cooling stage in that higher through-put rates produced a harder final product. Thus an increased yield was obtained since the syneresis of the grease was still very small and well below that permitted in commercial products.

Aluminum Grease Characteristics. The grease leaving the heating unit was sticky, clear and about the consistency of syrup. If undissolved soap was present, it could be seen and felt as small lumps on a spatula. Material leaving the cooling Votator was a very rubbery gel, with some stickiness and was very clear. The gel resisted deformation and could be stretched an appreciable amount and still regain its original shape. It was also characterized as "gutty". The material leaving the gelling section had lost all its rubbery properties, was not sticky, was easily deformed and the mass as a whole was not clear. The grease leaving the working Votator was buttery in consistency and texture and was clear and bright in appearance.

Effect of Oils Used. Oils from three different sources were tried. A Pennsylvania base, Mid-Continent base and Coastal base stock. It was found that a pure Pennsylvania stock required an outlet temperature from the cooling Votator of about 200° F., the Mid-Continent and Coastal stock a range of 110 to 130°F. They all gelled in about 20 minutes and had about the same final properties. These temperatures were found to be also influenced by the refinery treatment of the oil. These oils did not have the same treatment so that the above comparison is indicative only.

Effect of Soaps Used. It was found that there was an appreciable difference in the soaps on the market for making aluminum grease and in particular they affected not only the quality of the grease, but also appreciably affected the time of gelling. This is shown in the following table:

TABLE VI

Effect of Soap Type on Properties of Aluminum Grease

Soap		Cooling Votator Outlet °F.	Gel Time Minutes	Worked Penetration	Unworked-Worked Difference
Type	%				
A	8	110	30	325	50
B	8	130	30	290	39
A	9	120	15	300	42
B	9	120	11	264	38
C	9	120	17*	320	78*

* Took three hours for gel to set so that unworked-worked penetration was less than 40 points.

Summary

1. Lithium and aluminum greases can be made continuously by using heating, cooling, gelling and working stages in series. Votators can be used successfully for heating, cooling and working. The entire process from slurry to finished grease takes about 20 minutes, most of which time is in the gelling section.

2. The source and refinery treatment of the oil and the type of soap affect the process appreciably.

Report of the Referee Board, 1943-44

IN addition to the reappointment of 23 referee chemists whose names have already been published in *Oil and Soap,* four new applications were approved as follows:

Mr. R. H. Acock received a certificate on cottonseed, oil cake and meal, and on cottonseed oil.

Messrs. D. A. Bradham, G. C. Henry, Jr., and G. H. Nelson received certificates on cottonseed and on oil cake and meal.

The usual check samples of cottonseed, of soybean oil, and of cottonseed oil were distributed. The required analyses on the soybean oil samples were changed so as to include determination of refining loss and color, as prescribed in the amended grading methods of the National Soybean Processors Association. The present confused situation on grading soybean oil must be watched closely in planning further collaborative tests on this product.

Complaints on late delivery or non-delivery of check samples increased, and the number of late or missing reports suggests that as many as 4 or 5% of all the oil samples may have failed to arrive on time. Allowance for this must be made in scheduling samples next season.

The handling of applications for Referee Certificates alone involves about as much work as the average committee cares to undertake. A large additional burden is involved in handling the check samples needed by the Referee Board in the discharge of its duties. The committee has sought a correspondingly large amount of outside help on these samples and again makes grateful acknowledgment to the following:

to Dr. Frank G. Dollear and the Southern Regional Laboratory, for tabulation of reports on cottonseed oil.

to Dr. R. T. Milner and the Northern Regional Laboratory, for tabulation of reports on soybean oil.

to R. T. Doughtie, Jr., and the Agricultural Marketing Service, for tabulation of reports on cottonseed.

to T. C. Law and his Atlanta Laboratory, for preparation and shipment of the check seed samples.

MUCH thought has been given to the future of the check samples of oil and of cottonseed. These particular samples have been sponsored by the Referee Board because no other committee was responsible for them. The referee chemists regularly constitute a minority of the collaborators. The best interests of the Society as well as the selfish interests of the Referee Board could probably be better served if responsibility for all the check samples were placed in other committees. All the collaborative tests seem important enough to justify, if necessary, a special committee to handle each set of samples, like the Smalley Foundation committee. It is recommended that the Society proceed to create new committees for

this purpose, unless other existing committees, less burdened with work than the Referee Board, can more logically assume sponsorship of the various check samples. Of course, the Referee Board should follow the records of each Referee Chemist on the check samples. This has been done over a long period of years in the case of the check meal work.

The committee has examined critically its practice in paying for preparation of check samples of oil and seed and in charging collaborators for the service. We have paid little more than the out-of-pocket expense for the preparation and shipment of these samples and have collected from the collaborators barely enough to cover this amount. The committee particularly feels that we are too much indebted to Law and Company for time spent on the samples in excess of compensation received.

We are reluctant to increase the charge for the samples but feel that the financing of their preparation should be on a sounder basis. If the collaborative tests are believed to be of some value to the chemical profession and the Society as a whole, the general funds of the Society could logically be used to support the work in part. No complete solution of the problem has been proposed, and the only recommendation at the present time is that all dues paid by referee chemists in excess of regular membership dues be made available to the Referee Board, or through the Referee Board to the appropriate committee, for support of the collaborative tests.

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A Bibliography on the Solvent Extraction of Vegetable Oils From Raw Materials

With Special Attention to Soybeans

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To January, 1944

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* This is one of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.