New Commercial Value of Many of the Minor Metals

THE ELECTRIC FURNACE HAS BROUGHT INTO IMPORTANCE MANY INDUSTRIES WHICH PREVIOUSLY EXISTED ONLY FOR THE PURPOSE OF SUPPLYING EXPERIMENTAL LABORATORIES.

THE electric furnace for commercial uses has brought into existence electro-chemical and electro-metallurgical industries that were previously confined entirely to the laboratory of the experimenter. New companies are being formed continually to manufacture the products of the electric furnace, or to convert metals into new commercial forms and to reduce others. The extreme possibilities of discovery in this direction are still beyond prediction, and chemists and inventors are constantly experimenting to find cheaper and more effective ways of manufacturing metal products.

High temperature electro-chemistry has consequently an important bearing on the mining outlook and the metal trades in general. The consumption of many of the minor metals by the new group of industries has become suddenly so great that the demand exceeds the supply. In the use of copper, in particular, the consumption has tended onward at rapid increase, while the price of metal has steadily advanced. The comparative production of copper for the past ten years has averaged about nine per cent. increase, while the consumptive demand has advanced in recent years until the total stocks of copper in the country have several times been at an extremely low ebb.

Speculation in copper and attempts at corner the market have several times caused panicky prices and abnormal conditions, but the trade demands have been steady and healthy, and many dealers had no fear of the ultimate value of the metal and carried their stock easily through the short periods of depression. Mills and brass foundries have been running steadily and the output for the current year will no more than equal the demand, as the high temperature electro-chemical factories copper will be more of a factor than ever before, and the consumption of the metal for electrical purposes must on a large scale determine the actual value of the product.

The manufacture of carborundum and calcium carbide in the electro-chemical industries has advanced so rapidly that massive investments have been made in the furnaces and plants, while the output of the factories is readily bookkeeping. In the steel industry alone the consumption of carborundum amounts to seventy-five tons per month, and is rapidly all there is largely taking the place of emery and ferro-silicon. While the manufacture of this product requires only coke and sawdust and salt as raw materials, it nevertheless makes a big demand upon the copper market and also upon lime and other materials entered in its make. The manufacture of calcium carbide is even a larger industry than that of carborundum, and its effect upon the mining of metals is more important. This industry promises to extend for the current year so that the output will be nearly doubled.

ARTIFICIAL GRAPHITE.

The manufacture of artificial graphite in the electric furnace is another accomplishment that has resulted in the establishment on a large scale of an entirely new industry. By passing amorphous carbon through the electric arc artificial graphite has been made for many years past, but the commercial manufacture in the electric furnace is scarcely a year old. Almost pure graphite, containing only one per cent. ash, is made in large bulk in the factories. A granular graphite suitable for many lubricating purposes is produced in the electric furnace by graphitization of anthracite coal. This process has enabled the manufacturers to make a common form of cheap graphite, which enables many uses for it heretofore denied by virtue of its cost. There is today manufactured by the new processes some 2,000,000 or 4,000,000 pounds of graphite a year, and the material has been employed more extensively than ever before in the different trades and industries.

The artificial graphite lends itself readily to various forms of manipulation, which opens up for it new fields for usefulness. This it can be planed and cut by machinery and used for screwing up against beams and girders where needed without splitting or breaking. The ease with which it can be machined by ordinary wood tools has made it one of the most popular materials yet manufactured by the new electric furnaces. The elimination of impurities from the graphite by the electric process also recommends the product for the more difficult and exacting trade demands where a very fine material is demanded.

IMITATION ALUMINUM.

The manufacture of artificial aluminum has attained considerable importance through the same process as that which has revolutionized the graphite industry. Both the chemical and electrical processes of making aluminum are in vogue, and the output is so considerable today that aluminium is more generally used in over two-score different industries. New smelters for making the metal are in course of construction at Niagara Falls and at Massena, N. Y., while smaller ones have been projected in other parts of the country. The electric furnace used for this purpose is a carbon-lined crucible, which forms one electrode, and separate carbon rods make the other.

The most expensive part of the process is the cost of purifying the bauxite. This is a hydrated oxide of aluminum containing large percentages of iron oxide, silica and titanic acid. The elimination of these impurities must be obtained through a purely chemical process or by the electric arc furnace. In the latter the separation is obtained by heating the metal in contact with sufficient carbon to attract the impurities. The oxide is thus left in a fused state, which is then removed and cooled. Probably 10,000 tons of aluminum are produced annually at the leading factories using the electric method of manufacture.

Another metal made at the Niagara plants is sodium. This is made by electrolyzing fused caustic soda, the metal rising to the top of the fused mass, being skimmed off from time to time. The technical difficulties attending the manufacture of this metal are chiefly those which pertain to the control of the temperature. Either a too high or too low temperature spoils the operation. If the temperature of the furnace is carried twenty degrees above the melting point a recombination of the sodium takes place, and no metal rises to the surface. Consequently the manipulation of the whole process must be careful and exact. By means of recent improvements, however, the temperature is exactly measured and regulated so there is no chance of failure. The manufacture of sodium has thus caused an increased activity in the production of caustic soda.

This latter is produced likewise on a large scale by means of the electrolytic process. The production of all caustic alkalis and chlorine by electrolysis has been an interesting industrial question for years in all parts of the country, but the direct treatment of fused salt offers new studies. From the process is obtained the pure chlorine, which is used for making bleaching powder and good caustic soda. Fused lead is used as a cathode to the sodium, and the sodium alloy is rapidly removed, so that it will not become diffused into the mass of lead. To form an anode in each cell use instead of graphite.

The manufacture of zinc by the electrical process affects the mining of this material, and the extensive preparations for making the metal on a large scale indicate the confidence felt in the process. The work necessary for this purpose must be such and varied in metallic substances suitable for the work. But plenty of such ores are found in different parts of the country. Probably the richest and most promising are the complex Broken Hill ores, which yield a large percentage of the materials required. The present method of treatment is to free the chloride by the electrolytic process, and then obtain the pure zinc by distillation of roasting which are well understood. The treatment of the rich ores in this way has already yielded sufficient results to make the work a metallic success. How large a production of zinc may be obtained in the next few years by this process is impossible to estimate at this time.

BARIUM AND PHOSPHORUS.

The manufacture of barium and phosphorus by the somewhat similar electrolytic process has also taken important strides forward in the past few years. The former is made very much like aluminum. The oxide is dissolved in a bath of fused calcium fluoride, and then it is submitted to electrolysis. In order to resist in the metal reduction a slight amount of carbon is added. In the process the regulation of the temperature is so important that if it is raised much above the fusing point the manganese will become volatile and be lost. The operator must follow carefully the regulations found necessary to produce this metal. The artificial production of the metal is a highly important process, for the use of manganese in the trades and industries is steadily on the increase.

Phosphorus from the electric furnace is worked out on quite an extensive scale abroad and in this country. The method is very simple, and the results very satisfactory. The phosphate mineral is first obtained and then ground to a very fine powder. In this condition it is mixed with carbon and sand and then heated in the electric furnace to an intense temperature. When at the proper heat the phosphorus is distilled off and collected under water. The details of the work are not necessary to show that the process is one that promises to create a considerable change in the price and distribution of pure phosphorus in commercial forms.—New York Times.

Children Were Cheap.

In a Scotch church an old minister who was very deaf was also very anxious to introduce some new hymn books into the church and asked his precentor to give out the notice immediately after the sermon. The precentor, having a notice of his own, gave out that members of the congregation wishing to have their children baptized were to send their names into the vestry. The old minister, thinking it was the notice about the hymn books, stood up and said:

"And I wish to say, for the benefit of those who have not any, that they may be had in the vestry any afternoon, between the hours of 3 and 4. Ordinary little ones at a shilling each, and special ones, with red backs, at one and three."—New Orleans Times-Democrat.

VALUE OF CREOSOTE.

Adds Many Years to the Life of a Telegraph Pole.

In the course of a paper read before the Dublin section of the Institution of Electrical Engineers A. T. Kenny made the following statements relative to the efficacy of treating telegraph or other poles with creosote:

Timber is used for poles in preference to iron or steel, mainly on account of its lower cost, which may be one-third of that of iron. Some method of preservation of the timber so as to render it capable of resisting the influence of dry and wet rot are, however, necessary. Various treatments have been tried and abandoned, creosoting being the only method of any practical value and the only one much in use to-day.

One of the best timbers for poles is Norway red fir, but any timber that is used must be thoroughly seasoned and dried before treatment. The quantity of the preservative injected is eight pounds per cubic foot. It does not penetrate to the heart of the pole, even when the timber is very dry, for more than one or two inward rings. Sleepers in ordinary practice, the heart and the interior margin of the zone thereof which the creosote penetrates. It is this unpenetrated zone that dry rot usually gets in, taking the creosoted zone and leaving the heart more or less intact, with the outside skin of the pole unbroken or marked. But dry rot is comparatively rare. It is found likely in the course of the first seven to eight years from the top to the butt of the pole, and is due to the action of fungus. Poles taken down in that year which had been planted in 1849 and 1850 were found to be in all respects as sound as when erected. Since that date creosote has deteriorated in quality owing to the increased value of some of its constituents and the other things. It is time to investigate the matter again. He issued the statistics of creosoted poles in Ireland as early as 1858, and again in 1870. But the systematic treatment of the share of creosoting on the poles with a hot iron was not begun by the department until 1877, and little, therefore, is possible to identify with any fully poles of former dates. Higher. As a result of experience by possession of the poles thus treated, as the butt and earth line tend to be, it is to state that they are still in recently quite as sound as when creosoted, and there is an interval as to of poles treated from 1877 to the present year.

Indian Proverbs.

Charles Gibson, the Indian agent in the Eufaula district, says:

"A dog worries does not prevent the coming with his arrows. A small woman can drive strong men to men's vitals.

"A crazy Indian hasn't much sense on a hunt and stay in the woods for Bill like squaws is supposed to all the parties.

"Don't kick or shoot a dog. You don't know but what you may be a dog yourself in other detail.

"Women should not talk as a rule. A man may have a good deal to say. Men are to settle common

"If the Great Spirit had wanted women to go to politics and preach He would have made them with

"An Indian can't keep talking and find fault. He can't be in two places at once. A man leaves for one and you find fault with him for being absent in the other. A woman is never known to be absent from any direction on earth. She is always being missed in the center of the

"The white man and the Indian both work in a field. The white man sows and the Indian reaps. In the white man's place he plows slightly, but the Indian cannot be very careful in the pain the seasons, and hence his superior skill. The Indian must be careful after a drought, or a season of dry weather, or the white man will get ahead of him. The Indian must be careful after a drought, or a season of dry weather, or the white man will get ahead of him.—Kansas City Journal.

Why Germany Ships at the Tribunal.

The Paris correspondent of the London Times recently gave some of the most cautiously worded explanations of his opinion why Germany is so persistently opposed to the Tribunal and its work. It will be remembered how Count Von Caprivi proposed to the Reichstag which ended in the withdrawal of the proposal. The proposal was met with hostility on the Continent, especially in France, and all through the last to abandon delegates to the conference and all through the proceedings except in the most hostile against the arbitration of the Tribunal ought. The Times correspondent asserts that the personal hostility for all which the first chancellor of Germany's successor entertained to the Hague court will be known. It is conjectured in a few months to have considerably changed. Germany will give an international status to the Hague, and to Holland in general, because such would interfere with the realization of certain well-laid conspiracies she has. In other words, Germany is still looking toward the mouth of the Rhine and intends some day to make an effort to possess it. Should Holland come to be regarded as the seat of a great international court, a ground natural to all nations, Germany's plans would have a serious setback.

The Man From Brady's.

"IDA."

"Yes."

The girl looked up from her letters with a questioning tilt of her head at her brother.

"Say, Lola," with a feeble imitation of an old-time manner, "I told you, didn't I, that Kirk Kenton was coming up for a day or two?"

Lola dropped papers.

"What, your football captain? The football captain? How disgusting! We can't have everything stirred out by boys' feet and paper and fresh curtains. The spare room can be done in red for Stanford, you know. The men are coming to bring the paper tomorrow."

P. K. still knew Pete Kirkpatrick, flushed miserably under his sister's smile.

"Why, you see, Lo, with the fact of the matter is, I asked him he's coming up tonight."

"Pete Kirkpatrick?"

"I say, Lo, it doesn't matter! He won't care."

"He! What do I care how he feels? Look at my look at me!" She pointed dramatically from the demolished walls to her denim apron. "You must stop him!"

"Can't," gloomily. "He's on the way now."

"What time does he get here?" demanded Lola, a mental fixing to the occasion.

"Five-twenty-one."

"Quarter-past?"

The side door opened and a Mongol face appeared in the aperture.

"What we for dinner, Chessy?"

"I'll pie, number pie."

Lola wrinkled her nose.

"Pork chops and mince pie!" she interpreted. "Dreadful! P. K., don't forget to order a steak. Tie a knot in your pocket handkerchief."

Presently he [illegible] her at the telephone.

"Yes Brady's—yes. I want a messenger right away! Yes, now! No [illegible] won't do—send him over right away."

P. K. grinned appreciatively as he strolled out upon the piazza. "She's a winner," he murmured, "and if Kenton doesn't think we're on him."

Lola, 1-2 an hour was far from being as courageous as her actions warranted. "Kirk Kenton of all men!" she thought. "The correct and courtly Kirk," as P. K. called him. She had there was no use denying it, she had wanted to make a favorable impression, and now—

"Terrible!"

The paper-hanger! She rushed to the door to find the blank smile of the Chinese vegetable peddler.

"Bother! Bother! Go Rather!"

The curly head of her younger sister appeared over the banisters.

"Ruth, come down and make out the order! And tell Charley Jo to sweep P. K.'s room never mind about the spare. And in a moment come and help me with the dining room curtains." She disappeared, and presently a fierce hammering issued from the dining room.

Clouds of dust issued out of the second story window where Charley Jo was vigorously sweeping. The big old-fashioned house, habitually suggestive of homelike comfort, and odorous of the smell of earthly flowers, had an atmosphere of open doors and windows, newly scrubbed floors and unscarred stairs, while on the way redolent of soap and water carpenters, paste and shavings.

"Everywhere," as Lola expressed it, "was a painful cleanness." Even the lawn had not escaped. It was strewn with mattresses and pillows. "They must be brought in before train time," thought Lola, shaking a welcome blow at the last quilt and drawing it crooked.

Five-thirty! The time it was the telephone. The paper-hanger couldn't come before 12 o'clock. Lola groaned in spirit, and stretched an aching shoulder as the stroke of nine. Then having little faith in the painter's promise she took the carpenter's route and mounted the short ladder to P. K.'s room.

"Mercy!" It was little Ruth, hulling in the door with her arms full of clean bed linen. "Lola, you can't do that!"

"Can't I?" retorted Lola, by stubbornness and pretty. "You can't tell where Ben Ali's man left off and I began."

This was not strictly true, but in spite of a superabundance of paste on the papered surface she was making a creditable job.

"You've boys in your hair, and Charley Jo wants to know what to do about the shelves," reported the practical younger sister.

"Tell him to [illegible] alone," gasped Lola, sprawling with a roll of paper. "We won't have time. Just see that he gets the furniture back in the dining-room, Ruth, and the pictures hung in the right places. There goes the bell. Where is that paperer?"

Ruth [illegible]. At the door she met a hasty [illegible].

"Up here, to see Miss Lola" he announced.

The paperer! cried Lola, [illegible] "send him right up. Ruthie."

So Ruthie obeyed, with dew.

Lola looking over her shoulder [illegible] in the doorway a slight figure in a coat streaked with white paint. She thought she had never seen such a different looking person.

"I thought you never would come," she announced briskly, [illegible] the ladder, and promptly handing him the paste pot. He took it, her to [illegible] gravely.

"Sir, pid," commenced Lola, surveying him with [illegible] "I believe Brady has [illegible] of his life appendages." Aloud: "Did Brady send you over here?"

"Why, yes—I suppose so," he admitted, yet more stupidly.

"Well, can you do a job of paperings?"

A gleam of intelligence dawned in his eyes. He looked at the walls; he looked at Lola, her denim apron, her paste ornaments. His smile spread to his ears.

"Well, I guess if that's what you want me for."

"Fresh," was Lola's mental [illegible]. "Are you sure you know how?" she inquired coldly.

"Watch me," declared the fresh paperer, and promptly shed his coat.

"You seem to know how," she remarked, approvingly, after the first half dozen strokes. She was on the point of departure.

"If you would hold that roll of paper for me," he suggested. "I could get through much quicker; give the paste more time to dry."

Very well. I want it done as soon as possible."

"Expecting folks?" inquired the skilful paperer, casting a very blue eye down at her.

"Mr. Kirkpatrick expects a friend by the afternoon train," replied Lola, with reserve. "Do you think you can work any faster?"

"I'll just put it on in swoops," replied the paperer, and proceeded to do so with such rapidity that Lola found the paste roll lessening swiftly under her fingers.

"Really it is a good job," she said encouragingly. She and Brady's men were entering the work of their hands from the door.

He looked at her, smiled that wide and genial grin. She resented the fact that a paperer's appendix should have such thick lashes and such a humorous twinkle in such very blue eyes.

"Sure, it's good," he said.

"My uncle brought me up to the trade. Papering was on the side though. My trade is painting and"—again the twinkle—"and is my favorite color."

"Can you really paint?" said Lola, hopefully.

"Another job," inquired Brady's man.

"Well, the library door has not scholarly—but perhaps we had better wait."

"Not a bit! Let's do it now," he suggested joyously.

Lola hesitated. She had [illegible] to help him, but she did not approve of the manner of course, way in which he intended pay for it. But Brady's man was already leading the way down stairs. From the library window Lola beheld a lawn still strewn with bedding.

Dee [illegible] reminded. "I had Charley Jo to bring that in an hour ago."

"I'll bring it in," announced Brady's man, and in spite of Lola's objections this he proceeded to do with an ease which his elders [illegible].

"You are very useful indeed," said Lola, watching the step of the mattresses.

"I am pretty handy for my size," the apprentice agreed. "So is this varnish," he added, opening the tin with a can opener.

Lola sniffed a moment. "I [illegible] it," she declared.

"Well," answered the apprentice, dipping a brush, "if I can stand it I guess Mr. Kirkpatrick's nerves could have it."

They were very quiet indeed in the hall stretching. They didn't look at each other on the [illegible] Lola [illegible] P. K.'s voice [illegible] [illegible] like a big boy here to help in the [illegible] India.

"Hullo, Lola have you seen any thing of Sadie, why, where is Brady—why, Kirk! What in time does it mean?"

Brady's apprentice [illegible] to [illegible] and [illegible] with [illegible] [illegible] shaking hands enthusiastically with P. K.

"When did I get here?" Lola heard him saying "some time ago, I actually got into the only safe [illegible] Brady offered, got spilled out of [illegible] a [illegible] on the way over, and located so [illegible] when I arrived that I got to [illegible]." He waved [illegible] Lola's direction. "Isn't she pretty?" He surveyed the floor with the pride of Napoleon.

Then suddenly meeting with [illegible] old man for [illegible] sake [illegible] clean up before your sister gets home!"

"My sister!" said the completely mystified P. K. "Where is she now?" He pointed to the petrified Lola.

"She! Great Peter! I thought she was the maid!" whispered Kirk Kenton.

The [illegible] P. K. compared [illegible] new varnish.

P. K. played a hard part [illegible]. As a genial host he was entirely [illegible]. Lola, a trifle [illegible] glancing out the tail of her eye at the silent, careful-mannered boy [illegible] the table, wondered how she could [illegible] so stupid. And Kirk Kenton watching the haughty little blond [illegible] across the lilies, did nothing but mentally kick himself for being a fool.

After dinner he took P. K. by the arm and walked him up and down the veranda.

"But how shall I ever explain it—how shall I ever make it up to her—she'll never forgive me! Old man, do you think she will?"

"Well," said the chuckling P. K., "she mistook you for a paperer's apprentice. As far as I can see you are quits. Ask her and see!"

He did, but it took two months to get a satisfactory answer.—The Household.

Some people lose what little reputation they have by trying to acquire larger ones.

Lending money and borrowing trouble are often synonymous.

OUR BUDGET OF HUMOR.

A Fitting End.

[illegible] parts he play in life",
[illegible] no mistake when
[illegible] he shall die wearing side
[illegible]

"Crow
[illegible]
[illegible]"
—New York Sun.

Condemnation.

"Was his speech good?"

"Not very. It wasn't even clever enough to cause anybody to suspect him of statesmanship."—Washington Star.

The Lion's View.

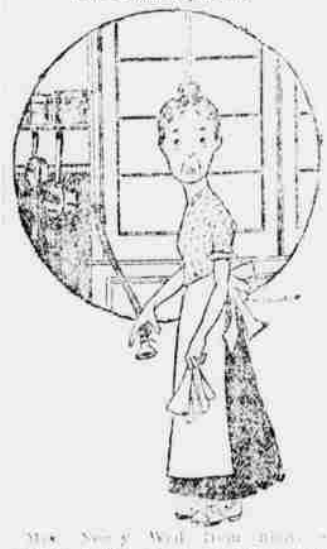
The Elephant: "So they want to depose the King of Beasts, do they? What does the lion say?"

The Tiger: "He has no objection to it, especially if he can be the figure of speech." Puck.

The Object.

[illegible] to give a perpetual [illegible]
[illegible]
"Yes. I believe there are some [illegible] the [illegible] [illegible]."—New York Sun.

The Servant's Question.



Mrs. Newly Wed (from above): "Bridget! Put the [illegible] on the [illegible]."

Bridget (to herself): "Is any woman ever that [illegible] people put [illegible] the [illegible]?"—New York Times.

A Limit to Scorn.

"I have the profoundest contempt for society," said the impractical person.

"Then applied the Broad Thinker, "you are entitled to your own opinion. Everybody else is entitled to your own opinion. But you are just as much a fool as anybody else if you accept a compliment half dollar."—Washington Star.

Gunpowder Joke Again.

"This is one latest novelty," said the man of the world proudly. "Blood warm pearls."

"Not bad," agreed the visiting girl, "but you can't beat a pearl in the [illegible] [illegible]."

"Still a good [illegible]."

"No. We must [illegible]."—Philadelphia Press.

A Fatal Weakness.

[illegible] Don't forget about [illegible]
[illegible]
"Already [illegible]."

"Why [illegible] the [illegible] [illegible] [illegible]