portant property. A lady suffering from cancer had had one breast amputated; at the suggestion of Prof. R. O. Doremus, hydrogen dioxide was selected as an antiseptic and the results were very favorable, the wound healed quickly without suppuration. In such cases, pure solutions must be employed; the commercial product contains free acids and when vaporized in a room produces irritation of the throat and coughing.

In conclusion, I will state that I do not believe that the manufacture of commercial hydrogen dioxide is susceptible of much development. Its chief application, the bleaching of ostrich and fancy feathers, is controlled by fashion; its use for changing the color of live hair is rapidly decreasing, henna (*Lawsonia Inermis*) which is less objectionable being a substitute. The high price of production forbids its application for the bleaching of comparatively low priced products, and unless new applications are found and the price of manufacturing greatly reduced, the demand for hydrogen dioxide cannot be increased.

Nevertheless, the preparation of hydrogen dioxide, on a comparatively large scale, is carried out in New York by the introduction of several improvements whereby as much as two hundred gallons are obtained in one operation; the stirring of the working vats is done by steam power, and the qualities of the product, which are always uniform, are highly commended and appreciated by the trade.

GENERAL CHEMISTRY.

On the Presence of Nitrous Acid in the Atmosphere.

L. T. LOSWAY.

In his experiments the author finds some form of combined nitrogen constantly present upon the surface of grass, leaves and branches. In clear and dry weather ammonium nitrite is converted into nitrate, either by the oxygen from the leaves or by atmospheric oxygen under the influence of sunlight. He has also found nitrous acid in the water of soils of different kinds after washing and calcining, and then wetting with pure water. The presence of nitric acid can also be detected after destruction of the nitrous acid, but ammonia was found only in minute traces. The same soils placed in a tube and put in contact with *pure* air did not show any of the nitrogen compound substances above mentioned, even after ten days exposure. But if into the same tubes *ordinary* air was passed for twenty-six hours, the presence of nitrous acid was easily shown. (*Bull. Soc. Chim.*, [3], **2**, *666.*) M. L.

Distinction of Phosphorus Oxychloride from Trichloride. G. Deniges.

The process is based upon the action, observed by the author, of phosphorus oxychloride on an excess of zinc powder. Flame is produced with white fumes of phosphoric anhydride. Zinc phosphide is also formed, as indicated by the production of spontaneously inflamable phosphorus hydride on addition of water to the mass.

With the trichloride there is no such action. (*Bull. Soc. Chim.*, [3], **2**, *787.*) M. L.

On an Acid Cerium Sulphate. G. Wyrouboff.

According to the opinion of the author the question of the atomicity and atomic weight of cerium is far from settled. Mendelejeff, guided by theoretical considerations relating to the periodicity of atomic weights proposed to change the old formulæ of cerium oxides, CeO and Ce_3O_4, into Ce_2O_3 and CeO_2, the atomic weight being then 141.6 instead of 94.4, the former being in accordance with the atomic heat 6.34.

Notwithstanding this apparent accordance, the author supposes that cerium may be an exception to Dulong and Petit's law. The chemical and physical properties of the salts of cerium seem to justify the first hypothesis of the formulæ CeO and Ce_3O_4. By crystallizations of the sulphate of the lower oxide, the author has obtained the body $CeSO_4 . SO_4H_2$ with $Ce = 94$, a sulphate having many similarities with the sulphates of the magnesian series, being one more acid sulphate of a monoxide. If the formula were written $(SO_3)3Ce_2O_3 . 3SO_4H_2$ with $Ce = 141.6$, this body would be the absolutely unique exception of an acid salt of a sesquioxide. (*Bull. Soc. Chim.*, [*3*], **2**, *745.*) M. L.

Action of Water on Stannic Chloride. LEO VIGNON.

An aqueous solution of stannic chloride must be considered as a mixture of water, hydrochloric and stannic oxide. From calometric experiments and considerations the author concludes that the chemical state of an aqueous solution of stannic chloride is unstable, and that the modification leads towards a state of equilibrium varying with dilution and temperature. The presence of HCl retards and limits the polymerisation of the stannic oxide ; NaCl and KCl do the same ; this is illustrated in the use of the so called pink salt (stannic chloride and KCl) in the arts. (*Bul. Soc. Chem.*, [3], **2,** *593.*) M. L.

Notes on Mellitose. M. BERTHELOT.

This sugar was discovered by the author in 1886 ; rediscovered in molasses by M. Loiseau and called by him *raffinose ;* found in cotton seed cake by Ritthausen, and studied by Scheibler and Tollens. The sugar obtained by Loiseau and others occurs in small crystals, containing 15.1% of water of crystallization; it corresponds to the formula

$$C_{36} H_{32} O_{32}+5H_2 O_2.*$$

The rotary power of the solution of this hydrate is the same as that of raffinose.

Under the influence of a weak yeast ferment, only one-third of this sugar is converted, even after two weeks, although cane sugar and glucose would be entirely transformed in forty-eight hours. The probability is that this sugar breaks up into a glucose, which ferments and disappears, and a second sugar of the saccharose family able to produce a certain reduction (of Fehling solution) or a mixture of two glucoses, of which one only has reducing action. (*Bull. Soc. Chim.*, [3], **2,** *655.*) M. L.

On a Nitro-Phenol : Campho-Nitrophenol, Isomeric with Nitro-Camphor. P. CAZENEUVE.

When the α-nitro-camphor or the nitro-camphor, hydrochloride of the body studied by the author ([3], **1,** 243) are boiled with conc. hydrochloric acid, there is obtained a neutral body, isomeric

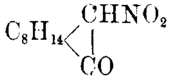
---

* The author has obtained another hydrate answering to $C_{36} H_{32} O_{32}+ 6H_2 O_2$.

with nitro-camphor, not possessed of the acetone function, but of the tertiary or phenol function. The preparation and composition of this body are given. The formula is

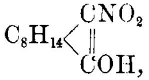
$$C_{10}H_{15}(NO_2)O\ H_2O.$$

It is more soluble in water than camphoric acid, soluble in all proportions in boiling water, soluble in alcohol, ether, chloroform and benzol. The author gives the crystallographic description of the crystals obtained, in dilute alcohol. In this paper, too long to be condensed, the author establishes the nature of this body. If nitro-camphor is



$$C_8H_{14}\left\langle\begin{array}{l} CHNO_2 \\ | \\ CO \end{array}\right.$$

The new body is



$$C_8H_{14}\left\langle\begin{array}{l} CNO_2 \\ \| \\ COH \end{array}\right.$$ etc., etc.

(*Bull. Soc. Chim.*, [3], **1**, *417.*) M. L.

Fixation of Atmospheric Nitrogen by Plants. M. Berthelot.

The author remarks that the belief that free nitrogen of the air takes no active part in vegetable growth is seemingly abandoned, and that this change of view has been brought about by his researches, which have shown that fixation of nitrogen is produced by the action of some kind of microbes. He cites in corroboration the experiments of G. Ville, Hellriegel and Willfarth, as to the relation of leguminous plants to this question, and those of Dehérain Julie Breal on the fixation of nitrogen by argillaceous soils. The experiments of the author have been fully confirmed by Frank of Berlin, and by Pichard and Tacke. (*Bull. Soc. Chim.*, [*3*], **2**, *652.*) M. L.

Volumetric Determination of Sulphates. H. Quantin.

The process is based on the insolubility of barium chromate in ammonia, and on the decomposition of a chromate by a sulphate (chromic acid being set free, and combining with the alkali of the sulphate); subsequent separation of the decomposed barium chromate by ammonia, and determination of the chromic acid by a ferrous solution, using potassium ferricyanide as an indicator. The solutions employed are, 19.48 grms. potassium chromate in 200 c.c. water, 50–100 c.c. HCl; 24.35 grms. $BaCl_2 . 2H_2O$ made up to 1 litre and filtered. The solution must contain a slight excess of chromate, which must be kept account of and deducted. Indications, *modus operandi*, and examples of the accuracy of the process are given. (*Bull. Soc. Chim.*, *[3]*, **1**, *21.*) M. L.

Technical Analysis of Water. LEO VIGNON.

The author, following the suggestion of Dr. A. Rossel of Winterthür, as to the exclusive use of sodium carbonate for the purification of waters for steam boilers, proposes a method of analysis having for its purpose to find what quantity of reagent is necessary to decompose the chlorides and sulphates of calcium and magnesium, the quantity of alkali answering to the bicarbonates having been determined once for all. This latter is calculated by the formula.

$$\frac{V\times Cv\times CO_3Na_2}{CO_2}\times 1.9774 \text{ or } V\times Cv\times 476\text{grms.}$$

V, being the average quantity of water of the boiler in normal run.

V′, the average quantity of water evaporated.

Cv, the volume of CO_2 (in litres) for 1 cubic metre of water.

P, the quantity of Na_2CO_3 answering to sulphates and chlorides.

P V′, the quantity of reagent to be used daily.

The process is volumetric and takes : 1st, a solution of calcium hydrate ; 1gr.80 per litre; 2d, alcoholic phenolphthaleine ; 3d, a solution of $CaCl_2$, 5 per cent. strong ; Na_2CO_3 1 grm. per litre, etc. (*Bul. Soc. Chim.*, [3], **2**, *596.*) M. L.

Detection of Free Chlorine in HCl. G. A. LEROY.

Very small traces of Cl can be detected by addition of a few crystals of diphenylamine to the acid. (*Bul. Soc. Chim.*, [3], **2**, *789.*) M. L.

ABSTRACTS.

Abstracts of American Patents Relating to Chemistry.

(*From the U. S. Patent Office Gazette.*)

Issued February 25th, 1890.

421,904.—Process of bleaching wax. W. Bruening.

The wax is atomized by a jet of steam or air, and the resulting powder bleached by the action of light, air and moisture.

421,935.—Process of making alkaline salts of antimony. J. Holliday.

The alkaline antimonites, generally considered antimonoso-antimonates, are prepared by treating metallic antimony in hot solutions of an alkaline nitrate or nitrite and caustic alkali.

422,018.—Blue-green dye. A. Herrmann.

Derivative of metaoxytetralkyldiamidotriphenylmethane.

422,118.—Process of carburizing malleable cast iron or low carbon steel. M. F. Coomes and A. W. Hyde.

The metal, raised to a white heat, is placed in a bath composed of water or milk and a carbohydrate.

422,119.—Process of carburizing malleable cast iron or low carbon steel. M. F. Coomes and A. W. Hyde.

The metal, raised to a white heat, is immersed in milk.

422,120.—Process of carburizing malleable cast iron or low carbon steel. M. F. Coomes and A. W. Hyde.

The metal, raised to a white heat, is placed into a bath containing an organic acid, which results from the oxidation of glycogen.

422,121.—Process of carburizing malleable cast iron or low carbon steel. M. F. Coomes and A. W. Hyde.

The metal, raised to a white heat, is placed into a bath formed by adding to water or milk a mixture of a carbohydrate and an oxidizing agent.

422,128.—Furniture polish. J. M. Hall, C. Morris and W. S. Hamilton.

Consists of Japan drier, linseed oil, turpentine, copal varnish, alcohol, hydrochloric acid and olive oil.

422,140.—Process of recovering alkali and glycerine from spent soap lye. E. D. Mellen.

The soap is precipitated from the soap stock by an excess of aqueous solution of alkali, whereby the resulting lye is obtained free from salt, after which the lye is concentrated and saturated with carbon dioxide, which separates the alkali as bicarbonate and leaves the glycerin in solution.

422,141.—Aparatus for making soap and carbonic acid. E. D. Mellen.

422.173.—Gas washer. F. A. M. Alavoine.

422,195.—Varnish. W. D. Field.

A non-hygroscopic varnish or lacquer for use on metals and hard or non-absorptive surfaces, consisting of a concentrated solution of shellac, in combination with a solution of pyroxylin in a practically non-hygroscopic menstrum miscible with the shellac solution.

422,234.—Condenser with multiple effect evaporator. S. M. Lillie.

422,235.—Evaporating apparatus. S. M. Lillie.

422,322.—Carburetor. J. W. Strouse and A. B. Strouse.

422,334.—Hydrazin. T. Curtius.

422,357.—Filter. F. T. Weidan and W. E. Kane.

Issued March 4th, 1890.

422,369.—Drum for fluid-separating machines. W. Bergh.

422,403.—Process of making steel containing carbon, manganese and aluminium. R. A. Hadfield.

422,430.—Printing ink. J. McCloskey and C. F. Farwell.

An ink for printing upon celluloid, consisting of pigment, albumin (animal or vegetable) and glycerin.

422,464.—Baking powder. H. D. Thatcher.

Consists of cream of tartar, an alkaline bicarbonate, and sugar of milk.

422,484.—Adjustable filtering and percolating stand. A. P. Yarnall.

422,500.—Process of purifying aluminium chloride. H. Y. Castner.

Iron is removed from aluminium chloride by melting the crude chloride and treating it electrolytically.

422,509.—Process of obtaining chromium and chromium alloys. A. K. Eaton.

Consists in first producing a chromite of the desired metal, and then reducing the chromite to an alloy.

422,514.—Manufacture of explosives. S. H. Emmens.

Consists in fusing a suitable hydrocarbon substition derivative, such as trinitrophenol, adding a suitable nitrate, continuing a sufficient degree of heat until actual liquefaction of the mixture is attained, and then allowing the same to cool.

422,515.—Manufacture of explosives. S. H. Emmens.

422,692.—Apparatus for the manufacture of gas. J. D. Averell.

422,750.—Polishing powder. E. P. Eells.

Consists of callustro, ammonium carbonate, and sodium carbonate.

422,806.—Apparatus for distilling wood. O. Koch.

Issued March 11th, 1890.

422,907.—Artificial fuel. J. Bowing.

Coal and coke dust, breeze, and similar substances are agitated with tar or pitch, in or under water, and allowed to settle. The water is then drawn off, and the mixture formed into blocks or briquettes, and dried.

422,939.—Method of separating impurities from salt. T. Higgin.

423,011.—Hydrocarbon burner. J. Wilson and A. Mason.

423,012.—Process of burning petroleum or other hydrocarbons. J. Wilson and A. Mason.

Consists in injecting oil, steam and air into a highly heated retort, and discharging the resultant products at the burning point.

423,042.—Waterproof composition for roofing, etc. A. M. Ford.

Consists of steam, pitch, oil, soap and petroleum.

423,044.—Apparatus for the manufacture of oil gas. W. B. Frink.

423,047.—Paint. W. B. Grover.

Consists of rubber pulp dissolved in dead oil of coal tar, a drier, a varnish, a mineral coloring matter, and the distilled unbroken residuum of bituminous gas coal tar.

423,071.—Production of restored or devulcanized rubber. N. C. Mitchell.

Consists in devulcanizing the rubber by the action of live steam, then while the rubber is yet moist rolling it until reduced to a powder, and finally drying the powder, and at the same time agitating or keeping it in motion to preserve the powdery condition.

423,101.—Process of electroplating non-metallic articles. W. H. Winslow.

323,127.—Apparatus for making infusions. J. Childs.

423,131.—Hydrocarbon injector burner. C. Cole.

423,133.—Cooling and refrigerating apparatus. H. J. W. S. Cooke.

423,183.—Weighing scales. J. G. Schmidt.

423,213.—Obtaining peptone and maltose. A. Brunn.

Albuminous and starchy substances are converted into peptone and maltose by fermentation, after which the peptone and maltose are separated by lixiviation with water.

423,230.—Explosive. S. H. Emmens.

Consists of paper or paper stock converted into a nitrocompound and impregnated with ammonia and picric acid.

423,257.—Carburetor. L. C. Huber.

423,263.—Making malted bread. J. Montgomerie.

Consists in first mixing flour, water and extract of malt or maltine, heating the mixture in a water bath to 130°–150° F., with agitation, maintaining it at that temperature for a few hours until the diastase acts on the starch and converts it into soluble dextrin and sugar, then making a dough of this compound by further addition of flour, and subsequently forming and baking the same.

423,281.—Alloy. W. V. Shelton.

Composed of copper, zinc, nickel, iron, manganese and silicon.

423,306.—Apparatus for the manufacture of ice. J. W. Brook.

423,320.—Process of making phosphatic fertilizers. E. R. Hodgkins.

Consists in combining finely pulverized phosphatic material and calcic oxide, slaking the calcic oxide by the addition of water, and finally intimately mixing the ingredients.

423,341.—Green dye. A. F. Poirrier.

Green or greenish coloring matters are produced by condensing with tetramethyldiamidobenzhydrol, in a hydrochloric or sulphuric acid medium, paratoluidine, a metaxylidine, pseudocumidine, amidotrimethylbenzol, or mesidine, and subjecting the leuco bases thus formed to oxidation, or oxidation in conjunction with the formation of hydroxyl, methyl, ethyl, benzyl and sulpho-conjugated benzyl derivatives of said leuco bases.

423,347.—Apparatus for generating and burning gaseous fuel in furnaces. E. P. Shetter. W. R.