be developed in both by inoculation with appropriate cultures after sterilization, provided a small quantity of nutritive gelatine were added. As to the typhoid bacillus it was found that its growth (after treatment as in the case of mine water alone) was possible in No. 2 (Hollenbach mine water) but not in No. 3. As the proportion of free sulphuric acid is very slightly higher in No. 3 than in No. 2, the difference must apparently be ascribed to the much larger proportion of ferric salts in the Hazleton mine water.

In conclusion, it is evident that no effective sterilization of the water of any large stream can result from the small and varying contributions made to its volume by mine drainage since surface waters are certain to overpower any specific effect which the former might be capable of exerting, and the results of the foregoing examination render it unlikely that even mine waters of such strength as are commonly met with could, even undiluted, be of certain effect with germs having the high resisting power that the typhoid bacillus is known to possess.

It is certain, moreover, that a water rich enough in sulphuric acid or iron salts to act as a disinfectant would be entirely unsuited for drinking.

ABSTRACTS.

GENERAL CHEMISTRY.

Analysis of the Seed of Calycanthus Glaucus. H. M. WILEY.*

The above plant is a shrub growing in the mountains of the Southern States from North Carolina to Georgia. The berries, known locally as "bubby" berries, are violently poisonous, and

* See also a paper by L. E. Sterns on the Fruit of the Calycanthus (Bulletin of the Torrey Botanical Club, August, 1888,) and by R. G. Eccles, in Western Druggist, Jan., 1889, p. 15, and in Druggists' Circular, March 1889, p. 65.

being rich in sugar are apt to be eaten by cattle, and many cases of poisoning have resulted. The author has determined the composition of pod, hull and kernel of the fruit. The seed is very rich in oil, containing about 50 per cent. The oil is faint yellow of Sp. Gr. 9058 (extracted by solvents) to .9110 (expressed), contains no volatile acids, yields a fatty acid crystallizing at 12.5° and, judging by its iodine coefficient, the oil has moderate drying properties, which, however, were not further determined. The oil also contains a trace of the peculiar alkaloid "Calycanthine," which exists in the kernels in the proportion of 1.96 to 4.25 per cent. of the oil-free, dried kernels, the proportion depending upon the method of extraction. The hulls also contain the alkaloid to the extent of .83 per cent. Calycanthine yields the following colors with reagents : H_2SO_4, pale yellow ; HNO_3, bright green (persistent) ; H_2SO_4 and cane sugar, fine purple (persistent, but changing finally to blue) ; H_2SO_4 and K_2CrO_4, fine blood brick red. Analysis of calycanthine leads to the formula $C_{18}H_{40}O_{11}N_6$. (*Am. Chem. Jour.*, **11**, *1889, No. 7.*) A. A. B.

Influence of Food and Animal Idiosyncrasy on the Composition of Butter. H. W. WILEY.

An investigation of some peculiarities in composition of butter fat first noted at the Agricultural Experiment Station of Texas where the cattle were fed upon cotton seed meal. The volatile acids in such butter were found to be abnormally low, reaching 21.00 as compared with 28.50 for butter from cows fed on other feed. The cotton seed butter had the phenomenally high melting point of 45° C., yielded the iodine number 33.40, and exhibited strong reducing properties with silver nitrate. Experiments made with cows fed largely on cotton seed meal after feeding for a time on grass confirmed the above results only in the main. The experiments indicated, however, that cows fed only upon grass may yield butter so low in volatile acids, in exceptional cases, as to cast doubt upon the validity of the Reichert process, taken alone, as a means of deciding upon the character of butter. (*From a paper read before the Society for the Promotion of Agricultural Science, Toronto Meeting, Aug., 1889.*) A. A. B

Determination of Mercury. W. FEIT.

In alkaline solutions of mercury compounds arsenious acid precipitates metallic mercury on boiling, according to the equations :

$$2\,HgO + A_2O_3 = 2\,Hg + A_2O_5$$
$$2\,Hg_2O + A_2O_3 = 4\,Hg + A_2O_5$$

Upon these reactions the author bases the following method. If mixtures of mercurous and mercuric compounds are under examination, oxidize to mercuric salt by boiling with nitric acid. The removal of the latter is not necessary as it does not interfere in the final titration.

To the solution of the mercury salt add an excess of NaOH solution, and an excess of $\frac{n}{10}$ arsenious acid. Boil the liquid for 10–15 minutes, cool, dilute to definite volume, filter and take an aliquot part for titration with $\frac{n}{50}$ iodine solution. Neutralize the aliquot part taken with HCl and make alkaline by addition of $NaHCO_3$, then titrate, using starch paste as an indicator. The quantity of arsenious acid actually required indicates the amount of mercury. (*Ztschr. anal. Chem.*, **28**, *pp. 318–322.*) J. F. G.

Determination of Thallium. W. FEIT.

The author proposes a quick volumetric method depending upon the reaction between thallic salts and potassium iodide, in which the amount of liberated iodine indicates the quantity of thallium present, according to the equation :

$$Tl_2(SO_4)_3 + 6\,KI \quad 2\,TlI + 3\,K_2SO_4 + 4\,I.$$

It is essential that the thallium be present as thallic salt, preferably thallic sulphate, to effect which add to the thallium compound an excess of sulphuric acid, boil the solution and oxidize the same by adding bromine water. Continue the boiling to expel the excess of bromine. To the thallic solution thus obtained add an excess of KI, neutralize the free acid by adding an excess of $NaHCO_3$, then add an excess of $\frac{n}{10}$ arsenious acid solution. Allow the solution to stand for some minutes after repeated shaking until the precipitate has a pure yellow color. If the operation is performed in a graduated flask, fill up to the mark, allow the

precipitate to settle, decant or filter and take an aliquot part for titration with $\frac{n}{50}$ iodine solution from which calculate the amount of arsenious acid actually required for the free iodine of the first operation, which indicates the quantity of thallium present. In some cases thiosulphate may be used in place of the arsenious acid solution. (*Ztschr. anal. Chem.*, **28**, *314–316.*) J. F. G.

Incineration of Sugars and of Sirups without Sulphuric Acid. JEAN LUCIEN.

The author admits the utility of the method of incinerating sugars and syrups in a current of pure oxygen gas, but maintains that it is industrially impracticable when a large number of determinations have to be made in a comparatively short time. He has obtained absolutely concordant results in less time than when operating with the aid of sulphuric acid, by mixing with five grammes of sugar or three grammes of syrup, one per cent. of zinc oxide in the former case or two per cent. in the latter, and incinerating the mixture in a platinum capsule over a Bunsen's gas jet; subsequently calcining at the entrance of a muffle heated to dull redness. (*La Sucrerie Indigène et Coloniale, from "Bulletin de l'Association des Chimistes," March, 1889.*)

F. T. K.

Abstracts of American Patents Relating to Chemistry.

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

(*Issued January 7th, 1890.*)

418,675.—Direct-pointed adhesive negative. J. Baynes.

418,711.—Process of manufacturing gas. A. O. Granger.

The process consists in raising a body of carbonaceous material to a high degree of heat by burning it with air, and at the same time burning the gaseous products of combustion with air and highly heating a body of refractory material, then suspending the combustion and introducing directly into the coolest portion of the heated refractory material hydrocarbon liquid, causing it to pass through the refractory material in a direction the reverse of that in which the products of combustion passed through during the process of heating, then at the same time causing

steam to pass through the highly heated carbonaceous material and be decomposed into carbon monoxide and hydrogen, then causing such gas, as fast as it is generated, to pass through the refractory material in the same direction and in company with the hydrocarbon liquid, and thereby combine with the vapors and gases of the hydrocarbon as they are generated by contact of the oil with the refractory material at successively increasing temperatures.

418,719.—Filter or strainer. W. A. Hepburn.

418,761.—Apparatus for making salt. F. Siedentopf.

418,792.—Process of aging liquors. J. A. H. Hasbrouck.

The liquor is confined in a vessel lined with carbon, and subjected to the action of heat and oxygen while in a fine state of division.

418,801.—Apparatus for dyeing. J. H. Lorimer.

418,807.—Gas blowpipe. D. M. Monroe.

418,814.—Pharaoh's Serpent. C. Nelson.

418,864.—Apparatus for the production of oxygen. L. Chapman.

418,872.—Process of Pasteurization of beer. W. Kuhn.

418,916.—Blue dye. B. Homolka.

A blue violet coloring matter, formed from aniline, aniline hydrochloride and amido azo benzol. The formula is C_{24} H_{18} N_4.

418,947.—Crayon. A. Hart.

Consists of a pigment and carnauba wax, stearic acid and paraffin.

419,023.—Filter. C. V. Roberts.

419,098.—Apparatus for making oil gas. T. Alexander and S. Alexander.

419,106.—Paint composition. J. Bollinger.

Consists of ammonium chloride, quick lime, boiled oil, salt and water.

419,163.—Black pigment. A. G. Wass.

Consists of calcareous earthy substances, as chalk, impregnated with saccharine matter, and particularly the earthy refuse of sugar refineries, calcined or burned.

(Issued January 14th, 1890.)

419,195.—Process of separating solder from tinned iron. W. E. Harris.

The tinned iron is coated with petroleum, and the latter burned on the iron to melt off the solder, in a suitable receptacle.

419,215.—Apparatus for producing fresh water from sea water. W. F. Pamphlett.

419,224.—Extracting apparatus. T. Scully.

419,266.—Filter. E. M. Knight.

Consists of asbestos cloth or other fibrous material and an exterior coating of a filtering medium in the form of paste spread upon the cloth and an exterior cover of wire screen to uphold the medium.

419,274.—Process of manufacturing iron and steel alloys. H. Marbeau.

A malleable alloy, composed of iron or steel and nickel, the proportion of nickel being less than 25 per cent. of the whole, with manganse and aluminium.

419,331.—Process of scouring or dyeing. S. Hodgson.

419,332.—Alcoholic distillation. W. L. Horne.

419,347.—Process of purifying and deodorizing petroleum. R. M. Perrine.

The process consists in first agitating the petroleum with bleaching powder for five hours, more or less, then adding sulphuric acid to complete the elimination of the chlorine gas, and to neutralize and precipitate the alkaline matters and other impurities, and finally drawing off the purified and deodorized oil.

419,350.—Apparatus for washing gases. M. A. Piedra.

419,404.—Process of manufacturing basic linings for converters. E. Bestrand.

419,533.—Stove polish. A. J. Miller.

Consists of alkali soap, water, plumbago, and oil of bitter almonds.

419,582.—Solution for preserving wood. J. P. Card.

Consists of 979 parts water, 20 parts zinc chloride, and 1 part mercuric chloride.

419,610. Process of recovering salt and crude glycerine from spent lye. E. K. Mitting.

The process consists in adding lime to the lye, removing the precipitate thus formed, concentrating the lye until it is saturated or nearly saturated with salt, then again treating with lime and again removing the precipitate, then boiling down the lye without further treatment to the finishing point, removing the salt thus produced either during or at the end of the operation, and finally purifying the salt by washing with a solution of common salt which has been rendered alkaline by the addition of a small percentage of caustic or carbonated alkali.

(*Issued January 21st, 1890.*)

419,655.—Manufacture of artificial stone. J. F. Gesner.

419,657.—Artificial solid material. J. F. Gesner.

419,671.—Foam for carbonated beverages. G. C. Henry.

Consists of infusion or tincture of sarsaparilla, etc., solution of gelatin, syrup, and water.

419,697.—Process of reclaiming rubber from waste rubber goods. N. C. Mitchell.

The process consists in grinding the stock into small fragments, attacking and disintegrating the fiber, removing the mud and similar impurities by washing in water, separating the heavier foreign substances by flooding in water, and floating the rubber away from such heavy substances by

the action of a current of water, devulcanizing by the action of live steam under pressure and disintegrating the devulcanizing mass.

419,707.—Preparation of malt. G. Reininghaus.

419,726.—Neutralizing sulphochlorinated organic compounds. A. Sommer.

Sulphochlorinated organic compounds containing hydrochloric acid, are neutralized by digesting the compounds with a volatile unsaturated hydrocarbon.

419,775.—Construction of filter presses. S. H. Johnson and C. C. Hutchinson.

419,779.—Process of treating glue and gelatin moulds. G. Koller.

The glue or gelatine is dissolved in an aqueous solution of an energetic oxidizing agent, then formed in molds and finally exposed to the action of light.

419,858.—Process of preserving wood. C. T. Lee.

The wood is immersed in a solution of resinate of glycerin and naphtha and then subjected to heat.

419,866.—Fuel block. A. K. Murray.

Consists of saw dust, a binder of clay and water, and a hardening mixture of plaster of Paris and water.

419,867.—Fuel composition. A. K. Murray.

Consists of about seven parts lignite and about one part coal dust, with sufficient clay and water to bring the mass to the consistency of soft putty.

419,868.—Fire kindler. A. K. Murray.

Consists of fibrous material, such as: waste paper, straw, shavings, sawdust, spent tan bark, etc., treated with a mixture clay, water, and saltpeter.

419,869.—Artificial fuel. A. K. Murray.

Consists of anthracite and bituminous coal dust, and sawdust, with a mixture of clay and water.

419,931.—Process of distilling mineral oils and like products. James Dewar.

Issued January 28th, 1890.

420,030.—Process of treating silver and zinc ores. F. L. Bartlett.

The process consists in mixing the ore with hydrocarbon fuel, supplying sufficient sulphur to produce an excess of the same, burning in the presence of an air blast forced uniformly up through the whole mass of ore and supplying air to unite with the products of combustion above said mass.

420,082.—Composition for paint. J. P. Moser.

Consists of tar, ammonium carbonate, lamp black, whiting, copal varnish, Japan drier, coal oil and tincture of ferric chloride.

420,130.—Flexible photographic film. W. H. Walker and George Eastman.

420,164.—Blue dye. J. Mohler.

420,311.—Nitroso dye. A. F. Poirriere.

Obtained by heating in a suitable medium, such as water, a salt of a nitroso derivative of a secondary or tertiary amine and separating the coloring matter from the solution by precipitation with a mineral salt.

420,315.—Process of cleaning wool. K. F. Stahl.

Woolen fibers are recovered from rags containing woolen and vegetable fibers by treating them with a heated solution of oxidized pickling liquor, unoxidized pickling liquor, brine and sulphuric or hydrochloric acid.

420,326.—Artificial stone composition. A. M. Blackmon.

Consists of salt, sand, alum, Portland cement, plaster of Paris, zinc chloride and boiled linseed oil.

420,371.—Method of burning cement making materials. J. M. Wilcox.

420,372.—Blue dye. O. M. Witt.

Is prepared by combining 1 molecule of the (so-called "Broenner's") betanaphthylamine, β-sulphonic acid with 1 molecule of β-naphthohydroquinone. The composition corresponds to the formula $C_{10}H_6$ (SO_3 Na)—N=N—$C_{10}H_5$ $(OH)_2$.

420,373.—Ammonium salt of β-naphthohydroquinone β-sulphonic acid. O. N. Witt.

Produced by submitting amido-naphthol-β-sulphonic acid to the successive action of oxidizing and reducing agents.

420,374.—Dark blue dye. O. N. Witt.

Results from the combination of 1 molecule of the so-called "Dahl's" α-naphthylaminedisulphonic acid with one molecule of β-naphtho-hydroquinone-β-sulphonic acid. The composition corresponds to the formula: $C_{10}H_5$ (SO_3 Na)—N=N—$C_{10}H_5$ $(OH)_2$.

420,394.—Process of making ozone water. C. F. W. Stelzer.

Hydrochloric acid or hydrochloric acid and a chloride in small quantity is added to ozone water to preserve its properties.

(Issued February 4th, 1890.)

420,428.—Process of filtering oil. C. F. Baker.

420,445.—Soluble nitrocellulose and process of manufacture. J. R. France.

Cotton is mechanically reduced to a uniform and homogeneous dust-like mass and subjected to the action of a bath of nitric and sulphuric acids.

420,446.—Insoluble nitrocellulose and preparing the same. J. R. France.

Cotton in a dust-like condition is subjected to the action of a bath of

nitric and sulphuric acids in the usual proportions and strength at a temperature of about 24° for about 15 minutes.

420,488.—Process of making soda alum. E. Augé.

A solution of sodium sulphate and aluminium sulphate is evaporated in vacuo at a temperature not exceeding 60°, and then cooled and crystallized.

420,515.—Apparatus for washing rubber stock. N. C. Mitchell and S. P. Sharples.

420,539.—Carbonizing steel. Charles Jones.

Ordinary steel is dipped into oil or grease, then into soot, and exposed to heat in contact with powdered carbon.

420,590.—Vulcanizer. C. A. Davis.

420,591.—Carbureter. W. Dawson.

420,598.—Alloy. E. Golay.

Consists of about 40 parts platinum, 35 parts copper, and 25 parts nickel.

420,615.—Compound for parchmentizing paper. Emery Andrews.

Consists of dilute sulphuric acid, hydrochloric acid, zinc and dextrin.

420,626.—Dynamite. Egbert Judson.

Consists of a base of nitrate or equivalent gas producing material, the grains and particles of which are protected by a paste, consisting of a cereal or leguminous powder combined with nitroglycerin.

420,642.—Solidifying colored fire. H. O. Frank.

Pyrotechnic powders are converted into solid form by adding a small quantity of alcohol to the powdered ingredients, and mixing the whole thoroughly together in a water bath at about 93° until the mass is in a soft pasty condition, and then while still warm pressing the mass into molds, previously coated with vaseline, or other analogous substance.

420,648.—Insulating compound. J. B. Williams.

Consists of India rubber, paraffin, a resinous body, sulphur, silica or its equivalent, and bituminous matter, which is solid when cold.

420,696.—Process of manufacturing transparent fabrics. L. L. Perry.

Consists in first passing bleached cloth or fabric through a size composed of starch, borax, water and lard, then drying the fabric, then passing it through a mixture composed of paraffin wax, dissolved in naphtha, boiled linseed oil mixed with benzine, linseed oil varnish mixed with turpentine and starch, and water, then drying, then moistening and subsequently calendering or glazing the fabric.

420,719.—Apparatus for subliming sulphur. C. Dubois.

420,749.—Evaporating apparatus. L. W. Tracy.

420,751.—Gas washer. W. T. Walker.

420,820.—Process of restoring rubber. N. C. Mitchell.

Rubber scraps are mixed with heavy oil and calcium sulphide, and subjected to the action of live steam.

420,821.—Apparatus for use in restoring rubber. N. C. Mitchell.

420,830.—Process of recovering glycerine from spent lyes. C. L. Porter.

The process consists in first treating the soap liquid with sulphuric acid, next passing superheated steam directly through the liquid, next adding lead oxide, then cooling and separating from the separated salts, then again passing steam through the liquid over direct fire, next adding charcoal or other carbonaceous matter, then adding lime, and finally, completing the process by separating the lye from the glycerine.

420,835.—Apparatus for recovering alkali. Geo. Seiler.

420,837.—Process of making chlorine. E. Solvay.

A mixture of a calcined silicious clay-like material and a chloride is filled into a decomposing apparatus. Then gas or combustible dust is introduced midway into the decomposing apparatus, producing combustion in the apparatus, and finally a current of air is introduced into the lower part of the apparatus.

420,877.—Apparatus for dyeing. W. D. Jones. W. R.