ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Crystallized Mercurous Iodide and Bromide. A. STROMAN.

Mercurous Iodide.—When a slightly acid, saturated solution of mercurous nitrate, as free as possible from oxide, is heated to boiling with an excess of iodine, the latter is covered with a yellowish powder, which is partly dissolved. From the supernatant solution, yellow, lustrous, translucent scales crystallize on cooling in the dark. The same yellow crystals are obtained when an alcoholic solution of iodine is added to a saturated solution of mercurous nitrate. The crystalline mercurous iodide, when heated, gradually passes from pale yellow through dark yellow and orange to garnet red, changing to yellow again on cooling. It sublimes between 100 and 120°. Alkalies and ammonia color it greenish, and, on heating, reduce it to metallic mercury, with the formation of the corresponding alkaline iodide. The yellow, precipitated mercurous iodide is more sensitive to light than the crystallized, becoming black in a short time, even in diffused light.

Mercurous Bromide.—This is obtained as white, nacreous, tetragonal scales, by the action of bromine on a saturated solution of mercurous nitrate. It sublimes without decomposition between 340° and 350° when quickly heated. Dilute and fuming hydrochloric acid blacken the crystalline mercurous bromide, and after heating for some time metallic mercury is separated. Hot concentrated sulphuric acid dissolves it completely with the evolution of sulphur dioxide.

Mercurous bromide, obtained by precipitation with potassium bromide, is also soluble in a hot solution of mercurous nitrate, and separates on cooling in tetragonal scales. (*Ber. d. chem. Ges.*, **20,** *2818.*) W. R.

Ultramarine. L. RAWLINS.

In 1828, Guimet first produced artificial ultramarine and gained a prize of 6,000 francs thereby; yet, notwithstanding his researches and those of other eminent men (particularly Hoffman), our knowledge of the chemical constitution of the "blue marvel of inorganic chemistry" is to-day in a very unsatisfactory condition.

The author gives the principal—and conflicting—opinions as to the nature of ultramarine, notices at some length the direct and indirect processes of its manufacture, and ends his paper with the words of Hoffman: "The time has not yet come when a well grounded theory can be formed with regard to the chemical constitution of ultramarine, or to its physical properties with respect to light—that is, its various colors." (*Jour. Soc. Chem. Ind.*, **6,** *791.*) W. P. M.

ORGANIC CHEMISTRY.

Benzylidenephthalide and Isobenzalphthalide. S. GABRIEL.

Benzylidenephthalide crystallizes in small, monoclinic prisms; $a : b : c = 1.9005 : 1 : 2.3830$; $\beta = 76°.2\frac{1}{2}'$. An optical examination was impossible on account of the minuteness of the crystals. Benzylphthalimidine is prepared by gradually adding a mixture of 12 grms. benzalphthalimidine and 6 grms. amorphous phosphorus to 36 c. c. boiling hydriodic acid, and boiling with a reflux condenser for 45 minutes. The resulting brown oil is washed with water and dissolved in 3–4 vols. hot alcohol. The hot, filtered solution is decolorized with sodium bisulphite and allowed to cool, when 9 grms. benzylphthalimidine separates in scales, melting at 137°. When a weight of 10 grms. benzylphthalimidine is heated with 12 grms. phosphorus oxychloride, as long as hydrochloric acid escapes a greenish resin is obtained, which crystallizes from boiling benzene in orange red to vermillion red needles, having the composition $C_{15}H_{11}N$.

β-Desoxybenzoincarboxylic methylamide, $COC_6H_5.CH_2.C_6H_4.CO.NHCH_3$ is obtained by heating 10 grms. isobenzalphthalide with 10 grms. 33% methylamine and 20 c. c. alcohol in a sealed tube to 100° for 9 hours. It crystallizes from benzol in snow-white, felted needles, melting at 143–144°.

When the product obtained by the reduction of nitrobenzylidenephthalide to isobenzalphthalid, is dissolved in warm benzene, there remains a white powder which is sparingly soluble in boiling alcohol, more readily in boiling glacial acetic acid, from which it crystallizes in colorless crystals, melting at 255–257°. With fixed alkalies it gives a yellow solution which yields yellow crystals of the salt. The composition of the colorless crystals is $C_{15}H_{11}NO_2$, and is probably an analogue of carbostyril, $CH.CH.C_6H_4.CO.NH$, having the formula $CH, C_6H_5.CO.C_6H_4.CO.NH$. (*Ber. d. chem. Ges.*, **20**, *2863*.) W. R.

Benzyl derivatives. S. GABRIEL and H. HENDES.

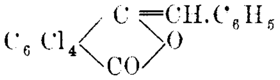
Metanitrobenzylphthalimide $NO_2.C_6H_4.CH_2.N : C_8H_4O_2$ is prepared by heating an intimate mixture of 1.7 grms. metanitrobenzyl chloride and two grms. potassium phthalimide in a paraffine bath at 120° until the mass forms a hard cake. It crystallizes from boiling alcohol or glacial acetic acid in fine needles, melting at 155°, and is soluble in water. The yield is about 74% of the theoretical.

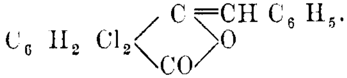
Metanitrobenzylamine hydrochloride is obtained by heating the imide for two hours with 4 parts fuming hydrochloric acid to 200°. When concentrated hydrochloric acid is added to the aqueous solution the salt separates in beautiful needles.

Metanitrobenzylacetamide $NO_2.C_6H_4.CH_2.NHCOCH_3$ is obtained from the preceding by heating it (2 grms.) with 5 c. c. acetic anhydride and 0.5 grms. potassium acetate for ½ hour on the water bath. It is soluble in boiling water and crystallizes in colorless needles, melting at 91°. The isometric ortho-compound melts at 97–99°; the para-compound at 125°.

Nitrobenzylamine platinochloride crystallizes in rhombic plates, which are anhydrous when air dried.

Nitrobenzylamine hydrochloride when added to a hot mixture of tin and hydrochloric acid yields meta-amidobenzylamine hydrochloride, which is readily soluble in water. From the aqueous solution the base is separated by adding potassium hydroxide, as an oil which can be shaken out with a mixture of chloroform and ether.

Benzaltetrachlorophthalide,  $C_6Cl_4{<}\begin{matrix}C=CH.C_6H_5\\ CO\end{matrix}{>}O$ is obtained by heating 10 parts tetrachlorophthalic anhydride with 5 parts phenylacetic acid, and ¼ sodium acetate. It crystallizes from benzene in fine yellow needles, which are sparingly soluble in hot alcohol and acetic acid, and soluble in benzene and nitro benzene. By heating with sodium hydroxide it yields *α*-tetrachlorodesoxybenzoin *o*-carboxylic acid, which crystallizes in colorless needles, melting at 175°, and is soluble in alcohol, ether and benzene.

Dichlorophthalic anhydride melting at 149–151°, under the conditions given for tetrachlorophthalic anhydride, yields *benzaldichlorophthalide*  $C_6H_2Cl_2{<}\begin{matrix}C=CH\ C_6H_5.\\ CO\end{matrix}{>}O$ It is very soluble in benzene, melts at 210° and crystallizes from glacial acetic acid in small brownish yellow needles. Treated with alkalies it is converted into *α*-dichlordesoxybenzoin-*o*-carboxylic acid crystallizing from dilute alcohol in colorless needles, which lose their water of crystallization at 100° and melt at 117°. (*Ber. d. chem. Ges.*, **20**, *2869*.)

W. R.

Auramines. W. FEHRMANN.

Commercial auramine is the hydrochloride of a base auramine $C_{17}H_{21}N_3$. To prepare auramine hydrochloride, tetramethyldiamidobenzophenone, ammonium chloride and zinc chloride are heated together. The oxygen of the ketone is replaced by an imide group. The resulting hydrochloride crystallizes from water in fine yellow, lustrous scales. It is sparingly soluble in water, readily soluble in alcohol. It is readily decomposed, even by dilute mineral acids in the cold. Boiling water also decomposes it with the formation of ammonium chloride and tetramethyldiamidobenzophenone.

Platinum chloride precipitates from the aqueous solution of the hydrochloride, its orange colored crystalline double salt; from its alcoholic solution, however, the double salt of tetramethyldiamidobenzophenone. The free base $[(CH_3)_2NC_6H_4]_2C{=}NH$, is precipitated from the cold, dilute solution of the hydrochloride by ammonium hydroxide in yellow flocks, which crystallize from alcohol in lemon-yellow needles. Auramine is insoluble in water and ether, moderately soluble in alcohol. Its salts are best prepared by adding the theoretical quantity of acid to the alcoholic solution of the base. The oxalate, $(C_{17}H_{21}N_3)_2H_2C_2O_4$, and the picrate $C_{17}H_{21}N_3 . C_6H_2(NO_2)_3OH$, were prepared. Both are crystalline and sparingly soluble in water. Like the guanidines, auramine acts as a univalent base. By heating auramine hydrochloride with aniline, *p*-tololuidine, *o*-toluylenediamine and ethylenediamine, ammonia is eliminated and the hydrochlorides of phenyl-, *p*-tolyl-, *o*-toluylene and ethylene auramine are formed. The substituted auramine bases are all separated at a low temperature from their hydrochloride by ammonium hydroxide, and are all crystallizable. The phenyl base is grey ish yellow, the ethylene base pale yellow, and the toluylene base brown. (*Ber. d. chem. Ges.*, 20, *2844*.) W. R.

Derivatives of Paraquinonedicarboxylic Ester.

A. HANTZSCH and A. ZECKENDORF.

In a previous paper the authors described the double nature of the ester $C_6H_2Cl_2O_2\ (COOC_2H_5)_2$. In the course of their investigations, they find that the acid of this ester also shows a double nature, existing in two well defined modifications:

1. Dichlorhydroquinonedicarboxylic acid,

$$C_6(OH)_2Cl_2(COOH)_2,$$

and

2. Dichlorquinonehydrodicarboxylic acid,

$$C_6O_2Cl_2(COOH)_2,\ H_2.$$

When a concentrated solution of sodium hydroxide is added to dichlorhydroquinonedicarboxylic ester, which is white at the ordinary temperature, it is immediately converted into a greenish yellow sodium salt, giving a similarly colored solution on addition of water. This belongs to the unchanged ester, and is quite permanent as such, for hydrochloric acid precipitates the unchanged white ester, not only after standing for some time, but also after short boiling. To effect saponification the alkaline solution must be evaporated almost to dryness. If then the difficultly soluble residue is dissolved in hot water, and acidified, the brown solution becomes pale yellow, and greenish yellow needles separate. These are permanent in the air, effloresce and fall to a white powder over sulphuric acid, and contain 2 mol. H_2O.

The colorless modification is the dichlorhydroquinonedicarboxylic acid, while the greenish is the dichlorquinonehydrodicarboxylic acid. The former is the more permanent, for while the green needles readily lose their color, the white, anhydrous modification will under no conditions directly combine with water. (*Ber. d. chem. Ges.*, **20**, *2796*.) W. R.

Furfuran Derivatives. W. Marckwald.

Furfuropropionamide, $C_7H_9O_2N$, is obtained by heating the ammonium salt of furfuropropionic acid to 220° for several hours in a closed tube. The product of the reaction is repeatedly boiled with benzene, and the amide precipitated from the solution with ligroin. It separates in white needles, melting at 98°, and boils at 270°. It is readily soluble in water, alcohol, ether and benzene. An attempt to prepare the amine $C_4H_3OCH_2CH_2NH_2$ by the action of bromine and aqueous potash, was unsuccessful, because the bromine attacked only the furfurane nucleus.

One part furfuracrylic acid in 3½ parts 95% alcohol was saturated with hydrochloric acid gas until a green turbid solution was formed, after which the solution was heated for about 20 minutes on a water bath, the passage of the gas being continued until the solution cooled. The product is a pale yellow oil, boiling at 286°. It is heavier than and insoluble in water, miscible in all proportions with alcohol and ether, and has an agreeable aromatic odor and bitter taste.

When heated with an alcoholic solution of potash, the potassium salt of a new acid is formed. The acid forms large, colorless, transparent plates, is readily soluble in water and alcohol, difficultly soluble in ether, and insoluble in benzene and ligroin. In a capillary tube it melts at 138°, and when heated in an open vessel to 110°, it also melts with partial decomposition. The sodium, potassium, calcium and zinc salts are very soluble. The barium salt crystallizes from hot water in thin scales; the copper salt separates on addition of cupric sulphate to the alkali salt, and the silver salt $C_7H_8O_5Ag_2$ is obtained in fine, white needles, when a dilute solution of silver nitrate is added to a dilute solution of an alkaline salt.

The acid is not identical with any of its isomers which are known, and is especially distinguished from Bayer's hydrofurfuronic acid by its melting point, which is 26° higher, and by the insolubility of its silver salt. (*Ber. d. chem. Ges.*, **20**, *2811.*)

W. R.

Action of Sulphuric Acid on Bromodurene. O. JACOBSEN.

Monobromdurene in contact with cold, concentrated sulpnuric acid gives dibromdurene and durene, the latter being then acted upon in the manner shown in a previous paper, giving finally hexamethylbenzene, prehnitene sulphonic acid, and two pseudocumene sulphonic acids. (*Ber. d. chem. Ges.*, **20**, *2837.*) W. R.

Trigonelline. E. JAHNS.

Trigonelline, the alkaloid of *Trigonella fœnum græcum*, is regarded as identical with the methylbetaine of nicotinic acid. When heated with potash lye or baryta water the whole of the nitrogen is given off as methylamine. Heated to 260–270° with an excess of hydrochloric acid, it yields nicotinic acid. (*Ber. d. chem. Ges.*, **20**, *2840.*)

W. R.

Solubility of Opium Alkaloids. DIETERICH.

The solubility of the alkaloids was determined by heating the solvent, to which an excess of the finely pulverized alkaloid had been added, setting it aside for twenty-four hours to cool at the temperature (° ?) of the room, and then evaporating known volumes of the solutions.

SOLVENTS.	Morphine.	Morph. Sulph.	Narcotine.	Narcot. Sulph.	Codeine.	Papaverine.	Narceine.	Thebaine.
Water	1.1250	Very sol.	1.5000	Very sol.	Soluble	Sparingly	Soluble	Insoluble
Normal Ammonia	1.2100	----------	1.5000	----------	“	Very “	“	Sparingly
$\frac{1}{10}$ Normal Ammon.	1.6200	----------	1.5000	----------	“	“ “	“	“
Ethyl Alcohol	1.1660	Soluble	1.1900	Soluble	Very sol.	Very sol.	Very sol.	Soluble
Methyl Alcohol	1.7000	Very “	1.1560	“	“ “	“ “	“ “	“
Amyl Alcohol	1.1300	Sparingly	1.4150	“	“ “	“ “	“ “	“
Acetic Ether	1.1665	Sparingly	1.3100	Sparingly	“ “	“ “	Sparingly	Very sol.
Ether	1.1250	Very sol.	1.1780	Insoluble	Soluble	Soluble	Insoluble	Sparingly
Acetone	1.1800	“ “	1.1400	Sparingly	Very sol.	Very sol.	Sparingly	Very sol.
Chloroform	1.1660	Insoluble	1.4000	Soluble	Soluble	“ “	“	“ “
Carbon Disulphide	1.1250	“	1.1450	Sparingly	Very sol.	Sparingly	Insoluble	Sparingly
Benzene	1.5000	“	1.1200	Insoluble	“ “	Very sol.	Sparingly	Very sol.
Petroleum Ether	1.5000	“	1.5000	Insoluble	Sparingly	Insoluble	Insoluble	Sparingly

Toluene and xylene act like benzene. (*Rep. d. anal. Chem.*, **6**, *684.*) J. F. G.

Trithioacetaldehydes. W. MARKWALD.

When γ-trithioaldehyde is dissolved in about four times its quantity of ethyl iodide, and kept for several weeks in a sealed vessel, the solution is suddenly transformed into a crystalline magma, consisting of β-trithioaldehyde, as shown by the melting point, and other properties. As traces of iodine had separated from the solution during the several weeks' standing, the change was at first ascribed to the presence of free iodine, but it was subsequently found that an ethereal solution of γ-trithioaldehyde, to which a small quantity of iodine was added, remained unchanged for months. (*Ber. d. chem. Ges.*, **20**, *2817.*) W. R.

Note on Saccharine. D. A. SUTHERLAND.

Heated to 145–150°, copious sublimate of acicular crystals. During gentle ignition a very sweet vapor escapes, which can be tasted several feet away. Fusion with caustic alkali yields salicylic acid. Potassium ferro- and ferricyanides give greenish colored precipitates on boiling, which are soluble in caustic alkali and are reprecipitated on addition of an acid. (*Jour. Soc. Chem. Ind.*, **6**, *808.*) W. P. M.

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ANALYTICAL CHEMISTRY.

Apparatus for Determination of Nitric Acid. DR. KRATSCHMER.

The determination of nitric acid by decomposing with ferrous chloride according to the method of Schlösing and Schulze is simplified by the following apparatus: Into a flask of 150 c.c. a double perforated rubber stopper is carefully fitted. In one opening a gas delivery tube of 40 cm. or more in length is inserted, and into the other a separating funnel of 100 c.c. capacity, with a closely fitting stopper and narrow stem, which is allowed to project into about the center of the flask.

To use the apparatus the concentrated nitrate solution is transferred to the flask, the latter closed with the rubber stopper holding the separatory funnel and delivery tube, the end of the latter is inserted into the mercury, and with the glass stopper closed, the flask and contents are carefully heated. After boiling for a few minutes to insure complete expulsion of the air from the flask, the air is also removed from the funnel by turning the stopper and allowing the vapors to pass through the same. The stopper must not be pressed in too firmly. The apparatus is then closed.

Complete absence of air is proved when gas bubbles cease to form over the mercury in the receiving tube. A hot solution (about 50 c.c.) of ferrous chloride in concentrated hydrochloric acid is then poured into the separatory funnel, and finally run in the flask, the flame having been momentarily removed from under the latter. When, after heating, the solution has become light brownish yellow and gas ceases to collect in the tube, the heat is again removed and the bulk of the remaining chloride solution run into the flask. Heat again until gas ceases to collect in the receiving tube. (*Fres. Zeit.*, **26**, *608–610.*) J. F. G.

Determination of Phosphoric Acid. A. ISBERT AND A. STUTZER.

For the rapid determination of P_2O_5, especially in fertilizers, the authors recommend the following short process: 5 grms. of phosphate are dissolved in hydrochloric or nitro-hydrochloric acid in a half liter flask; after cooling, the solution is diluted to the mark, thoroughly mixed and filtered. 50 c.c. of filtrate, supersaturated with NH_4OH, are acidulated with HNO_3, and precipitated with ammonium molybdate; the precipitate is allowed to settle at 60°–70° C. It is then filtered, washed first by decantation and finally transferred to filter, using about ¼ liter water for the washing. By the water washing, any precipitated silicate in the molybdate precipitate is removed. The washed precipitate, with filter, is transferred to a 750 c.c. Erlenmayer flask, an excess of sodium hydrate is added, and the ammonia distilled into standardized H_2SO_4. The per cent. nitrogen × 1.654 = % P_2O_5. For the titration, corallin is preferred. Corallin is prepared by heating a mixture of 100 grms. cryst. carbolic acid, with 50 c.c. sulphuric acid, and 60 grms.

cryst. oxalic acid in a flask over a flame, until the solution is highly colored. Wash with ½ liter water, decant, repeat washing two or three times, and finally dissolve the washed corallin (rosolic acid) in strong alcohol. (*Fres. Zeit.*, **26**, *583–587.*) J. F. G.

Water Analysis. OTTO BINDER.

In the ordinary tests for nitrates in well waters, the reaction is much intensified if excess of zinc is carefully avoided to prevent the further reduction of nitrites. To about 30 c. c. water add a very minute quantity of zinc dust or finely pulverized zinc, shake, add a few drops of dilute sulphuric acid, thoroughly mix and then add potassium iodide starch paste, when the iodine reaction will become apparent if the water contained nitrates.

Attention is again called to the care necessary in evaporating waters for analysis in respect to exposing them to the gases of the flame, as under favorable conditions appreciable quantities of SO_3 are absorbed. Thus, in several tests made, a liter of water was found to have absorbed during evaporation from .019 to .042 grm. SO_3. (*Fres. Zeit.*, **26**, *605–607.*) J. F. G.

Analyses of 14 Pure Alsace-Lorraine Wines of 1885. CARL AMTHOR.

In the analyses the ratio of alcohol to glycerine varied from 100:13.2 to 100:7.3.

After deducting the total amount of acid from the extract there remained a maximum of 1.8626 and a minimum of .9685 grm. and by deducting only the fixed acid a remainder of 1.9826 grm. to 1.0621 grm. per 100 c.c. wine at 15° C. The ratio of ash to extract varied from 1:8.38 to 1:12.63, and the P_2O_5 to ash from 1:5.33 to 1:9.81. (*Fres. Zeit.*, **26**, *610.*) J. F. G.

Hygienic Analysis of Air. KLAS SONDÉN.

By a modification of the Otto Pettersson method (*Fres. Zeit.*, **25**, *467,*) for air analysis, it is made practical to effect accurate analysis of air with quantities of only 50 to 150 c.c. which are collected as special pipettes, hermetically sealed and reserved until needed. (*Fres. Zeit.*, **26**, *592–598.*) J. F. G.

Simple Apparatus for Evaporating Ammoniacal Solutions at a Low Temperature. F. Muck.

A dessicator containing sulphuric acid is so arranged that it can be heated. The ammoniacal solution contained in a dish suspended above the acid is rapidly deprived of its ammonia- "Stronger water of ammonia" of the pharmacopœia boils at about 50° C.; diluted with an equal volume of water it boils at about 70° C. (*Fres. Zeit.*, **2**, *599.*) J. F. G.

Allen's Method for the Detection of Hop Substitutes in Beer. J. O. Arnold.

Allen claims that after the precipitation of hop-bitters by neutral lead acetate, and the extraction of the remaining liquid with chloroform and ether, the presence of some hop substitute is certain if the chloroform or ether residue have a marked bitter taste. This does not accord with the author's experience, and he holds that Allen's process is misleading, and that the bitter of the hop is *not* completely precipitated by either basic or neutral lead acetate. (*Chem. News*, **57**, *33.*) W. P. M.

Elementary Analysis of Very Volatile Carbon Compounds. G. Kassner.

The steady and regular volatilization of very volatile compounds for combustion is effected by giving the combustion tube near one end an upward turn of about 45°. The liquid is placed in a small bulb with long capillary extension; after breaking off the end of the latter the bulb is allowed to slide down the upturned end of the combustion tube upon a platinum covered asbestos stopper inserted at the bend in the combustion tube, which has been so placed in the furnace that the upturned end is but little affected by the heat of the burners. The liquid is burned in a current of oxygen. After heating the part of the tube which is within the furnace the liquid volatilizes very regularly and the combustion is easily effected.

Where silver wire or foil is generally used in the elementary analysis of substance containing halogen compounds the author recommends silver asbestos stoppers, prepared by shaking finely divided or reduced silver with fine asbestos fiber. After each analysis the tube with stopper must be carefully ignited in a current of pure hydrogen. (*Fres. Zeit.*, **26**, *588–590.*) J. F. G.

INDUSTRIAL CHEMISTRY.

Corrosion of Leaden Water Pipes. T. CARNELLY and W. FREW.

The corrosion upon an old pipe, which had been laid in a stone-built drain, had started from the outside of the pipe and proved to be a red modification of lead monoxide, PbO. This accords with the experience of plumbers, that a lead pipe laid through a wall, and in contact with the mortar, almost always suffers corrosion with formation of a red incrustation. That *free lime* causes this change, follows from the fact that pipe that had been laid in a bed of chalk did not exhibit a trace of corrosion, although the pipe so laid was a very old one. The experiments of the authors were numerous, and resulted as follows:

1st. Exclusion of air diminishes corrosion, except when the embedding substance is aluminum hydrate or blue clay.

2d. With exposure to air, slaked lime greatly increases action.

3d. Sand, calcium carbonate, old mortar, calcium silicate, and a mixture of sand and calcium carbonate, possess great protective power. This confirms results already obtained by Crookes, Odling and Tidy, who show that the action of soft water on lead is regulated by the amount of silica present in the water, and also that the most effective way to silicate a water is to pass it over a mixture of flints and limestone.

The results fully account for the difference in action between new mortar (slaked lime and sand), and old mortar (calcium silicate, calcium carbonate and sand), the latter having a corrosive power from 20 to 40 times less that the former.

4th. The protective action of calcium carbonate does not depend upon the presence of carbonic acid, with formation of the bicarbonate.

5th. The protective action of magnesium oxide is remarkable—it being equal to calcium silicate in that respect.

The authors quote two conclusions of Crookes, Odling and Tidy:

1st. Water becomes lead proof when the dissolved silica is about ½ grain per imperial gallon.

2d. It is essential, in order to ensure the protective action, that the silication of the water should be maintained. (*Jour. Soc. Chem. Ind.*, **7**, *15*.) W. P. M.

Preparation of Crystallized Chromic Acid from Lead Chromate. G. KLIEBHAN.

Lead chromate is treated with such a quantity of concentrated H_2SO_4 that two parts of acid are employed to one part of the dry salt. The mixture is allowed to stand some time —eight to ten hours—when the decomposition will be complete. If warmed, the reaction will be more rapid. The mass is then treated with water ; lead sulphate separates, from which, after subsidence, the supernatant red liquid is poured, the same being a mixture of chromic and sulphuric acids. The evaporation of the clear, red liquid is continued until succussion commences, when the heat is removed. On cooling, the greater part of the chromic acid separates in very handsome, carmine red crystals, an additional quantity being obtained on further concentration of the mother liquor. Chromic acid prepared in this way proves to be purer than that by any other method.

This is also the place to speak of a partly admitted and partly denied combination of chromic acid with sulphuric acid. The following facts indicate the probable existence of such a combination:

Chromic acid added to lead-free H_2SO_4 dissolves with red color. The gradual addition of a further quantity of chromic acid is followed by a yellow brown color, and after several hours a precipitate of a similar color separates, which is not soluble in conc. H_2SO_4. It dissolves, however, in H_2SO_4 at 50° R (63°C) separating again on cooling. On addition of the least quantity of water cryst. chromic acid separates. The same brown substance results when SO_3 is mixed with chromic acid.

From this it appears that under certain circumstances CrO_3 plays the part of a base toward SO_3, which must be taken into consideration in a method of preparing CrO_3, *e. g.*, in the method by $K_2Cr_2O_7$ the CrO_3 is separated often with difficulty from the last portions of H_2SO_4 employed. (*Chem. u. tech. Ztng.*, **6**, *42*.)

D. W.

New Process for Desulphurizing Coal Gas. J. J. Hood and A. G. Salamon.

The present methods of purification are reviewed, and the points noted that bye-products of little or no value are produced, and that where calcium sulphide is employed the foul-smelling "blue billy" is formed, the proper disposal of which is often a serious problem.

The authors then proceed to the consideration of their own process, which consists in placing air dried, finely divided "Weldon mud" (a bye-product in chlorine manufacture) in the ordinary purifiers. The mud has the following composition (after washing to remove excess of $Ca\ Cl_2$) :

$Mn\ O_2$	28%
$Mn\ O$	9"
$Ca\ O$	11"
$Ca\ Cl_2$	3"
$H_2\ O$	46"
Insoluble matter	3"
	100

The claims of the authors are :

That CO_2, H_2S and CS_2 are removed at one operation, and to a much greater extent than by the older process ;

That the illuminating power of the gas is not affected ;

That the purifying material is obtainable at a price which allows of considerable economy being effected over the present system of working ;

That the production of useless and obnoxious waste is not necessary ;

That the sulphurized material may be burned to acid more easily than pyritic sulphur ;

That the roasted remainder may be returned to the chlorine works whence it came, and be again utilized for preparation of chlorine, returning in due time to the gas works again as "Weldon Mud." (*Jour. Soc. Chem. Ind.*, **7**, *3*.) W. P. M.

The Weldon-Pechiney Process for the Manufacture of Chlorine from Magnesium Chloride. JAMES DEWAR.

A long and abundantly illustrated paper, descriptive of the process in five steps, namely:

1. Dissolving magnesia in hydrochloric acid.
2. Preparation of magnesium oxychloride.
3. Crushing, breaking and sifting the oxychloride.
4. Drying the oxychloride.
5. Decomposing the oxychloride.

The plant required for this process is somewhat more expensive than that demanded by the old Weldon process, but, on the other hand, there is much economy of hydrochloric acid, and a total yield in chlorine of 78 to 80 per cent. as against 33 per cent. by the older method. (*Jour. Soc. Chem. Ind.*, **6**, *775*.) W. P. M.

Free Acid in Superphosphates. W. W. MELLON.

Stated as $H_3 PO_4$, the average amount of acidity found in 485 samples of manures of various kinds was 8.54 per cent.; the highest having 16.36 per cent. and the lowest 2.36 per cent. The free acid always present in manures seems to consist mainly of phosphoric acid, with smaller amounts of hydrofluosilicic, hydrofluoric and (occasionally) sulphuric acids. The latter was found only in damp samples containing a large amount of free acid. (*Jour. Soc. Chem. Ind.*, **6**, *803*.) W. P. M.

Action of Bleaching Agents upon Writing Ink as a Means of Detecting Frauds. ROBERT IRVINE.

The writings selected were respectively one day, six months, twelve months, two years, six years, fourteen years and twenty-two years old. Heating with a very dilute solution of ordinary bleaching powder in water (Sp. Gr. 1.001), the newly written matter disappeared in six minutes; the six months' writing in nine to twelve minutes; the two years in twenty minutes, at the end of which time the six years old writing was not greatly affected, the fourteen years very slightly, and the twenty-two years hardly affected at all.

Old writing seems hardly affected by such a weak solution even after an exposure of hours to its action. (*Jour. Soc. Chem. Ind.*, **6**, *807*.) W. P. M.

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Abstracts of American Patents Relating to Chemistry.

[*From the Official Bulletin of the U. S. Patent Office.*]

November 15th, 1887.

373,158.—Process of and apparatus for manufacturing gas. A. M. Sutherland.

373,221.—Alloy. C. C. Carroll.

Consists of aluminium, 90–93 parts; silver, 5–9 parts; copper, 1 part.

373,264.—Process of making pyrosulphates. H. Baum.

The acid sulphates of the alkalies, as also of ammonia, are heated in vacuo to 200° to 400° C.

November 22d, 1887.

373,618.—Process of making a compound resembling butter. W. J. Skiff.

The process consists in taking a quantity of milk in any condition, heating it to about 95° and permitting to stand until curdled, then churning until seed of butter appear, then mixing with it a suitable quantity of butter oil, and churning until the compound assumes the consistency of molasses. The resulting mass is immersed in cold brine, and stirred until the butter gathers in lumps.

373,741.—Apparatus for storing liquid ammonia. D. D. Johnson.

November 29th, 1887.

373,992.—Manufacture of cement. S. Lowden.

About one part of clay and five parts of chalk, or limestone, are crushed, washed, mixed and burned at a white heat. Then limestone is crushed and roasted separately at a temperature of about 100°. Finally three parts of the first product are mixed with one part of the second.

374,077.—Apparatus for separating substances which volatilize at different temperatures. J. A. Mathieu.

374,078.—Apparatus for separating and purifying the products of distillation of wood. J. A. Mathieu.

December 6th, 1887.

374,201.—Process of making acid potassium phosphates. C. V. Petraeus.

Bone or similar phosphate is decomposed with an acid—such as sulphuric or oxalic acid—and leached, to produce an impure calcium phosphate. This phosphate is decomposed with potassium sulphate, and mixe withd potassium hydroxide, or potassium carbonate, to form in the solution an acid phosphate, containing an excess of potash over that in the dihydrogen potassium phosphate. The solution is then filtered and crystallized.

374,208.—Process of preserving wood. J. A. Sewall.

The wood is impregnated with boric acid, and subsequently treated to a bath of calcium hydroxide.

374,259.—Monosulpho acid of alpha-naphthol. A. Liebmann.

374,268.—Apparatus for concentrating acids. H. Pichon and R. Pfennig.

374,370.—Rosin oil compound. D. J. Ogilvy.

A dryer for paints, etc., consisting of rosin oil, combined with an oxide or other salt of manganese easily decomposed by heat. W. R.