of $\frac{3}{4}$ " pipe with a number of perpendicular $\frac{3}{4}$ " jets. Rubber stoppers have been put on these jets near their bottom to protect the tops of the flasks. In the other sink there is a similar arrangement for washing the milk bottles. Here the jets are so spaced that an entire rack of ten bottles can be washed by merely inverting it over the nozzles and turning on the water. Several racks on wheels are used for transporting the sticks full of Kjeldahl flasks from one place to another or storing them when not in use.

ROUTINE OPERATION: The work is divided as follows: (1) One man supplied with prepared and numbered samples can make 500 weighings in the forenoon and titrate in the afternoon. He is furnished with flasks previously charged with the sodium sulphate and copper by an assistant who also adds strong sulphuric acid to the flasks after the samples have been weighed in; draws the standard acid into the milk bottles and changes bottles below the stills as fast as one batch is finished. The third worker stays between the digestion table and stills and conducts those stages of the work. (2) Each group of twenty determinations is handled as a unit, and groups are put on to digest at twenty-minute intervals. As one hour and twenty minutes are required for digestion the eight stoves are loaded and cleared once in that time; at the end of every eighty minutes the fifth group replaces the first group. (3) Distillation and the changing of bottles, etc., requires one hour, therefore sixty distillations are on the three batteries of 20 stills each hour. Three digestions on the 80 stoves (240 determinations) require four hours; the 60 stills complete 240 distillations in the same time.

PRECISION REQUIRED: A great deal of time may often be saved by a careful study of the relative precision possible at each step in an analysis. For instance, it is worse than useless to weigh up a sample of about 2 grams for NH_3 to a tenth of a milligram when we know that, in routine work at least, the Kjeldahl method does not give results closer than 0.02 per cent. Such a study has led to the adoption of the following degrees of precision at each step of the work in Head Laboratory. (1) In weighing it is useless to be accurate beyond 0.5 milligrams which makes about 0.02 per cent NH_3 which is within experimental error. (2) The amount of sulphate may vary between 8 and 12 grams without influencing results. (3) The charge of sulphuric acid should be kept between 25 and 30 c. c. (4) Standard acid is delivered by a good automatic pipette within 0.02 c. c. of the supposed quantity used. (5) Titrations made with the 10 c. c. burette are read only to the closest graduation that is 0.10 c. c.

SUMMARY: The increase of analyses from 300 to 500 a day was not accomplished by increasing the labor and time nor by addition to actual equipment on hand. It was done by a systematic division of the work to save steps and eliminate lost motion; by specialization which made each worker expert in his activities; by being accurate to only the necessary degree and by using every labor and time-saving device that could be devised or appropriated.

Attention to every phase of one's routine work will disclose possibilities of increased efficiency. Such a detail as keeping one's pencil in his hand while titrating will accumulate minutes; having a large number of flasks and bottles in use permits the using of spare time for adding sulphate and for drawing standard acids. To my mind, the essential requisite for efficient speed is *keeping ahead of the work*. By this I mean having everything prepared for each step of a determination when it is time for that step.

It ain't so much people's ignorance that does the harm as their knowing so darned much that ain't so.

EFFECT OF SILICATE OF SODA USED IN LINING OF BARRELS FOR EDIBLE OILS

By Carl Bloess, Crown Margarin Co., St. Louis, Mo.

Upon being employed by the Crown Margarin Company, I was given the task of locating the cause of their products acquiring a soapy flavor, causing considerable loss. The cause was traced to silicate of soda used in lining the barrels of most edible fats and oils, especially coconut oil. Our experience has been that as long as the oils remain liquid there is no trouble, but as soon as the oil solidifies, the oil contracting from the sides of the barrel causes the silicate to adhere to it. It is the practice of most margarin manufacturers to spade the oil from the barrels in solid form, thereby adding the adhering silicate. This adhering silicate may be removed by stripping the barrel from the oil and then scrapping the oil to the depth of about one-quarter inch.

If the oil is left in contact, while in the solid form, with the silicate a few weeks, the oil acquires a very soapy flavor to the depth of about one inch. Last October, after calling the above to the attention of one manufacturer of edible coconut oil, they did considerable research work and have found that edible glue-lined barrels work very well, and we are at present receiving most of our coconut oil in glued barrels. We have received some coconut oil in raw wood barrels, but they have their objections, as numerous splinters and at times charcoal adhere to the oil, and they cause the strainers to become clogged very often during the day and also find their way into the finished product, where they are very objectionable.

We have had considerable trouble of all kinds with silicate under various conditions, but the above caused the most serious trouble.

KAPOK OIL

By H. P. Trevithick and W. H. Dickhart, New York Produce Exchange

Kapok Oil is an oil which is made from seeds quite similar to cottonseed and which resembles cotton oil in many particulars, especially in that it gives a Halphen reaction which is just as strong and positive as that of cotton oil. Importations of the oil are quite rare.

The seeds are black, the size of peas, and have a white kernel. They grind easily and being free from lint are very easy to crush in a crude cottonseed mill. However, so far as we know, but one lot has been crushed in such a plant.

Lewkowitch gives widely varying figures for the characteristics of the oil, so that when we received a sample sometime since, we took the opportunity of determining some of the values for ourselves.

The oil as received was fairly clear, of a brownish color, and showed the following results upon analysis:

	Per cent
Moisture	0.45
Insoluble Impurities	0.36
Iodine Value of Crude Oil (Wijs).....	94.9
Specific Gravity of Crude Oil.....	0.9221
Saponification Value of Crude Oil.....	194.5
Index of Refraction at 20° C.....	1.4710
Unsaponifiable Matter	0.66
Free Fatty Acids.....	12.13
Refining Loss	35.0
Color of Refined Oil, 35 yellow.....	7.0 red
Titre of Refined Oil—° C.....	28.1
Titre of Soapstock—° C.....	30.2
Halphen—Positive, Strong, Immediate.	

The Halphen color appeared just as fast as if sample was cottonseed oil, showing a reddish tinge before the carbon bi-sulphide had left the oil.