come to the top and are removed. The meats are now ground so that they pass a 1½ mm. sieve—I have a sieve handy and run a sample through this frequently to be sure that the meats are fine enough. The meats are then mixed and placed in the extraction tubes, using between 30 and 35 grams of ground meats. I have a pasteboard cup with a slit cut in it which holds very close to 32 grams, and I use this with all fatty acids. The solvent is added in three portions—60 cc, 25 cc, and then a second 25 cc. Care is taken to see that each portion has completely run through before adding the next. The rate of flow of the solvent through the meats should be not more than 150 drops a minute to give a thorough extraction instead of a washing. The solvent is next driven off by evaporating on the steam bath for from one to one and a half hours.

7.05 grams of this oil is weighed and titrated with quarter-normal caustic, using 30 cc neutralized alcohol, about 3 cc petrolic ether. This method gives excellent results in checking free fatty acids.

I would like to say in closing that my experience with hot percolation as contrasted with this method, that the hot percolation gives about two tenths of one per cent higher free fatty acids. This method may seem a little long and exacting at first, but after a little practice it is almost as easy as the old one, and the results check so closely that the little added work is well rewarded.

Municipal Tax on Soap Making Materials—Nicaragua

The Nicaraguan Congress has just enacted legislation whereby the various municipalities of the Republic will collect a tax of $0.06 per kilogram of imported tallow and palm oil shipped to the respective city or town.

The purpose of the act is apparently to stimulate the sale of domestically produced tallow to local soap manufacturers.

By a degree of May 18, 1932, the Government of Ecuador exempted from the payment of import duties machinery, parts, and the accessories for the manufacture, purification and refrigeration of hog lard. The purpose of the decree is to encourage the domestic industry with a view to reducing imports of lard.

Oxidation of Gum Degrades Rosin

One of the causes of low-grade rosin which naval-stores producers often overlook is the fact that gum standing in cups or barrels for any length of time oxidizes, and as a result of the oxidation the color of the rosin is darkened and the grade is lowered. Naval-stores specialists of the Department of Agriculture's Bureau of Chemistry and Soils, to assist producers, point to oxidation as one of the chief causes for the production of the lower grade rosins. About the only practical method of minimizing oxidation is the frequent dipping and prompt distillation of the gum.

Exports of Copra from French Oceania, 1931

During the year 1931, French Oceania exported to the United States 34,889 tons of copra valued at $1,457,916. Copra exported to France, Germany and Japan during the same year totaled 28,072 tons with a value of $1,232,092.

Copra is one of the principal exports of French Oceania. It represents approximately 85 per cent of the total of all exports of the Colony.

The price at Papette for the best sundried Tuamotu copra, for which the San Francisco importers pay and expect to be delivered, has been approximately 5 cents a kilo.