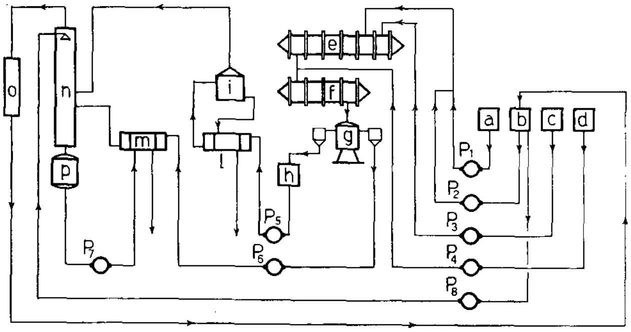

FIG. 6. Acetone continuous refining section (working diagram).

the heat-exchanger m to heat the solution to rectify. The cooled aqueous solution, on leaving m, can be used for the recovery of fatty acids by treatment with sulfuric acid.

The oily phase contained in the tank h is sent to the continuous distilling apparatus i, having passed through the heat-exchanger l. In i the acetone contained in the oily phase is completely separated while the refined oil thus obtained is cooled in the heat-exchanger l before being sent to the bleaching and deodorizing apparatus.

The acetone and water vapors obtained in i are also sent to the rectifying column n. The reflux of pure acetone required for this is withdrawn from the tank b by means of a pump P_8.

The very brief period of contact of oil and caustic soda during refining results in very low neutral oil losses; those by entrainment in the aqueous phase are negligible (0.1% at most of the aqueous phase). Since the average volume of the phase in question is 2.8 times the volume of the oil, the neutral oil losses by entrainment average 0.28% of the oil treated. Practically they can be made less since a share of the aqueous phase can be recycled to dilute the neutralized miscella. Thus only a portion of the aqueous phase is distilled, and a more concentrated final soap solution is obtained. This shows that the continuous process allows, in practice, the realization of a refining approaching theoretical.

It is useful to add that the regulation of the apparatus presents no difficulty because one works with wide margins of safety, and the handling of all the plant may be entrusted to a single workman of average qualifications.

Finally it must be stressed that the plant is not of high cost for all its parts are of extreme simplicity. The flowmeters are commercially obtainable, and the pumps are of current-production type. The centrifugal separator is of a type regularly made for other uses. A plant for neutralizing 30 tons of raw cottonseed oil costs in Italy about 40 million lires ($64,000).

The solvent losses are not much higher by employing acetone instead of hexane. The boiling point of pure acetone is 12–13°C. lower than that of hexane, which applies to the rectifying column, but in the neutralizing cycle acetone is diluted with water and this miscella boils at 75–76°C., that is to say, higher than the hexane boiling point. In Italy acetone costs 1.5 times hexane, and this ratio between the two solvents can be considered practical.

The cottonseed meal obtained by this plant has had a very favorable reception in the Italian and Central-European markets because of its rather light color and its proved efficiency as feeding for calves and milch cows. It is also used in mixtures for poultry and for young calves; its price, on a protein-content basis, is approximately equal that of soya meal. It must be remembered that this cottonseed meal, apart from being gossypol-free, contains a phosphorus content superior to that obtained by hexane extraction because the phosphatides (lecithin, etc.) are insoluble in acetone and therefore are not removed during extraction.

It may finally be remarked that if the production of gossypol-free cottonseed meal is not of interest, the acetone-refining system may be used only for improving the oil-refining yields. One may connect an acetone-refining section of the previously described type to a pressing plant (or hexane-extraction plant) of conventional type. This solution would be suitable for countries which have no special demands for quality in cattle food meals or in which it would be difficult to run an extraction plant (*e.g.*, in tropical countries). The employment of acetone, limited only to the requirements of the refining plant, cannot give rise to excessive difficulties. Moreover the cost of the plant and its relative operating costs are considerably reduced.

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[Received June 14, 1960]

Erratum

The authors wish to have Reference 6 in their paper, "Studies of the Chick Edema Factor. II. Isolation of a Toxic Substance," by Andrew Yartzoff, David Firestone, Daniel Banes, William Horwitz, Leo Friedman, and Stanley Nesheim (*38*, 60–62, 1961) deleted and the following substituted: "6. Ames, S.R., Swanson, W.J., Ludwig, M.I., and Brokaw, G.Y., J. Am. Oil Chemists' Soc., *37*, No. 4, 10 (1960)."