ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

A Redetermination of the Atomic Weight of Cerium.

H. Robinson.

The material used was a crude, yellow cerium sulphate obtained from Schuchardt, and contained much Di, together with La and other metals. Cerium was separated as basic sulphate, then converted into nitrate and peroxidized by Gibb's process (treatment with nitric acid and lead peroxide), washed, as basic nitrate, with dilute nitric acid, until it no longer yielded bands of Di in the spectroscope, and converted into chloride and finally into oxalate. The oxalate thus obtained, was heated in a current of HCl gas until completely converted into chloride, and this was finally titrated with standard solution of pure silver prepared by the method of Stas. The at. wt. of Ce thus obtained as the average of 7 determinations, after making necessary corrections, was 139.9035 ($H = 1$) or 140.2593 ($O = 16$). The ratios for at. wts. of H, O, Ag and Cl employed, were those of Stas.

Incidentally, it was found during the work that Ce may be quickly separated from Di and La, by evaporating the solution of the mixed nitrates to dryness, igniting over a naked flame until brown color disappears, and treating with boiling, dilute nitric acid, which leaves cerium undissolved as basic nitrate while Di and La go into solution. (*Chem. News, L. 251.*) A. A. B.

On Arsenotungstic Acid. By M. Fremery.

Tungstate of barium, Ba, WO_4, was suspended in an aqueous solution of arsenic acid and decomposed with the theoretical amount of H_2SO_4, by a prolonged digestion on the water bath. The golden-yellow solution so obtained was concentrated in vacuo, and deposited the sulphate in the form of six-sided plates. These crystals are quite stable, and do not lose water of crystallization even over strong H_2SO_4. The specific gravity of the saturated solution at 16° C. is 3.279.

The composition of the ammonium salt is:

WO_3	86.77	= 19.04
A_2O_5	4.52	= 1.
$(NH_4)_2O$	3.08	= 3.02
H_2O	6.35	= 17.96
	100.72	

(*Ber d. chem. Gesell, 296, 1884.*) J. H. S., jr.

On Solid Carbonic Acid. By H. Landolt.

The author recommends the use of crystallized carbonic acid for lecture experiments, etc. He prepares it in the form of small cylinders, and claims that in this form it may be kept for a long time exposed to the air. (*Ber. d. chem. Gesell, 309, 1884.*)

J. H. S., jr.

On the Hydrates of Cobaltous Chloride, and the Cause of the Difference in Color of this Salt. By A. Potilitzine.

The change of color which this salt undergoes on being heated is due, according to the author's experiments, to a loss of crystal water, and not, as Bersh supposed, to the formation of an isomeric, twice hydrated cobaltous chloride. (*Ber. d. Chem. Gesell, 276, 1884.*) J. H. S., jr.

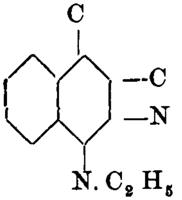
ORGANIC CHEMISTRY.

Behavior of Pyrotartaric Acid with Bromine. C. BÖTTINGER. (*Ber. d. chem. Gesell, p. 317, '84.*) J. H. S., JR.

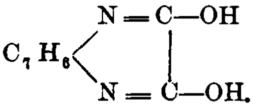
On Chinoxaline. O. HINSBERG.

Bases similar to the chinolines, which instead of containing the pyridine ring, contain one composed of 4C and 2N atoms, have, up to the present time, only been prepared from cinnamic acid derivatives. Among these compounds belongs E. Fisher's ethylchinazole (I.).

I.

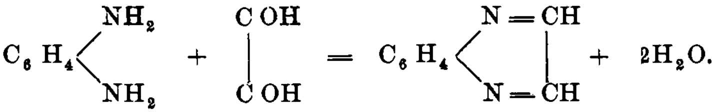


II.



Closely allied to this is one produced by v. Richter, from diazopropiolic acid, which he called oxycinnoline. Quite different from these, but allied to chinoline, is the condensation product which the author obtained from oxalic and m-p-toluylendiamine (II.).

It was hoped, by reducing this, to obtain a base free from oxygen. This, however, did not succeed. A new synthesis for producing this base was, however, discovered. It was found that these bodies are formed very easily by the action of aromatic diamines on glyoxal.



$$C_6H_4\left\langle\begin{array}{l}NH_2\\NH_2\end{array}\right. + \begin{array}{l}COH\\ \vert\\COH\end{array} = C_6H_4\left\langle\begin{array}{l}N=CH\\ \quad\ \ \vert\\N=CH\end{array}\right. + 2H_2O.$$

The derivatives of glyoxal also work very well, in fact all diketones which contain the group —CO—CO— seem to produce the same result. Theoretical acids which have the carboxyl, and carbonyl adjacent to one another, combine likewise with orthodiamines, to form monooxychinoxalines. Chinoxaline was obtained as a light yellow oil, boiling at 220–223° C. On cooling, it crystallized to a mass of white crystals, M. P. 27° C. It is easily soluble in alcohol, ether, benzol and water. It forms salts with acids, which are nearly all very soluble in water. The oxalate is however, only sparingly soluble. (*Ber. d. chem. Gesell, 318, 1884.*) J. H. S., Jr.

Absorption Spectra of the Alkaloids. By W. N. Hartley.

An attempt to substitute physical measurements for the chemical and physiological tests now used to detect the alkaloids in medico-legal examinations. The substances were dissolved in diactinic solvents, generally alcohol, and measurements were made upon the photographed spectra taken by the light of an electric spark, from electrodes made of alloys of lead or tin with cadmium, concentrated upon the slit by a lens of quartz. The absorption spectra afford a ready means of ascertaining the purity of the specimens of the alkaloids, and practically of establishing their identity. In some cases quantitative estimations are possible. (*Chem. News, L. 287.*) A. A. B.

Nitrating under Various Conditions. By E. Nölting and A. Collin.

In nitrating mono-substitution products of benzole, in which the position 1 is occupied by a basic group (NH_2), a neutral group (CH_3), the halogens, or a slightly acid group (OH), para-nitro and ortho-nitro compounds are formed, although the former predominate. The formation of meta-nitro- compounds, under these conditions, was rarely observed.

If, on the contrary, group 1 is an acid (NO_2, COOH, SO_3H, CN, COH, etc.), then meta-nitro- compounds are formed.

If the basic properties of the NH_2 group are neutralized, either by replacing one of its hydrogen atoms by an acid group, or combining it with a strong acid, as sulphuric acid, there are formed, according to Hübner, Frerichs, and Mears, besides ortho- and para-compounds, also meta- compounds.

The authors find that by nitrating in the presence of much sulphuric acid, that meta-nitro- derivatives may be formed exclusively. They also describe several ways of producing the para-nitro- compounds, which give very good results. Thus, for instance, to produce large quantities of para-nitro-acetanilide, one kilo. acetanilide is dissolved in 4 kilos. 66° B. sulphuric acid, and into this mixture is then poured (1 mol.) 590 grm. HNO_3 of 1.478 Sp. Gr., or an equivalent amount of an acid of 1.4 Sp. Gr., which has been diluted with H_2SO_4 of 66°. During the whole operation the mixture must be cooled with salt and ice. (*Ber. d. chem. Gesell, 251, 1884.*)

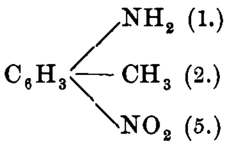
J. H. S., jr.

On Nitroorthotoluidine (M. P. 107°) and a few of its Derivatives.

By E. Nölting and A. Collin.

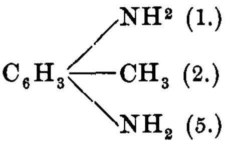
By nitrating orthotoluidine in 10 pts. of sulphuric acid, a new nitroorthotoluidine (I.) is formed, having 107° as melting point. On reduction with tin and hydrochloric acid it forms meta-toluylen diamine (II.), melting at 98–99° C.

I.



$$C_6H_3\begin{cases} NH_2 \ (1.) \\ CH_3 \ (2.) \\ NO_2 \ (5.) \end{cases}$$

II.



$$C_6H_3\begin{cases} NH^2 \ (1.) \\ CH_3 \ (2.) \\ NH_2 \ (5.) \end{cases}$$

The nitroorthotoluidine crystallizes in monosymmetrical prisms, and at times in fine large crystals of a light yellow color. It is soluble in ether, alcohol, and acetone, but only sparingly soluble in water. It crystallizes best from ether, to which alcohol is added till a faint cloudiness appears. It tastes sweet. It is a weak base, combining with acids to form well characterised salts.

Nitroorthokresole, bromnitrokresole, amidokresole, and a coloring matter from metaamidokresole were then described. (*Ber. d. chem. Gesell, 268. 1884.*) J. H. S., jr.

ANALYTICAL CHEMISTRY.

Magnesium Hydrosulphide and its Use in Chemico-legal cases as a source of Hydrogen Sulphide. By E. Divers and T. Shimidzu.

Magnesium hydrosulphide, first introduced into the arts as a means of regenerating the sulphur of soda waste, is found by the authors to be an efficient source of pure H_2S. The solution is prepared by passing H_2S into water containing, in suspension, $\frac{1}{10}$ of its weight of commercial calcined MgO. The solution, when made, contains about 16 per cent. of $Mg\ S_2H_2$, and possesses a sp. gr. of 1.118 at 12° C., and readily yields 10 per cent. of H_2S by weight. It is nearly colorless and yields H_2S abundantly by heating to 60° C. Exposed to the air, it evolves H_2S slowly, and oxidizes at the surface, soon forming, however, a protective film. After the solution is exhausted it may be saturated with H_2S as before. Incidentally, the authors note that pyrrhotite may be used as a source of H_2S under action of acids, its only objection being contamination by CO_2 from native carbonates which accompany it. (*J. Ch. Soc., CCLXV, 699.*) A. A. B.

Notes on Koettstorfer's Method of Butter Analysis. R. W. Moore.

Among a number of vegetable oils examined, only cocoanut oil was found closely to approach Koettstorfer's limit as to the alkali equivalent of genuine butter. Mixtures of oleomargarine and cocoa oil were made which came within this limit (221.5 — 232.4 mgs. KHO pr. grm. of butter). A mixture of 53.1% cocoa oil and 46.9% oleomargarine required 223.6mgs. KOH pr. grm. The oleomargarine used required 193.5 mgs. KOH pr. grm. Cocoa oil yielded, by Hehner's method, 86.43% insoluble fatty acids.

Cocoa oil has been used to adulterate lard and butter. In the former case it would be easily detected (1 grm. lard = 195.5 mg. KOH), but *deodorized* cocoa oil, if it could be obtained, might be used in preparations of artificial butter and could only be detected by the method of Reichert. (*Chem. News, L. 268.*) A. A. B.

Note on the Estimation of Iron by Potassium Permanganate in presence of HCl or Chlorides. J. Hood.

Magnesium sulphate is found to obviate the well-known difficulty presented here. No mention is made of the previous use of manganous sulphate by Zimmermann for the same purpose. (*Chem. News, L. 278.*) A. A. B.

The Estimation of Alkalies in Silicates. T. M. Chatard.

Hempel's method for decomposition of silicates, (fusion with bismuth subnitrate), is improved by substitution of bismuth oxide for nitrate. Oxide and mineral, both in fine powder, are heated gradually to full redness in a platinum crucible, and kept at that temperature for 10–15 minutes; complete fusion is not necessary nor desirable. Acid silicates are preferably mixed with an equal weight of calcium carbonate, in addition, to prevent fusion. The mass, when cool, is heated in the water bath with somewhat dilute HCl. It dissolves rapidly. If only alkalies are to be determined, add ammonia and ammonium carbonate, filter, and separate magnesia in usual way. Results very good. (*Chem. News, L. 279.*)

A. A. B.

INDUSTRIAL CHEMISTRY.

On Japanese Tea and Tobacco. T. Takayama.

A description of the method by which tea and tobacco are cured and prepared for use in Japan, with analyses of eight samples of tea, together with two analyses of tea ash from green and black teas, respectively, and four analyses of tobacco.

The total ash in the teas varies between 4.73 and 6.00; nitrogen, 3.87 to 5.37; extract, 37.00 to 45.21.

The ash of black tea is notably richer in P_2O_5 and K_2O and poorer in CaO and SiO_2 than that of green tea. Determinations of theine, tannin and gum are also given. The analyses of tobacco include determinations of nicotine, water and ash, together with oxalic, citric, malic, acetic and pectic acids. Nicotine in the four samples exists in the following proportions, per. ct., viz., 1.89, 2.45, 3.02, 3.92, and ash, 8.45, 9.80, 15.76, 20,71. Analyses of the ash of the four samples of tobacco are also given. (*Chem. News, L. 299.*)

A. A. B.

On Japanese Camphor Oil. H. Oishi.

A description of the industrial preparation of camphor in Japan, from the wood of *Laurus Camphora*, together with an account of an examination of the camphor oil, a by-product condensing with the camphor carried over by steam from the apparatus in which the wood is treated.

The oil is a colorless liquid when purified, having Sp. Gr. .895 at 15° C., yields common camphor by oxidation, and is easily attacked by chlorine or sulphuric acid. Specific rotary power, 68.96°. A large number of fractions were obtained by distillation, and examination of several of these indicate that the oil is a complicated mixture of hydrocarbons of the terpene series with various oxidized hydrocarbons. The industrial value of the oil is demonstrated by the readiness with which it dissolves resins and mixes with drying oils. The compositions of several varnishes, made experimentally, is given. A solution of aluminium palmitate in the oil may be used for waterproofing paper, and the oil yields, on combustion with limited access of air, a fine lamp black, at a cost, apparently, which will make this use of it commercially practicable. The oil is produced in large quantities and is used in Japan as a lighting material. (*Chem. News, L. 275.*) A. A. B.

American Patents Relating to Chemistry.

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

August 26th, 1884.

304,044.—Manufacture of alkaline salts.—S. G. Thomas.

Decomposes alkaline chlorides and produces alkaline silicates and other non-haloid alkaline salts and hydrates, together with chlorine and hydrochloric acid, by acting on common salt in a Bessemer converter or Siemens or puddling furnace by means of the silicon contained in molten pig-iron in presence of oxygen of the air, oxide of iron, or other oxygen-yielding body.

304,088.—Process of bleaching cotton fabrics.—J. H. Engeler.

Exposes them to the vapor of chloroform under pressure and then dechlorinates them by exposure to a mixture of hydrogen, carbonic acid, and sulphuric ether.

304,108.—Manufacture of glucose or grape sugar.—A. Kayser.

Consists in neutralizing the converted material by a soluble sulphuride, and then purifying the neutralized liquid by passing an air current through the same.

304,123.—Method of purifying hard water.—G. H. Nott.

Precipitates bicarbonates and carbonic acid by passing the whole of the water over lime and then filtering.

304,147.—Treating cotton seed to remove fibre.—T. Taylor.

Subjects the moistened fibres and hulls to the action of a spray of strong sulphuric acid.

304,260.—Process of obtaining ammonia from ammonium sulphate.—E. Carey, H. Gaskell, Jr., and F. Hurter.

Subjects ammonium sulphate in conjunction with sodium sulphate to an elevated temperature so as to obtain ammonia and sodium bisulphate.

304,263.—Cream-tester.—W. L. Edson.

September 2d, 1884.

304,303.—Applying natural gas to glass furnaces.—J. Dornan and C. N. Brady.

304,333.—Apparatus for recovering copperas.—J. Lyons.

Not intelligible without the specification.

304,341.—Purification of brine.—E. A. Mebus.

Heats it and adds an alkaline hydrate and carbonate.

304,360.—Composition for preserving meats.—J. Ross.

Chromic acid, nitrate of potassium and water.

304,361.—Explosive preparation made from gun cotton.—J. Schulhof.

Gun cotton impregnated with fat, compressed and coated with collodion.

304,446.—Compressing-pump for ammonia gas.—A. Osenbrück.

304,500.—Manufacture of solidified compound metals.—F. E. Canda.

A mixture or compound of two or more ground, pulverized, granulated or otherwise divided metals, or of two or more alloys, or of one or more metals with one or more alloys, solid at ordinary temperature, mixed in any desired proportion, such mixture or compound being in a loose form or condition.

304,607.—Apparatus for the emulsion of milk and fat by centrifugal force. —C. C. Burmeister.

304,644.—Apparatus for separating cream from milk.—W. Homer.

Not intelligible without the drawing.

304,735.—Apparatus for preserving beer.—J. F. Kausler.

Impregnates the air used for compressing with alcoholic vapor.

304,773.—Process of purifying iron and steel.—J. E. Atwood.

Infuses an amalgam of mercury and lead into either melted pig, cast, scrap or wrought iron or steel, or combinations thereof.

304,775.—Composition to be used as a substitute for hard india-rubber, celluloid, iron and the like.—S. Barbier and C. H. Coiffier.

Mixture of ivory waste or dust and horn agglomerated by means of albumen.

304,902.—Process of manufacturing paints.—R. M. Breinig.

Soap combined with a pigment dried and mixed with oil.

304,910.—Treatment of flax in the retting or steeping process.—R. H. Callyer.

Boils the flax straw in a saponaceous solution containing oxalate of ammonia, then washes and presses it.

304,911.—Fine and waterproof paint.—C. W. Colony.

Coal tar, pulverized stone or slate, salt, red or white lead, alum, Venetian red, asbestos, resin and linseed oil.

305,031.—Separation of zinc from galenas carrying silver and metallic oxides and sulphides.—P. B. Wilson.

Treats the ore with an acid to dissolve the zinc and to generate hydrogen sulphide, with the latter he precipitates, in another vessel, the dissolved lead and silver and then separates the zinc solution from the precipitates.

September 16th, 1884.

305,056.—Apparatus for distilling or reducing oils.—R. Dean.

305,057.—Process of dyeing hair.—C. A. C. de Barbaran.

An ammoniacal solution of nickel and pyrogallic acid.

305,097.—Apparatus for treating refuse from oil refineries.—H. McManus.

305,123.—Compound for axle-bearings.—I. P. Wendell.

Silicate of soda, asbestos, sulphur and a lubricant.

305,155.—Dye-vat.—J. P. Delahunty.

305,174.—Composition for rendering wood, &c., incombustible.—L. Gimenez and J. Trigoyen.

Infusion of bark of the holly, salt, zinc sulphate, ammonium chloride, alum and fish glue or isinglass.

305,180.—Method of dividing and distilling crude petroleum.—H. Halvorson.

Divides crude petroleum into two parts, designated primary and secondary oils, which process consists in mixing together crude petroleum and benzine, and volatilizing the latter, whereby it is caused to carry over with it the primary oil, leaving the secondary oil behind. The secondary oil is then subjected to fractional distillation, after adding a small quantity of sulphuric acid.

305,181.—Mode of preparing lubricating oils obtained from petroleum.—H. Halvorson.

The "primary oil" mentioned above is mixed with amylic alcohol; ethylic alcohol is added to the mixture until opalescence takes place, whereupon the mixture of alcohol and lighter petroleum constituents are removed.

305,182.—Apparatus for distributing crude petroleum.—H. Halvorson.

305,184.—Substitute for caoutchouc.—J. J. Haug.

Boils skins and glycerine under pressure, mixes the mass so obtained with glycerine and chromate of potash or other suitable salt, acted upon by light, with or without the addition of ground cork, ox gall and color.

305,192.—Solution for refining copper and separating gold, &c., from copper.—J. S. Howard.

A solution for the decomposition of copper and copper or other ores, consisting of potassium, bisulphate, hydrofluoric acid, sulphuric acid, sodium nitrate, and water.

The bath containing the above solution yields an electric current which may be employed in a plating bath.

305,201.—Manufacture of Portland cement.—R. W. Leslie.

Combines lime or lime and magnesia with slate, calcines the compound to a clinker and subsequently grinds it.

305,224.—Apparatus for the extraction of oils and fatty matters from animal, vegetable and mineral substances.—N. A. Pratt and G. W. Benson.

Consists in extracting by means of percolation and diffusion of chemical solvents in or through the mass while the same is under mechanical pressure.

305,249.—Method of treating phosphates for fertilizers.—T. B. Stillman and A. H. Koefoed.

Rocks containing insoluble phosphates are mixed with dolomite or limestone and roasted, and the pulverized mixture is subsequently treated with a mineral acid and water.

305,312.—Process of dyeing black.—D. Jamieson.

For cotton, linen jute or silk, whereby fast colors are secured in black, drab, or slate shades, consisting of the separate and successive steps of dyeing in indigo blue and in a solution of cutch or gambier, the two latter separately or combined, the solution having cupric sulphate mixed therein, followed by passing the goods so treated through a solution of potassium chromate.

305,329.—Apparatus for distilling low wines.—N. Peterson and H. Sommer, Jr.

305.336.—Incrustation preventative.—A. A. Rosenberg.

Consists of a mixture of raw potatoes, sweet peeled chestnuts, and common washed or soaked peas.

305.389.—Process of making chrome-red.—C. E. Hore.

Consists in mixing "sublimed lead" with a solution of potassium bichromate and an alkali, boiling the mixture, and finally separating the insoluble pigment from the soluble product.

305,390.—Process of making lemon-chrome.—C. E. Hore.

Consists in mixing "sublimed lead" with nitric acid, then adding thereto potassium chromate, stirring the mass and finally separating the insoluble color from the soluble products.

305,391.—Process of making chrome-yellow.—C. E. Hore.

Consists in mixing "sublimed lead" with a solution of potassium bichromate, boiling the mixture, and finally separating the insoluble coloring matter from the soluble products.

Reissue No. 10,522.—Refrigerating and ice making apparatus.—C. P. G. Linde.

Original No. 228,364, dated June 1, 1880.

September 23d, 1884.

305,423 —Antiseptic compound.—S. Cabot, Jr.

An insecticide compound consisting of resin dissolved in a solution of an alkaline sulphide, holding in solution crude naphthalene.

305,510.—Gas making apparatus.—J. Carroll.

Oil is heated by passage through pipes in a steam heated chamber on its way to the gas generator.

305,524.—Process for the manufacture of acetates directly from metallic ores.—J. A. Mathieu.

Sprinkles the ground ore with acetic acid, exposes the sprinkled ore to the air, separates the salt thus formed by the addition of water, then exposes the residual ore to the action of acetic acid vapors. The solutions so obtained are evaporated and crystallized.

305,579.—Preparing a vegetable size for use in textile manufactures.—V. Ducancel and E. Fortin.

Consists in dissolving a farinaceous substance in cold water, then adding thereto a solution of an alkali in a proper proportion to free the sizing matter, and then adding thereto an acid in sufficient quantity to neutralize the alkali.

305,631.—Apparatus for evaporating alkaline solutions.—J. P. R. Polk.

A vacuum pan connected with a calcining furnace.

305.636.—Varnish.—J. A. Shephard.

Kauri gum, beeswax, turpentine and linseed oil.

305,708.—Method of protecting unslaked lime during transportation.—J. W. Ormsby.

Protects the lime contained in a car from air and moisture by placing a cover of flexible and impervious material over it and then spreading a layer of sand or analogous material over the cover.

305,719.—Apparatus for washing gas.—J. Somerville.

September 30th, 1884.

305,737.—Electrolytic liquid for secondary batteries.—W. E. Case.

Zinc sulphate and magnesium oxide.

305,753.—Manufacture of hydraulic cement.—R. W. Leslie.

Mixes quick-setting cement rocks and ferruginous earths or stones and then calcining and subsequently grinding the same to a powder.

305,754.—Manufacture of Portland Cement.—R. W. Leslie and D. Griffiths.

Consists in combining with lime, or lime and magnesia in any of their forms, iron slag or cinder and subsequently calcining said compound to a clinker and grinding the same.

305,788.—Oxidizing and chloridizing furnace.—J. B. Brett.

305,828.—Manufacture of anhydrous caustic baryta.—C. Marchand and V. M. Picabia.

Consists in subjecting the barium nitrate in a close vessel to the action of gases heated to a high temperature so as to affect the disassociation of the oxide of nitrogen from the baryta.

305,846.—Process of working auriferous and argentiferous arsenides and arsenides and sulphides.—E. Probert.

Consists in introducing litharge or lead into the fused material contained in pots or vessels lined with some moistened refractory material, and also con. taing limestone, dolomite, or other mineral carbonate in the lining, or distinct therefrom, whereby the charge is stirred by means of the action of the molten mass upon the lining of and mineral substance in the pot.

305,970.—Manufacture of hydraulic cement.—S. H. Short.

Limestone containing clay and magnesia is mixed with marl, silica and alkaline carbonates, then formed into bricks and heated to the melting point of cast iron.

306.040.—Apparatus for purifying air and gases.—F. Windhausen.

Air or gases are forced by centrifugal force through a spray of water and against a thin sheet thereof upon the inner surface of a revolving cylinder, the water being sprayed and forced out by an inner perforated cylinder. The impurities are carried off by the water through a sealed trap.

Reissue No. 10,528.—Paint.—J. A. Shephard.

Red lead, glycerine, linseed oil, japan and turpentine.

O. H. K.