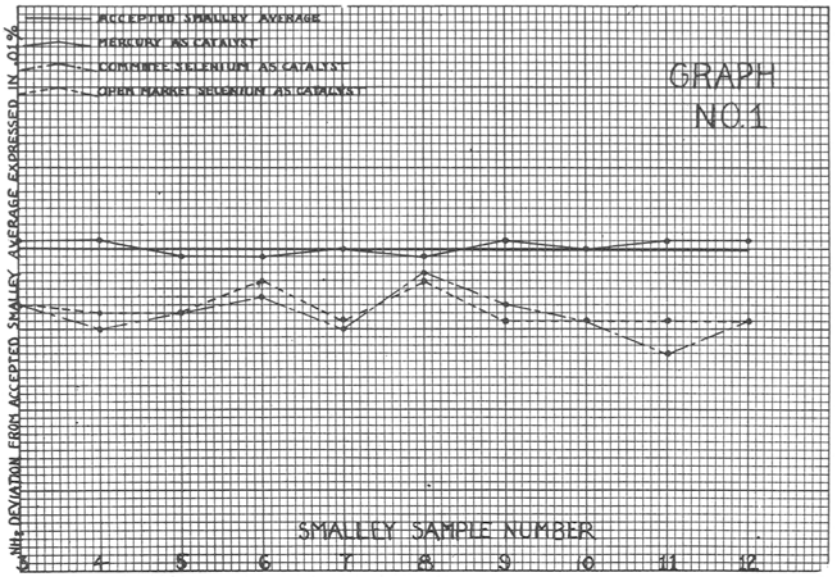
Report of Selenium Committee

Your committee believed, when undertaking the assignment of investigating selenium as a catalyst, that we had an accurate and fairly rapid method for Kjeldahl determinations, and it seemed reasonable to check the proposed method against our present official method.

The work was undertaken on samples 3 to 12 inclusive of the Smalley Foundation, and each member of the committee was asked to report his mercury figures and selenium figures. The chairman purchased a supply of metallic selenium and distributed it to the membership, and also requested each member to buy an additional supply in the open



each of you would determine ammonia, using selenium as outlined in proposed method. I suggest .1 gram of selenium, and that digestion be continued fifteen minutes after clearing. You will note also the proposed method recommends 8 grams of sulphate instead of 10. I would suggest this be carried through Smalley No. 12. Those of you who have received, or as soon as you do receive, a supply of selenium from your general dealer, I should be glad if you would make determinations using that sample also with this one point as the variant, reporting results on both sources of selenium, your source of heat for digestion, and total time for digestion, and of course any suggestions you have to offer."

Under date of October 24th, I wrote the committee as follows:

"Results obtained so far in the method as I originally outlined are not comparing favorably with mercury. I have already received five reports on Smalley samples No. 3 and No. 4 and in the case of all analysts except one, selenium results are lower than are those of our regular method using mercury as a catalyst. I also note that the results on selenium are more variable than they are market, thus checking two different selenium supplies against mercury. I quote from a letter written by myself to the committee on September 20th:

"Beginning with Smalley No. 3, I wish with mercury; the discrepancy between the highs and lows on ammonia values are greater with selenium. So far I have been unable to trace any definite relationship between mercury and selenium values."

I quote from letter of January 29th to the committee: "Cooperation in this work on the whole has been very good, not only as originally outlined, but there has been considerable work done on increased amount of selenium, digestion time, etc. In practically all cases, results have been low, when compared with our mercury method, and with accepted value on Smalley samples. The chairman's personal opinion is it is useless to go further with the method unless some member has an idea as to a material or condition under which it would be inadvisable to use mercury."

In reply there was no suggestion for carrying the work further, in line with what individual members had found out, and under date of February 27th, one member wrote me as follows:

"I call to your attention Volume XVII, No. 1, Journal of the Association of Official Agricultural Chemists, February 15, 1934. On page 48, under the head of 'Fertilizers' it is recommended by Sub-Committee 'A' on 'Recommendation of Referees' and approved by the Association, as follows:

"(5) That the study of the use of the catalysts selenium and mercury in the determination of total nitrogen in fertilizer materials and in mixed fertilizers be discontinued."

As the work progressed, various members of the committee advised that they had increased the selenium used and the digestion time, in an effort to get the ammonia values by selenium up to mercury. This seemed to have increased the ammonia values somewhat, but in few cases did they ever reach mercury values. A number of members bought additional selenium and ran determinations using two different supplies, but their results using the two supplies of selenium were not concordant.

Believes Not Equal

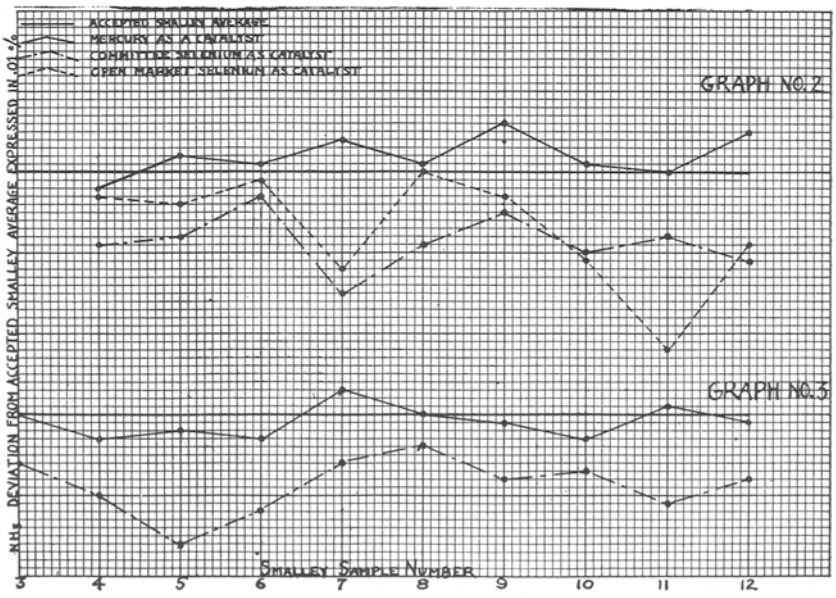
Mr. Henry E. Cutts of Stillwell & Gladding, did not have the Smalley samples, but did some work on meal, cracklings, tankage, fish meal and dried blood. I note from the reports that selenium again ran low and values were only increased by increasing digestion time and amount of selenium used. I note also that individual determinations on the same sample did not agree with each other as well as they did with mercury. Mr. Cutts wrote me on February 5th that he could see no reason for going forward with the method.

The committee believes selenium is not the equal, nor as dependable as mercury, as a Kjeldahl catalyst and is of the opinion that it is inadvisable to pursue it further.

Selenium Values

I have here some graphs which show results of the work on cottonseed meal:

Graph No. 1 shows the average ammonia results of the committee members, using mercury, selenium as sent out by the chairman and selenium purchased on the open market, as a Kjehdahl catalyst, the straight line of this graph being the accepted values of some eighty labora-



tories participating in the Smalley Foundation.

Graph No. 2 shows the ammonia values arrived at by one individual collaborator using the regular mercury method, selenium supplied by the chairman, and selenium purchased in the open market by the collaborator, these values again being plotted against the accepted ammonia value of these samples as arrived at by the laboratories participating in the Smalley Foundation.

Graph No. 3 shows the work of another collaborator who used only one supply of selenium.

Graph No. 4 shows the work of another collaborator on Smalley samples 3 to 27, inclusive, though he only used selenium prepared by the chairman through No. 15. His results are plotted against the straight line of the accepted averages.

Graph No. 5 shows detail values on each sample, the results being those of individual collaborators, all values again plotted against the straight line of accepted averages on the Smalley samples. Collaborator No. 5 turned in results on only two samples.

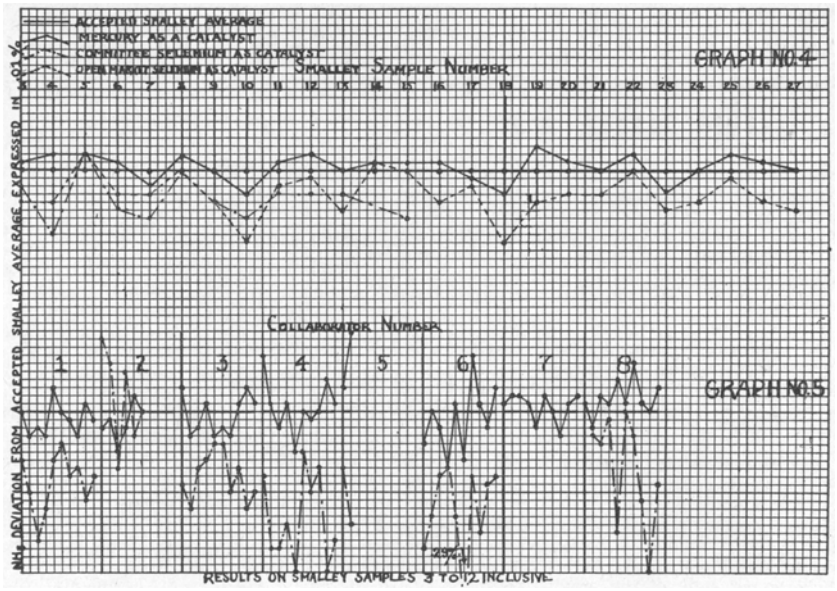
The chairman is very appreciative of the cooperation he had from the committee and the interest they manifested in the work.

Respectfully submitted,

N. C. Hamner, Chairman.

Committee:

J. D. Evans
Clinton Morris
H. L. Thomas
E. G. Williams
G. W. Agee
M. E. Whitten
J. J. Vollertsen
H. E. Cutts



Obituary—Paul Escher

Mr. Paul Escher of Swift and Company's chemical laboratory died on September 3. He was born in Breslau, Germany, November 20, 1865. He graduated from Cornell University in 1894. Shortly after his graduation he entered the employ of Swift and Company where his principal activities were concerned with fats, oils and soaps. He was one of the early workers in this country upon the hydrogenation of oils and fats and the preparation of suitable catalysts. He also prepared a number of bibliographies. He was connected with Chemical Abstracts from the very first issue, abstracting prncipally the German fat, oil and soap publications.