

ABSTRACTS.

ANALYTICAL CHEMISTRY.

Separation of Barium from Strontium. R. FRESSENIUS.

A continuation of the papers on the above subject published in the *Ztschr. anal. Chem.*, 29, 20-28, 143-160.

In addition to the methods there reported, the separation was attempted by precipitation as chromates and found to succeed admirably under conditions as given below :

The solubility of $Ba CrO_4$ was found to be in

.75%	ammon. acetate solution	1 pt. in	49381
1.5%	“ “ “	1 pt. in	23555
.5%	“ nitrate “	1 pt. in	45162

showing that ammonium salts do not greatly increase the solubility of barium chromate.

Strontium chromate was found to require 831.8 parts of water for solution, or in solutions containing

.5% ammon. chloride, 1 pt. in 512

.1% acetic acid, 1 pt. in 63.7

.75% am. acetate, 4 drops acetic acid and 6 drops chromate solution, 1 pt. in 348.8.

For carrying out the method of separation the following solutions were used :

1. Solution of ammon. chromate containing 0.1grm am. chromate, pure (prepared from pure am. bichromate, neutralized with sufficient ammonia to leave the solution just slightly acid).

2. Ammon. acetate 0.31g per c.c.

3. Acetic acid of 1.065 Sp. Gr.

4. Nitric acid of 1.20 Sp. Gr.

The mixture for separation contained the equivalent of 0.2774 g Ba and 0.4864g Sr. in the form of chlorides. The solution was

diluted to 300 c.c. and 6 drops of acetic acid added ; the solution then heated and while hot precipitated with 10 c.c (or an excess) of am. chromate. After one hour the precipitate was washed by decantation with water containing am. chromate until the filtrate gave no precipitate with ammonia and am. carbonate solution. 100 c.c. water were used in washing. The precipitate was then washed with pure water (110 c.c.) until the washings gave but a faint brownish red color with Ag NO_3 solution. The precipitate was next removed to a capsule. Portions remaining on the filter through which the liquid was decanted were dissolved in a little nitric acid and washed into the capsule containing the bulk of the precipitate ; a little more nitric acid was added (2 c.c. used in all) so as to completely dissolve the precipitate upon warming. The solution was then diluted to 200 c.c., heated 5 c.c., am. acetate sol. was gradually added, and then am. chromate solution (10 c.c. required) until the smell of acetic acid disappeared. After one hour the liquid was poured through a filter, (ac filter) hot water was added to the precipitate and, after cooling, the liquid was decanted, the precipitate transferred to the filter and the washing with cold water was continued until the washings no longer reacted with AgNO_3 solution. The precipitate thus obtained, after gentle ignition, showed a yield of 99.78% of the barium taken. The precipitate was free from strontium. The various filtrates and washings containing the strontium were collected, 1 c.c. of nitric acid was added, the liquid was concentrated, and then precipitated hot with ammonia and am. carbonate. The precipitated carbonate, after washing, was dissolved in hydrochloric acid, alcohol was added and the strontium was precipitated by sulphuric acid. The strontium thus recovered indicated 100.25%, showing that the separation under the above conditions was perfectly practicable. The author summarizes the results of his investigation as follows :

1. Barium chromate is insoluble in water containing acetic acid when so much am. chromate is present that the solution contains only am. acetate and bichromate.
2. Barium chromate dried at 110°C is not dry, but still contains about 0.5% of water.
3. Gentle ignition does not decompose Ba CrO_4 .

4. Estimation of barium by precipitation with am. chromate gives satisfactory results. (The conclusions of 1, 3 and 4 verify those of *Schweitzer*.)

5. A complete and satisfactory separation of barium from strontium is possible by double precipitation as chromates under the above conditions. (*Ztschr. anal. Chem.*, **29**, 413-430.)

J. F. G.

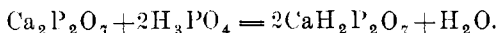
Estimation of Water in Superphosphates. JULIUS STOK-LASA.

The author obtained some very interesting results in drying superphosphates. In determining the influence of temperature upon mono-calcium phosphate a pure crystalline salt of the following composition was used :

CaO	22.36%
P ₂ O ₅	56.67%
H ₂ O	21.53%
Free P ₂ O ₅	0.014%

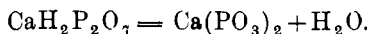
Upon drying at 100° C. this salt lost 1.83%, 2.46%, 5.21%, 6.32%, 6.43% of water respectively in 10, 20, 30, 40, 50 hours. The loss of 6.43% remained constant and is equivalent to one molecule of water. CaH₄(PO₄)₂ therefore loses all of its water of crystallization only after 40 hours drying if dried at 100° C., resulting in opaque, non-hygroscopic crystals, which dissolve slowly in 200 parts of water without decomposition.

The temperature may reach 105° C. without causing any further material change in the crystals, but if continued for 20 hours decomposition sets in. At higher temperatures, up to 200° C., decomposition is very rapid, resulting in the formation in part of free phosphoric acid, mono-calcium pyrophosphate, pyro-, and meta-phosphate. Drying at 200° for 1 hour results only in mixtures of the above compounds. At high temperatures the free P₂O₅ probably reacts upon the normal calcium pyrophosphate and forms mono-calcium pyrophosphate.

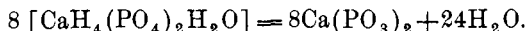


The height of the temperature and the length of time of drying at 150° C. or over, influences greatly the formation of monocal-

cium pyrophosphate. The latter salt when dried at 210° C. loses 1 molecule of water and is completely changed to calcium metaphosphate.



If the drying of monocalcium phosphate is conducted at 210° C. all the various changes may be summarized in the formation of calcium metaphosphate as follows :



(*Ztschr. anal. Chem.*, **29**, 390-397.)

J. F. G.

Water Analysis. By DR. DICKMAN.

The author, having found diphenylamin in a water contaminated with the waste waters from gas works, suggests the test for diphenylamin as a supplementary reaction for ascertaining such pollution. If diphenylamin is present, the residue of such a water will give the characteristic blue color with dilute sulphuric acid, the nitrates in the water being sufficient (?) to bring out the reaction. (*Ztschr. anal. Chem.*, **29**, 398.)

J. F. G.

Rise of Freezing Point in Thermometers. By F. ALIHN.

The author, in testing quicksilver thermometers made of glass from Jena and Thüringen, found that the scale of the former was less subject to change than the latter, and recommends that to prevent the rising of the freezing point, the glass, before fixing the scale, be heated to 300° C. for thirty hours. (*Ztschr. anal. Chem.*, **29**, 381-290.)

J. F. G.

Adulteration of Thomas Slag. By L. BLUM.

The direct admixture of foreign phosphate is difficult to detect, but inasmuch as the phosphates which can be profitably used for the purpose are usually very rich in CaCO_3 , any Thomas slag which will yield a very notable quantity of CO_2 should be looked upon with suspicion. Thomas slag may absorb CO_2 on account of

the full CaO contained in the same, but the quantity thus absorbed is not likely to exceed 2.5%. A dry Thomas slag which, upon ignition, loses over 2% in weight, should be examined as to the per cent. of CO₂. (*Ztschr. anal. Chem.*, **29**, 408-411.)

J. F. G.

Determination of Bile Constituents in Urine. ADOLF JOLLES.

Urines before and after dilution were subjected to the tests of Gmelin, Huppert, Vitali, Rosenbach, Ultzman, Hoppe-Seyler, Dragendorff, and to the process of extracting the urine with chloroform and subjecting the chloroform solution to the action of nitric acid or bromine water by which the color rings are developed. Of these the two following methods were found to be the most satisfactory :

Rosenbach's test was modified somewhat by passing a large quantity of urine through a pure white filter paper, then dropping upon the inner surface of the paper a drop of nitric acid containing a little nitrous acid, after which the funnel holding the paper was gently warmed by passing it over a Bunsen's flame 3 or 4 times. The gentle heating makes the test more delicate, so that mere traces of bile pigments are indicated by the appearance of a bright green ring around the drop of nitric acid.

The delicacy of Huppert's test was found to depend much upon the concentration of the "lime water." A solution containing 10.g CaO per litre is the most suitable.

Take 8 to 10 c.c. urine, add an equal volume of the lime water, shake the mixture and filter. Wash the precipitate into a small beaker with alcohol and dilute hydrochloric acid, filter and boil the filtrate. If bile pigments are present the filtrate will turn green to blue. For determining approximately the relative quantity of bile constituents excreted the iodine number is suggested.

The iodine number is calculated from the formula $I = \frac{g}{s-1} \cdot 4.292$, in

which g = grms. of I, which 10 c.c. urine absorb and s the sp. gr. of the urine. Urine free from bile constituents was found to require not over 7.3 to 7.8 of I, while in specimens containing bile

constituents the iodine numbers varied from 6.5 to 17.4, the iodine number increasing proportionately with the quantity of bile constituents. (*Ztschr. anal. Chem.*, **29**, 402-406.)

J. F. G.

A New Test for Albumen. ADOLF JOLLES.

Mix 8 to 10 c. c. of urine with an equal volume of concentrated hydrochloric acid; then carefully add two or three drops of a saturated solution of "chloride of lime," so that it will form a supernatant layer. If the urine contains albumen, a white turbidity will appear at the junction of the two layers. The test will clearly show the presence of $\frac{1}{1000}\%$ of albumen, and although it is less sensitive than the nitric acid test (it will indicate 0.00015 grm. albumen in 100 c. c.), the two together are very useful for clinical purposes. Thus if the "chloride of lime" test fails to indicate albumen while the nitric test does, then it is safe to assume that the urine contains less than $\frac{1}{1000}\%$ albumen. If both tests should indicate albumen, the urine may be diluted to some definite volume, until the "chloride of lime" test just fails to indicate albumen. By making the necessary calculation for the change of volume, the quantity of albumen may be approximately determined. (*Ztschr. anal. Chem.*, **29**, 407.)

J. F. G.

Determination Albumen in Bacterial Urine. ADOLF JOLLES.

For indicating mere traces of albumen the K_4FeCy_6 test is the most delicate, as it will detect even 0.0008 grm. albumen in 100 c. c. of urine. The urine must be filtered perfectly clear. Acetic acid and K_4FeCy_6 solution are then added, and any turbidity noted. Urine containing bacteria should be shaken with kieselguhr* (infusorial earth), after which the urine will filter clear. (*Ztschr. anal. Chem.*, **29**, 407.)

J. F. G.

* Finely divided asbestos fibre, ground to a pulp, will answer the purpose equally well.

J. F. G.

Abstracts of American Patents Relating to Chemistry.

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

(Issued September 30, 1890.)

437,192.—Absorber for refrigerative apparatus. P. R. Gray, Jr.

437,193.—Still. P. R. Gray, Jr.

437,252.—Sulphur candle. C. H. Shaw.

Consists of a block of sulphur provided with a wick.

437,258.—Composition for lining barrels. M. E. Spofford.

Consists of wood ash lye, essential oil and resin, glue, molasses and starch.

437,265.—Process of manufacturing copper. H. H. Vivian.

The copper-containing material is treated with an organic acid, and then reduced to the metallic state.

437,295.—Mordant. E. O. Frankhauser.

Consists of castor oil, sulphuric acid, soda lye, ammonia, white soap and sumach.

437,306.—Process of etching on lithographic stones or zinc. F. Kraupa and L. Moser.

The stone or plate bearing the design is sprinkled with finely powdered rosin, then rubbed with talc, and then covered first with a sheet of paper saturated with alcohol and then with a layer of damp paper. The rosin forms a crust which resists the action of the etching fluids.

437,315.—Apparatus for producing gas from hydrocarbon oil. J. McKay.

437,356.—Process of testing liquids. T. Clement.

437,421.—Apparatus for refining oil. C. Dorn and J. Carey.

437,433.—Water filter. H. Hegner and J. M. Skinner.

437,443.—Filter. E. Mertz.

437,448.—Apparatus for making soap. M. J. Palmer.

437,454.—Carburetor. D. D. Ranney.

437,499.—Explosive compound. D. Mindeleff.

Consists of nitroglycerine, and alcohol, and a soluble explosive.

437,525.—Artificial building stone. A. von Solemacher-Antweiler.

100 parts silica, 5 parts fluor spar, 5 parts feldspar, 20 parts soda, 5 parts tin ash, 5 parts alum earth, 5 parts red lead, 2.5 parts talc, and 2.5 parts

cryolite ore melted together in a regenerative glass melting furnace, at a temperature of 1500-2000°, and cast.

437,588.—Ink. W. G. Fuerth.

Consists of vaseline, linseed oil, and coloring matter.

437,611.—Gas retort furnace. K. M. Mitchell.

437,638.—Indigo solution. A. Ashworth.

A solution for reducing indigo is prepared by saturating a solution of sodium bisulphite with metal filings, separating the liquor, adding sodium sulphide till the formation of a precipitate ceases, filtering and adding caustic soda.

437,659.—Apparatus for refining oil. E. Noppel.

(Issued October 7, 1890.)

437,701.—Process of manufacturing lead pigments. G. T. Lewis.

Sublimed lead pigments containing zinc are purified by washing with water containing sulphuric or sulphurous acid.

437,780.—Printing or stamping ink. C. M. Higgins.

Consists of a solution of a coloring matter in oleic acid.

437,793.—Process of hardening steel. B. M. Pickett.

The process consists in heating steel to a red heat and then plunging it into a bath composed of a diluent and a base containing a calcined oxide or carbonate, or both of a metal of the "iron group," together with a combustible organic substance which is soluble in water, such as glucose.

437,794.—Process of and composition for tempering. B. M. Pickett.

437,795.—Composition of fluids for tempering steel. B. M. Pickett.

437,902.—Shavings for vinegar generators and for clarifying beer. R. H. Herder.

437,989.—Greenish blue dye. A. Herrmann.

The sulphonic acid of methylated and ethylated meta-amidotetraalkyl-diamidotriphenyl carbinol.

438,013.—Process of and apparatus for the manufacture of gas. B. Loomis.

438,053.—Violet dye. H. Boedeker.

Is obtained by the action of sulphuric acid upon ortho- or para-ditolyl-rhodamine, produced by the action of fluoresceine chloride upon ortho- or para-toluidine. It has the characteristic properties that in form of its free acid it dissolves easily in hot alcohol, with difficulty in hot water, and with great difficulty in cold water. With alkalis it forms salts soluble in water. It dyes silk and wool violet.

438,071.—Apparatus for making gas from oil and steam. E. R. Ellsworth.

438,117.—Method of purifying lead or alloys thereof. W. Shapleigh.

The molten metal or alloy is mixed with sodium or potassium or an alloy

of these metals in sufficient quantity to deoxidize the mass, whereby the oxygen is removed and a film or coating of caustic alkali is formed, which serves to protect the surface of the molten metal.

(Issued October 14th, 1890.)

438,149.—Carboys for Acids. J. W. Fox.

438,213.—Gas Generating Apparatus. W. S. Wright.

438,266.—Vacuum Evaporating Apparatus. H. S. Firman.

438,333.—Process of Obtaining Meat Extracts. J. Van Ruymbeke.

438,438.—Manufacture of Dye Stuffs. R. Lanch and C. Krekeler.

Is produced by the combination of the diazo compound of amido-salicylic acid with alphanaphthylamine, again diazotizing the amido-azo compound obtained and recombining the diazo compound obtained with alphanaphthol-sulpho acid. It forms a blue black paste and in the dry state a blue black powder, is difficultly soluble in cold water, easily in hot water with a blue violet color, which color changes to green blue on addition of soda lye. It is precipitated from its aqueous solution by mineral acids.

438,595.—Rubber Compound. W. H. Allen.

Consists of rubber, sulphur and lithargite (pulverized calcined magnesium silicate.)

(Issued October 31st, 1890.)

438,621.—Paint. W. A. Hall.

Consists of hydrous magnesium silicate, dextrin, calcined plaster, powdered alum, and salt, combined with hot water, and suitable pigments.

438,648.—Manufacture of Fertilizers. P. B. Rose.

Stick or other albuminoid is evaporated to dryness with an insoluble compound of iron.

438,715.—Process of eliminating graphitic carbon from cast iron. J. B. Renshaw.

Vegetable fibre mixed with pulverized ferric oxide is added to the iron to be melted.

438,772.—Apparatus for recovering alkali. H. Burgess.

438,816.—Manufacture of explosives. C. O. Lundholm and J. Sayers.

A process for incorporating together cellulose nitro derivatives and nitroglycerin, consisting in suspending the ingredients in a liquid or water, which is incapable of dissolving them, agitating them together in the liquid, and subsequently separating the liquid.

438,993.—Extract of tobacco. H. Endemann.

A sheep wash produced from tobacco by extraction with acidulated water, and from which the phosphates of the alkaline earths have been removed by precipitation with an alkaline substance.

(Issued October 28th, 1890.)

439,137.—Process of Vulcanizing Rubber. F. G. Fowler.

439,144.—Curing Meats. J. H. Greenstreet.

Fresh meat is treated with a solution of soda, before being salted in the ordinary manner.

439,150.—Process of Manufacturing Anti-corrosive Compounds. P. Helbig and H. Bertling.

Molten lead is repeatedly poured into cotton seed oil, until the oil has absorbed the desired quantity of lead.

439,267.—Baking Powder or Preparation. C. A. Catlin.

Contains a salt of a fatty acid of an inorganic base as a diluent.

439,318.—Dry Extract of Coffee and Mode of Preparing the Same. H. Barotte.

The process consists in first subjecting the coffee to dry distillation, then making an aqueous infusion from the residue, then evaporating the said infusion and drying the resulting extract, then adding to the product thus obtained the liquid distillate, and finally drying the compound.

439,330.—Process of and Apparatus for Decomposing Bicarbonate of Soda. L. A. Staub.

439,394.—Artificial Fuel. H. K. Flagler.

Consists of hydrocarbon oil, sodium nitrate, sal-niter, salt and water.

439,455.—Apparatus for the manufacture of Gas. H. White.

439,461.—Apparatus for Generating Illuminating Water Gas. J. D. Averell.

439,515.—Process of Refining Fat Oils. R. Hunt.

440,288.—Brown dye. J. Walter.

The brown coloring matter which is easily soluble in water, difficultly soluble in spirit, a little better in methyl alcohol, insoluble in benzine and ether, soluble in concentrated sulphuric acid with magenta red color; obtained by combination of metadiamines with two diazo compounds, of which one is diazotized polychromine and the other one of the diazo compounds of naphthylamine or amidoazo benzol, or amidoazotolnol.

440,314.—Process of preparing granulated cleaning material. F. W. Kistennacher.

Sawdust is caused to take up a sufficient quantity of a volatile solvent.

440,359.—Blue dye. C. A. Mayer.

Violet coloring matters are produced by the action of nitroso derivatives of the tertiary amines on the products of condensation of tannin or its specified equivalent with the primary amines.

440,391.—Insulating composition. F. E. Blaisdell.

Consists of asbestos, clay, and a flux, as feldspar and borax.

440,414.—Process of dyeing. F. Zenian.

The method of silk dyeing, consisting in first washing the same, then

subjecting it to a dyeing bath, next drying it, then steaming it, and subjecting it to the vapor of acetic acid, next subjecting the material to a bath of sodium silicate, then subjecting it to a hot bath of sumach, log-wood, and soap, until the desired color is obtained, and finally washing.

440,456.—Apparatus for the manufacture of gas. A. L. Allen.

440,464.—Apparatus for brewing beer. M. Byrne.

440,486.—Carburetor. J. Love.

440,528.—Process of and apparatus for preserving food. C. L. Bachelierie.

Alimentary substances are treated in a closed vessel with a mixture of gaseous or finely divided hydrochloric acid and carbonic acid.

440,536.—Blue dye. R. Bohn.

The blue dye which is in the form of paste, appears to be of a dirty greenish color; when dry it can be obtained as a crystalline powder of dark color possessing a metallic lustre, the color of which may vary from violet to green; the color of the body as shown by its streak on rubbing is blue; it is but very slightly soluble in cold water, but is readily soluble in dilute alkalis, giving beautiful blue solutions; it is practically insoluble in benzine and ether, but soluble in alcohol, and the alcoholic solution is most characteristic, being reddish violet in color, and marked by a striking reddish fluorescence,

440,539.—Process of preparing iron ore for filters. F. Candy.

(Issued November 4, 1890.)

439,639.—Treating residues of distillation. E. M. Cook.

439,645.—Water filter. W. T. Floyd.

439,717.—Process of making lactose or milk sugar. A. A. Bennett and C. S. Boynton.

The process consists in first treating whey with calcium hydroxide or carbonate, etc., for the purpose of neutralizing the natural acid contained therein, next heating the whey and separating it from the precipitate formed by the heat, then evaporating to the consistency of syrup and treating it in this condition with alum and soda, etc., in solution, for the complete separation of the nitrogenous impurities, and finally filtering and evaporating.

439,733.—Process of treating sublimed lead. C. V. Petraens.

Sublimed lead pigment is treated with water or an aqueous solution of sodium chloride and dried.

439,745.—Apparatus for distilling oils. E. A. Edwards.

439,756.—Compound for preventing incrustation in boilers. W. Blackburn.

Consists of hydrocarbon oil, starch and rice.

439,796.—Insulating composition. T. D. Bottome.

Consists of a solution of orthosilicic acid and silicon dioxide.

439,805.—Process of obtaining cream of tartar. A. Martignier.

Consists in treating lyes, argols, tartar, etc. with potassium or sodium sulphate, or a mixture of the two, separating the residuum from the liquid and then precipitating from the latter the cream of tartar by the aid of sulphuric acid.

439,834.—Preparing pressed yeast. E. Brunn.

439,880.—Process of making bags acid proof. J. A. Lighthall.

Dry pulverized acid proof material in sufficient quantity to cover the interior surface of the bag is introduced into the bag, after which it is sufficiently compressed to force a portion of the acid proof material into the interstics of the fabric of which the bag is made.

439,953.—Process of producing azo colors on cotton or other vegetable fiber. R. Holliday.

The fiber is subjected to a mixture composed of oil, a phenol and an alkali, and dried. The dried fibre is then subjected to the action of an azo compound.

439,970.—Manufacture of parchmented fiber. H. W. Morrow.

439,980.—Vinegar apparatus. P. Spink.

440,004.—Apparatus for the manufacture of gas. H. Burgess,

440,066.—Composition of matter. C. C. Shiber.

Consists of rosin, borax, sand, cement, lime, plaster, hair, marble dust and salt.

(Issued November 11th, 1890.)

440,124.—Apparatus for recovering soda. L. D. Armstrong.

440,139.—Process of manufacturing and tempering steel. M. T. Coomes and A. W. Hyde.

The metal raised to a white heat is plunged into a bath composed of water, sugar, sodium chloride and ammonium chloride.

440,143.—Process of separating gold and platinum from other metals in solution. E. Dodé.

The process consists in subjecting the entire acid solution in the presence of ether to agitation until the ether becomes yellow, in then decanting the remaining solution from the yellow ether, in then subjecting the remaining solution to agitation in the presence of lavender until the essential oil becomes brown, and in the decanting from the brown essential oil the remaining solution and adding thereto ammonia.

440,162.—Chemical feeder for filters. O. H. Jewell and W. M. Jewell.

440,173.—Battery zinc. A. J. Macdonald.

An amalgam of mercury and ammonium is added to heated mercury, and the mercury hardened by addition of zinc. A portion of this alloy is added to the melted zinc from which battery zincs are cast. Finally some magnesium is added,

440,232.—Manufacture of pigments. J. C. Martin.

A combination of oxide or sulphide of zinc, hydrated calcium oxide, and a sulphate of an alkaline earth.

440,239.—Filtering apparatus. M. Cole.

440,257.—Preservative. L. Benussi and C. Dondero.

Consists of water, albumen or gelatin, potassium sulphate, sodium chloride, boric acid or sodium baborate, sodium phosphate, iron phosphate, and calcium phosphate.

440,262.—Apparatus for drying starch refuse, etc. P. H. Grimm.

440,281.—Yellow dye. C. Ris.

Obtained by treating the diazo-compound of polychromine with ammonia. It forms a light brown powder, easily soluble in water, slightly soluble in common spirits, more readily soluble in methyl alcohol, scarcely soluble in concentrated acetic acid, and insoluble in benzol and ether.

W. R.