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IV. METALLURGY.-The Cyanide Process for Gold -Full details

A REMARKABLE CHEMICAL COMPOUND-NICKEL CARBON OXIDE.

A most curious and interesting chemical compound, one which may yet be the basis of important industrial processes, is the newly discovered nickel carbon oxide. Ludwig Mond, F.R.S., while working upon nickel and investigating its remarkable power of dissociating carbon monoxide into carbon and carbonic dioxide, accidentally produced the new compound. If nickel is heated in an atmosphere of carbon monoxide, it sepa-

rates carbon, and if the hot mass of carbon and nickel is exposed to the air, it spontaneously takes fire. To avoid this result, Mond, in his laboratory work, very naturally cooled the carbon and nickel in a stream of carbonic oxide gas, and in order to avoid poisoning the air of the laboratory passed the gas into a Bunsen burner and lighted it. As the mass cooled, the flame became luminous, and grew brighter and brighter as the temperature fell.

This very extraordinary phenomenon was investigated. The gas before reaching the burner was passed through a glass tube which was heated, as in the well known Marsh test for arsenic. A bright mirror was deposited on the tube and the flame lost its luminosity. Evidently the substance of the mirror was the agent in making the flame luminous. On analysis, it proved to be nickel of a high degree of purity.

In short, a discovery was fairly stumbled upon, that the hard, difficultly expansible, iron-like metal, nickel, could be carried off at ordinary temperatures by carbon monoxide gas, the metal and gas combining to form a volatile compound.

By special care the substance was produced in quantity, and was condensed by cold into a liquid of high refracting power, expanding very much with heat, and very volatile. Its specific gravity is 1.3185. At 13° F. below 0 (-25° C.) it solidifies into needle-shaped crystals. It is quite explosive ; sudden changes of temperature or jarring, by scratching with a file the tube containing the pure vapor, determines its violent explosion. Mixed with air, it explodes when a flame is applied to the mixture. Its formula is, Ni(CO),; one atom of nickel to four molecules of carbon monoxide, giving 34.28 per cent of nickel.

The compound is decomposed by heat without explosion, when the heat is properly applied. This was what took place in the first experiment with the Bunsen burner. At 392° F. the metal separates. The entire percentage of carbonic oxide is liberated, and perfectly pure coherent metallic nickel is produced.

In the above there are suggestions of the possibilities of this reaction. It now seems practicable to plate with nickel by this process. A heated body, whether a conductor or not, is rapidly coated with a fine coating of nickel, if acted on by the new compound. This suggests the plating of glass, china, and many other non-conductors, something which necessitated formerly an initial coating with graphite, platinum, or some equivalent, to act as a conductor for the electric current. Again, this nickel deposit may be made very thin, and may then be employed as a base for gold or silver plating on glass or china.

When the possibilities of the process in the extraction of nickel from its ores is considered, the subject assumes new importance. It is suggested that nickel may be separated by carbon monoxide gas, the metal may be separated by heat, and the same gas may be used over and over again until the ore is exhausted as if by a gaseous leaching process. The metallurgy of nickel has hitherto been anything but satisfactory. If it leads to the economical production of pure nickel, Mond's discovery will have accomplished a great deal.

The chemist sees in it a basis for the analytical separation of nickel and cobalt. The method, if practicable, would be a most elegant and neat one. Many substances have been examined, but iron is the only one that forms an analogous compound, and this compound is obtained far less readily than is the nickel one. Its use in analysis seems quite feasible.

In experimenting with it the highly poisonous nature

his station as British Commissioner to South Africa, acted as his secretary for a number of years, and employed her leisure hours in acquiring knowledge of South African flora and kindred subjects.

In 1870 she resided in the island of Mauritius, which is in the Indian Ocean, at least a thousand miles from the mainland. Col. Nicolas Pike, her future husband, was the United States Consul there, and was making a thorough study of the scientific features of the island. He gave special attention to the fish of the Indian Ocean, many new and valuable specimens of which he collected and sent to Prof. Agassiz for his museum at Cambridge, Mass. Mrs. Pike, who had made great progress in the acquirement of scientific knowledge and also in the art of drawing from nature, assisted Col. Pike in classifying the more than eight hundred different species which he secured, and she also made drawings of them, which she colored to represent the wonderful hues peculiar to the fish of that locality.

Mrs. Pike came to this country about seventeen years ago and here married Col. Pike. Since then she has written voluminously, contributing many interesting articles on various subjects to the SCIENTIFIC AMERICAN, American Agriculturist, American Garden, besides English and French journals. Her effectiveness as a writer was greatly enhanced by her skill as an artist. Her illustrations were skillfully executed and aided greatly in elucidating the subject treated. Among many other works from her pencil, Mrs. Pike illustrated in colors various portions of a very complete collection of spiders which her husband made, and she also executed drawings with pen and ink of the snakes of the United States. This work required a vast amount of labor and patience.

Mrs. Pike was a member of the Brooklyn Institute of Arts and Sciences, and took special interest in the department of botany, where her wide experience and store of knowledge were of great service to her associates. She was, however, an enthusiastic and painstak. ing student in many departments of science.

*** The Pogonip Fog.

The city of Carson, Nev., experienced the other evening the thickest and coldest pogonip fog "in the memory of the oldest inhabitant," says a writer in a recent issue of the *Evening Post*. The pogonip fog is peculiar to elevated altitudes in the Nevada Sierras. It ascends from the valleys, and its chill embrace is so much feared by the Indians, who are predisposed to affections of the lungs, that they change their camp if apprised by the atmospheric conditions that the dreaded fog is approaching. Mr. Ogden, a chemist of the Nevada Mining Bureau, furnishes this pleasing description of the pogonip:

"In the White Pine Mountains, the Toyabi, the Hyko, and the Pahranagat ranges it is quite common to see the trees, houses, and everything out in the open gradually become white without any apparent cause. There is no perceptible fog, but the hot air from the valleys gradually ascends up the mountain side, and, becoming crystallized, the minute crystals attach themselves to anything in sight. This phenomenon affects human beings in just the same manner, and when the fog passes by, the frozen particles will adhere to the hair and clothing, producing a very grotesque effect. Hot Creek Valley is situated right in the center of the mining district, and is so called because of the warm springs that are always to be found there. These springs cause a pogonip in that district every night, and for this reason : The wind in the valley always blows from one direction in the daytime, and after sunset it invariably blows from the opposite point. The effect of the cooler air passing over the hot valley is to force the heated air to rise. When it reaches a temperature of about 25°, the result is a pogonip."

The Best Mosquito Remedy.

Mr. C. H. Russel, of Bridgeport, Conn., has recently communicated to us the following interesting fact: A of carbon monoxide gas should be kept in view. None very high tide recently broke away the dike and flood-The receding

Tot this valuable process of extracting gold from its of estimated	of curbon monorate gub should be hept in the w. 1000	for y mgh the recently broke away the and hood
V. MINING. ENGINEERING.—Mining, Washing, and Calcining South Carolina Land Phosphate.—By W. DE L. BENEDICT.—Open	should be allowed to escape into the room, and the	ed the salt meadows of Stratford, Conn. The receding
work phosphate mining, calcination of the product and its ship- ment	nickel compound itself is highly poisonous if respired.	tide left two lakes nearly side by side of the same size.
VI. MISCELLA NEOUS -Sketches in BrazilRio de Janeiro, Bota-	This suggests one other property which was investi-	In one lake the tide left a dozen or more small lishes,
fogo, and sketches of other scenery in Brazil5 illustrations 13587	gated—its physiological action on the animal system.	while the other one was fishless. A recent examination
VII. NAVAL ENGINEERING Life Saving Devices The continu- ation of this interesting article presenting very novel ideas in	If injected into the veins, it lowers the temperature to	showed that while the fishless lake contained tens of
the way of effecting communication between wrecked vessels and	a remarkable extent. The experiment was tried upon	thousands of mosquito larvæ, that containing the fishes
The Launching of the Goeland A new Parisian industry	a rabbit; an extremely small dose produced a fall of	had in it no larvæ.
RUL (DEBNANCE AND ENCINEEDING On Angient MSS Con-	temperature of over 20° F.	An English gentleman living on the Riviera, accord-
cerning the History of Artillery and the Mechanic ArtsMilitary	For fuller accounts of this substance, Prof. Mond's	ing to a correspondent of Nature, having been troubled
appliances of olden times.—Methods of transporting artillery, in- cendiary apparatus, ontoon bridges, and other engineering ap-	paper given in a recent SCIENTIFIC AMERICAN SUPPLE-	by mosquitoes, discovered that they bred in the large
pliances.—7 illustrations	MENT (No. 823) should be consulted. Should the new	tanks kept for the purpose of storing fresh water,
IX. PHOTOGRAPHYChangeable Photo. ObjectivesA combi- nation of a long focus convex lens and a short focus concave lens,	compound realize but a small proportion of what it	which is rather a rare commodity at this Mediterranean
producing a most varied range of power 13585	suggests, it will prove the most valuable of recent dis-	resort. He put a pair of carp in each tank and suc-
upon WoodBy Prof. ANTON IHLWood pulp manufacture and	coveries.	ceeded in this way in extirpating the insect pest.
by-products of wood.—Examination of the chemistry of the pulp- ing process		The utilization of fish in this way is an old suggestion,
Bayasse as Fuel.—A suggestion for reducing the cost of Ameri- can sugar as produced in Louisiana and the South	MRS. MARIA LOUISA PIKE.	and a very practical one under some circumstances.
How Liebig's Extract of Meat is Made.—The works in Sonth America where Liebig's extract is manufactured, with graphic	Mrs. Maria Louisa Pike, wife of Col. Nicolas Pike,	Many people suffer from the mosquito plague when the
details of the manufacture	died at her residence in Brooklyn, N. Y., on March 23.	insect breeds in a circumscribed and easily accessible
RIEA selected palette of oil colors and researches into the du-	She was a lady of many scientific accomplishments	place and where it could be destroyed by some such
New Wheel for Vehicles.—A wheel with springs to prevent vi-	Bown in England and when seventeen years of age	method as that used by the level-headed Englishman
Bussian Sunflower Industry.—Sunflower oil for table use.—How	ageomnopied her father Her Benjamin Hedley to	Inegat Tife
it is produced and its popularity in Russia	accompanied her father, non. Denjamin namey, to	· — 110000 LUJE.