

The lowest percentage of oil in meal was 3.75, while the highest was 13.37.

I also have here a table showing the yields of about fifty mills during the season of 1887-1888. The best oil production shown is 44.05 gallons with 783 lbs. of cake per ton, while the poorest is 33.69 gallons and 737 lbs. of meal or cake.

The highest cake production shown is 852.63, while the lowest is 636.38. These results compared with present methods calling for 900 lbs. of meal and not over 7 per cent. of oil left in the same show what an improvement has taken place in the work of the oil mills.

The change in mill results is mostly due to the chemist who by constantly testing the products has shown the losses, and made necessary constant improvements in machinery, and care in operating the same.

What the chemist has done for the oil mills as a whole can be figured in dollars and cents as follows: Old method of working made 800 lbs. of meal and left in it 10 per cent. of oil or 80 lbs. oil per ton of seed. Present methods make 900 lbs. of meal and leave 7 per cent. of oil or 63 lbs., a difference of 17 lbs. of oil saved per ton of seed worked. At 5 cents per lb. this means a saving of 85 cents per ton of seed, or \$3,400,000 on the crop, without taking increased cake into consideration.

If we compare the old refining methods with the present ones, we find instead of 12 per cent. loss, an average of 8 per cent., 4 per cent. of 3,200,000 bbls. worth 5 cents per lb., \$20.00 per bbl., or \$2,560,000.

The conversion of soap stock into fatty acids and glycerine has raised the value of the fat therein at least 3 cents per lb., or \$12.00 per bbl.

In refining 3,200,000 bbls. of oil, 7 per cent. would appear as fatty acids in soap stock—224,000 bbls., which, at \$12.00 per bbl., would be worth \$2,688,000.

By making the oil edible, \$2.50 per bbl. is a conservative figure to put on the increased value of the oil on 3,200,000 bbls. This amounts to \$8,000,000 a year.

If we sum up we find results as follows:

|                                |             |
|--------------------------------|-------------|
| Improved mill work.....        | \$3,400,000 |
| Improved refining.....         | 2,560,000   |
| Improved soap stock value..... | 2,688,000   |
| Improved flavor of oil.....    | 8,000,000   |

|   |              |
|---|--------------|
| Total annual increased value of oil mill products due to applied chemistry..... | \$16,648,000 |
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We might go further into the various products made from the oil and soap stock, but this is sufficient to show, though somewhat imperfectly, the value of our work to the oil mills. On the other hand, the increased quality of the oil has increased the demand for it, and the supply of raw material, the seed, being limited, has gone in value from \$8.00 to \$20.00 per ton or an increase of \$12.00 per ton. 4,000,000 tons of seed at \$12.00 a ton is \$48,000,000 a year which goes to the farmer. In other words, chemistry applied to the oil mill business has done three times as much for the farmer as it has for the mills and refineries.

When we look back at our achievements, we feel something has been accomplished but we well know there is still a hard struggle before we get the business on a secure basis.

No sane miner would buy ore at \$20.00 per ton without having every car very carefully sampled and assayed. He would pay for no more than its value as shown by analysis. With cotton seed, we all know how little attention is paid to its intrinsic value, and how little care is taken to sample it. One per cent. oil in the seed means \$1.00 per ton difference in value, but who ever heard of seed being docked because it was poor in oil?

Meal is being more and more sold on analysis as it should be, but there is still much to be desired.

We have good methods for soap stock analysis, but we lack a strictly scientific and at the same time practical method for crude oil analysis. It is hoped we can some day in the near future obtain a method, the accuracy of which will be commensurate with the value of the product.

Let us continue our work, and, encouraged by the achievements of the past, endeavor to do better in the future, so we may all be proud of our membership in the Society of Cotton Products Analysts.

## NOTES AND CORRESPONDENCE.

### CORRECTION.

#### The Preparation and Properties of Metallic Cerium.

*Editor of the Journal of Industrial and Engineering Chemistry:*

In your Vol. 3, No. 12, December, 1911, pp. 880-897, appears an article by the writer on the "Preparation and Properties of Metallic Cerium." In justice to previous investigators, the writer would like to make the following corrections:

Bottom of page 881.—"The following year Hillebrand and Norton published.....chlorides of cerium and potassium." They used sodium-potassium chlorides and cerium chloride.

Bottom of page 881.—"They succeeded in producing about 6 grams of cerium." Should read, "They succeeded in producing about 6 grams of cerium at a single operation and produced in all about 30 grams of the metal."

Page 886.—"Earlier work on the Electrolysis of the An-

hydrous Chlorides." The method there described is that given by Moissan in his *Chimie Minerale* and is somewhat different from the process used by Hillebrand and Norton.

Page 891.—Under the heading "Physical Properties of Metallic Cerium" should be inserted the following: "Some of the physical and chemical properties of cerium have been determined by Hillebrand (*Pogg. Ann.*, 156, 466 and 158, 71) and by Muthmann (see references 23 and 24)."

Page 893.—At the end of the last paragraph on the "Determination of the Melting Point" should be added: "The melting point determined by the writer corresponds fairly closely with the value given by Muthmann (623° C.)."

Page 893.—At the end of the paragraph on "Specific Heat" should be added: "Dr. W. F. Hillebrand determined the specific heat of cerium by means of Bunsen's ice calorimeter (*Pogg. Ann.*, 158, 71). He gives the corrected value of 0.04479

for pure cerium, using about 2 grams of metal in a determination. The writer used more than 70 grams of metal in a determination using Joly's differential steam calorimeter, and obtained a corrected value of the specific heat for pure cerium equal to 0.05112. The atomic heat using Hillebrand's value is 6.28; using Hirsch's value, 7.17."

Page 893.—At the end of the paragraph on "Heat of Oxidation" should be added: "Muthmann (Liebig's *Ann.*, 331, 41) gives the heat of oxidation of cerium equal to 1603 cal. per gram."

Top of page 895.—At the end of the second paragraph under the heading "Alloys" should be inserted: "Muthmann and Beck (24b) have described some of the alloys of cerium with zinc, aluminum, magnesium and mercury."

Page 895.—Under "Aluminum Alloys" should be added: "Muthmann (Liebig's *Ann.*, 331, 47) describes the compound  $\text{CeAl}_4$ ."

Page 896.—Under "Mercury Alloys" should be added at the end of the paragraph: "Cerium will dissolve in mercury to the extent of about 15 per cent."

ALCAN HIRSCH.

BROOKLYN, December 6, 1911.

### THE MÉKER BURNER.

*Editor of the Journal of Industrial and Engineering Chemistry:*

The every-day tools of the chemist determine to a large extent the character of his work no less than those of the artisan do his. The success or failure of a great research problem in chemistry may depend as much upon the apparatus at hand as upon the imagination and skill of the worker. Possibly the leading fact in the history of science is this: that great trains of discoveries have depended more upon the invention of new apparatus than upon the development of the human brain. After all it is the attention to the details of equipment as well as the personal organization in a laboratory, which brings about perfect results. And so we sing the praises of the Méker burner. With this burner one can do almost the work of the blast-lamp, without the annoyance connected with the use of the latter. The flame is large and intensely hot and the highest temperature, strange to say, is reached at the base of the flame. For analytical work in crucibles it has no equal, nor is there any other device approaching it in excellence. It has no inner cone and platinum ware can be made to receive the full effect of the flame without danger of injury. "There is nothing new in the apparatus—no original idea involved," many a critic would say, "just a Bunsen burner with an abundant air supply and a piece of Davy safety-lamp gauze at the top." But not every burner so constructed will give a flame free from the destructive inner cone, and intensely hot at the base. Every point in the design must be carefully balanced to produce the perfect result. We do not know the inventor or the history of his invention, but a simple inspection of the burner in action indicates that this is no chance discovery, no day-dream or night-dream suddenly made concrete and perfect. Carefully thought out and wrought out by trial and experiment and repeated experiment is the perfectly simple Méker burner.

W. D. RICHARDSON.

### IMPORTS AND EXPORTS OF FARMERS' MATERIALS.

The agricultural interests of foreign countries buy nearly \$100,000,000 worth of American manufactures and other products for use in cultivating the soil, while about \$50,000,000 worth of foreign products are annually imported into the United States for use upon American farms. The foregoing summarizes certain information recently compiled by the Bureau of Statistics, Department of Commerce and Labor.

The exports from the United States of articles required in farming, the larger portion are composed of manufactures, such as agricultural implements, binding twine, barbed wire, and oil cake, while phosphate rock to be ground up and used as fertilizer, and clover, timothy and other grass seeds are among the articles exported in the natural state. In addition to the exports above enumerated as specifically for farm use, there are certain articles for which the agriculturalists of all other countries draw upon the United States but which cannot be classed as distinctively for farm purposes, such as wagons, carriages, traction engines, fiber bags, pumps, etc. In such cases the Bureau of Statistics has no means of determining the proportion of the exports intended for farm use and they are not, therefore, included in the \$100,000,000 worth of merchandise exported for agricultural purposes.

Taking up the principal exports of the class under discussion, agricultural implements head the list, with a probable total of \$40,000,000 in the year about to end, comprised of nearly \$20,000,000 worth of mowers and reapers, \$8,000,000 worth of plows and cultivators, \$2,500,000 worth of threshers, and the remainder miscellaneous farming tools and implements. These agricultural implements are exported to practically all parts of the world where man has adopted modern methods of cultivating the soil: the great wheat fields of Russia, in the vineyards of France, on the coffee plantations of Brazil, in the rice fields of China and Japan, and in all the rapidly developing countries of the New World, including Canada, Argentina, Cuba, and Mexico. The year's exports will range nearly \$8,000,000 to European Russia, \$6,000,000 to Argentina, and about \$5,000,000 to Canada, to about \$1,500,000 to Africa, while to British Australasia and Oceania will be sent a total of nearly \$2,000,000 to other Oceania and Asia about \$1,000,000, and Brazil about \$500,000 worth. Even the great manufacturing countries of Europe, the United Kingdom, Germany, and France, are represented in the year's exports of agricultural implements, the United Kingdom with a total of over \$1,000,000, Germany, \$2,000,000, and France, \$3,000,000.

Fertilizers, of which the exports will be about \$12,000,000 during the year, are chiefly sent to European countries, where long-continued use of the soil has largely depleted their natural fertility and rendered artificial fertilizers a necessity. For American phosphate rock and other fertilizers of that class Germany is the largest market, followed next by Netherlands and the United Kingdom. Another class of materials, used as cattle food, whose exports are considerable includes oil cake and oil cake meal made from cottonseed and linseed. Of these the exports amount to about \$15,000,000 per annum, being exported mostly to various countries of Europe.

Binding twine is another article of importance in wheat-growing countries. Of that article the year's exports will be about \$8,000,000, practically all destined for Russia and other European countries, Canada, and Argentina. American barbed wire exported, about \$5,000,000 per annum, goes chiefly to Canada, Australia, Argentina, British Africa, Mexico, Brazil, and Cuba. In addition to these articles, there are others largely if not exclusively required by farmers, such as windmills, with exports nearing \$2,000,000 per annum; and clover and other grass seeds, over \$1,000,000.

On the other hand, American farmers draw upon other countries for certain of their requirements, most of the imports, however, being articles in their natural state. The largest item shown in the imports of last year were fertilizers, including nitrate of soda, \$17,000,000; guano, manure salts, etc., \$10,000,000; potash salts, \$8,000,000; sulphate of ammonia, used in part as a substitute for manure and in part in the manufacture of alum, \$5,000,000; animals for breeding purposes, chiefly horses, nearly \$3,000,000; clover seed, \$3,000,000; and sugar beet seed, \$750,000.