ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Boiling Points of Solutions of Salts, etc., G. T. GERLACH.

From an exhaustive treatise on the boiling points of salt solutions the author draws the following conclusions: The boiling points of liquids, aside from the pressure upon their surface, are largely dependent upon the nature of the vessel. Rough metallic or porcelain surfaces facilitate the boiling most. When salts are deposited from highly concentrated solutions the boiling point is lowered. Apparently the lowering of the boiling point is due to a liberation of the last portions of the water of crystallization of the salts. If the deposited salt is removed the boiling point rises and vice versa. There are salt solutions which, under normal barometric pressure, may have their boiling point below 100° C. and at the same time give off vapors whose temperature is 100° C., also some salt solutions may have a boiling point far above 100° C. and yet give off vapors of only 100° C.

The boiling point curves approach a straight line when successive equal amounts of a salt are dissolved in the same volume of water. If, however, in salts containing water of crystallization, the anhydrous salt molecule is taken into consideration, then the boiling point differences of the solutions at first increase and then diminish.

It seems, therefore, that during the boiling of a solution the water of crystallization of a salt is retained in combination. The contractions accompanying the solution of equal molecular weights of anhydrous salts increase with the amount of the molecular weight for the different members of the same group, such as the Cl, Br and I combinations and nitrates and sulphates; but, with alkaline hydrates and carbonates, and probably with all salts containing organic acids, the solutions of the sodium salts sustain greater coutraction than the potassium salts.

If, however, the solutions of equal molecular concentration are compared according to their electronegative elements, then the solutions of the chlorides show less contraction than the nitrates, and their solutions have a higher boiling point, etc. Here the contractions decrease with the amount of the molecular weight.

It appears that there is a specific relationship between the boiling points of salt solutions and the other properties of the salt, such as fusibility, solubility, contraction in dissolving the salt, the vapor tension, etc. (*Fres. Zeit.*, **26**, *413–530.*) J. F. G.

On the Preparation of Crystallized Neutral Lead Chromate. L. BOURGEOIS.

The method of the author is based on the resistance of the salt to the action of nitric acid. The lead chromate is boiled with nitric acid diluted with 5 or 6 times its bulk of water; the solution decanted or filtered on glass gives on slow cooling the lead salt in crystallized form. The crystals are of better form when the operation is conducted in a sealed glass tube. The physical and chemical properties are identical with those of *crocoise.* (*Bul. Soc. Chim.* **47**, 886.) M. L.

On a Colloidal Copper Sulphide. W. SPRING AND G. DE BOECK.

A solution of copper sulphide in pure water can be obtained by precipitating any copper salt by H_2S, and washing the precipitate by decantation with an aqueous solution of H_2S. In proportion as foreign elements are eliminated by the washing the sulphide passes into the soluble state, giving a dark liquid, black by reflection and brown by transmission. It has a slight greenish fluorescence. The solution contains possibly a sulphydrate; on boiling H_2S can be expelled without the copper sulphide precipitating to any extent. The analysis of the solution shows the presence of CuS, and not CuS_2H_2. Spectroscopic examination shows that the liquid is a solution and not a turbid liquid. The authors give a table of the proportion of different salts necessary to produce the coagulation of CuS, and their conclusion is that the coagulating power of these bodies stands in no simple relation to the molecular weight of the salt, nor to the molecular volume, but that the atomocity of the metal enters into the question. (*Bul. Soc. Chim.*, **48**, 165.) M. L.

ORGANIC CHEMISTRY.

On Isodulcite. B. RAYMAN.

In the mannite group isodulcite is especially remarkable as the only sugar, $C_6H_{14}O_6$, having rotatory power of any importance and acting on the cupro-potassic solution. The author has devoted himself to its study and thinks that it must be placed in a new group. It is a quadrivalent alcohol, and must be placed with the glucoses corresponding to quinquivalent alcohols. The author extracts it from the residues of the treatment of the so-called yellow-wood. The *resina quercitri* is treated with H_2SO_4 of 10 per cent. and the solution neutralized with barium carbonate. The author describes the physical and chemical properties of this body, and concludes by this classification of sugars

I. Quadrivalent normal alcohol, erythrite.

II. 1st. Quinquivalent alcohols, (*a*) normal unknown, but may be obtained by reduction of isodulcite and arabinose; (*b*) with annular nucleus: quercite.

2d. Aldehyde or acetone, corresponding to the alcohols arabinose or isodulcite.

III. Sexvalent alcohols: (*a*) normal mannite, dulcite; (*b*) with annular nucleus, inosite according to Maquenne.

2d. Corresponding aldehydes, dextrose, galactose.

3d. Corresponding acetone: levulose.

4th. Products of condensation of groups 2 and 3, bioses and trioses.

The composition of crystallized dulcite is $C_6H_{12}O_5H_2O$; it is analogous to chloral hydrate. (*Bul. Soc. Chim.*, **47**, *668*.

M. L.

On the Identity of Dambose and Inosite. M. MAGULUNE.

Mr. A. Girard has given the name dambose to the body $C_{18}H_{12}O_6$ obtained by the action of iodhydric acid on dambonite. The authors of this paper compared the properties of dambose and of inosite and found them to be identical. The conclusion of the author is that the name of dambose must be abandoned, its termination seeming to place this body among the glucoses with which it has only an analogy of formula. Dambonite must be consid ered as a dimethyl-inosite, the action of HI showing that the methylic groups must exist as methoxyl. (*Bul. Soc. Chim.* **48**. *165.*) M. L.

Heat of Combustion of Solid Hydrocarbons and Sugars.

MM. Berthelot and Vieille.

The authors give the result of their calorimetric determination of the heat of combustion of naphtalene, anthracene, phenanthrene, retene, diphenyl, acenaphtene, stilbene, dibenzyle phenol and inactive crystallized camphenol.

Their paper is followed by one on the combustion of sugars, and the conclusion is :

The heat of formation of the hydrocarbons is nearly the following :

Cellulose and Isomeric bodies $(C_{12}H_{10}O_{10})_n$*.......+(231 Cal)$_n$
Saccharoses $(C_{12}H_{11}O_{12})_2$..........................+(266 Cal)$_2$
Glucoses $(C_{12}H_{1212})$...............................+(300 Cal.)

The thermic difference between the glucoses and the saccharoses, say +34 Cal, being about the same as the heat of formation of the equivalent of water that constitutes the difference of their composition, or +35 Cal for solid water.

2d. Comparing the heat of formation of the glucoses with the heat of formation of the hexatomic alcohols, of which they are the aldehydes, they find that the union of H_2 with glucose yields about 18 cal., a number very near the one for the heat of transformation of aldelyde into alcohol=+14 cal.

3d. The transformation of glucose into alcohol yields heat.

$C_{12}H_{12}O_{12}+2\ C_6H_6O_2 + 2\ C_2O_6 + 29$ Cal for the solid glucose, liquid alcohcl, and gaseous CO_2, being + 47 cal for all products supposed to be dissolved.

4th. The formation of sugars from its elements (diamond and water) on the contrary would absorb heat, that is shown by 300 — 414 = — 114 Cal, this number being about the same for cellulose, starch and saccharoses. This fact explains then the reserve of energy contained in those hydrates, and consequently the formation of hydrocarbon principles in organic beings. (*Bul. Soc. Chim.* **47**, 867.) M. L.

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* (O=8).

Contribution to the Study of Woman's Milk. M. LAJOUX.

The caseine of woman's milk differs from that of cow's milk ; it is coagulated with difficulty by basic lead acetate. This salt gives a magma from which it is not easy to separate any liquid by filtration. The only way is to treat the milk previously with sodium sulphate. This difficulty, says the author, prevents the use of the polarimeter for the examination of this milk. The milk of woman is *always* alkaline, whereas the milk of cow is always slightly acid, even when coming out of the udder. The milk of woman is coagulated with difficulty by acetic acid or calf's stomach. In colostrum the proportion of albuminoid matter is larger than in normal milk; whereas the proportion of sugar is smaller. As to fat the proportion varies greatly. (*Archives de Pharmacie,* **2,** *251.*) M. L.

Presence of the Laevorotatory β-Oxybutyric Acid in the Blood of a Diabetic Patient. L. HUGOUNENY.

The author indicates his method of research: it consists in keeping the blood in contact with ether until sugar disappears and evaporation nearly to dryness; the coagulum is then treated with boiling water, filtered, the liquid is precipitated with its own volume of basic lead acetate and half of its vol. of ammonia; it is then filtered and examined in the polarimeter. If the β-oxybutyric acid is present there is deviation to the left. To confirm this, another portion of blood is treated as above, and the filtrate from the treatment of the dry blood by boiling water is evaporated, and the residue is treated with its volume of strong $H_2 SO_4$ and distilled.

The products of distillation are fractioned and treated with a refrigerating mixture, andthe crystals are purified with ether, following the directions of Külz. These crystals melt at 70°–71; they are formed by crotonic acid resulting from dehydration of the pre-existing β-oxybutyric acid. The author found 4,27 grms. of acid in a litre of the blood; the urine contained 4.48 grms. of this same acid. (*Bul. Soc. Chim.* **47,** *545.*) M. L.

On Active Camphenol and on Ethylate of Borneol.

G. BOUCHARDAT AND J. LAFONT.

The authors have digested in sealed tubes at 150° camphene monochlorhydrate with potassium acetate and alcohol. The product, after several distillations and heating in presence of acetate of potassium and alcohol, gives this result: that the longer the treatment the smaller is the rotary power observed. At the same time the authors have remarked the formation of another product passing over at the same temperature as the monochlorhydrate. It is dextrorotatory, that is, of rotary power opposed to that of the monochlorhydrate used and of the camphenoil obtained. This body has the composition of an ethylate of camphenol, $C_{20}H_{16}C_4H_6O_2$. $(O=8)$. Treated with nitric acid it is converted into camphor, with production of oxalic acid. (*Bul. Soc. Chim.* **47**, *488.*)

M. L.

On Bacterian and Physiological Alcalines, Ptomaines and Leucomaines.

GAUTIER.

The author gives a history of the question of the alkaloids, especially those of putrefaction; of the discovery of the toxic nature the entrails of anatomical preparations by Gaspard and Stick in 1822; the thesis of the Dane, Panuni, in 1856 on the existence of an active poison in putrid matter, but denying its alkaloidal nature; from Bergmann and Schmiedberg in 1868 with sepsine from putrified yeast, etc., etc., of the observations of Selini and himself in 1870 on the putrefaction of albuminoid matter, of his experiments with Etard from 1881 to 1883, assigning the bases of fermentation to the pyridic and hydropyridic series, and giving their general chemical properties. The history and properties of leucomaines, those bases named by the author which are formed by the animal tissues in life are also given.

In the conclusion the author says: these alkaloids, whether coming from putrefaction or produced in the course of life, are generated almost exclusively by the breaking up of the albuminoids by hydration and generally without the action of the air. But ptomaines and leucomaines are not the only toxic substances produced by the living organism. There exist also active substances, not alkaline, which the author proposes to study. (*Bul. Soc. Chim.* **48**, *23.*)

M. L.

ANALYTICAL CHEMISTRY.

Use of Ammonium Thiocarbamate in Analyses. JOSEPH KLEIN.

The author finds that the above salt can be used in place of hydrosulphuric acid for the precipitation of metals. Ammonium thiocarbamate results from the action of CS_2 upon an alcoholic solution of ammonia according to the reaction :

$$CS_2 + 2NH_3 = CS,NH_2,SH,NH_3.$$

It is best prepared according to the method of Mulder, by distilling the ammonia from 150 pts. NH_4Cl and 300 pts. $Ca(OH)_2$ into 600 pts. of alcohol (95%), and then adding to the alcoholic solution 95 pts. CS_2, when on standing at 30° ammonium thiocarbamate will deposit in crystals.

The crystals are collected on a filter, washed with a little alcohol, and dried on bibulous paper.

If some of the crystals turn red on exposure to the air, the presence of sulpho-carbonate crystals is indicated. These must be removed. If to a solution of nickel sulphate an excess of NH_4OH is added, the solution considerably diluted, and a few drops of a solution of the crystals then added, the solution will become red if sulpho-carbonate crystals are in the above product. The am. thiocarbamate keeps best in water solution. The crystals decompose readily on exposure to air.

In the author's work a 5% solution was used.

Determination of Cu.

In the absence of other metals copper can be precipitated direct according to the reaction.

$$CuSO_4 + 2CS,NH_2,SH,NH_3 = Cu(CS,NH_2)S_2 + (NH_4)_2SO_4.$$

The precipitate is soluble in much hydrochloric acid after boiling ; dissolves readily in HNO_3 on warming, and is not changed on exposure to the air.

For quantitative determination about 150 c.c. of the copper solution (about ½% cryst. $CuSO_4$) are heated to boiling, 30 c.c. of the thiocarbamate solution added, and heating continued for 10 to 20 seconds ; precipitate filtered, washed with hot water, dried, and Cu finally determined as CuO or Cu_2S. The method is suitable for alloys of Cu and Ag, the silver being precipitated by HCl from the nitric acid solution, etc.

Determination of Zn.

Zinc is precipitated from its solutions (the precip. being solution in excess of the reagent) and reprecipitated from the solution, boiling. The precip. is sol. in HCl and HNO_3, but not in dilute acetic acid. For determination, add some sodium acetate and 1 to 1.5 c.c. acetic acid, sp. gr. 1.02, to about 150 c.c. of the zinc sol. (containing about .1% ZnO), heat to boiling, add 30 c.c. of am. th. carb. sol., continue the heat until precipitate collects, allow to settle, filter while hot, and wash with hot water; dry and determine zinc as ZnS. With brass and similar alloys dissolve in HNO_3, remove the HNO_3 by evaporation of the sol. with HCl, dilute sol. to .1% and for .3 grm. alloy add 10 to 15 c.c. HCl, sp. gr. 1.05. The solution is precipitated as under copper, the precipitate washed, dissolved in HCl, again precipitated and Cu determined as Cu_2S. The zinc is determined as above in the filtrates.

Separation of Cu and Ni.

Prepare a solution of the alloy as directed for brass, precipitate Cu twice, and precipitate the nickel in the concentrated filtrates by adding sodium hydrate.

Separation of Cu from Fe, Mn, Ni and Co.

The copper alone is precipitated in hot hydrochloric acid solution. If precipitate is contaminated with Co, dissolve in nitric acid and precip. the Cu by gaseous H_2S. Copper and zinc are readily separated from the alkalies and alkaline earth salts by direct precipitation as the thiocarbamates of the latter are readily soluble.

Action on Salts of Al and Cr.

Aluminium is not precip. until the solution is boiled, when $Al_2(OH)_6$ is the final precipitate. Solutions of chromic salts turn blue on heating and deposit $Cr_2(OH)_2$ mixed with blue crystals of chromic thiocarbamate. The precipitation is not complete, as NH_4OH still precipitates $Cr_2(OH)_2$ from the blue filtrate. The blue crystals are sparingly soluble in HCl, readily soluble in hot water.

Action on Fe, Ni, Co, Mn, Zn, Ur Salts.

Ferric salts are reduced to ferrous with liberation of sulphur. Nickel salts yield a yellowish green precipitate in neutral and acid sol. The precip. is soluble in HCl, and sparingly soluble in acetic acid. Cobalt is incompletely precipitated from acid or ammoniacal solutions. Manganese is not precipitated in neutral or acid solutions, but separates completely on boiling from ammoniacal solutions containing excess of NH_4Cl.

Lead solutions give a yellowish white precipitate, soluble in nitric acid, and decomposed by NH_4OH and NaOH, on boiling.

Silver reacts the same as lead.

Bismuth yields an orange yellow precipitate soluble in HCl.

Cadmium yields a white precipitate soluble in HCl.

In presence of an excess of KCN the salts of Hg, Ag, Bi, Cu, Cd, Ni and Co are not precipitated by am. thiocarbamate. Cadmium, however, can be precipitated if an excess of NH_4Cl is added and the solution heated.

Uranium.—The nitrate solution colored blood red, decolorized or changed to yellow on addition of ammon. carbonate. The nitrate and acetate solution incompletely (?) precipitated on boiling. The chloride is not precip. on boiling.

Action on Hg, Pb, Ag, Bi, Cu, Cd Salts.

Mercury.—Mercuric chloride sol. precipitated white. Precip. soluble in nitric acid, and sparingly in hydrochloric acid. Mercurous nitrate gives a black precipitate.

Action on As, Sb, Sn Salts.

Arsenious acid in water solution yields a white precipitate on acidulation. The precipitate is soluble in NH_4OH, NaOH, and am. carbonate solutions, and reprecipitated on acidulating. Arsenic acid and the salts of antimony and tin act similarly to the above. (*Rep. d. Anal. Chem.*, 7, *p.* 629.) J. F. G.

Qualitative Detection of Sulphites in Presence of Hyposulphites and Sulphates. A. Villiers.

If a neutral solution of a salt of an alkaline sulphite is treated with barium chloride, neutral barium sulphite (insoluble) is obtained and potassium chloride $K_2SO_3+BaCl_2=BaSO_3$

$+2KCl$, and the solution, strongly alkaline at first, becomes neutral.

If an alkaline bisulphite is so treated, neutral sulphite is formed and half of the sulphurous acid remains in solution.

$2KHSO_3+BaCl_2=BaSO_3+H_2SO_3+2KCl$.

On these two reactions is based the method of detection. The solution is neutralized by HCl. if the mixture is alkaline, and treated with $BaCl_2$. The solution which becomes acid is distilled. The sulphur dioxide gas is driven off and can be recognized. Or the filtered solution can be treated with solution of iodine in KI, and H_2SO_4 tested for in the product. (*Bul. Soc. Chim.*, **47**, *545*.

M. L.

Direct Titration of Phosphoric Acid with Uranium Nitrate. C. MALOT.

To the slightly acid solution of phosphoric acid (acidified by HNO_3) add a few drops of solution of cochineal (obtained by boiling the insects in water); add diluted ammonia to violet coloration, then acidulate slightly with nitric acid. Heat the solution to 100°, add the sodium acetate, then titrate with uranium nitrate.

Each drop of this latter solution produces a greenish blue coloration that disappears by agitation as long as the precipitation is incomplete, the solution keeping the pink cochineal color; at the precise moment of the saturation the liquid turns bluish green. The reaction is so sensitive, says the author, that to perceive the saturation by testing with the touch method on potassium ferrocyanide it requires several more drops of uranium to be added in the solution. (*Archives de Pharmacie*, **2**, *246*.)

M. L.

Thomas Slags. J. H. VOGEL.

The fineness of Thomas slags for fertilizing purposes is determined by a Fleischer normal sieve, No. 100, with meshes of 0.17 m.m. By shaking 50 g. of the powder in the sieve for ½ hr. at least, 75–80 per cent. should pass through. The coarse powder contains less P_2O_5 than the fine powder, the difference often amounting to 1 per cent., and on account of the coarseness of the powder the P_2O_5 is also less readily absorbed. Good Thomas slags usually contain 17 to 20 per cent. of P_2O_5, and yield over 80 per cent. of the fine powder. The phosphoric acid is readily determined by heating for ½ hr. 5 g. of the powder on a water bath, in a ½ liter flask, with 100 c.c. conc. hydrochloric acid, and 20 c.c. conc. nitric acid ; cool, fill to the mark, and filter. Take 50 c.c. of the filtrate, and precipitate by molybdate sol.,* etc. Before adding the acids to the powder, it is best to moisten it with a few drops of water. (*Rep. d. Anal. Chem.*, **7**, 469.) J. F. G.

New Method for Determining Phosphoric Acid in Thomas Slags. J. H. VOGEL.

Allow 50 c.c. hydrochloric acid, sp. gr. 1.025–1.030, to act upon ½ gr. of the pulv. slag in a covered beaker for 24 hours. Stir occasionally with a glass rod ; filter, wash with 50 to 60 c.c. of the dilute acid, evaporate the combined filtrates on the water bath in a porcelain or platinum dish. When dry, heat in an air bath, at 108 to 110° C., cool, add 10 c.c. conc. nitric acid, stir thoroughly with a glass rod, add 20 to 25 c.c. water. It is best to evaporate again, to insure complete separation of silica. Treat the residue with nitric acid, etc., as before ; filter, wash and precipitate the filtrate with molybdate solution. The P_2O_5 thus found is a trifle higher than the amounts obtained by the Brunneman method, which neglects the complete separation of the silica. (*Rep. d. Anal. Chem.*, **7**, 569.) J. F. G.

Potassium Manganate and its Analytical Importance. AD. JOLLES.

Pure potassium manganate is prepared by taking the equivalent proportions of $KMnO_4$ and KOH. The latter is placed in a crucible, a little water added, heat gradually, and finally add the $KMnO_4$ in a fine powder ; continue heating at dull redness for about 2 hours, cool, and transfer to a glass-stopped bottle.

Potassium manganate is very readily reduced, and therefore a powerful oxidizing agent. It is not affected by pure chloroform, ether, or amyl alcohol. It quickly reduces alcohol to aldehyd, by the reaction $K_2MnO_4+C_2H_6O=K_2MnO_3+C_2H_4O+H_2O$.

With certain bases it forms compact precipitates of definite composition in alkaline solution which readily subsides. The precipi-

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*It is advisable to separate the silica before precipitating with the molybdate solution. J. F. G.

tates may be either normal or basic manganates or normal or basic manganites. An alkaline manganate solution is a powerful oxidizing agent at ordinary temperatures, the end reaction being indicated by disappearance of the green color.

The author suggests volumetric methods for the determination of manganese and cobalt, as follows:

Into a measured quantity of a dilute alkaline potassium manganate solution of known titer, gradually run the manganous salt solution with constant stirring, until the green color disappears, or the supernatant liquid becomes colorless. Pure MnO_2 is found, which subsides readily. The reaction is:

$$MnSO_4 + K_2MnO_4 = K_2SO_4 + MnMnO_4 = K_2SO_4 + 2MnO_2.$$

Cobalt solutions may be titrated in a similar manner, with alkaline pot. manganate of known titer; the precipitate $CoMnO_3$ is constant in comp. and subsides readily from the solution.

The author also suggests the determination of SO_2 by running the solution of the latter into the alkaline manganate sol. (*Rep. d. Anal. Chem.*, 7, 485.) J. F. G.

Determination of Potassium Bitartrate in Lees, etc.

ARTHUR BORNTRÄGER.

A critical review of the different methods for determining potassium bitartrate by (1) direct titration, (2) "a la casserole," and by the methods of (3) Kämmer, and (4) F. Klein. (*Rep. anal. Chem.*, 7, 550.) J. F. G.

Examination of Indigo Colors. W. LENZ.

The following series of tests is suitable for discriminating between the various blue dyes:

1. Note character of the color of fabric.
2. Macerate about 4 sq. cm. of the fabric for one-half hour in about 4 c. c. of 80% alcohol containing 1% of conc. hydrochloric acid. Note character of solution.

Boil 4 sq. cm. of fabric:

3. With reagent as in No. 2.
4. With reagent as in No. 2, but with hydrochloric acid increased to 4%.
5. With 4 c.c. of 20% acetic acid.

6. With repeated portions of glacial acetic acid.
7. With formic acid.
8. With a saturated (1:8) solution of oxalic acid.
9. With 4 c.c. offic. phosphoric acid.
10. With 4 c.c. 10% solution of potash alum.
11. With solution of ammonium molybdate (1:2).
12. With 4 c.c. sat. borax solution.
13. With mixture of 10 c.c. solution of ferric chloride, 90 c.c. water and 19 drops of hydrochloric acid.
14. Test with conc. sulphuric acid.
15 Warm gently with an acidulated solution of stannous chloride.

For identification and separation of the blue colors extract the fibre with glacial acetic acid, and to 1 volume of the concentrated solution add 5 volumes of chloroform and 2 volumes of water, and supersaturate with crystals of sodium carbonate. Shake the mixture, allow the chloroform to separate and then wash the latter with borax solution, which will take up the logwood and indigo carmin, while indigo and aniline blue remain in the chloroform solution. To the latter add dilute acetic acid and sufficient ether to cause the chloroform to separate. The acid solution will contain the aniline blue and the ether-chloroform layer the indigo.

Amyl alcohol will extract the logwood from the borax solution after acidulating with acetic acid, after which the indigo carmin can be extracted by the same solvent, after adding a large excess of sulphuric or hydrochloric acid.

A fabric colored with indigo only should satisfy the following requirements :

No color should be extracted from the fabric when the same is gently warmed with 50% or 95% alcohol, or when boiled with water or solutions of oxalic acid (1:8) borax, 10% potash alum, or 33⅓% solution of ammonium molybdate. The borax solution, on the addition of hydrochloric acid, should not turn red (logwood), nor should it turn blue after acidulating and adding ferric chloride (Prussian blue). The solutions of stannous chloride and ferric chloride should destroy the color of the fibre on warming. Glacial acetic acid should extract the color completely. The latter solution, mixed with 2 volumes of ether and sufficient water to separate the latter should give a light blue ether solution with most of the indigo suspended at the water level. The acid water solution should be almost colorless and not turned red (logwood) when hydrochloric acid is added to the same through the ether layer. By boiling the fabric with concentrated hydrochloric acid, no H_2S should be liberated (ultramarine). After continued boiling with hydrochloric acid, supersaturating with sodium hydrate and warming with a few drops of chloroform, no isonitril should be developed (aniline blue). (*Fres. Zeit.*, **26**, *535–555*.) J. F. G.

Analyses of Milk. R. FRÜHLING and J. SCHULZ.

The milk station of Fr. Dreves, at Braunschweig, has constantly a herd of 16 to 18 cows, which are milked for about 5 months during each year, and which are fed almost exclusively on dry food—the object being to obtain a milk of good average quality and of a uniform grade throughout the year.

The daily fodder rations per 1,000 lbs. of living weight consisted of 4 lbs. crushed oats, 5 lbs. rye bran, 6 lbs. wheat bran, 15 lbs. clover hay, and as much straw as desired.

The average daily yield of milk per cow was 12.5 litres. Each month an analysis was made of an average sample of the morning and evening milk of the herd. The results for 1886 are given in the following tables:

	EVENING MILK.			MORNING MILK.		
	Aver.	Min.	Max.	Aver.	Min.	Max.
Fat	3.00	2.53	3.43	2.84	2.57	3.35
Proteids	3.96	3.37	4.70	3.92	3.36	4.80
Salts	.72	.69	.77	.72	.68	.79
Milk sugar	4.43	4.06	4.87	4.39	4.00	4.87
Total solids	12.11			11.87		
Water	87.89			88.13		
	100.00			100.00		

The methods used in the analyses were briefly: a weighed quantity of milk, 5 to 6 c.c., was evaporated at 100° C. in a weighed porcelain dish containing about 20 grms. of coarse sand, the residue extracted by about 8 successive portions of petroleum, using in all about 100 c.c. The residue was dried at 100° C.

The above data give water, total solids and fat, by difference.

The milk sugar was determined by means of the polariscope. (*Rep. d. anal. Chem.*, **7**, 517.) J. F. G.

Apparatus for Measuring Sterilized Solutions. H. Treskow.

The apparatus is intended to prevent the contamination of sterilized liquids used in bacteriological investigations during the measuring and transfer of the liquid to suitable receptacles.

A large glass pear-shaped bulb, of about 1 liter capacity, open at the upper end for the reception of the liquid, is drawn out at the lower end into an elongated stem, near the end of which a stop cock is inserted, having a rectangular bore of about 4 m.m.

At the side a graduated tube of about 10 c.c. is attached in a vertical position parallel to the stem of the bulb, and communicating with the rectangular bore of the stop cock. The side tube and opening in the large bulb are plugged with cotton during use, to prevent access of bacteria. (*Rep. d. Anal. Chem.*, **7**, 505.)

J. F. G.

Destruction of the Foam in Urea Determination. Dr. Mehu.

When a urine is rich in albumin, the agitation of this urine with the sodium hypobromite produces a foam that remains for hours, preventing thus an immediate reading of the graduation. The foaming is greater if the urine has begun the ammoniacal fermentation. To remedy this accident Dr. Mehu suggests the introduction of a little ball of tallow in the graduate, and turning of the graduate once or twice before the reading. (*Archives de Pharmacie,* **2**, *348.*) M. L.

Abstracts of American Patents Relating to Chemistry.

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

May 10th, 1887.

362,502.—Method of manufacturing starch. G. S. Graves and R. W. Graves.

362,560.—Production of a new naphthylaminemonosulphuric acid. A. Weinberg and H. Siebert.

362,592.—Trimethylethylthionin blue coloring matter. E. Ullrich.
Is produced by the joint oxidation of paramidodimethylaniline and ethylmethylaniline in presence of a hyposulphite.

362,594.—Compound for artificial stone. G. R. Williams.
Consists of shellac, rosin, alum and sand.

362,677.—Manufacture of caustic soda. E. Solvay.
The manufacture of sodium hydroxide and potassium hydroxide and of carbon dioxide from sodium or potassium mono- or other carbonate by heating the respective carbonates with ferric oxide, removing the materials employed from the nearly pure carbon dioxide produced by the reaction, and bringing them repeatedly into an atmosphere comparatively free from carbon dioxide by means of a cylindrical or barrel-shaped revolving furnace lined with fire bricks, forming projecting radial ribs or steps, or serations, whereby the material is lifted up and then falls through, the gases passing through the furnace.

362,813.—Yellow-red dyestuff from tetrazo-diphenyl. F. Bayer.

362,835.—Process of dyeing. T. Holliday.
Wool or other animal fibre is impregnated with metallic mordants and immersed in a bath containing one or more nitroso-compounds of naphthol.

362,856.—Process of and apparatus for saponifying and decomposing fatty bodies. L. Rivière.

362,860.—Phosphorescent paint. J. H. Thorp.

362,899.—Manufacture of gunpowder. T. Nordenfelt and V. A. Meurling.
The sulphur and saltpetre are incorporated with the carbon in solution, and the solvent is evaporated.

362,903.—Process of making glue and chlorine from salted fish skins. J. R. Pringle.
The fish skins are ground and placed into an air tight boiler containing a mixture of sulphuric acid, manganese dioxide and water. The mixture is heated to liberate the chlorine and other substances contained in the salt.

Next the air is exhausted from the boiler by means of an air pump. The contents of the boiler are then maintained at a temperature a little above the boiling point for about two and a half hours, after which the glue is drawn off.

May 17th, 1887.

363,023.—Gas generating furnace. H. B. Van Benthuysen.

363,056.—Process of preparing grain or cereals. J. Fordred.

363,057.—Apparatus for torrefying grain, etc. J. Fordred.

363,136.—Recovery of scraps from tin plate. W. Hasenbach.

363,197.—Granular nitrocellulose. R. Bernstein.
Is prepared from the pulverized nut, fruits or shells of nuts of the *Phytelephas macrocarpa* and kindred plants.

363,313.—Apparatus for distilling wood. E. J. Burrell.

May 24th, 1887.

363,402.—Cement. I. Lichtentag.
Consists of lime, kainite, calcium acetate and sand.

363,432.—Process of distilling petroleum. L. Stevens.
The petroleum is injected into water heated above 100° C., under pressure, and the vapors are carried off.

363,457.—Apparatus for and process of the manufacture of sulphurous oxide. H. P. Ford.

363,481.—Apparatus for generating gas. J. A. Price.

363,502.—Manufacture of dyestuffs and coloring matters. F. Bayer.

May 31st, 1887.

363,945.—Apparatus for generating illuminating gas. R. Boeklen.

363,952.—Process of and apparatus for making sodium carbonate by ammonia. H. Frasch.

June 7th, 1887.

364,268.—Process of manufacturing sublimed lead pigments from lead ores. G. T. Lewis.

364,320.—Nitrosophenyl-blue dyestuff. E. Ullrich.
Prepared by the action of paranitrosophenyltolylamine upon phenols or oxycarbonic acids.

364,550.—Molding boiled sugar mass. F. Scheibler.

364,552.—Process of and apparatus for making sodium bicarbonate. E. Solvay.

364,579.—Process of preserving milk. K. G. Dahl.

364,615.—Purifying, clarifying and decolorizing saccharine liquids. R. Viterbo.

The liquid is intimately mixed with hydrogen gas.

June 14th, 1887.

364,979.—Process of reducing zinc ore. E. Walsh, Jr.

364,898.—Albumimeter. A. C. Christensen.

364,932.—Pressure filter. E. S. Hutchinson.

364,933.—Apparatus for cleansing filtering surfaces. J. W. Hyatt.

364,979.—Process of reducing zinc ore. E. Walsh, Jr.

W. R.