

ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

On the Different Forms of Tellurium. M. BERTHELOT and CH. FABRE.

With a view to study the heat produced by the passing from the amorphous to the crystallized state, bromine and water saturated with bromine were employed, the two liquids dissolving tellurium without yielding any gas.

Crystallized tellurium: Three determinations at 13°, for one equivalent (Te=64), the average heat was +33.33 Cal.

Amorphous tellurium: precipitated by SO₂. Three determinations: 21.292 Cal.

2d. Tellurium: precipitated from tellurides average +33.39 Cal.

3d. Tellurium from hydrotelluric acid: Precipitated by oxidizing agents; average 33.505 Cal.

Hence crystallized Te changed into amorphous Te

yields.....+12.096 Cal.

The result is the establishing of the existence of two allotropic states for tellurium, and there is parallelism between the states of sulphur and tellurium, for similar physical and chemical conditions. (*Bul. Soc. Chim.*, **49**, 692.) M. L.

Heat of Formation of Hydrotelluric Acid. BERTHELOT and CH. FABRE.

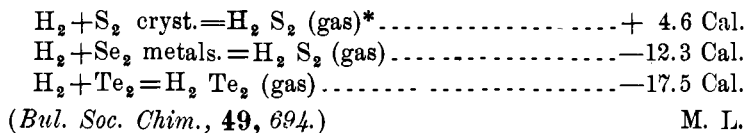
The gas is prepared by the action of HCl on the magnesium telluride (prepared by passing Te over Mg heated in a stream of pure and dry H).

For the calorimetric studies the reaction of ferric chloride with hydrotelluric acid is employed. The result is

H (gas) + Te (crystallized) = HTe (gas).....-17.52 Cal.

The formation of TeH from its elements occurs, then, with absorption of heat. The combination of H with the elements of the

sulphur family yields quantities of heat represented by numbers decreasing as the *equivalent* weight of the element increases. Thus



Action of Hydrogen Sulphide on Arsenic Acid. B. BRAUNER and F. TOMICEK.

Upon passing a stream of hydrogen sulphide through aqueous arsenic acid, or an acid solution of an arseniate, the more *arsenic pentasulphide* is formed :

- (a.) The larger the quantity of hydrochloric acid present ;
- (b.) The larger the quantity of hydrogen sulphide passed in a unit of time ;
- (c.) The lower the temperature (between 0-100°).

The more *arsenic trisulphide*, mixed with sulphur, is formed :

- (a.) The less the hydrochloric acid present ;
- (b.) The less the quantity of sulphuretted hydrogen used ;
- (c.) The higher the temperature. (*Jour. Chem. Soc.*, **53**, 145.)

W. P. M.

Action of Hydrogen Sulphide on Arsenic Acid. L. W. McCAY.

The author believes he has separated free sulphonyarsenic acid, by acidifying a dilute solution of an alkaline arseniate with sulphuric acid, and then acting upon the latter with a small quantity of H_2S water. Although a potassium salt of this acid has been prepared, it has always been held that the acid itself is too unstable to exist in the free state. The work on this subject will be continued. (*Chem. News*, **57**, 54.) W. P. M.

Direct Fixation of Free Nitrogen of the Air by Vegetable Soils. M. BERTHELOT.

The conclusion is that vegetable soils continually assimilate free nitrogen of the air. The gain of a soil in nitrogen could not be attributed to the nitro-compounds existing in the atmosphere or in solution, for in the experiments of the author the rain water would carry off, in the form of nitrate alone, more nitrogen than the same rain would have brought in the form of ammoniacal and nitric nitrogen together. Nevertheless the fixation of nitrogen is greater in a soil washed by rain than in a soil under cover; probably on account of the greater activity given to the organisms which assimilate nitrogen directly, by this circulation of air and water.

The author continues the study of the fixation of nitrogen by soils in the presence of vegetation as before and enumerates here his results tending to prove that plants liberate again the nitrogen assimilated from the atmosphere by the soil. (*Bul. Soc. Chim.*, 48, 684.) M. L.

Researches on Drainage. BERTHELOT.

The author has found that the drainage waters from rain take away from the soil a quantity of nitrogen (combined) much greater than the amount brought by the atmosphere and by the rain. In the conclusion of the paper he states that the amount of nitrogen carried away by drainage is 24 or 26 times the amount brought by rain, the limits being from 5:1 to 50:1. (*Bul. Soc. Chim.*, 48, 684.) M. L.

Researches on the Emission of Ammonia by Vegetable Soils. BERTHELOT and ANDRÉ.

These soils emit ammonia spontaneously, owing to the slow but necessary decomposition of the amides and ammoniacal bodies of the soil in the presence of water, to the decomposition of the carbonates, and probably also to physiological causes. The presence of free ammonia in the air surrounding the soil does not prevent this emission.

The emission of ammonia by a soil covered with vegetation in free air and in confined air has also been studied. The conclusion

is that there is no relation between the time of contact of a soil with atmospheric air and the proportion of NH_3 yielded by it; on the contrary the emission of NH_3 by a confined soil is proportionate to the time. (*Bul. Soc. Chim.*, 48, 678.) M. L.

ORGANIC CHEMISTRY.

Mixed Acid Anhydrides. W. AUTENRIETH.

The preparation of the mixed anhydrides by means of acetic anhydride is generally effected by heating the corresponding acid with 2-3 times the theoretical quantity of acetic anhydride in a flask, provided with a reflux condenser, for 15-30 minutes. After cooling, the product of the reaction is mixed with sodium carbonate in excess, to remove the acetic acid formed and decompose the excess of acetic anhydride. The mixed anhydride then separates as an oil.

Acetic-caproic anhydride, $\text{C}_6\text{H}_{11}\text{O}-\text{O}-\text{C}_2\text{H}_5\text{O}$, is a colorless liquid, lighter than water. The boiling point is not constant, the greater portion distilling between 165 and 175°. After continued heating, complete decomposition appears to take place, the thermometer rising above 200°.

Acetic-valerianic anhydride, $\text{C}_5\text{H}_9\text{O}-\text{O}-\text{C}_2\text{H}_5\text{O}$, is very similar in its properties to the previous compound. The greater portion distills between 147 and 160°.

Acetic-β-thioethylcrotonic anhydride, $\text{CH}_3\text{C}(\text{SC}_2\text{H}_5) : \text{CH}.\text{CO}-\text{O}-\text{CH}_3.\text{CO}$, is a thick yellowish brown oil, which is heavier than water. Exposed to the air, it is gradually decomposed, the thioethylcrotonic acid separating in finely developed crystals. Concentrated nitric acid acts upon it very violently. With concentrated sulphuric acid the anhydride gives a dark red coloration. It does not show the characteristic dark green coloration of thioethylcrotonic acids, with isatine and sulphuric acid.

Acetic-benzoic anhydride, $\text{C}_6\text{H}_5.\text{CO}-\text{O}-\text{C}_2\text{H}_5\text{O}$. This compound, which was first obtained by Gerhardt, from chloracetyl and

sodium benzoate, may also be prepared from acetic anhydride by the above method. When benzoic acid is boiled with acetic anhydride for 2-3 hours, in a flask with reflux condenser, the yield of acetic-benzoic anhydride is very favorable.

Valeryl-phenylhydrazid, $C_6H_5 \cdot HN \cdot NH \cdot C_5H_9O$, is obtained by mixing acetic-valerianic anhydride with phenylhydrazine. The product of the reaction is dissolved in water, and acidified with acetic acid in excess, when the hydrazid separates in crystals. From hot petroleum ether these are crystallized in yellowish white plates, which are readily soluble in alcohol, ether and chloroform, but difficultly soluble in cold petroleum ether. The melting point is at 101° .

Capryl-phenylhydrazid, $C_6H_5 \cdot HN \cdot NHC_8H_{11}O$, is obtained in the same manner as the previous compound. It crystallizes from petroleum ether in white needles, and melts at $116-117^\circ$.

Cinnamic acid, β -chlorocrotonic acid and other substituted fatty acids also give compound acetic anhydrides, in the above described manner. (*Ber. d. chem. Ges.*, **20**, 3187.) W. R.

Homologues of Acetylacetone ; General Methods for the Preparation of a Series of Diacetones, etc., etc. A. COMBES.

The author having in previous papers studied the body called by him acetylacetone, continues his studies on its derivatives. By the action of sodium he obtains a metallic compound in which Na replaces one H atom of the central link CH_2 , and he starts from this organo-metallic product to obtain the higher homologues, employing for this substitution the alcoholic iodides. By heating $C_5H_7O_2Na$ (sodium acetylacetone) with ethyl iodide, he obtains the ethylacetylacetone, $CH_3-CO-CH(C_2H_5)-CO-CH_3$, which boils at $178-179^\circ$. Its general properties are the same as acetylacetone ; it does not combine with sodium bisulphide. The result of the decomposition of ethylacetylacetone by caustic potash is methylpropylcarbonyl, studied by Friedel, which combines with sodium bisulphide. The compound $CH_3-CO-CH(C_5H_{11})-CO-CH_3$, iso-amylacetylacetone, has been similarly studied. The author concludes with general considera-

tions relating to this new class of bodies, and says that the same reactions will allow the preparation of all the bissecondary glycols; he insists on the fact that the group CH_2 , contained in acetylacetone, has very distinctly acid properties, the hydrogen atoms partaking of all the properties of the typical H of acids. From this it follows that the organo-metallic derivatives are really salts. (*Bul. Soc. Chim.*, **48**, 611.) M. L.

On the Constitution of the Chlorinated Ethyl-bisulphide of Guthrie. W. SPRING and A. LECRENIER.

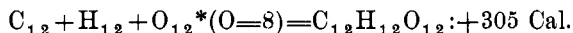
The authors recall the fact that Guthrie studied the action of ethylene on sulphur chloride, having obtained thus the bodies $(\text{C}_2\text{H}_4\text{Cl})_2\text{S}_2$ and $(\text{C}_2\text{H}_3\text{Cl}_2)_2\text{S}_2$, and propose to investigate the chemical structure of these compounds. They first oxidize the body obtained by Guthrie $(\text{C}_2\text{H}_4\text{Cl})_2\text{S}_2$; the lead salt of the acid obtained has the formula $(\text{C}_2\text{H}_4\text{ClSO}_3)_2\text{Pb}$. This salt is heated in sealed tubes in the presence of ammonia; the product boiled with lead hydrate to eliminate NH_3 , yields crystals of taurine. The acid is β -chloroethyl sulphuric $\text{CH}_2\text{Cl}-\text{CH}_2\text{SO}_3\text{H}$, which, as is known, yields taurine, $\text{CH}_2\text{NH}_2-\text{CH}_2\text{SO}_3\text{H}$, whereas α -chloroethyl sulphuric acid, $\text{CH}_3-\text{CHClSO}_3\text{H}$, yields isotaurine. (*Bul. Soc. Chim.*, **48**, 629.) M. L.

Calorimetric Measurements. BERTHELOT, LONGUISIENE and RECOURA.

The so-called calorimetric bomb of M. Berthelot (*Annales de Chem. and de Phys.*, 6^e serie, **6**, 546, and **10**, 433) was employed for the determination of the heat of combustion of organic compounds, those being burned in O compressed to 24 atmospheres. The results of a series of confirmatory and new determinations are given:

Retene gave for 1 grm.	9.7181 Cal.
Naphthalene gave for 1 grm.	} 9.696 Cal. 9.651 Cal.
Glucose $\text{C}_{12}\text{H}_{12}\text{O}_{12}$ (1 mol.)	

Thus, in the formation of glucose from its elements,



The result is that the combination of C with the elements of water to form this body would absorb—108 Cal. Studies upon the heat of formation of bodies that stand between the fatty and aromatic series are also described. (*Bul. Soc. Chim.*, **48**, 697, 700-702.) M. L.

On Inactose of Neutral Sugar. E. J. MAUMENÉ.

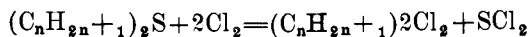
The author refers to his previous paper on the formation of a sugar optically inactive, obtained by the action of the white powdered sugar of the refineries on silver nitrate. (*Journal des fabricants de sucre*, May, 1870.) The preparation recently attempted with pure sugars did not succeed so well; the reason assigned by the author is the presence of traces of alkali in the sugar first used, this alkali preventing the formation of the acid $C_{12}H_{12}O_{14}$, the presence of which produces a rapid inversion of the whole quantity of sugar present. The pure inactive sugar is isolated by treating the silver compound with calcium chloride. The filtered solution of sugar and calcium nitrate is separated by alcohol. The deposit of inactose is dissolved in a small amount of water and again treated with alcohol. The sugar does not crystallize; it retains its chemical properties in an alkaline solution, and does not reduce the cupro-tartaric solution. It is inverted more quickly than sucrose by acids; it combines with lime, but is separated from it by CO_2 and then remains inactive as before. (*Bul. Soc. Chim.*, **48**, 777.) M. L.

Action of Chlorine on the Sulphides of the Alcoholic Radicals—Preparation of Some New Chloro-derivatives. W. SPRING and A. LECRENIER.

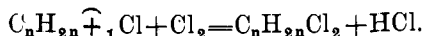
One of the authors of this paper having, in collaboration with C. Winssinger, studied the action of Cl on the sulphuric derivatives of the fatty series, the authors have extended the investigation to include the sulpho-compounds. The result is that no

* O=8.

addition products are obtained by the action of Cl; the sulphur is entirely removed, while the hydrocarbon constituents are submitted to a more or less energetic chlorination. The general formula or equation representing the action of Cl on the sulphides would be



The final reaction being



The authors have studied the action of Cl on the sulpho-compounds of propyl, isobutyl and amyl (6 chloro-derivatives). The conclusion of their paper is that the hydrocarbon groups C_nH_{2n+1} behave towards Cl in different ways when free or when combined with sulphur. When the group C_nH_{2n+1} is combined with the latter element, chlorine seems to combine in preference with the atoms of carbon united to sulphur, taking hold of another atom only when the affinities of these latter have been satisfied. (*Bul. Soc. Chim.*, 48, 623.) M. L.

On few Derivatives of Saccharic Acid and of Mucic Acid.

M. MAQUENNE.

The author has found that saccharic and mucic acid act differently upon acetic anhydride in the presence of zinc chloride. Saccharic acid under these conditions yields a dilactone, mucic a tetracetyl derivative.

The author has combined mucic and saccharic acids with phenylhydrazine and describes the properties of the compounds obtained. He discusses the probable constitution of mucic acid and all other bodies of the same group. He regards them as acetic hydrates comparable to mesoxalic or to dioxytartaric acids, but of a more stable nature. (*Bul. Soc. Chim.*, 48, 719.) M. L.

On some Chlorinated Derivatives of Acetic Ether.

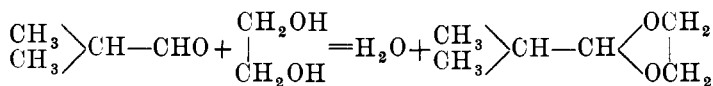
MAURICE DELACRE.

A lengthy description is given of experiments on the substitution of Cl for H in acetic ether, the theory indicating the possi-

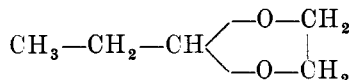
bility of 48 products of substitution. Two methods are employed for this study. The first is by letting the acetyl chlorides react on the chlorethylic alcohols. The second by the action of acetylchloride upon aldehyde. (*Bul. Soc. Chim.*, **48**, 704.) M. L.

Combinations of Aldehydes and Glycols. H. LOCHERT.

A new compound has been obtained by heating a mixture of glycols and isobutylic aldehyde; the reaction is represented by



The liquid obtained distils at 124–126°, is soluble in 10 parts of water, very soluble in alcohol and ether. CaCl₂ and KOH precipitate the body from its aqueous solution. Propionic aldehyde gives similar results with glycol. The formula of the compound is



(*Bul. Soc. Chim.*, **48**, 716.) M. L.

Oxydiphenyl Bases. A. WEINBERG.

Diamido-oxydiphenyl, C₁₂H₁₂N₂O. 300 gms. of sodium benzene azo-*p*-phenol-sulphonate are suspended in 500 gms. water, and to the mixture is carefully added a solution of stannous chloride in hydrochloric acid, care being taken to keep the temperature below 30°. After standing 12 hours the reaction is complete. The tin is removed by hydrogen sulphide, and the solution evaporated to small bulk, when the hydrochloride of diamidooxydiphenylsulpho acid separates in large, colorless, transparent crystals.

The free sulpho acid is prepared from the chlorhydrate by carefully neutralizing it, or by adding sodium acetate. It crystallizes in needles from water, in which it is readily soluble, and forms soluble salts with the bases.

The hydrochloride, heated to 180° with water, yields diamido-oxydiphenyl sulphate, which is sparingly soluble in water, but dissolves in warm dilute hydrochloric acid. Diamidooxydiphenyl hydrochloride is readily soluble in water. Platinic chloride pro-

duces in this solution a yellowish precipitate, $C_{12}H_8O.(NH_2.HCl)_2 + PtCl_4 + 5H_2O$, which is sparingly soluble in water, and insoluble in alcohol and ether.

The free base is precipitated from its salts by soda. It crystallizes from water in colorless scales, melting at 185° . It is difficultly soluble in water, cold alcohol, ether and benzene, but readily soluble in soda or potash lye. The alkaline solutions quickly oxidize in the air. It easily forms a tetrazo-compound with nitrous acid.

Diamidooxyphenyltolyl, $C_{13}H_{14}N_2O$. The coloring matter obtained from *o*-toluidine and *p*-phenol-sulpho acid is reduced in the same manner as the aniline compound. The hydrochloride of diamidooxyphenyltolyl sulpho acid crystallizes from the concentrated solution freed from tin. On adding sodium acetate to the aqueous solution of the hydrochloride, the free sulpho acid immediately separates in colorless needles. The free acid when heated decomposes without showing any definite melting point, is difficultly soluble in water, very soluble in acids and alkalis, and forms a readily soluble tetrazo-compound.

Heated to 180° with water, the diamidooxyphenyltolyl sulpho acid immediately yields colorless crystals of diamidooxyphenyltolyl sulphate. The free base crystallizes from water in nacreous plates melting at 177° . It is difficultly soluble in ether and benzene, but dissolves easily in a dilute solution of potash, from which it is precipitated unchanged by acetic acid. The tetrazo derivative is very much like tetrazoxydiphenyl. (*Ber. d. chem. Ges.*, **20**, 3171.)

W. R.

Derivatives of *p*-Amidoisobutyl Benzene. C. GELZER.

Mononitroacetylamidoisobutylbenzene. $(C_4H_9)(NO_2)C_6H_3.NHC_2H_5O$. Acetylamidoisobutylbenzene is added in small portions to nitric acid of sp. gr. 1.485, cooled by ice. It rapidly dissolves with an intensely yellow color. The reaction is quite violent, but with care the evolution of hyponitrous acid may be prevented. The product of the reaction is poured into an excess of ice water, and the resulting yellow, crystalline precipitate is filtered off, washed and purified by crystallization from dilute alcohol.

It melts at 104.5°. From a large quantity of hot water, or dilute alcohol, it crystallizes in fine yellow needles having a faint aromatic odor. It boils with partial decomposition at 250–252°. When a cold alcoholic solution of potash is added to nitroacetylamiidoisobutylbenzene, the yellow solution changes to reddish yellow, with the evolution of much heat. On addition of water to the product an abundance of reddish yellow crystals of nitroamidoisobutylbenzene, $(C_4H_9)(NO_2)C_6H_3.NH_2$, separates. After repeated crystallization from dilute alcohol, the melting point is constant at 106.5°.

Diamidoisobutylbenzene, $C_4H_9C_6H_3(NH_2)_2$ is obtained by reducing nitroamidoisobutylbenzene with tin and hydrochloric acid. The tin is removed from the solution by zinc, an excess of sodium hydroxide added, and the solution is shaken out with ether. The etherial extract, after removing water with potassium hydroxide, leaves a yellowish brown, crystalline mass, which is purified by distillation in an atmosphere of hydrogen. It boils at 280–282°, and crystallizes in the receiver in pale yellow, radiated, crystalline masses. From water it is obtained in colorless, micaceous plates, melting at 97.5°. It sublimes readily in foliated crystals. On keeping, even in sealed tubes, it is at first colored pale blue, becoming darker, and finally dirty, dark blue. The sublimed base is permanent in the air. The base is soluble with difficulty in cold water, but readily soluble in boiling water, alcohol, ether and benzene. Its salts crystallize readily.

The hydrochloride, $C_{10}H_{16}N_2 \cdot 2HCl$, is separated from the alcoholic solution of the base, on addition of hydrochloric acid, in white, shining plates. It is soluble in cold water and boiling alcohol, slightly soluble in cold alcohol, and insoluble in benzene and ether. The aqueous solution is colored cherry-red by ferric chloride. Potassium bichromate produces a brown, pulverulent precipitate.

The picrate, $C_{10}H_{16}N_2 \cdot 2C_6H_2(NO_2)_3OH$, separates immediately on mixing benzene solutions of the base and picric acid, in light yellow needles. It is insoluble in cold water, sparingly soluble in boiling water and ether, insoluble in benzene and readily soluble in alcohol.

The oxalate $(C_{10}H_{16}N_2)_2 \cdot H_2C_2O_4$, is prepared by mixing alcoholic solutions of the base and oxalic acid. It separates as a white, crystalline precipitate, which crystallizes from alcohol in fine white plates. It is soluble in boiling water, slightly soluble in boiling alcohol, and insoluble in ether. The alcoholic solution gives a fine green color with ferric chloride.—(*Ber. d. chem. Ges.*, **20**, 3253.)
W. R.

β -Chinolinedisulpho Acid. W. LA COSTE and F. VALEUR.

This acid is obtained by heating the barium salt with the theoretical quantity of standardized sulphuric acid, filtering off the barium sulphate, concentrating the filtrate and adding alcohol. On cooling it crystallizes in fine white needles, which are readily soluble in water, and insoluble in alcohol, ether, benzene and chloroform.

Potassium β -chinolinedisulphonate, $C_9H_8N(SO_3K)_2 + H_2O$, is prepared by decomposing the barium salt with potassium carbonate. It separates from its aqueous solution in white, crystalline, granular crusts, which are readily soluble in boiling water, soluble with difficulty in cold water, and insoluble in alcohol. Fused with three times its weight of potassium hydroxide at 160° , it yields basic potassium- β -oxychinolinesulphonate, which is readily soluble in water. On addition of dilute sulphuric acid to the solution, the free β -oxychinolinesulpho acid crystallizes in fine, yellow, lustrous plates, which are readily soluble in hot water, soluble with difficulty in cold water and alcohol, very sparingly soluble in chloroform and carbon disulphide, and insoluble in ether and benzene. They melt at $270-275^\circ$.

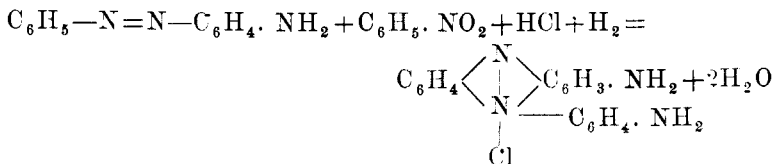
β -Dioxychinoline is prepared by fusing one part potassium β -chinolinedisulphonate with 5 parts potassium hydroxide at $250-255^\circ$. The melt, after cooling, is dissolved in water, decomposed with sulphuric acid, and neutralized with sodium carbonate, after a portion of the potassium sulphate has crystallized out. The separated flocculent base is shaken out with ether. After distilling off the ether, the base remains as a dark oil, which crystallizes on cooling. It is dissolved in alcohol, boiled with freshly ignited bone black and filtered. On addition of water the base crystallizes in pale brown needles, which are soluble in ether, alcohol, benzene,

chloroform and carbon disulphide, and insoluble in water and alkalis. β -dioxychinoline is very permanent in the air, melts at 68° C., and sublimes at a higher temperature in fine white needles. With acids it forms permanent salts, which can only be crystallized with difficulty from their solutions. (*Ber. d. chem. Ges.*, **20**, 3199.)

W. R.

New Method of Formation of Safranines. PH. BARBIER and LEO VIGNON.

The authors have thought that if they could make amidoazobenzol react on nitrobenzol in the presence of a reducing agent, capable of yielding H_2 , phenosafranine might be formed, the nitrobenzol furnishing the oxygen and also the nascent aniline necessary to the equation :



The method giving the best results is as follows :

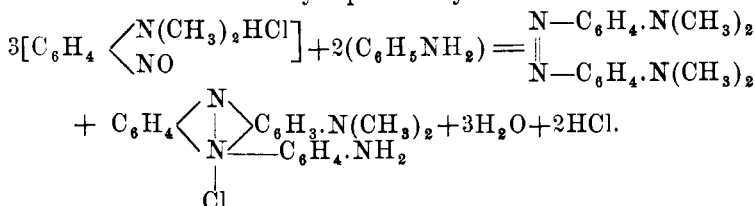
Heat on oil bath at 180° in a glass flask, with cooler and condenser, a mixture of amido azobenzol hydrochloride (1 mol.), enough Fe and HCl to evolve H_2 and enough nitrobenzol to give convenient fluidity. After three hours, the reaction being ended, treat the mass with 5 times its weight of water and distil in a current of steam to remove nitrobenzol. The coloring matter in solution is precipitated by salt. The pure coloring matter is very soluble in hot water, with a red coloration; crystallizes readily on cooling; soluble in alcohol, the solution being dichroic; is not precipitated by alkalis; the solution in strong sulphuric acid is green, passing through blue to red on addition of water. (*Bul. Soc. Chim.*, **48**, 771.)

M. L.

On a new mode of formation of substituted Safranines. PH. BARBIER and L. VIGNON.

By the reaction of para-nitrosodimethylaniline hydrochloride on aniline in alcoholic solution, the authors have obtained the two

bodies: tetramethyldiamidobenzol and dimethylphenosafranine, the formation of which they represent by



Orthotoluidine gives the same results as aniline, the homologues of the above bodies being obtained. (*Bul. Soc. Chim.*, **48**, 636.)
M. L.

ANALYTICAL CHEMISTRY.

A Criticism of the Direct Methods for Determining Tartaric Acid in Lees, Argols, etc. By A. BORNTÄGER.

The conclusions arrived at by the author's criticisms are that the oxalic acid method should be applied as follows to lees, argols, sablons, etc.:

1. For a preliminary analysis, weigh out 7.5 grms. lees, or 3.75 grms. argol. Of tartrate of lime weigh out, according to purity, from 3.75 to 7.5 grms. 3.75 grms. c. p. calcium tartrate (+ 4H₂O) contain 2.1638 grms., 7.5 grms. (92.20% pure) contain 3.9894 grms., the same quantity with 16% tartaric acid contains 1.2 grms. of the latter. These data apply only to tartrates of lime which have not been dried above 60° C.

For sablons use a quantity proportionate to the tartaric acid in the same as above. The sample taken may contain from 1.2 to 4.0 grms. tartaric acid. The weighed amount of the freshly pulverized sample is treated with 30 c.c. water, and heated until all effervescence ceases. Neutralize the mass with KOH solution or HCl, as required, leaving it slightly acid, and then proceed to determine the quantity of potassium oxalate required to precipitate all the lime. Add 1.5 grms. K₂C₂O₄, and heat on boiling water bath for 10 min.

Test the filtrate, acidulated with acetic acid, for oxalic acid. If absent add another 1.5 grms. $K_2C_2O_4$, and heat again, etc., and continue the addition of $K_2C_2O_4$ until the filtrate shows the presence of oxalic acid.

2. For the actual analysis an accurately weighed amount is taken and heated on a water bath with 30 c.c. water as above and 1.5 grms. more of oxalate than was found to be required by the above preliminary test; heat for 15 m.; neutralize as required, leaving the solution slightly acid; continue the heat with frequent stirring for $\frac{3}{4}$ hour. Almost neutralize the mass and filter while hot through a vacuum filtering funnel. Wash with hot water until the washing no longer contains oxalic acid. If the filtration proceeds too slowly the modified method of Grosjean (*J. Ch. Soc.*, **35**, 346) should be followed, by which a larger quantity of material is taken for the analysis, and then, without filtering, the whole is diluted to a considerable volume and a proportional part of the filtrate taken for the further determination of the tartaric acid. The volume occupied by the precipitate must be determined. By this modification it is best to add 100 c.c. of hot water to the material before the final neutralization.

The filtrate with washings, or an aliquot part of the filtrate, is evaporated after the addition of 5 grms. KCl to about 50 c.c.; after cooling 3 grms. citric acid, in 50% solution or crystals, are added. Stir for 10 minutes and filter after $\frac{1}{2}$ hour, or stir for a few minutes and let stand over night. The bitartrate precipitate is washed with the 10% KCl solution saturated with $KHC_4H_4O_6$ until the washings give no indication of oxalic acid after the addition of acetic acid and calcium acetate. The precipitate is titrated, hot, with normal KOH solution. (*Zeit. Anal. Chem.*, **26**, 699-714.)

J. F. G.

Volume and Quantity of Carbon in the Gases Evolved by the Solution of Iron in Acids. H. BÄCKSTRÖM and G. PAJJKULL.

The following table gives the results of these investigations :

TOTAL C %.	NAME.	C. C. GAS FROM 1 GRM. IRON.	% CARBON IN GAS.
0.00	Pure iron should give.....	399.6	----
0.11	Eggertz normal wire.....	398.7	----
0.20	Iron wire.....	396.9	----
0.26	Eggertz normal wire.....	392.5	0.180
0.50	Iron wire from Bofors.....	393.6	0.165
0.60	" " " ".....	378.5	0.346
0.60	" " " ".....	386.3	0.356
0.60	Iron.....	391.3	----
1.00	Steel wire from Bofors.....	356.0	0.242
1.00	Bessemer steel with 0.13 % graphite.....	383.2	0.776
1.30	Eggertz normal wire.....	380.2	0.645
1.30	Eggertz normal wire.....	353.3	0.492
3.28	White pig iron with 41 % graphite.....	297.8	1.94
3.80	Gray " " 3.45 % ".....	298.4	2.12
3.87	White pig iron, dissolved in sulphuric acid.....	383.	----
	" " dissolved in hydrochloric acid.....	295.7	2.245
	" " " ".....	290.8	2.276
	" " " ".....	282.8	2.235
	" " " ".....	309.5	2.546
	" " " ".....	311.1	2.552
3.90	Gray pig iron with 3.55 % graphite.....	372.0	----
4.24	White " ".....	296.3	2.806
6.37	Ferromanganese, 84.3 % mn. + 7.72 % Fe.....	287.5	3.80

It appears, therefore, that the combined carbon is not all evolved as hydrocarbon, and that the volume of gas and the per cent. of carbon in the same are not proportional to the combined carbon contained in the iron ; also, that hydrochloric acid generates a greater volume of gas with higher per cent. of carbon than sulphuric acid under the same conditions.

The gas evolved from hardened steel is greater in volume and contains more carbon than that from unhardened steel. Thus, 1 grm. of steel with 1 % carbon gave 356 c.c. gas (with 2.5 mgm. C.), and after hardening 386.1 c.c. (with 8.8 mgm. C.), while after having been hammered, cold, it gave but 345.1 c.c. gas (with 1.2 mgm. C.). (*Zeit. anal. Chem.*, 26, 683-689.) J. F. G.

Iodide Coatings and Sublimates. WHEELER and LUEDEKING.

A mixture of 40 % iodine and 60 % sulphur is made. To obtain the coatings, by means of the blowpipe, mix the substance to be tested with about an equal quantity of the sulphur-iodine mixture, and heat in the oxidizing flame of the blowpipe on small "Plaster of Paris" tablets, prepared by allowing "Plaster of Paris" paste to harden on oiled glass plates and then cutting it into suitable sized tablets. The following are the colors of the coatings obtained as above :

Arsenic and antimony—orange red.

Mercury—scarlet red and yellow, the red finally becoming yellow.

Selenium—reddish brown.

Lead—chrome-yellow.

Silver—hot, bright yellow ; cold, light grayish yellow.

Tin—brownish yellow.

Bismuth—chocolate brown, red at the edges while hot.

Cobalt—grayish brown, green at the edges ; the brown finally turns green.

Tellurium—purplish brown.

Molybdenum—ultramarine blue.

Tungsten—light greenish blue.

Copper, cadmium and zinc all give white coatings, that of zinc being very volatile. Treatment with ammonium sulphide vapor serves to distinguish the three. The coating with bismuth becomes scarlet red when treated with ammonia vapors. (*Zeit. anal. Chem.*, **26**, 602-604.)

J. F. G.

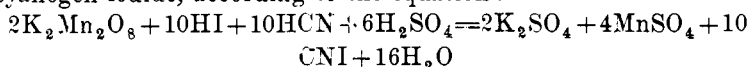
Estimation of Chlorates by the Zinc-Copper Couple. C. H. BOTHAMLEY and G. R. THOMPSON.

The reduction of chlorates to chlorides, followed by titration, usually gives results which are too low. The authors show the error to be due to partial conversion of the reduced chloride into insoluble zinc oxychloride, which conversion increases with the concentration of the chlorate solution. The error due to this cause may be removed by slightly acidifying with sulphuric acid. (*Jour. Chem. Soc.*, **53**, 164.)

W. P. M.

Estimation of Iodine. NORMAN McCULLOCK.

A volumetric method, the capabilities of which the author hopes to develop later. The titration is done with potassium permanganate, in presence of sulphuric acid and an excess of hydrocyanic acid. The latter acid causes formation of colorless cyanogen iodide, according to the equation :



Without the HCN, free iodine would separate, and obscure the "end reaction." (*Chem. News*, 57, 45.) W. P. M.

Determination of Solids and Fat in Milk and Butter.
F. GANTER.

The author uses wood pulp, prepared by the sulphite process, as a substitute for sand, gypsum to facilitate the drying and subsequent extraction of fat. (*Zeit. anal. Chem.*, 26, 677-680.)

J. F. G.

INDUSTRIAL CHEMISTRY.

Bang's Process for the Detection and Separation of the Impurities of Alcohol.

The principles on which the process repose are :

1st. The head products of the distillation (aldehydes and ethers) are insoluble in the liquid hydrocarbons, but are converted into soluble products by alkalies. The polymerized products are soluble also in alcohol, to which they give a certain color.

2d. The tail products are entirely soluble in the hydrocarbons, whereas diluted alcohol is not.

3d. Strong sulphuric acid entirely removes the soluble bodies dissolved in the hydrocarbons.

Detection of the head alcohols : Take 50 or 60 c. c. of the alcohol to be tested, and mix with concentrated potash or soda ; heat on the water bath at about 60°. If the alcohol contains head pro-

ducts, it takes a color varying from straw yellow to black. The same reaction takes place after a longer time without heating.

Detection of the tail distillates: Take the same amount of alcohol as before, and shake with a light hydrocarbon, added in small portions until no further solution occurs. Dilute with 5 volumes of water. Decant the separated hydrocarbon, and shake with a few c. c. of conc. H_2SO_4 . The coloration of the acid is yellow when isobutylic acid predominates, and brown when amylic alcohol is in excess.

The same reactions permit the detection of adulteration of wines with impure alcohols. The author has applied these principles to the industrial purification of alcohols. (*Arch. de Pharm.*, **2**, 487.)

M. L.

Abstracts of American Patents Relating to Chemistry.

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

December 13th, 1887.

374,618.—Obtaining ammonia from manure, etc. W. F. Nast.
An alkaline base is added to the manure, after which it is treated with sodium chloride, or other chloride.

374,636.—Distilling wood. A. Smith.

374,716.—Manufacture of white lead. W. B. Talbot.

374,740.—Explosive compound. L. G. Heusschen.
Consists of coal oil and glycerin, together with potassium or sodium nitrate, a sulphate, and sulphuric acid.

December 20th, 1887.

374,921.—Blasting powder. G. Anthéunis.
Consists of mahogany sawdust, sodium nitrate, charcoal, sublimed sulphur, potassium ferrocyanide, and ammonium picrate.

375,060.—White pigment. J. B. Freeman.
Consists of lead sulphate, zinc white, and barium sulphate.

375,085.—Gas retort furnace. G. A. McIlhenny.

375,161.—Apparatus for making fuel gas. A. C. Huidekoper and L. Houze.

December 27th, 1887.

375,405.—Method of manufacturing non-blooming vulcanized soft rubber. F. Wilhoeft.

Rubber is mixed with a compound, consisting of sulphur and a greasy, fatty, resinous or turpentine-like body.

375,436.—Recovering and utilizing waste rubber. S. M. Allen.
Rubber scrap is heated with a mixture of non-volatile oil, asphalt, resin and sulphur.

375,455.—Process of and apparatus for tanning. A. Millochan and F. Chailly.

The tanning liquor and hides are placed in a closed vat or pit, and atmospheric air is passed through the vat by injecting it at the base, and withdrawing it at the top. The air charged with the tanning principles is repeatedly conveyed back to the base of the vats.

375,490.—Apparatus for distilling wood. G. Humziker.

375,601.—Soluble food for infants and invalids. J. Carnrick.

Consists of peptonized and partially digested milk, and flour, in which the starchy portion is converted into soluble starch and dextrin.

375,606.—Process of treating sal ammoniac or flux skimmings. G. G. Conyers.

375,611.—Apparatus for producing and washing carbonic acid gas. J. H. Digeon.

375,621.—Process of making vinegar. C. Gould.

Fruit and other juices are acidified, by receiving and confining the acid gases in a suitable receptacle as they rise from the liquid, and condensing and reincorporating the acid constituents of said gases into said liquid from time to time as the acidification progresses.

375,622.—Vinegar apparatus. C. Gould.

375,651.—Explosive. C. Roth.

Consists of the combination of an aromatic chloronitro-carburet with an oxidant, such as ammonium nitrate.

January 3d, 1888.

375,787.—Apparatus for drying starch or other solid matter. E. E. Duryea and P. H. Grimm.

375,845.—Tanning. L. M. Waer, J. H. Phillips and W. S. Kenzla.
Hides are tanned in a bath of yellow dock root, water and phenol.

375,848.—Manufacture of dyestuffs. A. Weinberg and H. Siebert.
A coloring matter produced by the action of tetrazoditoyl upon a new naphthylamine sulpho acid, described in the patent.

375,908.—Apparatus for distilling wood. J. Wilson.

375,917.—Composition of metallic alloys. H. Berglin.

Consists of copper, 83.23; tin, 3.48; zinc, 8.16; nickel, 4.92; antimony, 0.04.

375,930.—Production of orange azo dyestuffs. P. Friedlaender and B. Priebis.

A solution of tetrazoditoylchloride is prepared from tolidine sulphate, and to the solution is added a solution of metatolylenediamine sulpho acid, and then a solution of salicylic acid.

W. R.