not deliberately rejected. When such packages are sampled a tryer tapering toward the tip ought to be preferred, if an ideal sample is aimed at. Under the circumstances indicated, when

a cylindrical core is taken, the sample will only be accurate if a sufficient number of cores are drawn in various directions and equably distributed.

LEAD, S. DAKOTA.
December 4, 1911.

LABORATORY PREPARATION OF LITMUS PAPER.

Experience has shown that with a good quality of litmus paper, uneducated workmen are able to distinguish slight differences in shade, and maintain very slight acidities or alkalities, if such are desired. It is found, however, that they are often deceived by the quality of the litmus paper, which, through varying amounts of salts in the paper, may require widely differing amounts of acid or alkali to give a definite color.

Practically all directions for the laboratory preparation of litmus paper start with commercial litmus and require from 10 per cent. to 33 per cent. solutions to make a sufficiently colored paper. Various methods of purifying this commercial product before its use may be found in the literature, all of which require considerable time for sedimentation, and, usually, quite an amount of alcohol, which makes purification expensive. A great many have used a water extract of commercial litmus without further purification, neutralizing to meet their requirements. This gives a paper which is satisfactory for some purposes, but the red paper is usually rather impervious to water, and the large amounts of soluble salts which it contains cause reactions in the paper which are often deceiving.

These various difficulties have led to the use of the chemically pure litmus which is sold by the various supply houses and can be prepared in about one-quarter of the time required by the ordinary substance. Although the chemically pure litmus is listed at ten times the value of the commercial product, its coloring strength is so much greater that the final cost is never more, and in some cases is less. Continued trials have shown the following to be a very satisfactory grade of litmus paper for all purposes, whether laboratory or manufacturing, and the product will be found more delicate than most litmus papers on the market.

For blue paper, 1.4 per cent. of chemically pure litmus is dissolved in distilled water with constant shaking for about one hour. This solution is set aside over night, carefully decanted from the small amount of sediment, and sulfuric acid added, drop by drop, sufficient to reduce alkalinity to such a point that a piece of filter paper floated on the top and then dried

will assume a very perceptible red color after being suspended one-half minute in $N/2000$ hydrochloric acid.

To make red litmus paper a 1.0 per cent. solution of chemically pure litmus is required with the addition of sulfuric acid until such a degree of acidity is reached that a very perceptible reaction will take place when paper floated and dried as before is suspended one-half minute in $N/4000$ caustic soda solution.

Time of exposure to these standardizing solutions is found to be as important a function as the degree of acidity or alkalinity of the paper. The above-mentioned degrees of sensitivity are close to the practical limits, for if the papers are made more delicate they cease to be red and blue, but become lilac or neutral.

The filter paper used is any smooth compact qualitative paper sold by the chemical supply houses. The best manner to saturate the paper with litmus has been found to cut it in strips about seven inches wide and to draw the paper over the surface of the litmus solution, which has previously been placed in an ordinary shallow square-cornered enameled bread-baking pan. The paper is held by the ends and first touched to the surface of the liquid, about two inches from one end; then the other end is released and the paper drawn down across the edge of the pan. Surface tension holds the paper to the liquid, yet only one side of the paper is allowed to touch the solution, and drawing across the side of the pan takes away any excess. The strips are hung up to dry by pinning the blank ends over lines stretched in some convenient place.

The paper will be found very uniform, as just sufficient solution will have been taken up to dye all the sheets of the same shade. One liter of solution will make one hundred sheets seven inches by twenty inches in size.

These sheets may be rolled up or packed away in proper containers to protect them from the air, and cut in strips of convenient size for use shortly before they are needed. Wide-mouthed, glass-stoppered bottles are found very convenient for holding the small strips for daily use. Great uniformity is secured by making up large batches at a time, and the method allows for closest similarity of succeeding batches.

E. W. RICE.

PERILLA OIL.

Product from the seed of *Perilla ocimoides* (Nat. Ord. Labiateae), an indigenous plant of India, China and Japan. Perilla oil is very similar to that of linseed. In Manchuria, it is used for edible purposes. The Japanese use the oil for waterproofing paper umbrellas, and for preparing transparent paper for windows.

In the colder portions of Japan, the plant is grown as a field crop. The annual production of seed is about 300,000 bushels. A bushel of seed gives up a gallon of oil, worth 70 cents per gallon.

U. S. Consul Sammon, Yokohama, Japan, in 1910 suggested the introduction of this plant into the United States. Following this suggestion, a small quantity of the seed was imported from Japan. During the season of 1911, this plant was grown at Akron, Ohio. Seed were sown April 15th; plants came up 10 days later; growth slow; bloomed Aug. 25 to Sept. 1st; harvested Oct. 1st, after plants had been injured by frost. Plant resists light frosts, but cannot resist drought.

On the dry, sandy soil of West Akron, the plant did not do well. On the damp, clayey soil the growth was much better.

Yield of seed based on very small area is about 400 pounds per acre. The seed of this Ohio-grown perilla was 20 per cent. lighter, per equal volume of seed than the parent seed. The crop did not fill well; about 80 per cent. of the seed pockets

contained well-formed seed. Many of the seeds were of light weight. Japanese perilla seed contains, according to Lewkowitsch, 38 per cent. of oil. Our sample of imported seed gave by benzole extraction, 45 per cent. The Ohio grown seed contained 41 per cent. oil. Domestic perilla oil was thinner than the foreign oil. The oil extracted from Japan grown seed gave a distinct linseed oil odor. The odor of Ohio oil was that of the fresh plant—a strong minty odor. These peculiarities were, perhaps, due to fresh seed.

Compared with linseed oil, perilla oil dries slower than linseed, but gives a better film. Perilla oil film is smooth, glossy and tough. The usual objection to perilla oil is the difficulty in spreading, this oil having a tendency to gather in globules. This has not been the case in our experience.

Parallel experiments with linseed oil show that its spreading qualities are equally as good as those of linseed. Tests on paper, imitating Japanese umbrella work, indicate that linseed oil is superior for this work. Old oil or oil that has been heated may give better results.

Compared with flax as a suitable crop for Ohio soils, perilla returns a less oil value per acre, and has no valuable by-products. Perilla press cake is of doubtful value as a cattle food. The green stem may yield an essential oil of value, though the plant is quite dry when the ripening of the seed occurs.

CHAS. P. FOX.

BARLEYS EXHIBITED AT THE SECOND INTERNATIONAL BARLEY AND HOP PRIZE EXHIBIT.

Of the 107 specimens of barley entered 53 were of the Manchuria, 26 of the Bay Brewing and 28 of the two-rowed class, of which latter 7 specimens came from Germany. Of the 1910 crop there were 9 specimens in the *Manchuria* class and 4 in the two-rowed. The 1910 Manchuria class barleys average higher than the 1911. The Wisconsin pedigreed barleys grown from seeds disseminated by the Wisconsin Agricultural Experiment Station took the largest number of prizes. Practically all of the pedigreed samples belonging to the six-rowed variety had a 1000 berry-weight within the permissible limits. Of the 1911 crop five samples were disqualified for demerit, and of the 1910 crop one, in both cases owing to generally poor quality; four of these on jury inspection alone. In the samples of the Manchuria class the albumen content varies between 11.2–15.5 per cent., and the 1000 berry-weight between 24.4 and 32 grams.

The *Bay Brewing* barleys generally have an albumen content

below 10 per cent. which is considerably lower than the *Manchuria*, whose average is approximately 12 per cent. In the samples of the *Bay Brewing* type, the Nitrogen ranges from 7.3–10.3 per cent., and the 1000 berry-weight between 36.1–47.1 grams, only 50 per cent. of the total number of samples having a berry-weight higher than 42 grams. The vitality or germinating capacity of these Californian barleys is also considerably higher and varies between 100–97 per cent. These *Bay Brewing* barleys conform in their characteristics more nearly to the *two-rowed* barleys of the far West, like Idaho, Montana, and California. With a few exceptions, the *two-rowed* barleys of the Middle Western States were disqualified for excessive albumen content, which was 13.5–19.6 per cent. The Nitrogen content in German barleys is 9.1–10 per cent., in American Western *two-rowed* 7.5 per cent. The superiority of the Western *two-rowed* barleys over the Eastern is noticeable on almost every count.

From the analytical and jury results it seems evident that the climatic, soil, and other cultural conditions of the barley growing sections of Idaho, Montana and the Coast, are better suited to the growth of barleys that conform to the European type in their brewing qualities, than the barley growing sections east of the Rocky Mountains, which seem to be the home of the *Manchuria*, *Oderbrucker* and related varieties. Whether these *Manchuria* varieties will do as well or better in the Western area, where they have been introduced, for instance in Montana, remains a matter of future concern.

ROBERT WAHL.

EIGHTH INTERNATIONAL CONGRESS NOTES.

Among the features of the Eighth International Congress of Applied Chemistry which are of interest and importance, are the general lectures, presenting a review of some branch of chemical activity by an acknowledged authority. These lectures are only a part of the return that these International Congresses endeavor to make to the country whose hospitality they enjoy. At the Eighth Congress, which meets in New York and Washington, September, 1912, the following lectures are now announced:

"*Some Physical Aspects of Molecular Aggregation in Solids.*" By GEORGE BEILBY, England.

"*The Role of Very Small Amounts of Chemical Substances in Biochemistry.*" By Professor GABRIEL BERTRAND, France.

"*Photochemistry of the Future.*" By Professor G. CIAMICIAN, Italy.

The exact dates for these lectures will be announced later.

OBITUARIES

DR. NAOKICHI MATSUI.¹

The scientific world sustained a great loss by the death of Dr. Naokichi Matsui, Doctor of Science and Dean of the Agricultural College of the Imperial University of Tokyo, upon the first day of February, 1911.

Dr. Matsui was born at Ogaki, in the province of Mino, in 1855, and studied chemistry at the University of Tokyo. He went to the United States in 1875, as first Japanese Government student, with several other young men, among them Marquis Komura, Dr. Hatoyama, Dr. Hirai and a few other brilliant young students, and devoted himself to the study of chemistry at the School of Mines at Columbia University, under Prof. Chandler and others. He obtained the degree of Bachelor of Philosophy in 1878, from the same university, and was awarded the degree of Doctor of Philosophy in 1880, by presenting a

¹ Translated from the *Journal of the Tokyo Chemical Society*, April, 1911.

thesis on "Kaolin of Arita." When he returned to Japan in the same year, he was appointed lecturer in the Science College of the University of Tokyo. In the following year he was appointed a professor in the same university, and taught chemistry exclusively in the Science College and Preparatory School.

When the Imperial University was founded in 1886, by amalgamating the University of Tokyo and the College of Engineering, he was appointed a professor of the Engineering College. In 1888 he was awarded the degree of Doctor of Science.

In 1890 he was appointed a professor and Dean of the Agricultural College of the Imperial University of Tokyo, which position he held over twenty years, until his death.

Dr. Matsui went to Europe and the United States in 1900, and returned to Japan after an absence of one year. He succeeded Prof. Yamakawa as President of the Imperial Univer-