ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Electrical Conductivity of Dilute Saline Solution. E. Bauty.

The saline solutions were so weak that their density and their viscosity were practically those of pure water. If *p* be the weight of salt in the unit of weight of solution, and *c* the conductivity of a cylinder of liquid of which the length and section are unity, there is, for every salt, a value p, of *p*, below which conductivity varies proportionately to the quantity of salt in solution. If the conductivity of various salts are examined, they will be found to be inversely as the equivalents. If *e* be the equivalent, we have :

$$C = K \frac{p}{e}$$

The coefficient K is constant for all salts that have been examined If, in the above formula, p = e, *i. e.* if for the same volume of each liquid we take a weight proportional to the equivalents, the conductivity C is the same for all. *The molecular conductivity of all salts is the same.* The following experiments were made with anhydrous salts. Solutions contained $\frac{1}{20}$, $\frac{1}{200}$, $\frac{1}{1000}$, $\frac{1}{4000}$ of the salts in solution. Taking potassium chloride as unity, we have had the following results:

Formula of the Salt.	Equivalent.	Values of r for solutions.				p.
		$\frac{1}{20}$	$\frac{1}{200}$	$\frac{1}{1000}$	$\frac{1}{4000}$	
$NH^4\,Cl$	53.5	0.743	0.73	0.724	......	0.718
$K\,Cl$	74.5	1.000	1.000	1.000	1.000	1.000
NH^4, NO^5	80	1.203	1.134	1.156	1.133	1.074
KO, SO^3	87	1.507	1.338	1.257	1.182	1.169
$K\,Br$	119	1.473	1.536	1.531	......	1.597
$K\,I$	166	2.132	2.202	2.108	......	2.233

Similarly, values are given for seven other salts, and another table follows with results given by hydrated salts.

In the discussion M. Berthelot called attention to the importance of these results. According to the new law, electrical resistance in dilute solutions is determined by the chemical equivalents and not by the atomic weights. Faraday's law also is relative to equivalents and not to atomic weights. Equivalent weights are then the foundation of electro-chemical laws, as well as of all physical laws in which the relative weights of bodies play a part. All of these laws become more obscure and more complicated when expressed by means of atomic weights. (*Comptes Rend.*, *XVCIII*, 140.) P. C.

On Skrivanow's Battery—Pocket Model. D. Mounier.

The elements are a zinc plate and silver chloride wrapped in parchment paper. The liquid has potassium hydrate, 75 parts water, 100. The trough is made of gutta percha, and hermetically closed. The couple weighs, 100 grammes; the electromotive force being $1\frac{1}{2}$ volts. It gives a current of 1 ampere for an hour. (*Comptes. Rend. XC VIII.* 224.) P. C.

Observations on Faraday's Law, and on the Law Discovered by Mr. Bauty. A. Wurtz.

The law discovered by Mr. Bauty, concerning the conductability of very dilute saline solutions, is connected with Faraday's law, as M. Berthelot has observed, while adding that the interpretation of these laws is more complicated and obscure when expressed in atomic weights.

"Different chlorides submitted to the same electric current deposit at the negative pole quantities of metals corresponding to 1 atom of chlorine."

By electrolysis the chlorides: $NaCl$, Cu^2Cl^2, $CuCl^2$, $BiCl^3$, $SnCl^4$, Fe^2Cl^6 deposit quantities, equivalent to Na, $\frac{Cu^2}{2}$, $\frac{Cu}{2}$, $\frac{Bi}{3}$, $\frac{Sn}{4}$, $\frac{Te^2}{6}$ but these do not correspond to "equivalents" in the case of cuprous, besmuthic, stannic and ferric chlorides. In the electrolysis of HCl, H^2O, H^3N, for 1 volume or molecule of hydrogen, at the negative pole, there will be, at the positive pole, 1 volume of chlorine, $\frac{1}{2}$ volume of oxygen, $\frac{1}{3}$ volume of nitrogen. The quantities are strictly equivalent, but it cannot be said that $\frac{1}{3}$ volume of nitrogen rèpresents 1 "equivalent" of nitrogen. The question here is not one of "equivalent" or of atomic weights, but one of valency or atomicity of elements. (*Comptes. Rend. XC VIII.* 176)

P. C.

Thermic Study of some Oxychlorides and Oxybromides of Mercury. G. ANDRE.

Heat of formation of $HgO. HgCl$, $3HgO. HgCl$, $4HgO. HgCl$, and the corresponding bromine compounds. (*Bul. Soc. Chim. XLI.* 274.) E. W.

Equivalent of Chromium, determined by means of the Sulphate of Sesquioxyde. H. BAUBIGNY.

On p. 100, Baubigny gives processes for preparing pure sulphate of sesquioxide of chromium. By means of this salt, heated to 440° C, until the weight remains constant, the equivalent of chromium has been determined. The results are $Cr = 26.020$ and 26.012 if $S = 16$ and $Cr = 26.055$ and 26.116 if $S = 16.037$. Berzelius gave for Cr, 28.1, and later $Cr = 27.35$; Péligot in 1844 gave $Cr = 26.28$ and Berlin for the average of his results. Moberg from ammoniacal chrome alum, found in 1848, $Cr = 26.79$, a remarkable degree of accuracy considering the crudity of his methods. In 1861 Kessler found : $Cr = 26.15$, and Siewert, $Cr = 26.047$. (*Comptes Rend., XCVIII,* 146.) P. C.

On the Krakatoa Ashes, in the Year 1883. DR. A. SAUER.

These ashes are composed of a grayish-white, fine, loose powder, in which coarser particles may be felt by rubbing between the fingers.

The composition was found to be as follows :

SiO_2	63.30 %
Al_2O_3	14.52 “
Fe_2O_3	5.58 “
TiO_2	1.08 “
CaO	4.00 “
MgO	1.66 “
MnO	0.23 “
Na_2O	5.14 “
K_2O	1.43 “
Loss on ignition	0.82
Total	97.76

Other analyses are given. (*Chem. Cent. Bl.* 1884, 129.)

J. H. S., JR.

Russian Chemical Society. M. O. DAVIDOFF.

M. Brauner has determined the atomic weights of cerium, didymium and tellurium, obtaining results according better with Mendeleff's periodic system than the figures previously obtained.

M. Dieff communicates results of experiments on the action of argentic oxide with haloid salts of sodium. The amount of double decomposition depends upon the atomic weights of the elements taking part in the reaction.

M. Tchinkoff reports upon (1) the influence of certain mineral substances on the results of the elementary analysis of coal. (2) Finds that CO_2 at 200° afford no lead carbonate with PbO_2. (3) The increase in weight observed after heating a coal for some time to 165°, did not take place when the coal had been previously treated with ether. (4) The red color of some rock salts from the south of Russia was found to be due to the presence of manganese salts.

M. Beketoff communicates the results of thermochemical investigations on lithium.

M Betz finds that the sensitiveness of silver bromide to light, is greatly increased when it is crystallized from a weak solution of gelatine (or better of pure fish glue), and dried at 10 or 12°

M. Petrieff communicates the results of studies on the double decomposition of salts. Between carbonates and nitrates or acetates of several of the metals the amount of decomposition depends as a rule upon the atomic weights of the substances taken. In experimenting on the action of nitric acid in limited amount upon mixtures of bases, the amounts dissolved seemed to have no correspondence with the ratio of the atomic weights. The results with a nitrate were very different from those with the free acid.

M. Betekoff communicates a report on the relation of temperature of dissociation, heat of formation and atomic weights of atoms in combination. The nearer the atomic weights the higher the temperature of dissociation. This observation serves to explain some exceptions to the general rule that exothermic compounds are more stable than endothermic.

M. Potilitzine obtained results upon the rapidity of chemical reaction, which go to show that there is a relation between the speed of the reaction, the atomic weight and the thermic effect.

M. Alexeef gives as his opinion upon the nature of solution, that solutions are formed under the influence of cohesion.

M. Brauner finds the atomic weight of tellurium to be 125, a result which gives it the proper position on Mendeleef's system. (*Bul. Soc. Chim.* XLI., 309 *et seq.*) E. W.

On the Proportion of Imperfectly Oxydized Phosphorus Contained in Urine, especially in Nervous Diseases.

LÉPINE, EYMONNET and AUBERT.

In man, normal urine contains for every 100 parts of nitrogen (by sodium hypobromite), 20 parts of phosphoric acid as phosphates, and less than 0.25 of imperfectly oxidized phosphorous, estimated as phosphoric acid.

In a case of apoplexy, with loss of consciousness for two hours, for 100 parts of nitrogen, 21.6 of phosphoric acid were obtained as phosphates, and 1.07 from phosphorus imperfectly oxidized.

In a case of epilepsy, urine after the attack had for every 100 parts of nitrogen 31 of phosphoric acids as phosphates, and 0.71 as other phosphorus compounds.

In a case of *hystero*-epilepsy, for 100 parts of nitrogen—phosphoric acid of phosphates 27.5—from other phosphorous compounds, 0.5.

In a case of *delirium tremens*, for nitrogen 100 parts—phosphoric acid from phosphates, 34.5—from other phosphorous compounds, 0.47. (*Comptes. Rend. XCVIII.* 237.) P. C.

Intensity of the Chemical Phenomena of Respiration in a Super-Oxygenated Atmosphere.

L. DE ST. MARTIN.

Lavoisier and and Séguin have ascertained that no change takes place in the products of respiration whether the gas inspired be pure oxygen or super-oxygenated air. Regnault and Reiset, from their experiments, reached a similar conclusion.

The following results are obtained by the author:

Animal used for experiment.	Properties of oxygen in air per cent.	Co^2 given out per hour.
Guinea Pig,	20 95	511 C. C.
"	"	501 "
"	"	558 "
"	"	475 "
"	"	530 "
"	66	529 "
"	58	500 "
"	50	504 "
Rat,	55	506 "
"	20.95	525 "
"	75	535 "
"	20.95	551 "

Conclusion—Super-oxygenation has no appreciable influence on the products of respiration. (*Comptes. Rend. XCVIII.* 241.)

P. C.

Heating of Cultivations of Bacillus anthracis obtained on a Large Scale. A. Chauveau.

After obtaining a cultivation in a large flask, as described on p. 73, small portions are taken and heated at temperatures from 80° to 90° C. Inoculation shows what degree of heating is sufficient to obtain a desired result with the cultivation under examination. Generally 84° C gives the best result for the first inoculation, and 82° C for the second. The author, however, has had liquids which required heating to 80° for the first inoculation and 78° for the second. When the virulence is great, it keeps pretty constant after a cultivation has been kept up several months without heating. Weak virulence is apt to diminish by prolonged cultivation.

On vaccinating with liquids very slightly attenuated, quite a number of animals have died; with greater attenuations the deaths have been very few. After using liquids with a minimum of virulence, the deaths from inoculation with strong virus have been very few. Double inoculation gives almost perfect immunity, even when both inoculations have been practiced with very weak virus. (*Comptes Rend.*, *XCVIII.*, 126.) P. C.

ORGANIC CHEMISTRY.

On Tetranitrated Ethylene Bromide. A. VILLIERS.

The potassium compound, $C_4 Br_2 (NO)_4$ 2KO, (old style), previously described by the author (Bul. Soc. Chem., 37, 451), on being treated with an acid affords a coloress or slightly yellow oil, which is, no doubt, the compound sought, but it is so unstable that attempts to isolate it for examination have, so far, been unsuccessful. (*Bul. Soc. Chim. XLI.*, 281.) E. W.

On Nitrated Derivatives of Ethelene hydride. A. VILLIERS.

The potassium compound referred to in the last paper is decomposed by sulphurous acid, sodium amalgam, or zinc in alkaline solution, with formation of hydrocyanic acid, hydrobromic acid and ammonia. HS also destroys it, though if the addition is stopped before the decomposition has proceeded too far, $C_4K_2(NO_4)_4$ is formed. This substance detonates violently at 200°, or even at 100°, when lightly touched. With acids, even when extremely dilute, it decomposes explosively. Among the products of decomposition by H_2S, is a base containing potassium and sulphur, and forming a fine chloroplatinate. With potassium sulphate and carbonate, the tetra-nitrated potassium bromine compound yields a body with the composition $2C_4K_2(NO_4)_4$ 3KO, SO_3. By treating with barium chloride in hot concentrated solution the same compound as before, $C_4K_2(NO_4)_4$ is obtained.

This compound is peculiar in having the bromine replaced by potassium. By treating it with bromines the original compound may be re-formed (formulæ, old style). (*Bul. Soc. Chim. XLI.*, 282.) E. W.

On a Case of Isomerism of Chloronitrated Camphor. P. CAZENEUVE.

Reference is made to a previous paper describing the formation of one chloronitrated camphor. (Bul. Soc. Chem., 1883, 503). The alcoholic solution from which the first was crystallized, on being cooled down, yields the second chloronitrated camphor. The characters of the two are contrasted:

FIRST (normal).	SECOND (isomeride).
Hard, pulverizes easily; not	Soft, pulverized with difficulty.

readily soluble in cold alcohol, crystallizes from ether in prisms.	Insoluble in water, very soluble in cold alcohol and ether. Ether on evaporating leaves an ill-defined crystalloid mass.
Lævorotatory $[\alpha]$ J$= -6^\circ 2$.	Dextrorotatory $[\alpha]$ J$= +17^\circ$.
Fuses at 95°.	Fuses at 83°.

Priority in these researches is claimed over MM. R. Schiff and J. Puliti. (*Bul. Soc. Chim. XLI.*, 285.) E. W.

On Bromised Xylenol. P. Adam.

By treating paraxylenol at 160° with bromine, introducing the latter rather rapidly, the compound $C_6H_3(OH)(CH_2Br)_2$ was obtained. (*Bul. Soc. Chim. XLI.*, 288.) E. W.

Note on Furfurol. A. Guyard.

Furfurol is always formed by projecting a substance consisting essentially of a carbohydrate into a hot mixture of equal parts of sulphuric acid and water. By covering the vessel in which the reaction takes place with a paper soaked with aniline acetate, the paper takes a fine rose tint, which however spontaneously decomposes in a short time. Swedish filter paper affords very little furfurol; bran affords much. Cellulose, and some other substance the nature of which is not determined, seem to be necessary for the production of the furfurol. Pyroligneous acid contains relatively large amounts of furfurol. This gives the bad taste to vinegars. By agitation with benzine, furfurol may be removed. The benzine may then be distilled off, leaving the furfurol. (*Bul. Soc Chim. XLI.*, 290.) E. W.

Synthesis of Tartaric Glucoside. A. Guyard.

By projecting the pulverized, anhydrous tartaric acid of M. Fremy into melted glucose, until the mass becomes pasty and almost infusible, aqueous vapor is disengaged, and a substance is obtained nearly white, very soluble in water, unaltered by boiling in it, in which neither tartaric acid nor glucose can be detected by the usual reagents. Boiling water with a mineral acid for a few minutes affords tartaric acid and glucose. (*Bul. Soc. Chim. XLI.*, 291.)
E. W.

On a New Coloring Matter derived from Chlorophyll. ROBERT SACHSSE.

In a previous article the author described three coloring matters, which he had isolated from chlorophyll. They differ from one another not only in composition but, also owing to the fact that one is sparingly soluble, while the other is nearly insoluble in alcohol. The third is easily soluble in alcohol. These compounds are named by the author as follows: That which is nearly insoluble in alcohol he calls α-phaeochlorophyll; that which is sparingly soluble, β-phaeochlorophyll, and that easily soluble in alcohol, γ-phaeochlorophyll.

β-phaeochlorophyll, when dry, appears nearly black. It is insoluble in water, but soluble in hot alcohol, from which it separates on cooling, in the shape of an amorphous precipitate. The formula of this compound is $C_{27} H_{33} N_3 O_4$; (*Chem. Cent. Bl.* 1884, 113).

J. H. S., JR.

On the Action of Chlorine on Sulphuric Compounds and on Amylic Oxysulphides. W. SPRING and C. WINSSINGER.

The introduction of the sulphonic group into a hydrocarbon seems to act as a bar to the formation of any substitution product of chlorine in the molecules. As regards the higher homologues of ethylsulphuric acid, Kékulé believes that they are capable of forming chlorine substitution products, the chlorine entering into the molecule at a part as far as possible removed from the influence of the sulphonic group. Kolbe, however, dissented from this view The results of the authors tend to confirm the view of Kékulé. The group causing this resistance to chlorination is found to be SO_2 itself, not S or SO. (*Bul. Soc. Chim. XLI.*, 301.) E. W.

On the Products Resulting from the Reduction of Erythrite by Formic Acid. A. HENNINGER.

The author and M. Tollens have communicated to the Academy a process for the preparation of allylic alcohol, founded on the reduction of glycerine by oxalic acid. As an intermediate product, a formine of glycerine is obtained, which is decomposed by heat into allylic alcohol, carbonic acid and water.

The same reaction has been extended to other multivalent alcohols, glycols erythite and mannite. The experiments which the author described in 1873, led him to the conclusion that formic acid effects reductions of valency of two steps at a time, and gives rise to unsaturated bodies. Formic acid is the only body which acts in this manner. When erythrite is boiled for six hours with 2½ times its weight of formic acid a crystallizable residue is left on driving out the excess of acid by heating to 190° or 200° C. This residue has the composition of diformine $C^4 H^6 (O H)^2 (CHO^2)^2$, but is in reality a mixture of several formines, which may be separated by crystallization from anhydrous ether or absolute alcohol. One of these is tetraformine.

The mixture of formines is decomposed by heating at 210°—220° C. The reactions are:

$C^4 H^6 (OH)^2 (OCHO)^2$.

$1 = CO^2 + H^2O + C^4 H^6 (OH) (OCHO)$.

$2^\circ = 2CO^2 + 2H^2O + C^4 H^6$

$3^\circ = CO^2 + CO + 2H^2O + C^4 H^6 O$.

$4^\circ\ C^4 H^{10} O^4 = H^2 O + C^4 H^8 O^3$.

$C^4 H^8 O^3$ is *erythrane*, an anhydride of erythrite, not previously described. (*Comptes Rend.*, *XCVIII*, 149.) P. C.

On an Aromatic Di-acetone. E. Louïse.

The constitution of mesitylene, considered as symmetrical trimethylbenzine, leads to the supposition that the successive replacement of the aromatic hydrogens by the radical benzoyl, will give rise to three acetonic compounds. In a previous communication the author has described the mono-substitution product, *benzoyl-mesitylene.* The present communication relates to *di-benzoyl-mesitylene,* formed by the action of benzoyl chloride on benzoil mesitylene. Thirty grammes of benzoyl mesitylene are dissolved in 80 grammes of benzoyl chloride and heated to 150° C. Aluminic chloride is added and H Cl escapes. The residue is a thick, black mud of benzoyl, which contains the body sought. The excess of chloride is dissolved in water and the residue dissolved in alcohol mixed with ether. Further purified by distillation and crystallization the resulting body has the composition: $C_{23} H_{20} O_2 = (C^6 H^5 CO)^2 C^6 H (C H^3)^3$, which is di-benzoyl mesitylene. This body is colorless, transparent, soluble in ether, alcohol, petroleum, etc. By crystallization from a mixture of acetone and chloroform, large crystals, often several centimetres long, are obtained.

On a Nitrogenized Colloid derived from Amidobenzoic Acid. E. GRIMAUX.

By the action of phosphorus perchloride on amidobenzoic acid, a white powder is obtained, which appears to be an anhydride, originating in the union of several molecules of acid. This white powder is soluble in ammonia. The solution filters very slowly, and when concentrated *in vacuo*, at ordinary temperatures, it forms a thick jelly, and dries to translucent, yellowish scales, which are tasteless and inodorous, and resemble blood albumen. It swells in cold water, and dissolves slowly. It is easily soluble in hot water, and may be heated to 100° C without becoming insoluble. Evaporated at 100° C, it losses its solubility. This character also belongs to albumen.

Experiments made with a 2% solution of the colloid show that it behaves like animal colloids obtained from living organisms. It is precipitated by hydrochloric, nitric, acetic, tartaric and oxalic acids.

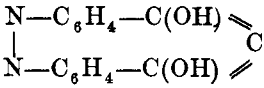
In presence of sodium chloride, sodium sulphate and potassium nitrate, carbonic acid coagulates its solutions at ordinary temperatures. Alum, corrosive sublimate, mercuric nitrate and tannin give voluminous precipitates. Rennet coagulates its solutions like those of caseine. (*Comptes. Rend. XCVIII.* 231.) P. C.

Russian Chemical Society. Correspondence of M. O. DAVIDOFF.

M. Ponomareff finds confirmation of his belief that allantoxanic acid is parabanic acid in which an atom of O is replaced by the residue of carbonic acid.

M. Reoformatsky has obtained C_8H_{14} by treating allyldiethylcarbinol with dilute H_2SO_4.

M. P. Alexeef proposes the constitutional formula of indigo blue



$$\begin{array}{l} N—C_6H_4—C(OH)\searrow \\ |\qquad\qquad\qquad\quad C \\ N—C_6H_4—C(OH)\nearrow \end{array}$$

as explaining more completely the phenomena manifested by that body.

M. Petrieff has studied first, the isomerism of fumaric and maleic acid; second, the action of zinc ethyl on the neutral ether of fumaric acid.

The same author also communicates information regarding a new group of coloring matters from aniline, the starting point being the substance obtained by the action of potassium nitrite on aniline chlorhydrate.

To purify bone oils, M. Petrieff washes with a solution of potassium permanganate in dilute H_2SO_4, then with water, and finally filters through bone black.

M. Lupatkine has obtained a chlorinated alcohol by the action of zinc and allyl iodide on epichlorhydrin.

M. Chestakoff has obtained a compound, apparently diallyl carbinol, in which one atom of hydrogen has been replaced by a propyl.

M. Melikoff communicates the results of his researches on the homologues of glycidic acid.

M. Ponomareff gives the result of studies of cyanuric acid ethers and the constitution of this acid. (*Bul. Soc. Chim.* XLI, 309 *et seq.*) E. W.

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ANALYTICAL CHEMISTRY.

On the Oxidation and Determination of Chromium of Sesquioxide. H. Baubigny.

I. The tendency of Cr_2O_3 to combine with oxides of other metals and thus to be precipitated, or fail to be precipitated under ordinary conditions, has led to an attempt to convert the chromium into the form of acid when it or the metallic oxides with which it may be mixed are to be determined.

II. Preference is given to the method of Storer (Proc. Am. Acad. 6, 338), in which the pulverized material is dejected at a temperature not above 100° in nitric acid into which potassium chlorate is thrown from time to time. The chromium in chrome iron may be entirely extracted by this treatment. The process has recently been published in the Berichte (16, p. 3,008), as a new and original method.

III. After converting the chromium into the form of acid, alumina or ferric oxide may be separated by addition of sodium bicarbonate in quantity just sufficient to give an alkaline reaction with litmus.

In the filtrate the chromium may be separated by acidifying with sulphuric acid, adding ammonia, and saturating with H_2S.

IV. The presence of even minute traces of alkali in the precipitate of chromic hydrate or oxide, causes the formation of alkaline chromate which may prove a source of error.

V. If the chromium is determined as $BaCrO_4$, the solution should be faintly acid. Sulphate must be absent. If it is determined by Rose's method, using $Hg_2(NO_3)_2$, HCl, H_2SO_4 and ammonia salts must be absent. (*Bul. Soc. Chim. XLI.*, 291.) E. W.

Dissemination, Accumulation and Determination of Phosphoric Acid in Arable Soils. P. DE GASPARIN.

All granitic, metamorphic, volcanic, schistous and calcareous rocks contain phosphoric acid.

The most active agents of the decomposition of rocks are mosses and lichens. On a rock containing $\frac{2}{1000}$ of phosphoric acid, a kilogramme of dry mosses and lichens contain 1.20 gr. of phosphoric acid or six times as much as the rock.

On a field of calcareous clay at Tarascon, the soil of which contains 2½ p. c. of organic matter, this organic matter had $\frac{1}{1000}$ of phosphoric acid or 125 kilogrammes per hectare. This was but a small quantity compared to the total phosphoric acid, which was 2,500 kilogrammes per hectare. It may be said that about 5 per cent. of the phosphoric acid is combined with organic matters. It is mainly these 5 per cent. which furnish phosphoric acid to plants. This small accumulation may be increased by adding manure. To determine phosphoric acid, the author recommends that the sample of earth should be treated by aqua regia having an excess of hydrochloric acid. In the filtered liquid ammonia is added slowly and not in sufficient quantity to make the liquid alkaline. Afterwards an excess of ammonia is added, and *all* the phosphoric acid is left in the precipitate. This is calcined, ground to a fine powder and treated with nitric acid of $\frac{1}{50}$ strength. The filtered solution is precipitated by ammonium molybdate, etc. (*Comptes. Rend. XCVIII.* 201.) P. C.

Determination of Water in Starch. L. BLONDONNEAU.

If there is no acid present, 5 or 10 grammes of starch are heated in a porcelain dish at a very low heat so that 60° C. is only reached in 3 hours. Then the stove is heated to 100°. It may even be heated to 110°. If the starch is acid there should be added to it its own weight of water and a few drops of ammonia. Then it should be dried slowly, the temperature not exceeding 40°. When nearly dry the operation proceeds as above. Desiccation of water in starch can only be complete at 115° or a vacuum must be used. A thoroughly dried starch becomes heated when moistened with water. (*Comptes Rend. XC VIII.* 153). P. C.

On the Evaluation of Wines, from Analytical Data.

Dr. J. Nessler.

According to Kayser, wines containing 12 vol. per cent. of alcohol, should contain at least 1.2 % glycerine. The author claims on the contrary, that the relation of glycerine to alcohol, in the best quality of wines, is as 7—100.

Kayser further states that, in a certain wine examined by both parties, the relation of extract and mineral matter to the alcohol present was too low.

The author and Dr. Barth had, however, previously shown that, in some cases, no exact limit can be assigned for these relations. He further states that the total ash of wines may be relied upon, but does not agree with Kayser, who claims that the value of a wine may be determined by estimating separately each of the mineral constituents of the ash. Thus it would not be right to condemn a wine because it only contained 0.009 % lime, or .011 % magnesia. (*Chem. Cent. Bl.* 1884, 133).

J. H. S., Jr.

INDUSTRIAL CHEMISTRY.

On the Manufacture of Cuprammonium and Zinc ammonium Compounds and their Technical Adaptation. C. R. A. Wright.

Reference is made to the well-known property of copper and zinc salts to form ammonia compounds. The solutions, however, lose ammonia by heating, or if concentrated, by standing for some time. The more dilute they are the longer they take to decompose.

The Patent Waterproof Paper and Canvas Co., of Willesden Junction, have put on the market materials known as the Willesden fabrics, consisting of paper for lining damp walls, a thicker quality for roofing, and also canvas, ropes, etc., prepared with ammoniacal copper solution so as to be mould-proof.

The process consists in preparing a concentrated solution of cuprammonium hydroxide, and passing the goods through a bath of this material at just such a rate as will permit of the pectising and gelatinizing of the exterior of the paper or canvas, without wholly disintegrating the mass, so that the material retains sufficient coherence to enable it to be passed over and under the usual drums, etc., of a paper mill, and so to be dried in the ordinary way. To obtain a "two-ply" card, two reels of paper are simultaneously employed, passed simultaneously through the bath, and then pressed together and dried as a whole.

The best qualities of thicker papers, 4, 8-ply, etc., are made by pressing two or more rolls of two-ply through the bath a second time, pressing them together and drying.

The compound is wholly unaffected by water when once dry. In some cases a mixture of zinc ammonium and cuprammonium hydroxides is used. The zinc compound alone does not give good results with paper.

The solutions contain 100 to 150 pounds ammonia, and 20 to 25 pounds (metallic) copper per 100 gallons.

The hydroxide appears to have a higher pectising power than any of the salts, sulphate, for instance, and also leaves no soluble compounds in the finished product.

The liquid is made by the combined action of air and ammonia water on metallic copper. Only about one-sixth of the oxygen of the air used was found to be absorbed. The passage of the air through the mixture of copper and ammonia solution carries away much of the ammonia, so that provision has to be made for recovering this, as also the ammonia given off in drying the goods. (*J. Soc. Ch. Ind.* III., 2, 211). E. W.

On the Filtration of Potable Water. S. H. Johnson.

Five well-known cases of outbreaks of disease from the use of infected drinking water are quoted.

Filtration through sand does not have any oxidizing effect on the impurities. The upper surface of each grain of sand simply serves as a catchment shelf on which the sediment is deposited. Animal charcoal, as a filtering material for domestic purposes, has the objection that the phosphates present afford nutriment to the various germs, and the filter soon becomes foul.

The author proposes the use of filter presses, in which the filtering material is a paper containing 10 to 20 per cent. of animal charcoal, which has been freed from phosphates by treatment with acid and in which the power is supplied by the pressure in the service pipes. (*J. Soc. Ch. Ind.* III., 2, 126). E. W.

Notes on Kieselguhr and its Technical Applications. A. Haacke.

The best qualities of kieselguhr are obtained near Naterleuss, between Hamburg and Hanover. The deposit is there about 150 feet below the surface, being overlaid by thin beds of diluvial and alluvial origin. The upper stratum is white, and contains but little organic matter or sand, and only requires washing to fit it for the market. The second stratum is gray, and contains but little sand. When calcined to remove the organic matter, it affords the finest product. The lowest and thickest stratum (of 50 to 100 feet in depth) supplies the green kieselguhr, which contains up to 30 per cent. of organic matter. When dried this will glow like peat when once set on fire. As it contains enough fuel to burn itself, it is prepared by burning in kilns about 15 feet high by 6 feet diameter, the raw (dried) material being charged at the top, and the finished product raked out at the bottom.

The use of kieselguhr for the manufacture of alkaline silicates has been superseded by white sand, on account both of the value of the kieselguhr for other purposes, and the large size of the melting pots which were required, as the material is quite bulky. In Germany an 82 per cent. dynamite has been made with this kieselguhr, and it is also much used as a non-conductor for safes, stoves, steam pipe, jacketings, etc.

Experiments are being made looking toward its use in the manufacture of light refractory fire bricks.

Sticks of kieselguhr saturated with bromine are used for the purpose of disinfection.

A patent has been taken out in Germany for the use of kieselguhr as an absorbent of sulphuric acid (66°) to facilitate transportation without danger of leakage and loss. Other application are mentioned. (*J. Soc. Ch. Ind.* III., 2, 132). E. W.

The loss of Nitre in the Manufacture of Vitriol. G Eschellmann.

Results of tests made at the Widnes Works (J. Muspratt & Sons). The nitre used was 2.75 to 3.24 per cent. of the sulphur. Of the nitre used, 10.7 per cent. to 12.5 per cent. of this was left unabsorbed. The mechanical losses represent 22 per cent., distributed as follows :

1. At Glover tower,			1%
2. Gay Lussac tower,	(*a.* Non-absorption of soluble gas,	12.	19%
	(*b.* Escape of nitric oxide,	7.	
3. Leakage, etc.,			2%

As to chemical losses by reduction of nitrogen oxides, calculation showed that an increase of steam by one-third would only raise the temperature of the first chamber by 2°.6. The variation in temperature due to that of the external air amounted to less than 5° in 24 hours.

The variation due to potting was found to be from 48 to 68° C., showing lowest when the nitre pot was nearly exhausted.

A fall in temperature indicates less vitriol made.

Loss by reduction results from fall of temperature or excess of water. In an experiment where vitriol with four equivalents of water was made instead of three, the loss by reduction amounted to 10.5 per cent. of the nitre. Excess of oxygen caused a loss of sulphur, and a fall of temperature in the chambers with less than 3 per cent. of oxygen much extra nitre is required.

To the above table the author adds 31½ per cent. of loss from steam at the inlets, leaving still over 46% unaccounted for. (*J. Soc. Ch. Ind.* III., 2, 134). E. W.

On the Action of Nitrates on Alkaline Sulphides. E. W PARNELL.

The author has endeavored to find the cause of the difference between the conclusions to which his experiments led, and those obtained by Messrs. Lunge and Smith. Those gentlemen concluded from their experiments with crude Leblanc liquors that metallic iron boiled in an alkaline solution with nitrate afforded ammonia. The author, working with a solution of nitrate in caustic soda, was unable to verify this conclusion, but in a set of experiments which are here described at length, found that such reduction took place in presence of iron oxide or sulphide at 370° Fahr. and upwards. His conclusion is that in making experiments with the Leblanc liquors on metallic iron, Messrs. Lunge and Smith really produced an iron sulphide which reduced the nitrate. (*J. Soc. Ch. Ind.* III., 2, 138). E. W.

On the Dyeing Properties of Anthragallol. R. BOURCART.

The compound has been known for several years, but has not been recognized hitherto as a coloring matter. It is prepared either by effecting a combination of benzoic and gallic acids in presence of sulphuric or by the combination of phthalic acid and pyrogallol. After long treatment with sulphuric acid and thorough cooling, the dyestuff is precipitated by running the sulphuric acid solution into water (which precipitates it), and washing it free from acid. It is an isomer of purpurin. Specimens of the colors produced by it were exhibited, and a sample accompanies the article. A light brown was produced with an alumina mordant, drabs with iron mordant, and dark brown with combinations of alumina and iron mordants. (*J. Soc. Ch. Ind.* III., 2, 140). E. W.

Notes on some of the Modes of Preparing, Bleaching, Dyeing and Finishing Cotton Goods, Practiced by Lancashire and Yorkshire Dyers, and their Results.. J. SHARP.

The machinery and methods used in Lancashire and Yorkshire are contrasted. Incidentally the author remarks that the use of mordants for dyeing "black cotton Italians" is objectionable, since in a short time the black becomes a green olive, and a predisposition to mildew is induced.

In dyeing goods of mixed cotton and woolen, the lâtter must be dyed before the cotton is either bleached or dyed.

In the dyeing of "shot" or two-colored effects, sodium stannate or tin chloride cannot be used as mordants.

As regards fixing coal-tar colors on cotton, the author divides the colors into basic colors and acid colors. The first have, as a rule, a much greater affinity for cotton, though it is usually preferable to use mordants with them. The acid colors do not dye cotton well, even with a mordant, but simply serve as impregnation colors. (*J. Soc. Ch. Ind.* III., 2, 141). E. W.

Abstracts of American Patents relating to Chemistry.

February 26, 1884.

294,003.—Hot-blast apparatus for blast furnaces.—J. F. Bennett.

294,051.—Process of making copper salts by the aid of electricity.—J. K. Kessler.

Claim.—1. The process of making basic acetate of copper, which consists, first, in passing an electric current through a solution of potassium chloride or sodium chloride, using copper as an anode and any suitable substance as a cathode, keeping the products formed at the opposite poles separate from each other, and then mixing them together, whereby hydrated suboxide of copper is precipitated, and secondly, in mixing the precipitated suboxide of copper, properly washed and dried, with neutral acetate of copper, moistening the mixture with water, and exposing it to the air.

294,052.—Lactometer.—A. R. Leeds.

Consists of a cylindrical glass vessel in combination with a glass stopper, made of any non-transparent material, on which are drawn lines at regular intervals and parallel to the circumference of its base, forming a graduated scale.

294,080.—Manufacture of cement.—L. Roth.

Burns and pulverizes a mixture of blast furnace cinder, carbonate of lime, and an alkaline chloride.