

claim is made for originality other than adaptation to the work in hand:

**SILICON**—Weigh out 0.5 gram of alloy into a 400 cc. Erlenmeyer flask and cover with 20 cc. of water; add 15 cc. HCl and 5 cc. HNO<sub>3</sub>. Boil until completely decomposed. Carefully add 20 cc. concentrated H<sub>2</sub>SO<sub>4</sub> and boil until sulfuric anhydride fumes are freely evolved. The silica is now completely separated and is dehydrated. Cool and carefully add 75 cc. of water. Boil until all sulfates are in solution and filter, catching the filtrate in a 200 cc. volumetric flask. Wash with hot water nearly to mark and place the flask in ice-water to cool, being careful to have the contents near the temperature of calibration of the flask, when it is finally made to the mark. Ignite, weigh the residue as SiO<sub>2</sub> and calculate to silicon.

**TIN**—When the flask has cooled make up to the mark with water, and transfer 100 cc. to a 400 cc. Erlenmeyer flask, add 0.15 gram of finely powdered metallic antimony, dissolved in 5 cc. concentrated H<sub>2</sub>SO<sub>4</sub>, 35 cc. of concentrated HCl, and 1 gram of iron filings. Boil until the iron is nearly all in solution and then connect the flask by means of a three-hole rubber stopper which carries a right angle tube dipping into the liquid, to a carbon dioxide generator. The second hole in the stopper is fitted with an exit tube which connects to a small flask holding a saturated solution of sodium bicarbonate which acts as a seal. The third hole is fitted with a glass plug and serves to admit the burette tip during titration. The flask is now heated to boiling while CO<sub>2</sub> is passing until all iron is in solution and reduction is complete: 20 to 30 minutes are usually sufficient. The flask is now removed from the flame and set in cold water to cool as rapidly as possible. The glass plug is now removed, a small funnel inserted, about 5 cc. starch solution poured in, and the plug replaced. When the contents of the flask are below 40° C., the generator is shut off, the flask detached, and the tin rapidly titrated with *N*/10 iodine solution which has been standardized against pure tin. Air must not enter the flask and the flask with the bicarbonate seal remains in place during the titration.

**COPPER**—The other 100 cc. portion is made alkaline with ammonia, then acid with nitric acid and allowed to digest on the hot plate for an hour. The stannic acid, which should now be white, is filtered off and washed well. To the filtrate 5 cc. H<sub>2</sub>SO<sub>4</sub> are added and it is boiled down to fumes, cooled, diluted with water, neutralized with ammonia, made acid with 7 cc. of a mixture of 2 parts 50 per cent nitric acid and one part 50 per cent sulfuric acid, washed into a 150 cc. beaker and the copper determined by electrolysis.

E. D. KOEPPING

THE ELECTRIC SMELTING AND ALUMINUM CO.  
LOCKPORT, N. Y., May 9, 1914

#### ON THE RAPID DETERMINATION OF COPPER IN OPEN HEARTH AND ALLOY STEEL OR IN CAST IRON

The prevailing method of determining copper in steel by precipitation with hydrogen sulfide with subsequent incineration in porcelain, digestion with nitric acid and transfer of the solution to platinum, where it is again evaporated with hydrofluoric and sulfuric acids to remove silica, and re-solution in sulfuric acid is tedious and becomes even more so in the presence of molybdenum.

The following modification of Low's method will be found to give entire satisfaction, and is much more rapid and convenient where many samples are to be run than the well known method outlined above or any modification which involves electrolysis.

**METHOD**—From 3 to 10 grams of steel are dissolved in 35 cc. of 1:1 HCl or 1:5 H<sub>2</sub>SO<sub>4</sub> and then diluted with 35 cc. of water. A strip of sheet aluminum,<sup>1</sup> with the corners

<sup>1</sup> The use of cast pieces is to be avoided as they usually contain some copper.

bent up so that it will not lie flat on the bottom of the beaker, is then dropped in and the solution boiled vigorously for 20 minutes.

Remove from the hot plate and wash down the cover glass and the sides of the beaker with hot water. Filter through a 11 cm. S. & S. filter and wash thoroughly with hot water. Puncture the filter and wash the precipitated copper into a 300 cc. Erlenmeyer flask. Over the strip of aluminum in the beaker pour 3 cc. HNO<sub>3</sub> and 7 cc. water, warm and pour through the paper, giving the beaker and paper a final wash with hot water.

The volume of the solution in the beaker should now be about 30 cc. Boil 15 minutes to remove any nitrous fumes. Add 7 cc. NH<sub>4</sub>OH and boil until the deep blue fades to a very light blue and the odor of ammonia is faint. Add 10 cc. of 80 per cent acetic acid and boil one minute. Cool, add 10 cc. of 30 per cent KI solution and titrate with standard thiosulfate solution, using starch indicator.

**THIOSULFATE SOLUTION**—About 5 grams of the pure crystallized salt to one liter of water gives a solution, 1 cc. of which = 0.00125 gram of copper, approximately.

The solution should be standardized against a bichromate solution of known iron value, or against pure copper foil or a standard copper solution, the copper content of which has been accurately determined by electrolysis. A better method than any of the foregoing, to the writer's mind, is the use of a standard steel from the Bureau of Standards.

**STARCH INDICATOR**<sup>1</sup>—The starch solution is prepared by allowing raw starch to soak in 0.1 per cent hydrochloric acid for 24 hours. The acid is then poured off and the starch washed with cold water until free of acid. The starch is then dried at 32°, occasionally stirring to break up the pieces, and finally drying at 100° for several hours. One gram of the starch prepared in this way boiled in 100 cc. of water and filtered will give a clear solution which will keep indefinitely and will give a brilliant transparent blue.

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#### TIN PLATE AND STEEL MILL OPERATIONS IN JULY

During July the tin plate mills ran at between 85 and 90% of capacity, one or two interests being to about 50%, while the others ran full. The Jones and Laughlin Steel Company operated thirty-two tin mills at its Woodlawn, Pa., plant having added eight mills to this plant in the record period of two months. The Woodlawn plant is now the largest in the United States, having during the week of July 13th wrested the honor from the Shenango plant at New Castle, Pa., which held first place for more than fifteen years. The third largest plant is the American, at Elwood, Ind., with twenty-eight mills, while the fourth in output is the National at Monessen, Pa., with twenty-five mills.

In July, steel mill operations in the Pittsburgh District averaged between 65 and 70% of the full capacity, while the average for the country at large was close to 65% of capacity. The production is somewhat larger than in the late part of May and this showing is looked upon as a favorable one by experts because ordinarily the production is much reduced in July. A slight improvement was noted in the demand for wire products.

W. A. HAMOR

#### PLATINUM IN WESTPHALIA

A report of a general meeting of the Deutscher Platinwerke, held recently in Düsseldorf, given in the London *Mining Journal*, says that a platinum ingot of about 500 grams, obtained from the ore occurrences near Wenden in Westphalia, was shown. Dr. W. Hommel, of the Clausthal Mining Academy, made an interesting report on the ore deposits, in which he laid stress on the statement that the metal occurs with lead, zinc, antimony and nickel.

<sup>1</sup> Chem. Abs., 4, 2617.

A sensation was caused when Dr. Hommel exhibited a lump of pure platinum, which was obtained, he stated, by smelting 1 ton of concentrates obtained from 25 tons of crude ore. In addition to the platinum, the concentrates gave about 10 to 12 per cent nickel. The cost of production including mining would be about \$4.76 per ton, and ores containing no more than 5 grams platinum would be payable.

### CHEAPER PIG IRON

The Interstate Commerce Commission handed down on July 7th a decision of great importance to the pig iron business of the country.

The decision put into effect a substantial reduction on the freight rates on pig iron from Alabama, Tennessee and other Southern points to all Northern and Eastern consuming points. This will enable the Southern producers to effectively compete with the big pig iron producers of Ohio, Pennsylvania, Michigan

and Illinois. In substance the commission has cut the rate approximately 35 cents a ton on all rail and something like 45 cents on rail and water hauls. The commission's order goes into effect on October 1st, 1914.

The protestants stated that the decision would force a general readjustment of prices on pig iron. Ohio and Pennsylvania furnace operators will be compelled to cut the price of their product in order to meet the new competition.

The decision was handed down on a complaint brought by the Sloss-Sheffield Steel and Iron Company and others in the Birmingham and Tennessee districts. After it was filed, foundries and other users of Southern pig iron located in the North, East and West intervened on behalf of the complainants. Furnace operators in Ohio, Pennsylvania, Illinois, Michigan, Wisconsin and Minnesota made an organized effort to have the present rates maintained. The case has been pending for more than a year and the commission made an exhaustive investigation.

W. A. HAMOR

## PERSONAL NOTES

Dr. Arthur H. Elliott received the honorary degree of Master of Science on the occasion of the 50th anniversary of the founding of the School of Mines, Columbia University, May 29th. Dr. Elliott is at present abroad and is representing the American Gas Institute at various gas association meetings advancing the interests of the International Gas Congress.

Dr. Edward Dyer Peters, Gordon McKay Professor of Metallurgy at Harvard University, has received the honorary degree of Doctor in Engineering from the Royal School of Mines, Freiberg, Saxony. The degree was conferred upon Professor Peters in recognition of his academic and practical services and writings on the metallurgy of copper.

A license agreement has been made between the Pittsburgh Iron and Steel Foundry Company of Midland, Pa., and the United Engineering and Foundry Company of Pittsburgh, Pa., by which the latter concern will be permitted to manufacture "adamite" steel rolls for rolling mills. "Adamite" is a patented alloy which has been owned by the former corporation for several years.

At its recent commencement Wesleyan University conferred the degree of Doctor of Science on Dr. Walter P. Bradley, who has this year retired from the professorship of chemistry which he had held since 1893.

Dr. Jokichi Takamine entertained, on July 8th at the Nippon Club, a number of friends at a Japanese dinner given in honor of Dr. L. H. Baekeland on the eve of his departure for Japan. Dr. Takamine officiated as toastmaster. Ellwood Hendrick directed to the guest of honor a characteristic and brilliant poem on the catalysis of friendship and good fellowship. The other speakers at the dinner were Charles F. McKenna, Charles Baskerville, Dr. H. Noguchi, M. C. Whitaker and H. S. May.

The U. S. District Court at Buffalo, Judge Hazel presiding, sustained Patent No. 939,757 of the Williams Patent Crusher & Pulverizer Co., in their suit against the Kinsey Manufacturing Co.

Dr. Hans Goldschmidt, the inventor of the Thermit Process and President of the Goldschmidt Thermit Co., is now paying his annual visit to the United States in order to keep in touch with his numerous interests in this country.

Dr. William L. Dudley, Dean of the Medical Department and Director of the chemical laboratories of Vanderbilt University, Nashville, Tenn., had conferred upon him the degree of LL.D. by the University of Cincinnati at its recent commencement.

The Pittsburgh Iron and Steel Foundry Company is erecting additional open-hearth furnaces and plans to make other important extensions to their plant at Midland, Pa.

Dr. Jerome Alexander is convalescing from a serious illness which has confined him to his home for the past two months.

Keuffel & Esser announce the removal of their Chicago headquarters to a new seven-story building which they have purchased, at 516-520 South Dearborn Street, Chicago. The main portion of the building, which is centrally located near the Buren "loop" between Van Buren and Harrison Streets, will be occupied by their stockrooms and offices.

Dr. Ross A. Gortner, since 1909 resident investigator in biological chemistry at the station for experimental evolution of the Carnegie Institution of Washington, has been appointed associate professor of soil chemistry in the University of Minnesota.

President Francis P. Venable has retired from the presidency of the University of North Carolina and has assumed the chair of the Francis Preston Venable Professorship of Chemistry in the University of North Carolina.

The Tagliabue Manufacturing Company have announced the issue of a Codex giving full information about industrial thermometers.

Ralph W. Perry, Ph.B. announces that he has severed his connection with the Michigan Central Railroad as Chemist and Engineer of Tests, in which capacity he has served them during the construction of the Detroit River Tunnel, the New Station and subsequent improvements to their terminal in the City of Detroit. Mr. Perry has leased the laboratory used in the above work for a general Chemical, Inspecting and Testing business to be known as the "Perry Testing Laboratory."

Professor J. Miller Thomson, F.R.S., is retiring at the end of this session from his position as Vice-principal of King's College, London and head of the chemical department of the college, after a service of forty-three years.

J. U. N. Dorr was given the honorary degree of Mining Engineer at the recent commencement of Rutgers College, New Brunswick, N. J., in recognition of his contributions to gold and silver metallurgy.

Archibald F. Law, Vice-President and General Manager of the Temple Iron Company, which controls furnaces at Temple, Pa., died at Scranton, Pa., on July 19, 1914, aged 58 years. Mr. Law's grandfather, Charles Law, introduced underground (shaft) mining in Pennsylvania.

Mr. C. M. Means, Electrical Engineer, of Pittsburgh, Pa., has been appointed Consulting Electrical Engineer with the U. S. Bureau of Mines.

Mr. Wm. W. Clark has resigned as Chief Chemist for the American Vanadium Co., and has accepted the position of Metallurgist with the Seymour Manufacturing Co., Seymour, Conn.