ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Note on the Heats of Dissolution of the Sulphates of Potassium and Lithium. (S. U. Pickering.)

Calorimetric Determinations of Magnesium Sulphate.

S. U. Pickering.

Neither potassium nor lithium sulphate indicate, by their respected heats of solution, that they can exist in different modifications such as the author has shown belong to sodium sulphate.

As to magnesium sulphate, great difficulty was found in preparing a pure sample of the monohydrated salt. Determination of sulphur trioxide in a given sample is not sufficient to establish its identity, since the errors incident to the determination represent too large a quantity of water. For the same reason a determination of magnesium leads to no conclusion that can be depended upon. Determination of the water itself is the only available method. The heptahydrated salt is permanent in the air, however, and yields $6H_2O$ at temperatures between 150° and 160°. The salt obtained by loss of a quantity of water corresponding closely with the value for $6H_2O$ may be assumed to be the monohydrated salt. and correction can be made for difference in water, provided the heats of solution of the anhydrous and heptahydrated salts are known. The value of such corrections depend also upon the truth of the assumption that the six molecules of water in the heptahydrated salt are combined with the same energy. The monohydrated salt obtained by heating within the prescribed limits, showed no variation in heat of solution for different temperatures in preparation, and no modification therefore exists. The difference between the results of Favre and Thomsen and the author, depend probably upon imperfect dehydration. Anhydrous magnesium sulphate is readily obtained, and yields no modifications. The heat of solution obtained agrees with that obtained by Favre. The phenomena of rehydration of the anhydrous and monohydrated salt respectively, indicate that the latter cannot be formed as the first product of the action of water on the anhydrous salt. (*Jour. Chem. Soc.*, **266**, 98–100.) A. A. B.

On a New Method of Determining Vapor Pressures, etc. W. Ramsay and S. Young.

Using a new and simple apparatus of their own design (not intelligible without the cut) the authors have investigated the vapor pressure of acetic acid (liquid and solid).

The V. P. of the liquid, according to a table constructed by graphic interpolation from the numbers obtained in a series of observations, is 3.50 at 0° C., 56.2 at 50°, 202 at 80°, 416.5 at 100°, and 582.6 at 110° ; V. P. of solid, 2.02 at 0°, 5.19 at 10°. These results differ widely from those of Landolt and Müller, but approach more closely to those of Regnault. Regnault attributed these discrepancies to presence of acetone, but the authors regard them as depending upon the presence of air and moisture and to the forms of apparatus previously used. These difficulties are avoided in the present apparatus. (*Jour. Chem. Soc.*, **266**, 42.)

A. A. B.

Note on Solubility of Certain Salts in Fused Sodium Nitrate. F. B. Guthrie.

A study of what is called *anhydrous solubility*, *i. e.*, solution of a given substance by another in a state of fusion. When one salt is dissolved in this way by another, the quantity dissolved increases with temperature, but on cooling of the mass the excess separate unaltered while a part remains dissolved. The "eutectic alloys" (permanently associated salts) obtained by this process, using sodium nitrate as the solvent for the sulphates, carbonates and chromates of Pb, Ba, Sr and Ca, contained the following percentages of the salts named :

	SULPHATE.	CHROMATE.	CARBONATE.
Ba	2.61	.205	.916
Sr	1.84	2.133	.69
Ca	1.477	.547	.294
Pb	6.81	.245	....

Results with potassium nitrate are also given. (*Jour. Chem. Soc.*, **266**, 94.)

A. A. B.

On the Application of Iron Sulphate in Agriculture and its Value as Plant Food. A. B. GRIFFITHS.

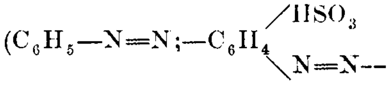
The general conclusions of the author from the experiments described in this and preceding papers, is that ferrous sulphate is a good plant food when sparingly applied. A solution containing as much as $\frac{1}{6}$ per cent. of Fe SO_4, however, is fatal to most plants. A fairly large proportion of soluble iron in the soil is favorable to the growth of plants developing a large amount of chlorophyll, especially in the leaf of the plant. Iron is regarded by the author as closely related to the production of chlorophyll and the increased production of soluble carbohydrates, woody fibre and fat in certain cases is a direct consequence of the increase in chlorophyll. Phosphoric acid in certain cases increased as ferric oxide in the ash of the plant increases. Nitrogen is perceptibly increased by the use of ferrous sulphate, and the salt acts also as an antiseptic agent in the soil to prevent parasitic diseases of the plant. (*Jour. Chem. Soc.*, **266**, 46.) A. A. B.

ORGANIC CHEMISTRY.

On Azo- and Disazo- Compounds of the Kresoles. E. NÖLTING and O. KOHN.

Very little is known about the azo- compounds of the kresoles. The only reference on the subject being by Mazzara, (*Gazzetta Chimica Italiana*, 9, *428*) who produced phenylazoparakresole, obtained by treating a dilute solution of parakresole with diazobenzole nitrate, and by Stebbins, (*Ber. d. chem. Gesell*, **12**, *718*) who produced phenylazokresolesulpho- acid (from coal-tar kresole). The author, therefore, thought this subject worthy of investigation.

Parakresole unites with diazo- compounds with the same ease as the phenoles not substituted in the para- position.

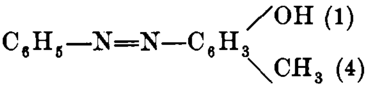
The diazo- residue 

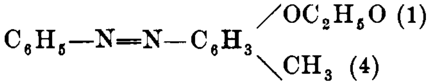
$$(C_6H_5{-}N{=}N;{-}C_6H_4\begin{matrix}\diagup HSO_3\\ \diagdown N{=}N{-}{-}\end{matrix}$$

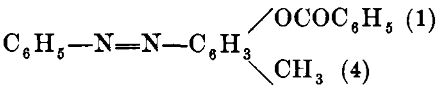
etc., standing in relation to the hydroxyl, in the ortho- position.

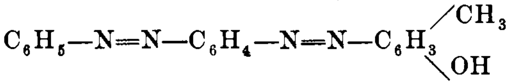
Disazo- compounds could not be obtained.

Ortho- and metakresole form with diazo- compounds oxyazobodies, in which the azo- group takes the para- position, in relation to the hydroxyl group. Both these easily form disazo- compounds. The following compounds are described :

Phenylazo-*p*-kresole, 
$C_6H_5—N=N—C_6H_3\begin{matrix}\diagup OH\ (1)\\ \diagdown CH_3\ (4)\end{matrix}$

Phenylazo-*p*-acetylkresole, 
$C_6H_5—N=N—C_6H_3\begin{matrix}\diagup OC_2H_5O\ (1)\\ \diagdown CH_3\ (4)\end{matrix}$

Phenylazo-*p*-benzolekresole, 
$C_6H_5—N=N—C_6H_3\begin{matrix}\diagup OCOC_6H_5\ (1)\\ \diagdown CH_3\ (4)\end{matrix}$

Azobenzoleazokresole, 
$C_6H_5—N=N—C_6H_4—N=N—C_6H_3\begin{matrix}\diagup CH_3\\ \diagdown OH\end{matrix}$

Paratolylazokresole.
Parasulphophenylazoparakresole..
Phenylazoorthokresole.
Phenyldisazoorthokresole.
Phenylazoorthoacetylkresole, etc. (*Ber. d. chem. Gesell, 1885*, 351.) J. H. S., Jr.

On Nitrosoorthokresole. E. Nölting and O. Kohn.

Orthokresole is dissolved in 30–40 pts. of water and treated with the theoretical amount of a standard solution of nitrosyl sulphate in the cold. After a short time a grayish precipitate settles to the bottom of the beaker, and constitutes the raw nitrosokresole. This is collected on a filter and dissolved in ammonia; the impurities are precipitated with CO_2, the ammoniacal solution is poured into cold dilute H_2SO_4, and the substance finally crystallized from water or benzole. Long white needles, soluble with difficulty in cold water, easily soluble in boiling water, alcohol, ether, or chloroform. Soluble in dilute caustic alkalies with a red brown color. Acids reprecipitate it as a white, flocculent body. Melting point, 134–135.° (*Ber. d. chem. Gesell, 1885*, 370.) J. H. S., Jr.

On Paraamidoacetanalide, and a few new Azo- Compounds. R. Nietzki.

Up to the present time it seems to have been impossible to convert the nitro- compounds of acetylated aromatic amines into the corresponding amido- compounds.

Hobrecker (*Ber. d. chem. Gesell*, **5**, *p. 920*) obtained from paranitracetanilide, on reduction, paraphenylendiamine and acetic acid. The author found, however, that by treating the paranitracetanilide with the proper reducing agent, that he could obtain menacetylparaphenylendiamine. The reducing agents used in this case were iron filings and acetic acid. The acetyl group may be easily removed by boiling with dilute sulphuric acid.

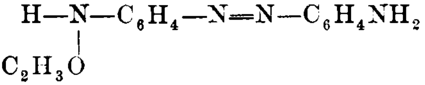
On diazotizing this compound and combining it with β naphtholdisulpho- acid, a scarlet dyestuff crystallizing in golden leaflets, is obtained. It has the following composition :

$$C_2H_3O-HN-C_6H_4-N_2-C_{10}H_4HO\ (HSO_3)_2$$

From this the acetyl group may be removed, in the shape of acetic acid, by boiling the substance with dilute H_2SO_4. The removal of the acetyl group converts the substance into a Bordeaux red dyestuff. This latter may now be diazotized and combined again with betanaphtholedisulpho- acid. This produces a new body, crystallizing in needles with beetle-green lustre. This compound dyes wool of a deep indigo-blue color. Commercially, however, it is of little value on account of its instability.

Diazoacetanilide and aniline yield a highly yellow colored diazoamido- compound, which, on being heated with aniline and aniline chloride, may be easily converted into the corresponding amidoazo-compound. The acetyldiamidoazo- compound so obtained, crystallizes in light yellow leaflets with golden lustre. Melting point, 212° C.

It may be represented by the following formula :



$$H-\underset{\substack{|\\ C_2H_3O}}{N}-C_6H_4-N=N-C_6H_4NH_2$$

This compound, on being boiled with dilute H_2SO_4, is converted into symmetrical paradiamidoazobenzole, which melts at 255° C. (*Ber. d. chem. Gesell, 1885*, 343.) J. H. S., Jr.

Notes. E. Nölting.

1. Orthonitrobenzyl chloride.

Beilstein and Geitner observed that when benzylchloride was nitrized, a certain oil was formed, together with the ordinary crystallized paranitrobenzylchloride. This they supposed to be an isomer of the nitro- compound, but gave it no further investigation. This matter was taken up again by the author, who had some of the oil at his disposal. A sample of the oil was oxidized with $KMnO_4$ (5 grms. per lit.) and yielded besides a little benzoic acid, and paranitrobenzoic acid, a large amount of orthonitrobenzoic acid. Metanitrobenzoic acid could not be found. Benzyl chloride on being nitrized at 15°C., forms principally paranitrobenzylchloride, whereas, when nitrized at the ordinary temperature, a large amount of the ortho- compound is formed. This would there fore be an easy method of preparing the nitrobenzoic acids.

2. *On the High Boiling Phenols Contained in Coal Tar.*

It is well known to chemists that anthracene oil contains besides anthracene, compounds possessed of a phenol character. The isolation of these compounds has, however, never been performed. The author found that the raw phenols obtained by shaking up the crude tar oils with NaOH+Ag, and afterwards precipitating them with an acid, begin to boil at 240–250° C., and distil under partial decomposition to 360° and over. In vacuo the distillation runs much better. The fraction boiling from 300 and over was examined. It contained still some hydrocarbons, which were removed by dissolving the mixture in NaOH+Ag, diluting with water, and shaking the mixture repeatedly with toluol. The phenoles remaining in solution were precipitated with an acid, extracted with ether, and then distilled over zinc dust. A mixture of semi-fluid hydrocarbons was obtained, which were then oxidized with chromic acid. The oxidation product contained small amounts of phenanthrenchinone, and anthrachinone. It is therefore probable that the tar oil contained the phenols of anthracene and phenanthrene. Besides these, however, it contains a number of other phenolic bodies.

3. *On the Constitution of Phthalyl chloride.*
(*Ber. d. chem. Gesell, 1885*, 385.) J. H. S., Jr.

On Isatin. H. Kolbe.

Chromic acid oxidizes isatin (dissolved in glacial acetic acid) to a product $C_8H_6NO_3 = C_6 \left\{ \begin{matrix} H_4 \\ N \end{matrix} \right\}$ CO. COOH, according the author, and called by him isatoic acid. The acid is slightly soluble in water and alcohol when cold, more easily when hot, crystallizes from water in long needles, from alcohol in yellow, rhombic plates, decomposes when heated beyond its melting point or by prolonged boiling in water, yielding carbon dioxide and other products. This acid can also be gotten directly from indigo-blue by oxidation with chromic acid under glacial acetic acid. (*Jour. f. prakt. Chem.*, **30**, 87). F. P. V.

Betain in Cotton-seed Cake. H. RITTHAUSEN AND F. WEGER.

The mother liquor from which melitose has been extracted, dissolved in 90 p. c. alcohol, gives with platinum chloride a crystalline precipitate. This is dissolved in water, treated with sulphuretted hydrogen and the clear solution evaporated to dryness. The residue is treated with a little water, neutralized with barium hydrate and the filtrate treated with alcohol. To get rid of barium and potassium chloride, still present, the alcohol was distilled off and replaced by absolute alcohol. Some chloride was still retained however. By fractional precipitation with hydrochloric acid, a nearly pure fraction of the hydrochloric acid compound with the base was obtained. This is very soluble in water and crystallizes in large colorless crystals, melts when heated on platinum foil, with white smoke and smell of trimethylamine, then burns with pale blue flame. Analyses lead to the formula $C_5H_{12}NO_2Cl$, and for the base $C_5H_{11}NO_2$. The compounds with gold chloride and with platinum chloride were prepared and examined. From the experiments made, the body seemed identical with betain. Whether this base occurs as such in the cotton seed or is produced by the treatment, is undecided as yet, though the authors are engaged upon the solution of the question. (*Jour. f. prakt. Chem.*, **30**, 36.) F. P. V.

Action of Allyl Iodide, Butyl Iodide and Zinc upon Acetone. E. SCHATZKY.

A mixture of acetone, allyl iodide and butyl iodide is dropped upon zinc. At the end of the reaction heat is applied. The oil obtained yields, on fractionating, a large amount of allyldimethylcarbinol, and, in smaller quantity, a substance with the boiling point 192°–196°, appearing from the analysis to be $C_{10}H_{20}O$, or allyldimethylcarbinol, in which one atom of hydrogen is substituted by the butyl radical. (*Jour. f. prakt. Chem.*, **30**, 216.) F. P. V.

On the Oxidation of Purpurine. C. Dralle.

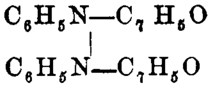
It is a well known fact that purpurine derived from the madder root is not nearly so stable against the action of oxidizing agents, as its synthetically prepared isomers. Schunk and Römer (*Ber. d. chem. Gesell,* **10,** 175) found that a solution of purpurine in caustic potash, when exposed to the sunlight, soon becomes decolorized. The product formed in this reaction, however, was not previously known. This experiment was repeated by the author who succeeded in extracting from the reaction product with ether, a compound which he found to be phthalic acid. This was verified by the melting point of the anhydride (128° C.), the melting point of the inside (226° C.) and the fluoresceine reaction with resorcine.

Phthalic acid was also obtained by oxidizing an alkaline solution of purpurine with potassium ferricyanide. Chinizarine yields with the same reaction also phthalic acid, while alizarine does not. (*Ber. d. chem. Gesell, 1885,* 376.) J. H. S., jr.

On Hydrazobenzole and Benzidine. D. Stern.

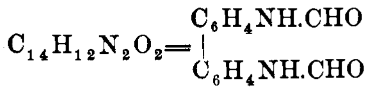
The changes produced by the action of the chlorides and anhydrides of acids upon hydrazobenzole, have, up to the present time, been very little examined.

If hydrazobenzole and benzoylchloride are slightly heated, a dark-colored mass is obtained, which is insoluble in water. On purification this was found to be dibenzoylbenzidine.



$$\begin{array}{l} C_6H_5N\text{—}C_7H_5O \\ \quad\;\; | \\ C_6H_5N\text{—}C_7H_5O \end{array}$$

Hydrazobenzole on being treated in the same manner with formic acid, yields a compound possessing properties similar to dibenzoylbenzidine. On analysis it was found to consist of diformylbenzidine.



$$C_{14}H_{12}N_2O_2 = \begin{array}{l} C_6H_4NH.CHO \\ | \\ C_6H_4NH.CHO \end{array}$$

Hydrazobenzole and acetic anhydride on being mixed together in the cold yield monoacetylhydrozobenzole.

On heating this compound with acetic anhydride, it is converted into diacetylhydrazobenzole. Benzoylchloride converts monacetylhydrazobenzole into dibenzoylbenzidine. (*Ber. d. chem. Gesell, 1885,* 379.) J. H. S., Jr.

The Hydrocarbon, C_8H_{14}, obtained from Allyldiethylcarbinol. REFORMATSKY.

This hydrocarbon is gotten by the action of dilute sulphuric acid upon allyldiethylcarbinol. It is a colorless, mobile liquid with the characteristic odor of the fatty series, insoluble in water, easily soluble in alcohol, ether and benzol, and boils at 122°–123°. The vapor density is 3.81, and the specific gravity at 18° (water at 20°) is .7572. It oxidizes slowly in the air. When oxidized by means of potassium dichromate and sulphuric acid, it yields principally propionic and acetic acids along with some formic acid. It combines energetically with bromine, although, in the experiments made, hydrobromic acid was always evolved. (*Jour. f. prakt. Chem.*, **30**, 217.) F. P. V.

Simple method for the Preparation of Anthranilic Acid. H. KOLBE.

On heating isatoic acid with strong aqueous hydrochloric acid upon a water-bath, is decomposed into carbon dioxide and anthranilic acid, which is left, after evaporation to dryness, combined with hydrochloric acid as a white crystalline mass. Large, colorless crystals may be gotten by crystallizing out of hot water. The aqueous solution is precipitated with ammonia, neutralized with acetic acid, and may be treated with animal charcoal and recrystallized. That which fails to be precipitated by ammonia may be gotten as a blue precipitate with copper acetate, which is then decomposed with sulphuretted hydrogen. The yield is near the theoretical amount. (*Jour. f. prakt. Chem.*, **30**, 125.) F. P. V.

On Haematoxylin and Brasilin. CHR. DRALLE.

This investigation was undertaken with the view of learning whether, by the action of certain re-agents on haematoxylin and brasilin, compounds might be obtained, from which the structure of these two bodies might be ascertained. The authors, however, did not succeed in accomplishing this, and merely publish the results of their experiments, in order that other chemists may not be obliged to go over the same ground. (*Ber. d. chem. Gesell*, *1885*, 372.)

J. H. S., jr.

ANALYTICAL CHEMISTRY.

Volumetric Determination of Nitric Acid. A. LONGI.

Diphenylamine (sulphuric acid solution) is added in very small quantity to a mixture of the solution of nitrate and from 3 to 4 volumes of concentrated sulphuric acid. The resulting deep blue color disappears on adding a definite amount of a solution of potassium stannous sulphate. This solution is prepared by taking the salt $K_2Sn(SO_4)_2$ and dissolving it in sulphuric acid (diluted one-half), effecting complete solution by means of the least possible quantity of hydrochloric acid. The reduction of the nitric acid in the nitrate is as follows :

$$4SnSO_4+2H_2SO_4+2HNO_3 = 4Sn\,(SO_4)_2+5H_2O+N_2O.$$

The method is not applicable when ferric salts are present in considerable quantity, nor for large amounts of nitric acid, on account of the quantity of sulphuric acid which must be added. The author, in his experiments, made use of dilute solutions containing less than .04 grms. of potassium nitrate. (*Zeit. f. anal. Chem.*, **24,** *23.*) F. P. V.

Notes on the Detection of Nitrous and Nitric Acids. R. WARRINGTON.

A study of the relative values and degrees of delicacy of the different tests.

Nitrous Acid.—The Naphthylamine test (Griess') is sensitive to one part of nitrogen as nitrite in 1000 millions of water ; the iodide test reaches its limit at 1:200 millions, the paraamidobenzeneazodimethylaniline test (R. Meldola) at 1:100 millions.

Detection of Nitrous and Nitric Acid.—Of tests serving to indicate presence of one or both of these acids without distinguishing between them, the ferrous sulphate test distinguishes one part (of nitrogen as above) in 300,000. The indigo test is sensitive also to the presence of other oxidizing substances, and is modified or annulled by presence of sugar, urea, and other organic matters which apparently are oxidized in preference to indigo during the necessary heating. The brucine test, applied as recommended by the author, *i. e.*, by keeping down the temperature and adding strong sulphuric acid very gradually, will detect one part **N** as nitrate in 20 millions, and one part as nitrite in 10 millions. With the method recommended by Nicholson, still greater delicacy is possible. The diphenylamine test is sensitive to one part of nitrogen (nitric or nitrous) in 10 millions.

The detection of nitric acid in presence of nitrous acid is more difficult than the converse, and the author knows of no certain method by which it can be accomplished. (*Chem. News*, **51**, 39.)
A A. B.

Lead Assay in the Wet Way. C. Roessler.

The method of Storer (*Chem. News, 1870, 137*) is open to objection on account of the easy oxidation of the spongy lead and the retention of particles of unaltered galena. The anther proposes to substitute the following : The galena is first decomposed with boiling hydrochloric acid and the lead then precipitated by means of zinc. The spongy lead is then dissolved in a pellet of Wood's metal fused under slightly acid water. The increase of weight in the pellet gives the amount of lead taken up. It is capable of dissolving half its weight. The pellet must be rapidly and carefully cooled to prevent its becoming porous and absorbing water. It should be cooled by pouring in cold water when itself not much above its melting point. Veinstone and earthy matters are left behind. The presence of copper necessitates a precipitation and separation of the lead as sulphate before applying this method. Antimony must be separated by precipitation with sodium hydrosulphide, or, if the antimony and lead are together in hydrochloric acid solution, by evaporating to dryness and volitizing the antimony chloride. From test experiments the method seems rapid and fairly accurate. (*Zeit. f. anal. Chem.*, **24**, *1.*) F. P. V.

Identification of Caramel. C. Amthor.

If paraldehyde be added to alcoholic liquids colored with caramel, a brown precipitate is given, and if enough be used the liquid is decolorized. Natural wines, whether white or deeply colored, give white precipitates. Again, if the amount of caramel is not too small, a solution of phenylhydrazine causes a brown precipitate to settle out after twelve hours' standing (the precipitation commences immediately). This reaction is hastened by heating on a water bath. In practice the brown precipitate with paraldehyde may be dissolved in hot water and tested with phenylhydrazine. (*Zeit. f. anal. Chem.*, **24**, *30.*) F. P. V.

Determination of Extract in Wine. C. WEIGELT-RUFACH.

The usual method of evaporating 50 c.c. and weighing the residue is, for wines rich in extract, open to the errors of imperfect drying and loss of glycerine and easily decomposable organic acids during the prolonged heating. It is suggested that an approximate determination be made and then the wine diluted so as to bring its proportion of extract to about the usual amount (or a correspondingly smaller portion than 50 c.c. may be used), or that the material left after the picnometric determination of alcohol be properly diluted and used. The usual method does not seem accurate when the extract is 2 p. c. or over. (*Zeit. f. anal. Chemie.*, **24**, *23.*) F. P. V.

Examination of certain Musts for Sugar and Acid. E. SCHMIDT.

The author has examined the vintage of Montreux and Villeneuve for the contents of sugar and acid from 1880 to 1884, and presents them in a tabulated form. (*Zeit. f. anal. Chem.*, **24**, *33.*) F. P. V.

INDUSTRIAL CHEMISTRY.

On Aniline Black. L. LIECHTI and W. SUIDA.

The authors, in an investigation still in progress, find occasion to modify the formula hitherto accepted for aniline black and throw new light upon the process of its development in dyeing. Aniline chlorate, $C_6H_5NH_2HClO_3$, was obtained by reaction between barium chlorate and aniline sulphate. The salt crystallizes in colorless prisms which by exposure to the air are transformed into aniline black (Emeraldine) under the influence of the chloric acid contained in the salt and without the presence of a metal, which has hitherto been considered necessary. The crystals of the new compound retain the form of the old (pseudomorphism), and the absence of intermediate products indicates that the process is one of direct oxidation of aniline.

The solutions of aniline chlorate may be boiled unchanged but yield emeraldine in abundance on heating with addition of HCl or of ferric chloride, aniline chloride or dilute chromic acid mixture. Pure emeraldine is obtained by treating the crystals of aniline black with HCl, alcohol, ether, and dilute KHO in succession. This corresponds to formula $C_{18}H_{15}N_3HCl$, but the true molecular wt. is as yet undetermined. By distillation with zinc dust the authors obtained diphenylphenylendiamine, diphenylamine, diamidodiphenylamine and, in lesser quantity, phenylendiamine, aniline and ammonia.

The authors regard emeraldine as a chlorine substitution product of the base $C_{18}H_{15}N_3$ and not as a hydrochloride of that base; *i. e.*, as $C_{18}H_{14}ClN_3$ and not $C_{18}H_{15}N_3HCl$. The latter formula maintained by Nietzki (1876, **222**, 592), is discredited by the facts that chlorine is not removed from emeraldine by silver oxide, and that the chlorates of heavy metals, such as are used in development of aniline black, furnish, by decomposition, oxides of chlorine which are capable of yielding chlorinated derivatives of organic bodies.

The use of heavy metals in the development of aniline black depends upon the property possessed by their chlorates of setting free HCl, which is the essential condition in the development of aniline black. The regeneration of these chlorates in presence of $KClO_3$ used in the process permits the repeated transfer of HCl, and the minute proportion of the salts of vanadium, copper, etc., required is thus explained. Free HCl decomposes aniline chlorate and produces emeraldine. In a direct experiment in which fibrous material was treated with mixtures of aniline chlorate and hydrochloride the addition of HCl effected rapid development of black at moderate temperatures (31°–35°) while without this addition a temperature of 80°–90° was required, the necessary HCl being then set free from the aniline salts. (*Ding. pol. Jour.*, **254**, 265.)

A. A. B.

Conversion of Liquid Fat Acids into Solid Products.

The method of St. Cyr. Radison (of Marseilles), for converting oleic acid, a bye-product of the fat industry, into solid palmitic acid rests upon the reaction discovered by Varrentrap in 1841, *i. e.*, treatment with fused caustic potash in large excess, whereby potassium palmitate and acetate and free hydrogen are produced.

$$C_{18}H_{34}O_2+2KOH=C_{16}H_{31}KO_2+C_2H_3KO_2+H_2$$

The operation is carried out in a decomposing vessel of wrought iron with cast iron bottom heated over an open fire, with a large fire space in order that the necessary temperature may be uniformly maintained.

In the process of W..L. Carpenter (J. Soc. Ch. Ind., 1884–200), a closed pan provided with manhole, safety valve, gas exit, tube and stirrer is used. The gaseous products are passed through a coke scrubber and thence into a holder. The charge is 1,500 kilos. oleic acid and 2800 KHO solution, sp. gr. 1.4. Decomposition begins at 290° C.; the most favorable temperatures for the operation being from 300°–310°. At 320° destructive distillation begins and steam is blown in as a preventive measure when this temperature is reached. The process lasts 36–40 hours. The end of the reaction is ascertained by testing the fusing point of the palmitic acid produced, using the method of Dalican. (*Ding. pol. Jour.*, **254**, 264.) A. A. B.

Preparation of Barium and Strontium Hydrate.

Leplay's method (D. R. P., 28,757, Oct. 13, 1883), depends upon the action of superheated steam upon the highly heated carbonates of these bases, which have previously been moulded into balls or cylinders. The material is heated to a red heat and the temperature of the steam must, in all cases, exceed 110° C. The hydrates are formed at temperatures above their fusing points and flow off into appropriate vessels as fast as formed. The fused hydrates, however, dissolve about 25% of their respective carbonates without becoming infusible. The separation of the hydrates from undecomposed carbonate is facilitated by adding caustic alkalies to the water used to mix with the pulverized carbonate before moulding it into cylinders. The temperature of decomposition of the carbonates lies near the fusing point of cast iron. By the substitution of alkaline carbonates for the caustic alkalies used above, the process may be made to yield alkaline hydrates also. Barium and strontium hydrates, being practically insoluble in caustic alkalies, are readily separated from the latter by water. (*Ding. pol. Jour.*, **254**, 436.) A. A. B.

The Fusion, Casting, etc., of Iridium. N. W. PERRY.

An extended description of the iridium industry as recently developed by the introduction of the Holland process, together with many practical details and an index to the literature of iridium. (*Chem. News*, **51**, 1.) A. A. B.

On Some New Paraffins. K. B. SORABJI.

Cetane, $C_{16}H_{34}$, made from cetyl iodide by action of zinc and fuming HCl, is a crystalline solid fusing at 19–20°, boiling at 278° and yielding vapor density 7.85–7.90. Theory requires 7.84.

Dicetyl, $C_{32}H_{66}$, and diheptyl, $C_{14}H_{30}$, were prepared by the method of Wurtz ; action of sodium upon iodides of the alcohol radicles. Dicetyl crystallizes in pearly scales from its solution in acetic acid ; fuses at 70°, boils at a temperature far above the range of the mercury thermometer, distills unchanged and is not dissolved or blackened by strong sulphuric acid at 150°. Vapor density found, 16.1–15.64, calculated 15.5. Diheptyl is a colorless, mobile oil, having a slight odor, solidifying at 6°; boiling at 245°, at 750 m. m. without decomposition, and yields a vapor density of 7.06–7.04. Theory 6.82. (*J. Ch. Soc.*, **266**, 37.) A. A. B.

Abstracts of American Patents Relating to Chemistry.

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

February 3, 1885.

311,470.—Composition for preserving eggs.—C. U. Chamberlin.

Consists of alcohol, crystals of salicylic acid, deodorized wood-naphtha, bleached resin-lac and powdered chalk.

311,483.—Apparatus for manufacturing gas.—A. O. Granger and J. H. Collins, Jr.

Water gas is made by the decomposition of steam in contact with heated carbon in a furnace, and such gas is passed into the bottom of a vertical heated flue or chamber, and is therein enriched or carbureted with hydrocarbon vapor sprayed in at the top of the flue. The carbureted gas is fixed in the heated flues of the fixing chamber.

311,484.—Gas-generating apparatus.—A. O. Granger.

311,493.—Apparatus for generating gas.—I. James.

311,506.—Refrigerating machine.—C. G. Mayer.

311,529.—Lubricant.—H. Riedel.

Consists of mineral oil, boiled linseed oil and powdered plumbago.

311,542.—Process of refining, reducing and separating hydrocarbon oils.—E. W. Strain.

The oils are first subjected in transit and under pressure to heat which will vaporize them, then the oil is sprayed into an expansion chamber in the presence of superheated steam, where the oil and vapors are separated, and, finally, the vapors are conducted through a surface or air condenser, where the vapors of different degrees of gravity are trapped and separated at the points of condensation.

311,555.—Composition for soap.—H. Zahn.

Claims the use of a silicious, alkaline earth in soap making.

311,569.—Composite roofing.—W. Coultas.

A covering for boilers, roofs, etc., consisting of an argillaceous paste or plaster, mixed with fibrous material and soot. The composition is coated with tar after being applied.

311,583—Inextinguishable lamp for marine and land purposes.—J. R. Holmes.

311,585.—Hydraulic main for gas works.—C. W. Isbell.

311,590.—Method of and apparatus for mashing and cooking grain.—F. O. Kinz.

311,595.—Production of sulphurous acid.—J. S. McDougall.

Sulphurous acid is produced by forcing air under pressure into a close vessel or retort, containing ignited sulphur or sulphur bearing material, a low temperature being maintained in the vessel or retort, by surrounding it with a cooling medium.

311,646.—Liquefaction, dextrination and saccharification, by means of malt of the starch in amylaceous substances.—L. Cuisinier.

311,694.—Apparatus for the manufacture of artificial stone.—C. I. Walker.

311,699.—Apparatus for recovering volatilized metals.—A. F. Wendt.

311,748.—Metal-extracting apparatus.—W. Hamilton.

311,749.—Metal-extracting apparatus.—W. Hamilton.

311,750.—Covering for steam pipes.—J. M. Hammill.

Consists of superposed layers of paper or other material having granulated cork adhesively applied.

311,799.—Heater and evaporator for syrup and other liquids.—H. Y. y Lazarte and E. P. Larée.

311,082.—Puddling aud heating furnace.—T. H. Bennett.

311,804.—Calcining and chloridizing furnace.—W. H. H. Bowers.

311,830.—Manufacture of iron and steel.—J. Grottenthaler.

The iron is purified and decarburized by melting, adding sulphur and mixing it therewith by puddling.

311,858.—Gas machine.—W. C. Strong.

February 10th, 1885.

311,878.—Magma pump.—Geo. Dinkel.

This is a pump for pumping semi-fluid masses.

311,895.—Manufacture of hydraulic cement.—D. Griffiths.

To the calcined cement-rock or hydraulic limestone, is added some of the raw rock containing silica and slaked lime.

311,938.—Paper for roofing felt.—C. W. Armour.

311,983.—Paper for sheathing, &c.—C. W. Armour.

The paper is made of spent tan bark, meadow hay and mill waste, and is covered on both sides with a layer of paper pulp.

311,967.—Method of an apparatus for enriching and burning water gas.—C. J. Eames.

This is a process for applying water gas in metallurgical operations.

311,998.—Process of filling bottles with aerated beverages.—G. Matthews.

312,010.—Protected nitrate of ammonia for use in explosive compounds.—R. S. Penniman.

Nitrate of ammonia is protected against deliquescence by a coating of petroleum or its products.

312,037.—Sectional non-conductive covering for tubes.—W. M. Suhr.

A tube covering consisting of plaster of Paris, asbestus and sawdust, covered on the outside with felt.

312,045.—Process of annealing copper wire.—W. Wallace and T. J. Wood.

Coils of wire are packed in pots with oxide of copper, and heated in the annealing furnace.

312,057.—Composition for the manufacture of artificial stone.—J. L. Wray.

Consists of water, lime, alum, glue and common mortar.

312,106.—Gas meter.—Gustav Fajen.

312,142.—Method for deoxidizing the surface of sheet metal.—E. V. McCandless.

The oxidized iron or steel plates are heated in a current of natural gas, or other deoxidizing gas.

312,186.—Apparatus for caburetting air and gas.—J. S. Butler.

312,187.—Filter.—C. De Los Rios.

312,240.—Amalgamator.—R. J. Atcherley.

February 17, 1885.

312,248.—Manufacture of potassium ferrocyanide.—H. Bower.

Nitrogenous animal matters, potassium carbonate and iron are mixed together and heated. The resulting melt is treated with water, and carbon dioxide.

312,270.—Insecticide.—J. B. Hoag.

Consists of cayenne pepper, American hellebore root, Paris green, sugar and carbolic acid.

312,281.—Filter.—J. Mallie.

312,289.—Air or gas carburetor.—J. M. Palmer.

312,333.—Apparatus for separating or concentrating material of different specific gravities.—A. E. Crow and W. L. Crow.

312,341.—Apparatus for drying starch.—W. Duyrea.

The starch is dried on endless aprons, in chambers heated by hot air.

312,342.—Apparatus for drying the bye-products of starch manufacture and other vegetable matters.—W. Duryea.

312,351.—Process of oxidizing linseed and other oils.—J. W. Hoard and F. R. Hoard.

The oil is oxidized by passing and repassing it, by the agency of a blast of air through an atomizer, within the vessel containing the liquid under treatment.

312,356.—Artificial stone.—J. D. King.

Consists of sand, cement, water, soluble glass, borax, saltpetre, dried alum and salt.

312,418.—Manufacture of linseed and other oils.—H. F. Jaryan.

The oil is extracted by solvents and filtered through animal charcoal in the cold, for the purpose of bleaching and deodorizing it.

312,422.—Glass melting furnace.—G. H. Benjamin.

312,431.—Gas apparatus.—W. M. Casler.

Coal is distilled, and the resulting gas is enriched or carbureted with the vapor of hydrocarbon oil, the oil being admitted to the retort containing the coal by a supply pipe. The gas, after leaving the retorts, is purified by passage through a mixture of sawdust, iron filings and salt.

312,510.—Sorghum evaporator.—D. Rather, Jr., and S. Rather.

312,525.—Bleaching compound for jute, paper stock, etc.—P. Souders, C. Smith, H. M. Craighead and N. Souders

The stock is mixed with a composition of alum and clay, raised to steam heat, and bleaching powder is then added.

312,527.—Filter.—F. X. Spitznagel.

312,586.—Process of preparing ores for amalgamation and desulphurizing the same.—C. R. Squire.

The ore is prepared and desulphurized by immersing in a solution of salt-cake.

312,587.—Treatment of ores for amalgamation.—C. R. Squire.

The ore is desulphurized by subjecting to a mixture of a solution of salt-cake and a solution of nitre-cake.

312,592.—Apparatus for treating the refuse from breweries.—F. W. Wiesebrock.

312,593.—Preserving brewers' grain.—F. W. Wiesebrock.

The refuse from starch and glucose factories and breweries, is first treated with an antiseptic, and then dried by forced currents of air, heated to a high temperature.

W. R.