

## (CHEMISTS' SECTION)

few of the meal samples, say five or ten, both by the official Gunning-Mercury method, and at the same time by the Gunning-Copper method, both with and without the addition of sodium sulphide.

"You will note from the last two questions that the committee proposes, if approved by members, to secure a quantity of pure ammonium sulphate and sodium carbonate, packed in four-ounce, glass-stoppered bottles, to be held possibly by the secretary so that the members can secure this from time to time in checking up their work. These samples will be prepared from chemicals of the highest purity obtainable. The lots selected will be thoroughly mixed so as to be uniform. I think if we can have standards to draw on that all laboratories will be working on a more uniform basis and it may help somewhat in getting a better quality of work. Some of the laboratories participating in this work certainly need improvement.

"All members of the committee have approved this. Most of the members of the committee have taken an interest in this work, several have made some very good suggestions, while one or two have not been very active as yet."

It is unnecessary to remark that this is a live committee.

We note from correspondence that Mr. C. P. Long of the Soapstock Committee is lining up with his committee and perhaps has some work already finished that has not yet been reported.

The Refining Test Committee, with its various subcommittees, has had some difficulties to overcome, but Mr. Morrison has been following this matter, and we are sure there will be a continuation of good work accomplished in the next three months.

The Free Acid Committee, Mr. J. C. Postell, and Bleach Test Committee, Mr. R. C. Hatter, chairman; the Extraction Committee, Mr. Felix Paquin; the Oil Constants Committee, Mr. L. M. Tolman; the Sampling Committee, Mr. E. R. Barrow, general chairman, are, we trust, just so busy getting work done that they have not had time to give the writer a progress report in response to his recent letter.

Surely, with this line-up of good work already accomplished and five or six months of uninterrupted work before our annual meeting, we will make progress this year that will be a credit to our society.

It is not too late for every member of the society who reads this progress report to resolve to do some very definite things on committee work this year. If your name appears in the above lists of committee chairmen, you, of course, know your work. If your name appeared in the lists of committee men in the July COTTON OIL PRESS, you probably know what your chairman would like you to do. If not, write him and tell him what you want to do. If your name does not appear on any of these lists because you are a new member, or because our secretary and president did not happen to know what work you would like best to carry on, refer to the July number of THE COTTON OIL PRESS and pick out the committee or subcommittee covering the line of work in which you are especially interested, and write the chairman your idea and your offer to help. The chairman in question may be severely shocked by such an offer, but we will guarantee that he will recover. Try it anyway, and in so doing better yourself and our society.

## MONTHLY LETTER ON CHECK MEAL WORK.

On November 6 we obtained our one hundredth application for check meal work from Dr. Wm. P. Manglesdorf, State Chemist, Little Rock, Ark., and on the 8th the one hundred and first from Wm. P. Nelson, Jr., New Orleans, La., and the one hundred

and second from Herbert E. White, Chickasha, Okla. It has been a long, hard pull to get this number, and it will require work to keep these men for another year, as well as to further increase the number.

I have just finished a tabulation for all ammonia results for the Society's Ammonia Committee through the first fifteen meals. This shows that Analyst No. 41 stands first with 20 points difference; No. 6 second, with 21 points; No. 81 is third, with 32 points; No. 40 fourth, with 34 points; No. 29 is fifth, with 37 points; Nos. 9 and 21 are sixth, with 39 points; No. 47 is eighth, with 41 points; No. 68 is ninth, with 42 points, and Nos. 18, 30, 48 and 59 tenth, with 46 points. All of these indicate fine work. The Uniform Feed Committee of the Interstate requested me to give certain information regarding the accuracy of the ammonia determination in cottonseed meal, to be used at a hearing before the Feed and Food Control officials at Washington November 17, 18 and 19. This I was able to produce from the results on our check meal work.

When they requested similar information in reference to low-grade feeds, I did not have it, and so decided to see how quickly we could get it for them. This decision was reached Friday, the 5th, and on Saturday, the 6th, a set of samples, meals 40, 19 and 20, and fertilizer No. 2 were prepared and sent out. With these was also sent a letter asking that No. 40 be reported at once. Forty is shorts, and that number was used in order so as not to break up the series.

Results are commencing to arrive, and I hope to have a representative number to carry with me to Washington when I go to the A. O. A. C. meeting.

Owing to my absence from my desk, I will not be able to announce in this month's letter the winners of Group 4 and Group B. I hope if there is anything of especial interest at either the A. O. A. C. or the Food and Feed Chemists' meeting to the chemists to get out a separate letter containing such news.

F. N. SMALEY, Chairman.

## THE BASKERVILLE PROCESS FOR THE PRODUCTION OF EDIBLE OILS.

By Charles Baskerville.

The material of this communication was prepared for use by several publications, but especially for *The Chemical Age*. On receipt by the editor of that journal, one versed in oil matters, it was promptly taken in hand, edited and published. In the November number of the COTTON OIL PRESS, the editor of the Chemists' Section in an abstract "of articles by A. O. C. S. members" (p. 50), says "This is an unsigned article, which was submitted *originally* (italics mine—*vide supra*) by Dr. Baskerville for publication in the COTTON OIL PRESS, and returned to him by your editor for a few suggested changes, particularly the name of the author." A carbon copy of the "material" was sent the editor of the COTTON OIL PRESS, with the thought that the *substance* of the article might be of actual interest to members of the Interstate Cotton Seed Crushers' Association. It was referred, in turn, to the editor of the Chemists' Section, who suggested certain changes, partly to make it more appropriate to the readers of the COTTON OIL PRESS, and that the name of an author be attached to the "material." As Mr. H. E. Brown and I were responsible for the statements of facts, I gladly acquiesced, but in reply said that I would prepare an appropriate article as soon as the multiplicity of my duties would admit. This has been done as soon as possible. Informative material for an entirely different audience has been eliminated. However, material facts, which it seems to the writer should in justice be known to his fellow-members of the American Oil Chemists' Society and which were not in the other manuscript, are incorporated in this communication.

CHAS. BASKERVILLE.

More fats for foods have been and are now needed, so numerous efforts have been directed toward securing new sources of supply. Some novel sources of edible oils have, in consequence, been made known, but as yet the production therefrom has made no appreciable impression. It was therefore desirable to secure

## (CHEMISTS' SECTION)

a method for increasing the yield of edible oil from the available raw material. The "loss" of whole oil in the common practice of refining with caustic soda has been well known, but little had been done effectively in the way of reducing this "loss" until the Great War impressed the necessity. Prior to the war, however, in studying the fundamental problems in hydrogenation, the writer began an investigation of the character, quality, etc., of edible oils, to learn the interfering factors during hydrogenation, more or less indefinitely stated in the literature. The practices of refining in common use were wasteful and open to improvement, hence his attention was devoted to securing a method to insure a larger output from the raw material available. The writer's efforts have been successful, and plants are now operating with the process which grew out of the researches undertaken.

The principles of the process were explained, accompanied by a laboratory demonstration, in an address presented by invitation at the Birmingham meeting (May, 1915) of the Interstate Cotton Seed Crushers' Association.<sup>1</sup> For reasons best known to themselves, cottonseed oil producers and refiners did not then take up the process, perhaps because the technical features had not been sufficiently developed at that time. The laboratory method in detail was offered the Committee on the Refining Loss on Cold Pressed Oils of the Cotton Products Analysts' Association (now the American Oil Chemists' Society) to be tried out simply as a laboratory control. The laboratory method gave speed (requiring but half an hour for a determination), if it offered no other advantages, which it did. In September, 1915, we submitted to the chairman of that committee comparative results obtained by the official and the writer's methods on two samples of cold pressed oils, low grade, to be sure. In 1916 we again called attention to the method, insisting that any new method of control at least deserved consideration, but in so far as we are aware, it has not been tried out by the Association or Society.

Many hundred different oils have passed through our laboratories and come out as edible products, refined by our processes. These involved many grades and kinds of vegetable oils (corn, peanut, cottonseed, cocoanut, soya bean, sunflower, palm, alfalfa seed, etc.) and animal oils (cod-liver, whale dog-fish, salmon, menhaden, etc.). Some grades of cottonseed oil, which expert refiners could not refine by the old processes, yielded promptly with our process operated by these same practical men under our instruction.

So it may be of interest to my fellow-members of the American Oil Chemists' Society to learn of the technical application of the process. They may judge for themselves as to its success. Those who are operating it are satisfied. The essential contents of this article appeared in *The Chemical Age* (September 20, 1920), but as that was edited for an entirely different audience, much is properly omitted here.

To the readers of this journal it is unnecessary to discuss the composition of fats (which include oils), but for the sake of clarity it may be just as well to recall that glycerides, fundamentally classed as edible oils by us in the United States, come from various sources and, by virtue of the origin, conditions of collections, storage, extraction, etc., contain a variety of substances which must be removed or materially reduced in amount before they become acceptable to the trade. The substances in question, normally present, depending upon the quality of raw material, mode of extraction, conditions of storage, transportation, etc., may and do vary in quantity from notable to

small. Even if a particular substance be present in very small quantity, its presence may materially affect the commercial value, for such is one of the esthetic factors, with or without reason, of the purchasing public. Among those bodies in solution, in suspension, or as dispersed colloids, are acids, gums, carbohydrates, proteins, pigments, phosphatides, and cholesterol or phytosterol, or both. The trade demands that some of these be removed or materially reduced; of others the trade knows little or nothing; the feeding public takes what it has been educated to take, some of the more discriminating, relatively small in numbers, but who are willing to pay, insisting upon labels.

No universal method for refining animal and vegetable oils is known. A number of processes have been proposed, patented, or kept secret during the last 130 years. Around the knowledge and power of the practical oil refiner not a little mystery still obtains in many places. The foregoing statement is based upon actual knowledge. It is only within recent years that refining edible oils has become understood from a scientific point of view. Each individual oil presents its own problem, and even the same oil by name, obtained under different conditions, involves judgment, based on the knowledge of the chemistry involved, to secure the best and most economical results. Furthermore, the use to which the oils is to be put must be considered; for example, one wants acid oil for some paints and neutral oils for foods.

The customary practice for refining vegetable oils for food purposes, as is well known to readers of this journal, depends upon neutralizing the free fatty acids in the crude oil, usually by agitating the oil with an aqueous solution of an alkali, the strength and the amount having been previously determined by laboratory tests, agreed upon as a standard, and then heating the mixture during agitation to a suitable temperature until the oil "breaks." The mass is then allowed to stand until the "foots" settle to the bottom of the kettle, when the supernatant oil is drawn off, usually by means of a swivel siphon. According to the process of Chisholm, sodium silicate is also added with the caustic to facilitate the settling. Nearly always some "dreg" floats on top of or remains suspended in the oil. If this be very great, its settling is sometimes facilitated by throwing salt on top of the oil in the kettle while the oil is still hot. The salt drags down some of the floating "dreg." In any event, the oil drawn off is clouded, perhaps on account of the presence of some dissolved soap or globulated moisture or suspended matter, much doubtless colloidal in nature. This oil is then "brightened" after drawing off by throwing in small amounts of fuller's earth, heating again with stirring and passing through a filter press. Sometimes, previous to this treatment with fuller's earth, the decanted oil is heated to 160 degrees to 180 degrees F., in a separate settling tank to cause the "foots" remaining in the oil to rise to the top, when it is skimmed off. If the oil is to be bleached by fuller's earth or one of the carbons at once, the "brightening" may be omitted. Sometimes the oil is washed to remove the residual soap in the oil.

The time factor in settling (six to twelve hours) of the "foots" materially affects the completeness of the separation referred to above. Cocoanut oil sometimes requires 48 to 60 hours to settle. In any event, the "foots" is wet with oil. This "whole oil," that entrained and that which wets the "foots," goes with the "foots" as soapstock, which commands a much less price than the "whole oil" obtained as refined. During the rush season the efficiency of yield of refined oil must be sacrificed for speed and quantity refined. The more speed in refining the more loss of refined oil by

<sup>1</sup>Oil, Paint and Drug Reporter, 1915.

## (CHEMISTS' SECTION)

the process just outlined. A recently developed method of recovering some of this whole oil from the "foots" will be referred to later.

A process which would reduce the amount of oil entrained in the "foots" to a minimum, thus increasing the yield of refined oil, and one which would not be dependent upon the slow subsidence of the "foots" (that is, admit of rapid separation with consequent increase in capacity of a refinery), therefore would approximate the high efficiency one might hope for in such an industrial operation.

Therefore, the aims to be accomplished by any superior process were:

1. To reduce the amount of oil entrained in the "foots," thus increasing the yield of the "whole oil";
2. To reduce the time of contact of the excess alkali (necessary for the "break" and to secure the best "color") to the minimum;
3. Utilization of the by-products.

It is to be assumed that all oils, good, bad and indifferent, are to be refined as they come. However, this may not be necessary, as in some cases only the good, and perhaps the indifferent, oils are refined under the old practice at some places. In fact, some commercial oil is of such a grade that it cannot be refined at all by the process given above, and, in consequence, is sold as soapstock or for other uses, but at a lower price. Certain markets foreign to the United States call for a highly colored oil, so they do not present the problem of bleaching. Furthermore, high and low colored oils may be blended to meet the market demands. Hence, an oil not refinable by the old processes, but refined by a new process, renders a formerly discarded food product fit for food.

So various kinds of crude vegetable oils, as corn, peanut, cottonseed, coconut, soya beans, sunflower, palm, alfalfa seed and rapeseed from various kinds of sources, United States, Canada, Japan, France, England, Philippine Islands, China, etc., produced under various (extreme) conditions, cold and hot pressed, extracted, burnt seed, tank cars contaminated with tar products, tank steamers contaminated by petroleum, etc., have been refined by this process to prove it out. In fact, all crude vegetable oils submitted have been refined by the process in our laboratory. Some very low-grade oils, which have not been refined by other processes, and which were suitable only for the soap kettle, have been refined and yielded edible oils by this process. This has been done with a very low grade cottonseed and soya bean oils. The economic importance of this will be readily appreciated.

It must be stated that no claims are made to refine China wood oil by this process. Castor oil and aged linseed oil cannot be refined economically by the process, although another process was worked out for the lowest grade castor oil. However, fresh linseed oil has been refined commercially by this process.

By this process also such animal oils as cod-liver, menhaden, salmon, dogfish, seal and whale oil have also been refined. These, as a rule, however, require a preliminary treatment for the removal of characteristic contaminating material acquired in the more or less crude productions of such oils. Fish oils carrying 15 per cent. or higher F. F. A. cannot be converted into neutral edible oils economically by this or any other process known to the writer.

To accomplish the first two aims referred to above, the purpose was to get the "foots" into such a condition that it might be filtered and then squeezed to reduce the amount of "whole oil" entrained and wetting the "foots." By doing this immediately after the "break" and while the oil is still hot, time is saved, heat conserved and saponification of "whole oil" by

the necessary excess of alkali present to secure the best color reduced to the minimum.

Some colloids may and are coagulated by heat, some by acids, some by alkalis, some by salts, and in time will settle out. Some colloids that have been coagulated or lumped may be filtered away from the liquid medium. Some coagulated colloids in their formation absorb or adsorb coloring matter.

Suitably prepared cellulose fiber will absorb and adsorb some coloring matter. It will bring about an agglomeration of the material precipitated from oils by treating the oil with alkalis and heating, and it will bind the particles together so that they may somewhat lose their slimy character and then may be easily filtered away from the oil in which they were produced. Short-fibered "linters" or "delint" is a suitable form of cellulose for some oils.

Therefore suitably prepared cellulose is added along with the caustic to the oil to be refined. The "break" takes place normally in such a physical condition that the soaps and other constituents in the precipitate thus produced may be separated from the oil immediately by filtration. However, it was determined that some of the soaps formed by neutralizing the free fatty acids with the alkali tended to emulsify with the oil, or so to distribute themselves by colloidal solution, as to render their separation difficult.

This was completely overcome by subjecting the oil, at a suitable stage of the treatment, to the action of an anhydrous salt which is capable of taking up water of crystallization, the preferred salt being dry sodium carbonate (soda ash), which, as is well known, becomes hydrated by taking up water of crystallization, according to temperature conditions. By such treatment the soaps, which have already been formed by the treatment with caustic alkali, and which have become so incorporated with the oil as to be incapable of complete separation by ordinary filtration, are hardened or pectized, presumably by dehydration or partial desiccation, and are so modified that they are readily separated by simple filtration or centrifuging. Sodium sulphate, which acts in the same way, may be used instead of soda ash. These dehydrating chemicals produce no change whatsoever in the composition of the finished oil.

#### How the Process Is Carried Out.

The process is carried out by adding ordinarily 2 per cent. of prepared cellulose (less than 1 per cent. real cellulose) and a suitable amount of caustic soda (usually much stronger, but actually less in amount than is commonly used). The whole is thoroughly basted by mechanical means and then heated to 45° to 65° C. to produce the "break"; a determined amount of soda ash (usually 2 per cent.) is added, after which it is filtered. The "cake" may also be separated by centrifuging, using a cloth lining for the basket.<sup>2</sup> At first, some soap may pass through the filter-cloths. In that event, the first filtered oil may be run directly back into the refining kettle and pumped through the press until the oil is "bright." This usually occurs within a few minutes; in fact, the speed of filtration is directly dependent upon the speed of the pumps. This re-filtration also improves the color. This oil is neutral (or as neutral as can be obtained by refining with an alkali) and can be bleached and deodorized,

<sup>2</sup> This was done long before the work reported in the interesting paper by Dr. Shrader (this journal, October, 1920, p. 50). However, we have never used the novel type of centrifuge described by him; that for refining oils is new as far as we are aware.

## (CHEMISTS' SECTION)

or both at once, or may be stored safely. If linters is used,  $\frac{1}{4}$  to  $\frac{1}{2}$  per cent. of the dry cellulose is added.

*Commercial Operation.*

The process is operating commercially at present in the United States on corn, peanut, and soya bean oils. A new factory has just been constructed to operate with peanut, soya bean, and cocoanut oils. The owners of the patent rights have contracted for other plants and are completing negotiations for six more plants to be operated in the United States, as well as plants in Great Britain and Japan.

*Advantages Claimed.*

The advantages claimed for the process are:

- (1) Speed in handling oil, allowing the oil to be exposed to elevated temperatures a minimum length of time;
- (2) Speed, which admits of quick turnover;
- (3) Speed, which doubles the capacity of a refinery, or quadrupling the capacity of a 24-hour basis;
- (4) Increase of yield of refined oil; 1 to 15 per cent., depending upon the oil;
- (5) Ability to refine a very low grade oil, yielding an edible product from raw material which cannot be refined by other processes;
- (6) Conservation of heat, if the oil is to be bleached and deodorized, hence less fuel;
- (7) It gives a double check on the refinery by weighing the finished oil and cake;
- (8) A further saving of whole oil to the extent of 1 to 3 per cent. is made possible by having the "foots" in the form of a filter cake, which is subjected to hydraulic pressure;
- (9) Little new machinery is needed beyond that of a refinery by the old process; extra filter presses, a hydraulic press, a breaker and cutting tank, with piping and pumps, being practically all that is needed;
- (10) The cost of chemicals is the same or less;
- (11) The labor items cost no more or less;
- (12) The by-product may be converted directly into a useful and commercial material.

All the claims have been verified on a commercial scale. For example, at one plant it is the common practice to filter two and a half tons of corn oil in 15 minutes. Ten tons of soya-bean oil in another plant have been filtered immediately after the "break" in 26 minutes. In fact, commercial practice has shown greater saving than was claimed as a result of the laboratory practice.

*Objections Raised and How Met.*

The only objection that has been seriously raised to the process is based upon the presence of cellulose in the filter or press cake. This cake corresponds to the "foots" of the old process. The "foots" went directly to the soap kettle or was cut with acid and sold as grease on the acid content. The soap maker ordinarily does not want cellulose or linters in his soap stock. In the case of linters, this is objectionable. However, the press cake may be cut by acid or niter cake, and the linters removed by simple filtration. The product is acid grease similar to that obtained from "foots."

Another objection is the slightly greater cost of chemicals used in the first stage of the process. This is cared for by credit for the excess used in the by-product.

*Utilization of Everything Used.*

If paper pulp (cellulose) be used, then soda ash may be employed as the dehydrating agent, and the whole cake goes into the soap kettle. The soda ash used co-operates with the necessary extra caustic soda

needed for making soap. The caustic soda used in converting the cake into soap dissolves some of the cellulose and mercerizes some. If this soap stock be evaporated down with more soda ash to produce a soap powder, the cellulose used acts as a filler and serves as a detergent in the same way as sodium silicate (water glass), a constituent of some soap powders. Thus, everything used in the process may be converted into a product commanding a price equal to or superior to the costs of the raw material.

*Recovery of Whole Oil From Soap Stock by Other Methods.*

The desirability of recovering whole oil from the "foots" has long been recognized and numerous efforts have been put forth with that end in view. Apparently the best method cottonseed-oil specialists and engineers in the United States have been able to devise, except the process here described, has been to give centrifugal treatment to a water emulsion of the soap stock.

*Centrifugal Method.*

"In general, this process consists of dissolving soap stock in about four parts of water to one part of soap stock and subjecting it while warm to the action of enormous centrifugal force in a specially designed Sharples super-centrifugal, whereupon a considerable portion of the oil present is forced out of the soap stock solution in the shape of an emulsion, which emulsion is subjected to the action of further super-centrifuges after being agitated with a concentrated brine solution, whereupon those second-run machines deliver oil itself and brine nearly free from oil. The action of the super-centrifuge is continuous except for shut-down periods to clean any sediment from bowls.

The recovered oil can then be returned to the refining kettle for refining. It will be about equal in quality to the original crude oil from which the soapstock being treated was made, provided this soap stock is handled from the refinery through the centrifugal plant within a short time after being made.

The resultant soapstock solution which flows from the machine for treatment therein will be too dilute for sale as such, but can be readily reduced to acidulated soap stock by boiling with the proper amount of sulphuric acid or nitre cake."

The commercial recovery of the centrifugal process, as reported, is 60 to 64 per cent. of the whole oil in the "foots." On an 8 per cent. refining loss the recovery is 1.55 pounds of oil per 100 pounds used. This oil requires refining, as if it were the original crude oil.

By the process of the author from two to four pounds of refined oil per 100 pounds used from the same oil is obtained at once.

An estimate is given herewith of the differential for a plant to refine cocoanut oil in the New York district. This estimate is based upon actual figures secured from a plant refining soya bean oil by the process.

**Estimates of Differentials Obtained in Refining Cocoanut Oil in the Metropolitan District Based on Refining Soya Bean Oil.**

*Assumptions.*—Oil to be brought alongside plant and to contain 5 per cent. free fatty acid.

*Refining Costs.*—Five per cent. free fatty acid cocoanut oil gives 7 per cent. refining loss. At 7 per cent. refining loss, there would be nearly 140 pounds per ton of oil to go into free fatty acid. It is estimated that of this amount 110 pounds could be recovered as free fatty acid.

<sup>3</sup>This Journal, December, 1919.

## (CHEMISTS' SECTION)

Two per cent. of salt cake to be used; or 40 pounds of salt cake at 2 cents per pound equals 80 cents.

At 5 per cent. free fatty acid there would be required 14 pounds of caustic soda per ton, at 4½ cents per pound, equals 64 cents per ton for caustic soda.

Estimate linters at 1 per cent. of weight of oil, or 20 pounds per ton; linters to cost 5 cents per pound, or \$1 per ton.

Fil-char to be used for bleaching, using one-half of 1 per cent., or 9 pounds, at 10 cents per pound, equals 90 cents.

Estimate loss of oil in bleaching at 3 pounds per ton, and value of the oil at 22 cents per pound, equals 66 cents.

Coal consumption (coal costing \$7 per ton), including deodorizing, equals 90 cents per ton of oil refined. Resume of Chemicals and Coal Costs . . . . .

**Resume of Chemicals and Coal Costs.**

Coal. . . . .	\$ .90
Caustic soda . . . . .	.64
Linters. . . . .	1.00
Salt cake . . . . .	.80
Fil-char . . . . .	.90
Loss of oil in fil-char. . . . .	.66
	<hr/>
	\$4.90

**Resume of Refining Costs Per Ton.**

Sales commissions. . . . .	\$2.42
Office expenses. . . . .	.50
General administration expenses. . . . .	3.70
Chemicals and coal. . . . .	4.90
Royalty. . . . .	2.00
Wages. . . . .	4.50
	<hr/>
	\$18.02

**Prices of Coconut Oils.**

(Prices taken from the *Oil, Paint and Drug Reporter* as of August 16, 1920, quotation in New York.)

Edible coconut oil in barrels. . . . .	\$ .18
Crude in tanks. . . . .	.14
(5 per cent. free fatty acid.)	

**Profits Per Ton on a 50-Ton-Per-Day Plant. Income Account.**

1860 lbs. refined oil, at 18c. . . . .	\$334.80
Fatty acid soap stock recovered, 110 lbs. . . . .	6.60
	<hr/>
Total income. . . . .	\$341.40

**Cost Items.**

2000 lbs. crude coconut oil, at 14c. . . . .	\$280.00
Refining costs as itemized above. . . . .	18.02
	<hr/>
	\$298.02

**Items of Cost to One Ton of Refined Oil from Actual Factory Operations Based on Soya Bean and Peanut Oil.**

The total refining costs are based upon the operations of a small plant, and should be lower in a plant of greater capacity. Barrels or other containers are not included.

Costs per ton given below are based upon several months' operation of a plant, and converted into costs per ton of oil refined. It will be noted that the cost per pound, less overhead, is 6.7 mills. In another plant refining at the rate of 25 tons per day, the refining costs, exclusive of overhead, were reduced to 5 mills per pound on a month's operation. As to be expected,

the larger the plant, the better these cost items, especially the items of general administration and executive expenses:

Coal. . . . .	\$ .968
Chemicals. . . . .	.934
Labor. . . . .	4.527
Sundry expenses . . . . .	1.155
Sales account . . . . .	3.87
Royalties. . . . .	2.00

Total cost refining, bleaching, deodorizing oil per ton (without overhead) . . . . . \$13.354

It will be noted in the above resume of the costs involved that deodorizing is included. Mr. H. E. Brown, a chemical engineer of New York, who has installed the process in several plants, and who has smoothed out some of the technical wrinkles, has devised a special deodorizer of high efficiency. This deodorizer may be used with neutral oils refined and bleached by any process.

**PERSONAL ITEMS AND NEWS NOTES.**

By Thos. Law, Assistant Editor.

If the readers of this column think it of sufficient interest to warrant its continuation, it is up to them to furnish items to fill it every month. "We aim to please," but obviously the only way for us to get news is through the co-operation of our readers.

Messrs. Smalley and Law were in Washington the middle of November to attend the meeting of A. O. A. C. and the Feed and Fertilizer Chemists' Association.

H. C. Moore, chairman of our Ammonia Committee, was in Atlanta the latter part of October. He has already gotten the committee work for this year well under way and promises, with proper co-operation from those called on for assistance, to produce interesting results on the Gunning-Copper method by next summer.

Wilson H. Low's present address is 532 South Lorraine Building, Los Angeles, Cal. Care of J. H. Show.

Carl Bloess, formerly chemist of the St. Louis branch of the American Cotton Oil Co., has resigned to accept a similar position with the Crown Margarine Co. of that city. His address is 3527A Humphray street, St. Louis.

L. G. Copes, assistant to Dr. Smalley at the Southern Cotton Oil Co.'s head laboratory, Savannah, Ga., has just returned from a two-months' trip to the various branch laboratories of the company.

Mr. Edwin M. Davis, formerly with Franklin Baker Company of Newark, N. J., is no longer connected with this company. His address is 163 Berwyn street, Roselle Park, N. J.

W. D. Crandall, formerly associated with Dr. Wesson in his Montclair laboratory, has been added to the force of the Southern Cotton Oil Co.'s research laboratory at Savannah, Ga.

Dr. J. H. Shrader, our associate editor, has severed his connection with the Coconut Products Corporation of Baltimore, and temporarily returned to the U. S. Bureau of Plant Industry as oil technologist.

The following members of the A. O. C. Society attended the meeting of the Official Agricultural Chemists in Washington November 15, 16 and 17:

W. D. Richardson and J. J. Vollertsen, Chicago; S. W. Wiley, Baltimore; F. N. Smalley, Savannah; G. C. Law and C. A. Butt, Atlanta; C. N. Herty, New York.

Messrs. Smalley and Law also attended the meeting of the Feed Control Officials in Washington, the same week, as representatives of the Interstate Cotton Seed Crushers' Association.