ABSTRACTS

GENERAL AND INORGANIC CHEMISTRY.

The Decomposition of Ammonia by Heat. W. RAMSAY and S. YOUNG.

The object of the researches was especially to determine with accuracy the temperature of dissociation, and the influence of the material of the vessel in which the decomposition is effected. The ammonia gas was obtained from concentrated solution of ammonia and after passing through three tubes containing lime was carried into the decomposition tube which was heated by a Fletcher furnace. The temperature of the furnace was ascertained by the use of salts fusing at known temperatures. The gases escaping from the heated tube were passed first into standard sulphuric acid and the gases unabsorbed (H & N) were collected and measured.

Tubes of porcelain, iron and glass were used, and in some cases filled with fragments of other substances, as asbestos, cardboard, copper wire or spongy copper, broken porcelain, etc. The results show that decomposition begins at a little below 500° C, under the most favorable conditions, but in contact with glass only, at much higher temperatures. The amount of decomposition depends upon time of heating and extent of surface. Under pressure in sealed glass tubes the results were less decisive, as it was difficult to prevent bursting of the tubes. In one case a tube was maintained at 780°, or a little lower, for six hours without appreciable decomposition of NH_3. Recombinations of dissociated gases has been shown to occur to a very minute extent. (*J. Ch. Soc.* CCLVI., 89). A. A. B.

History of the Ammonio-Silver Compounds. S. A. REICHLER. (*Ber. d. ch. Ges.* 1884. 41.) J. H. S., Jr.

On the Validity of the Clausius-Williamson Hypothesis. Examination of a few of Dr. Hans Jahn's Objections. By SVANTE ARRHENIUS. (*Ber. d. ch. Ges.* 1884. 49.) J. H. S., Jr.

On the Numerical laws of the Solid State. P. SABATIER. (*Bul. Soc. Chim.* XLI. 166.) E. W.

On the Fluorides of Sodium. M. GUNTZ.

From a study of the thermal phenomena of solution of NaF and of NaF,HF, the conclusion is reached that hydrofluoric acid is a bibasic acid like sulphuric and not monobasic like hydrochloric. (*Bul. Soc. Chim.* XLI. 168.) E. W.

Thermo-chemistry—Heat of Formation of Fluorides. M. BERTHELOT.

This is an answer to Tommassi's paper given above. The author says that Tommassi is mistaken as to the importance of his publications. He has not made any experiments, nor has he published any original idea. He has only appropriated laws that have been known for thirty years, the laws of Andrews and of Favre and Silbermann, or law of *modules*. This law itself belongs to a by-gone period; it is not accurate and it is useless to substitute approximate values for the precise numbers found experimentally by Thomsen and by Berthelot himself.

Besides, the law of *modules* does not give the initial number 98.5; this number is obtained by adding the oxidation heat of the metal(=82.3 for potassium, obtained by experiment) to the heat of neutralization of its oxide (=16.2, obtained by experiment.) (*Comptes Rend.* XCVIII. 61.) P. C.

On the Heat of Combination of Soluble Fluorides. D. TOMMASSI.

The heat of combination of these, as found by Guntz, confirm the law enunciated by Tommassi.

	Heat Units of Combination.	
	Found.	Calculated.
Potassium fluoride	98.4	98.5
Ammonium fluoride	36.2 70.7	35.9 70.4

[M. de Forcrand has already stated (Comptes Rendus March 26, 1883) that this is the law of Andrews, published in 1842.) (*Comptes Rend.* XCVIII. 44.] P. C.

On the Synthesis of Compounds Possessing of a Molecular Rotatory Power. E. JUNGFLEISCH.

Contesting the view of M. Pasteur, that the synthesis of bodies possessed of rotatory power has not yet been accomplished. (*Bul. Soc. Chim.* XLI. 226). E. W.

On the Speed of the Dissociation of Brass. R. B. Warder.

When brass is heated in a current of hydrogen, the rate at which zinc is volatilized diminishes more rapidly than the whole quantity of zinc present. Whatever may be the relation between the rate of loss and the quantity of zinc at the surface, the rate of loss as a whole is believed to be modified by the slowness with which zinc diffuses from the interior to the surface of the mass. (*Chem. News*, XLIX, 73). A. A. B.

Phenomena of Dissociation.—M. Isambert. A mathematical paper, being a discussion of Berthelot's formula:

$$Q_T = Qt + u - v.$$

Q_T and Qt being heats of combination at the temperatures T and t, and u — v, difference of heats absorbed in passing from t to T. (*Comptes Rend.* XCVIII, 97.) P. C.

On the Behaviour of Carbonic Oxide with Air and Moist Phosphorus. Ira Remsen and E. H. Keiser.

On passing purified air through an apparatus specially constructed for this purpose (all organic matter being excluded), the authors still obtained a precipitate of barium carbonate in the last wash bottle, and, therefore, came to the conclusion that the formation of carbon dioxide could only be due to the presence of carbon in the phosphorus.

In order to see whether carbonic oxide on being passed over moist phosphorus would form carbon dioxide, they passed a stream of air mixed with carefully purified carbonic oxide through the apparatus; the precipitate of barium carbonate was no greater than with pure air. The authors therefore came to the conclusion that carbonic oxide is not oxidized in contact with air and most phosphorus. (*Ber. d. ch. Ges.* 1884. 83). J. H. S. Jr.

On Hyponitrites. E. Divers and M. Kawakita.

After alluding to the discovery of the hyponitrites by Divers in 1871, the authors maintain the validity of the formula AgNO first given by Divers, and discuss the results of Berthelot and Ogier, which have led these observers to adopt the formula $Ag_4N_4O_5$. The per cent. of Ag obtained by the latter is shown to be too low, and to have resulted from presence of nitrate or nitrite, produced by oxidation, and to imperfect washing of the salt. Using boiled water for washing, the authors obtained a product considerably richer in silver, and by repeated solution and precipitation in an atmosphere, of CO_2, they finally obtained a salt with 77.06—77.13% of Ag, which accords more closely with the formula AgNO than with any other. In preparing the alkaline hyponitrite as a preliminary step, the original method of Divers, viz., reduction of the alkaline nitrite or nitrate in solution by sodium or potassium amalgams is preferred to the methods of Zorn or Menke. (*J. Ch. Soc.* CCLV., 78). A. A. B.

New Sulphur Salts Derived from Phosphorus Ter-Sulphide. G. Lemoine.

Starting from phosphorus sesquisulphide, the author has obtained salts, which may be supposed to be derived from the action of $P\ O\ S_6$ on H O. (Old style.)

Analogous compounds are also derived from phosphorus ter-sulphide $P\,S^3$. (Old style.) (*Comptes Rend.* XCVIII. 45.) P. C.

Silicated Chloride of Manganese. M. Al Gorgen.

Obtained by heating at a low red heat. 20 grammes of manganic chloride and 1 gr. of precipitated silica, and passing a current of hydrogen and steam. There is formed a button, which is a mixture of rhodonite, tephroite and the silicated chloride which the author has studied.

The button is treated with concentrated alcohol, which dissolves all the chloride. The residue is made of the two silicates which are bi-refracting and form large laminae, not acting on polarized light. These are formed from the silicated chloride. Their composition is

$$Si\ O^4\ Mn^{11}\ (Mn\ Cl)^{12}$$

A silicated bromide of manganese is obtained by analagous processes. A silicated iodide is more diffiult to obtain. (*Comptes Rend.* XCVIII. 107.) P. C.

The Halogen Compounds of Selenium. F. P. Evans and W. Ramsay.

From their experiments the authors are led to believe that selenium monochloride splits up on heating into Se and Cl. There is no indication of the existence of a dichloride. The tetrachloride does not decompose below 200° C., but at high temperatures breaks up rapidly according to the equation 2 $SeCl_4 = Se_2 + 4 Cl_2$, yielding eight volumes of Cl from four of $SeCl_4$. 50% of substance is decomposed at 288°, and 65.74% at 350°. Details in regard to the effect of heat upon selenium chlorobromide are also given together with a table of the corresponding halogen compounds of sulphur and selenium. (*J. Ch. Soc.* CCLV., 62). A. A. B.

An Experimental Investigation on the Value of Ferrous Sulphate as a Manure for Certain Crops. (Concluded in following number.) A. B. GRIFFITHS.

The treatment was found to increase the weight of beans as compared with a plot of land untreated and planted with the same crop. The proportion of iron and phosphoric acid in the ash of the stalks and leaves was increased to a marked extent, but the composition of the seeds was little affected. (*J. Ch. Soc.* CCLV. 71). A. A. B.

On a New Method of Preparing Barium Permanganate. G. ROUSSEAU and B. BRUNEAU.

To a cold saturated solution of potassium permanganate (100 gms. in 1500 to 1600 gms. water) are added 300cc. of hydrofluosilicic acid of 30° B. The mixture is allowed to stand for some time, then filtered through asbestos, and then neutralized by milk of baryta in quantity sufficient to about neutralize the amount of hydrodfluosilicic acid originally used. Barium carbonate will not serve here, as it will precipitate the whole of the manganese as hydrated peroxide. The solution is allowed to settle, decanted, and evaporated. By re-dissolving and again evaporating a pure product is obtained. (*Bul. Soc. Chim.*, XLI. 246). E. W.

Zinc in Drinking-water. C. W. HEATON.

Spring water, originally free from zinc, was found to contain 6.41 grains of $ZnCO_3$ per gallon, after flowing half a mile through a galvanized iron pipe. (*Chem. News*, XLIX, 85). A. A. B.

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

M. Wilne in separating the base metals of platinum ore by $BaCo_3$ has found a compound the reactions of which differ from those of compounds of known elements. He desires to preserve the right to continue his researches.

M. Alexieff presented results of a thermochemical examination of the effects of mixing solutions of different substances.

M. Sturm has studied the changes in concentration of solutions filtered through a mixture of pulverized quartz, $CaCO_3$ Ca SO . and stilbite.

M. Kouznetzoff's analysis of Rotschoubeite from the Yougine mine was presented.

SiO_2	32.43	FeO	1.63
Cr_2O_3	5.32	CaO	0.32
Al_2O_3	12.20	MgO	34.11
Fe_2O_3	0.50	H_2O	14.42

Bul. Soc. Chim., XLI., 253. E. W.

Preparation of Chromic Sulphate.—H. BAUBIGNY.

$Cr_2\ O_3$ is precipitated from potassium dichromate by treatment with hydrogen sulphide, and thoroughly washed. The chromic oxide is dissolved in a minimum quantity of nitric acid and by the action of heat, the violet salt is obtained. A slight excess of sulphuric acid is added and by means of alcohol the violet sulphate is thrown down. This salt is filtered rapidly, dissolved in weak sulphuric acid, re-precipitated by alcohol and purified by two solutions in water and two precipitations by alcohol. After every precipitation the sulphate is dried in a centrifugal.

The sulphate may also be prepared from chlorochromic acid, by reducing with alcohol. The violet sulphate is obtained by proceeding as above, after adding sulphuric acid diluted with 2 or 3 times its volume of water. (*Comptes Rend.* XCVIII. 100.) P. C.

Preparation of Large Quantities of Attenuated Cultivations of Anthrax Virus. A. CHAUVEAU.

The object is to prepare sufficiently large quantities to vaccinate 8,000 sheep.

There are two series of operations.

A drop of infected blood is taken from a guinea pig and introduced into a flask containing 20 c. c. of sterilized broth. The cultivation is carried on for 10 hours at a temperature of 43° C. The cultivation liquid is afterward heated to 47° C.

The second series of operations is carried on in flasks of 1 litre to 2 litres, according as there are 4,000 or 8,000 sheep to be vaccinated.

These flasks are Wollf's bottles with three tubulures, nearly filled with the cultivation liquid. The middle tubulure has in it a tube drawn to a narrower portion at the lower end and provided with a cotton plug. By this tube the air enters and bubbles through the liquid, keeping it in motion. One of the other tubulures communicates with an aspirator, while the third is provided with a fine tube to empty the flask. This last tube also serves for introducing the organism to be cultivated ; 1 drop of previous cultivation to be introduced for every 10 c. c. of liquid.

This apparatus is kept at 35°-37 C, and the cultivation would take place very slowly if the liquid were not stirred by the continual passage of air through the liquid, which causes a profuse production of organisms.

Chicken broth (1 part of lean meat to 4 or 5 parts of water) has given the best results as a cultivating liquid. (*Comptes Rend.* XCVIII. 73.) P. C.

Antiseptics and Bacteria. P. Miguel.

An article published in "Annuaire de Météorlogie," for 1884. From a table there given the following data are taken. The quantities represent the weights in grammes of antiseptics, which prevent the putrefaction of 1 litre of neutralized beef broth.

	Gr.
Mercuric iodide	0.025
Silver iodide	0.030
Hydrogen peroxide	0.050
Mercuric chloride	0.070
Silver nitrate	0.080
Osmic acid	0.15
Chromic acid	0.20
Chlorine	0.25
Iodine	0.25
Auric chloride	0.25
Platinic Chloride	0.30
Hydrocyanic acid	0.40

Bromine	0.60
Cupric chloride	0.70
Chloroform	0.80
Cupric sulphate	0.90
Salicylic acid	1.00
Benzoic acid	1.10
Potassium cyanide	1.20
Aluminic chloride	1.40
Zinc chloride	1.90
Sulphuric, nitric, hydrochloric and phosphoric acids	2.00 to 3.00
Carbolic acid	3.00
Alum	4.50
Tannin	4.80
Arsenious acid	6.00
Boracic acid	7.00
Ethylic alcohol	95.00
Sodium hyphosulphite	275.00

"This list will cause surprise in many quarters. The only criticism permissible is to repeat the experiments of M. Miguel."

Mention is made of the fact that naphthalene is powerless as an antiseptic when purified from phenol and other bodies. Even when present in such quantities that the beef broth is filled with solid pieces, the development of bacteria is not prevented. (*Mon. Scientifique.* 3. XIV. 170.) P. C.

ORGANIC CHEMISTRY.

Contributions Towards a Knowledge of the Indulines

O. N. WITT.

The indulines belong to a class of bodies, which are produced in many reactions, and depend usually upon the occurrence of some secondary reaction. Their formation and constitution is therefore, still obscure.

In the ordinary formation of induline from amidoazobenzole and aniline, the presence of ammonia is always observed. Besides the formation of the typical induline $C_{18}H_{15}N_3$, the author has observed the presence of a series of more complicated byproducts

If phenylated amidoazobenzole be used, the reaction takes a different shape. If phenylamidoazobenzole and aniline chloride are heated together, no ammonia is formed, and the product obtained is free from complex byproducts.

As phenylamidoazobenzole and induline are isomeric, it seemed probable that, under the influence of aniline chloride, a molecular change might take place. This idea, however, was found to be untenable. If Tropaeoline O. O. is substituted for phenylamidoazobenzole, however, in this case, the addition of aniline chloride is not even necessary. The aniline salt of this acid (Tropaeoline O. O.), heated with an excess of aniline, forms induline, and regenerates sulphuric acid. A reduction and splitting up of the azo-group has taken place, the hydrogen required being derived from the aniline present, and this, on combining with the amidodiphenylamine produced during the reduction, forms induline.

The higher homologues of phenylamidoazobenzole, behave in the same way.

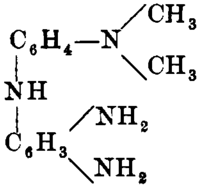
Diazoparatoluole and diphenylamine, form a compound crystallizing in yellow leaflets, melting point 109—110° C, and soluble in strong sulphuric acid with a green color.

The corresponding derivative of 1 : 2 : 4 metaxylidine forms golden yellow crystals, melting point 142—143° C.

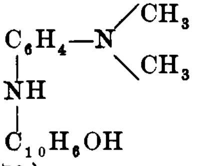
By substituting other secondary amines for diphenylamins, amidoazo-compounds are formed, which, under the action of salts of primary aromatic bases, form a whole series of induline dye-stuffs. (*Ber. d. ch. Ges.* 1884. 74.) J. H. S., JR.

On Indophenoles. O. N. Witt.

In the beginning of this year, Nietzki published a paper on the examination of saffranins, in which he described the constitution of dimethylaniline green, and toluylene blue, or at least its leuko-base. From these data the constitution of leukindophenole was established. Thus, if toluylene white has the following constitution :



Leukindophenole must be constituted as follows :



(*Ber. d. ch. Ges.* 1884. 76.) J. H. S., Jr.

On Orthoamidoazo-Compounds. Emilio Nölting and O. N. Witt.

It has until recently been assumed that by acting with diazo-compounds upon amines or phenoles, that amido- or oxyazo-compounds could only be formed when such amine, or phenole, had its para-position unoccupied.

The authors find that the above hypothesis does not hold true, as they have succeeded in producing amido-azo-compounds, in which the —N═N— groups stand in the ortho-position.

Starting from para-toluidine, they produced first diazoamidoparatoluole, and this was converted into amidoazoparatoluole, which appears as beautiful, orange-red, lustrous needles, easily soluble in alcohol and acetic ether. Melting point 118.5° C. Reducing agents split up this new compound into paratoluidine and orthotoluylendiamine. (*Ber. d. ch. Ges.* 1884. 77). J. H. S., Jr.

On the Lutidine of Coal Tar. M. Oechsner de Coninck

The fraction boiling at 153°.5 to 154°.5 constituted the base,

C_7H_9N. Specific gravity 0.9443, vapor density determined by Meyer's apparatus 3.6 to 3.9, colorless Mobile liquid, with an acrid and penetrating odor, quite distinct from that of pyridine. The fumes provoke violent headache. The chloro platinate was examined and found to agree in composition with that demanded by theory. It combines very slowly with ethyl iodide. The conclusion of the author that the lutidine of coal tar is an ethyl pyridine while picoline is a methylpyridine, is regarded as confirmed.

The most marked character of this lutidine is its perfect miscibility with water in all proportions.

By oxidation with potassium permanganate, an acid melting at 308° and exhibiting the other properties of isonicotricic acid was obtained. (*Bul. Soc. Chim.*, XLI. 249). E. W.

Theoretical Considerations on Isomerism in the Pyridine Series. MM. OECHSNER DE CONINCK and J. C. ESSNER.

Facts are cited tending to indicate that pyridine instead of being a monosubstituted benzine constitutes in itself a special group. (*Bul. Soc. Chim.* XLI. 175.) E. W.

Pyridine Derivatives. C. BÖTTINGER.

The following compounds are described:

Picoline carbo-acid, crystallizes with one mol. of water of crystallization, which may be driven off at 100° C.

Pyridine carbo-acid, crystallizes with one mol. water of crystallization; has slightly basic properties; dissolves easily in sulphuric and hydrochloric acids.

Pyridine tricarbo-acid. Several salts of this acid are described. (*Ber. d. ch. Ges.* 1884. 92.) J. H. S., JR.

Pyridine Compounds obtained by Condensation. C. BÖTTINGER.

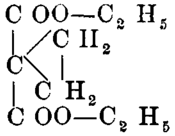
The author states that by treating an aqueous solution of imidopyrotartrate of ammonia with the fumes of bromine, he obtained uvitonic acid, which was recognized by the analysis of its silver salt. (*Ber. d. ch. Ges.* 1884. 53.) J. H. S., Jr.

On the Action of Ethylene Bromide on Malonic Acid Ether. W. H. PERKIN, JR. (*Ber. d. ch. Ges.* 1884. 54.)

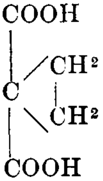
Trimethylendicarbo-acid Ether.

This was obtained from 30 grms. malonic acid ether, by treating it with 9 grms. sodium and 100 grms. absolute alcohol.

FORMULA.

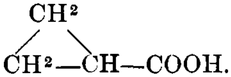


Trimethylendicarbo-acid.



Obtained from the ether by heating it with alcoholic potash.

Trimelthyenmonocarbo-acid.



Obtained from trimethylen-dicarbo-acid by heating it on the oil bath to 210°C. (*Ber. d. ch. Ges.* 1884. 54.) J. H. S., JR.

On Benzoylacetic Acid. ADOLPH BAEYER and W. H. PERKIN, JR.

The authors after a few preliminary remarks describe the following compounds :

Diethyl Ether of Dibenzoylsuccinic Acid.

Colorless, small prisms, melting point, 125–126°C.

Monolactone of Dibenzoylsuccinic Acid.

Small needles, with brownish color. Melting point 230°C. Sparingly soluble in water, but easily soluble in alcohol, ether and benzole.

Dilactone of Dibenzoylsuccinic Acid.

Colorless leaflets, with silver colored lustre. Melting point, 254–255°C. At this temperature it undergoes decomposition. (*Ber. d. ch. Ges.* 1884. 57.)
J. H. S., Jr.

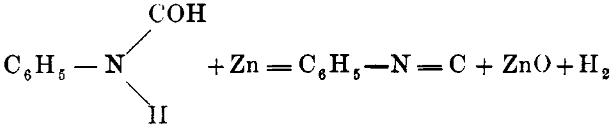
On the action of Chlor-and Bromacetone, Acetophenonebromide and Phenylbromacetic Acid on Acetacetic Ether.

A. Weltner. (*Ber. d. ch. Ges.* 1884. 66.)

J. H. S., Jr.,

Nitriles and Carbo-Acids from Aromatic Amines. K. Gousiorowski & V. Meiz.

The authors prepared benzonitrile by heating formanilide and zinc dust in a flask with return cooler. This was formed according to the following reaction:



$$C_6H_5-N\begin{array}{l}\diagup COH\\ \diagdown H\end{array} + Zn = C_6H_5-N=C + ZnO + H_2$$

$$C_6H_5N = C = C_6H_5 - C = N$$

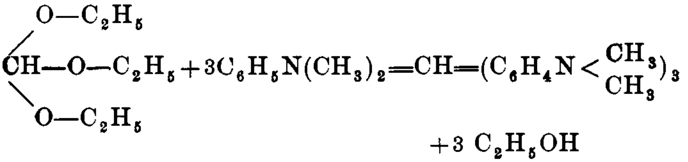
From this benzoic acid was obtained.

Similar results are obtained from formoorthotoluide, only in this case the acid obtained from the nitrile corresponds to orthotoluylic acid. Melting point 102° C. (*Ber. d. ch. Ges.* 1884. 73.)
J. H. S., Jr.

On the Violet Derivatives of Triphenylmethane. O. Fisher and G. Köerner.

The authors describe a new synthesis of hexamethylparaleukaniline. 1 pt. ethyl ether of orthoformic acid, $\frac{3}{4}$ pts. dimethylaniline, and 2 pts. of zinc chloride are heated on the water bath. The melt is freed from excess of dimethylaniline by steam, dissolved in HCl, and poured into cold ammonium hydrate, which precipitates the base. After one crystallization it is perfectly pure; crystallizes in beautiful silvery leaflets. M. P. 172—173° C.

This compound is formed according to the following equation:



(*Ber. d. ch. Ges.* 1884. 98.) J. H. S., Jr.

On a New Method of Producing Acridine. O. FISHER AND G. KÖERNER.

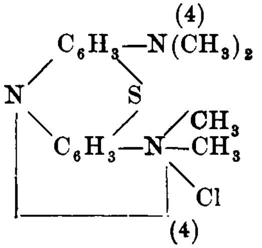
One pt. of chloroform, 1 pt. diphenylamine, and ½ pt. of zinc oxide are heated under pressure. The formation may be explained by the following reaction:

$$C_6H_5—NH—C_6H_5+CCl_3H+ZnO=C_{13}H_9N+ZnCl_2$$

(*Ber. d. ch. Ges.* 1884. 101.) J. H. S., Jr.

On Methylen Blue. RICHARD MÖHLHAU.

The author agrees with Bernthsen in giving methylen blue chloride the following formula:



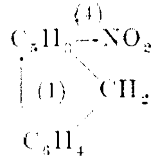
(*Ber. d. ch. Ges.* 1884. 102.) J. H. S., Jr.

On the Synthesis of Pyrocoll. G. L. CIAMICIAN and P. SILBER. (*Ber. d. ch. Ges.* 1884. 103.) J. H. S., Jr.

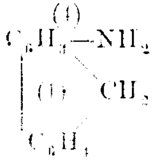
On Paraamidofluorene. JOS. STRASBURGER.

This compound was obtained by reducing paramononitrofluorene with tin and HCl.

p. Mononitrofluorene



p. Amidofluorene

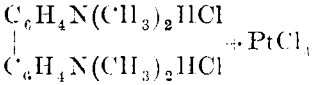


Light brown colored needles melting at 124—125° C. (*Ber. d. ch. Ges.* 1884. 107.) J. H. S., Jr.

On a few Naphthaline Derivatives. Eug. Lellman. (*Ber. d. ch. Ges.* 1884. 109). J. H. S., Jr.

On Tetramethylbenzidine. W. Michler and H. Pattinson.

This compound was produced by heating dimethylaniline dissolved in sulphuric acid, and adding by degrees 3 mols. of lead peroxide. The platinum salt of this compound has the following formula:



$$\left.\begin{array}{l} C_6H_4N(CH_3)_2HCl \\ | \\ C_6H_4N(CH_3)_2HCl \end{array}\right. + PtCl_4$$

A tetramethylbenzidine was also produced directly from benzidine by treating it with methyl iodide and methyl alcohol. (*Ber. d. ch. Ges.* 1884. 115.) J. H. S., Jr.

On the Preparation of Orthonitrobenzaldehyde. Alfred Einhorn.

The soda salt of orthonitrocinnamic acid is dissolved in water and oxidized with potassium permanganate. The mixture is shaken up with benzole during the whole process of oxidation, which removes the orthonitrobenzaldehyde the moment it is formed, and after the reaction is ended the nitrobenzaldehyde is obtained in a solid state by distilling off the benzole. Yield, 50–53% (*Ber. d. ch. Ges.* 1884. 119.) J. H. S., Jr.

On Derivatives of Hydrindonaphthene. A. Baeyer and W. H. Perkin, Jr. (*Ber. d. ch. Ges.* 1884. 122.) J. H. S., Jr.

Researches on the Gums of the Arabin Group, Part I. Arabic Acid, its Composition and the Products of its Decomposition. C. O'Sullivan.

Gum arabic, ordinary Levantine gum, is stated to be a salt of arabic acid, with potash, lime or magnesia. The results of Mulder, Neubauer, Scheibler and earlier investigators are conflicting, and leave the true composition undecided. The author separated the acid by the method of Neubauer in the main. Successive portions of the acid obtained by fractional precipitation were found to be practically identical in their action on polarized light, and in their precipitates with BaO, showing the acid to be a homogeneous body. The decomposition products of arabic acid by H_2SO_4 were then studied as affording a possible clue to its condition. These products, according to Schiebler, are a crystallined and a non-crystalline sugar, and an acid of which the Ba salt is insoluble in alcohol. The latter was first precipitated by the author, and after precipitation submitted to fractional decomposition by H_2SO_4, whereby it yielded two acids, the Ba salts, of which contained respectively 13.4%, corresponding to the formula $C_{29}H_{48}O_{27}$ BaO and 15% of BaO. The latter, by further action of H_2SO_4, gave a new salt requiring 18.68% BaO, and an uncrystallizable sugar of the $C_6H_{12}O_6$ class. The acid of the last salt agreed most closely with the formula $C_{23}H_{38}O_{22}BaO$, corresponding to a carbohydrate $-CH_2+O_2$. The relation between the salts of the two acids is indicated by the equation

$$C_{29}H_{48}O_{27}BaO+H_2=C_{23}H_{38}O_{22}BaO+C_6H_{12}O_6, \text{ and}$$

the three Ba salts differ from one another by the group $C_6H_{10}O_5$, which, in the decomposition of the salt, is hydrated to form a sugar of the $C_6H_{12}O_6$ class. The arabic acid molecule, in breaking down, yields with simultaneous hydration, a series of acids, each one differing from its neighbor by $C_6H_{12}O_6$.

Arabic acid has the formula $C_{89}H_{142}O_{74}$, and its Ba salt has 6.00% of BaO. The paper is devoted mainly to establishing the constitution of arabic acid. Four different sugars (α. β. & γ arabinose), resulting from separate stages of the decomposition of arabic acid are shown to exist and to be defined by their difference in rotation and copper-reducing properties. The different acids (α. β. & γ arabinosic acids) are partly defined, the details being left for a later investigation.

Arabic acid $[\alpha] = -27°-28°$ is the chief constituent of all laevorotatory Levantine, E. Indian, Senari and Senegal gums, but other acids are also present in these gums which the author believes to bear simple relations to arabic acid. Some high-rotating gums are believed to contain acids of large molecule, and to be related to arabic acid, as it is itself related to the arabinosic acids above mentioned. (*J. Ch. Soc.* CCLV., 41). A. A. B.

On the Preparation of Pure Chlorophyll. A. Tschirch.

The belief in the comparative stability of chlorophyll, which has hitherto been held, is regarded by the author as an error and to be the source of failure in preparation of the pure substance. Previous attempts to separate it have been based upon the action of energetic chemical agents, by which chlorophyll itself has been destroyed. The crystalline chlorophyll of Gautier and Rogalski is found to be identical with the chlorophyllan of Hoppe-Seyler, and is a product of the oxidation of chlorophyll; also the pure chlorophyll of Berzelius, Mulder and Pfaundler is identical with Fremy's phyllocyanic acid. These two bodies agree perfectly in their absorbtion spectra, but are shown by their behavior with caustic alkalies to be totally distinct substances. Chlorophyll is decomposed by weak acids, even by the vegetable acids in leaf cells, which accounts for the spontaneous decomposition of chlorophyll tinctures as shown by the changing spectra. It is also decomposed during extraction from the leaf by solvents, through the same agency. Saponification of chlorophyll extracts is equally ineffective in securing the pure substance. The author defines pure chlorophyll as the substance which yields a spectrum identical with that of the living leaf, and obtains this substance through reduction of chlorophyllan in alcoholic solution of zinc dust on the water bath. The solution thus obtained is in the form of blackish-green drops, which have not yet been made to crystallize. It is soluble in alcohol, ether, benzene, fatty and volatile oils, sparingly soluble in fused paraffin, and insoluble in hot water. It is decomposed by concentrated and dilute acid and by caustic potash. The alcoholic solution is much less sensitive to light than ordinary chlorophyll tincture. The article concludes with a table of synonyms relating to bodies of the chlorophyll group. (*J. Ch. Soc.* CCLV., 57). A. A. B.

Preparation of Glyoxal. R. de Forcrand.

The product resulting from the action of nitric acid on aldehyde was taken up with a small amount of water, saturated with calcium carbonate and filtered, then precipitated with a slight excess of concentrated solution of bibasic lead acetate, filtered, exactly enough oxalic acid added to precipitate the lime, and evaporated on the water bath. The product is purified by drying in vacuo at a temperature not exceeding 110° to 120°. After this, however, it is not absolutely pure. The yield amounts to about 18 per cent. of the amount of aldehyde used. (*Bul. Soc. Chim.*, XLI. 240). E. W.

Transformation of Glyoxal into Glycolic Acid. R. DE-FORCRAND.

Glyoxal prepared as above dissolves in alkalies forming glycolates. The author gives an account of some thermochemical investigations on this reaction. (*Bul. Soc. Chim.*, XLI. 244). E. W.

On the Decomposition of Compounds Optically Inactive by Compensation. E. JUNGFLEISCH.

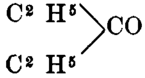
Ordinary, crystallized paratartrate of soda and ammonia contains two forms, a right and a left-handed salt, the solubilities of which have been considered practically the same. By making a supersaturated solution, and introducing simultaneously, in different places in the solution, a right-and left-handed crystal, the two salts were separated. As the right-handed crystals separated in larger proportion at first, the conclusion is that the right-handed salt is somewhat more insoluble. (*Bul. Soc. Chim.*, XLI. 222). E. W.

On the Decomposition of Silver Fulminate by HCl. E. DIVERS and M. KAWAKITA.

Formic acid and hydroxyammonium chloride were produced as in the case of the mercury salt, but only $\frac{2}{3}$ of the calculated quantities of these bodies were obtained. Ammonia and a trace of HCN were also obtained, but the authors have failed as yet to find what becomes of the rest of the carbon and nitrogen. The silver salt used contained 71.79% Ag. Theory requires 72%. (*J. Ch. Soc.* CCLV., 75). A. A. B.

Heat of Combustion of Some Ketones and of two Carbonic Acid Ethers. N. W. LONGUININE. P. C.

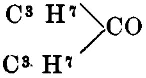
Diethylketone



$$\begin{matrix} C^2H^5 \\ C^2H^5 \end{matrix} \Big\rangle CO$$

Average of 3 experiments give 8569 heat-units for 1 gramme of substance burnt, or 736934 heat-units for 1 molecule.

Dipropylketone,

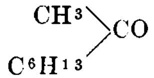


$$\begin{matrix} C^3H^7 \\ C^3H^7 \end{matrix} \Big\rangle CO$$

Average of 5 experiments, 9244.5 heat units for 1 gramme or 1053873 for 1 molecule.

Diisoprophylketone, $CH\ (CH^3)^2\ CO$

Average of 4 experiments, 9172.4 heat-units for 1 gramme, 1045654 heat-units for 1 molecule.

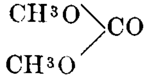
Methylhexylketone,

$\left.\begin{matrix}CH^3\\C^6H^{13}\end{matrix}\right>CO$

Average of 3 experiments, 9467 heat-units for 1 gramme, 1211789 for 1 molecule.

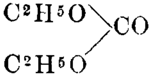
Conclusions: The differences between the heats of combustion of dipropylic and diisopropylic ketones (1053873 and 1045654) = 8219 heat units or 0.8 of 1 p. c., which is within the limit of error for experiments of this nature.

The difference between the heat units of dipropylketone (1053873) and of diethylketone (736954) is 316969 for $2(CH^2)$, or 158484 heat units for CH^2. The difference between the heat of combustion of methylethylketone (1211789) and dipropylketone (105387) = 157916 for CH^2, very nearly the same result as above.

The author has also studied two ethers of carbonic acids :

Methylcarbonic ether,

$\left.\begin{matrix}CH^3O\\CH^3O\end{matrix}\right>CO$

Average of 4 experiments, 3774.3 heat units for 1 gramme, and 339691 for 1 molecule.

Diethylcarbonic ether,

$\left.\begin{matrix}C^2H^5O\\C^2H^5O\end{matrix}\right>CO$

Average of 5 experiments, 5442.8 heat units—for 1 molecule, 642250.

The difference of the heats of combustion of these two ethers is 302559 for 2 (CH^2), or 151280 for CH^2, which is a little less than was found by comparison of two ketones.

By comparing the combustion heats of diethylketone and of ethylcarbonic ether, we see that the introduction of 2 atoms of oxygen has given a diminution of 94684 heat units or 47342 for 1 oxygen atom. (*Comptes Rend.* XCVIII. 94.) P. C.

On Camphoric Peroxide and Camphorate of Barium.

C. T. KINGZETT.

Brodie has stated (Phil. Trans. 1863, p. 407) that a barium salt of camphoric peroxide is obtained by triturating camphoric anhydride with an equivalent of BaO_2 in ice-cold water. This statement is questioned by Kingzett who interprets the facts presented by Brodie in another way. Camphoric anhydride becomes camphoric acid in presence of water, and this acting on BaO_2 sets free H_2O_2 and forms barium camphorate. Experiment shows this hypothesis to be the true one.

The following reactions which are found to occur separately, will take place in succession under the conditions of Brodie's experiment, viz:

Camph. Anhydride. Camph. Acid.
(1) $C_{10}H_{14}O_3+H_2O=C_{10}H_{16}O_4$
(2) $BaO_2+C_{10}H_{16}O_4=C_{10}H_{14}BaO_4+H_2O_2$.
(*J. Ch. Soc.* CCLVI., 93). A. A. B.

On Strychnine. (First note.) M. HARRIOT.

The presence of brucine interferes with the bichromate test for strychnine. If the proportion of strychnine is large, the brucine can be first destroyed by nitric acid, when the strychnine reactions can be obtained. Many commercial samples of brucine no doubt contain strychnine, and the suggestion is made that possibly the toxic effects attributed to brucine, may be partly or entirely owing to such admixture of strychnine. In conjunction with M. Blarez, the author has noted that concentrated solutions of strychnine salts are precipitated by any acid, preferably by the acid already existing in the salt. The precipitate re-dissolves in an excess of the acid, and is re-precipitated by water, provided that too large an excess of acid has not been used.

The mode of preparation and properties of dinitrostrychnine and diamidostrychnine are described. (*Bul. Soc. Chim.*, XLI. 233).
E. W.

Ferric Ethylate and Colloidal Ferric-hydrate—by M. ED. GRIMAUX.

By treating 1 molecule of ferric chloride, dissolved in absolute alcohol, with six molecules of sodium ethylate, a precipitate of Na Cl is obtained, and a reddish brown solution, which does not give the reaction of chlorine.

By distillation over a water bath a black, pasty mass is obtained which is soluble in absolute alcohol, benzine, chloroform, petroleum, and methylic alcohol.

The alcoholic solution is not precipitated by gaseous ammonia. If the alcoholic solution is left in contact with air, moisture is absorbed and a thick coagulum of ferric hydrate obtained. If a large quantity of water is added, a limpid liquid is obtained, presenting all the characters of Graham's solution of colloidal ferric hydrate. After a time the solution coagulates spontaneously. Heat coagulates it at once. The rest of the paper is taken up with a study of the conditions of coagulation, leading to the conclusion that mineral colloïds behave like nitrogeneous animal colloïds. (*Comptes Rend.* XCVIII. 105.) P. C.

On the Occurrence of a Phenol in the Stem and Leaves of Pinus Sylvestris. A. B. Griffiths.

Phenol is identified in a hot-water extract of the materials by means of ferric chloride and bromine water, and by the coagulation of albumen. (*Chem. News*, XLIX, 95). A. A. B.

Remarks on the Chemistry of Plants. M. Ballo. (*Ber. d. ch. Ges.* 1884. 6.) J. H. S., Jr.

Action of Solutions of Cellulose in Schweitzer's Reagent on Polarized Light. A. Levallois.

The plane of polarization is strongly turned to the left, but this deviation is not proportional to the degree of concentration of the solution. The celluloses were from linen, cotton Berzelius paper and German filtering paper. (*Comptes Rend.* XCVIII. 44.)

P. C.

On the Action of Hydrocarbons of the Acetylene Group, on Oxide of Mercury and its Salts. M. Kutscheroff.

If allylene, at the ordinary temperature, be passed through a solution of corrosive sublimate, the latter soon becomes turbid, and after a while deposits a copious, white, crystalline precipitate. During this reaction HCl is evolved, which may be easily recognized by means of litmus paper. On analysis, the purified precipitate gave figures which lead to the following formula:

$$3\,Hg\,Cl_2.\ \ 3\,HgO.\ \ 2\,C_3\,H_4.$$

The precipitate is insoluble in water and cold alcohol, but is easily soluble in hydrochloric and acetic acid, undergoing decomposition and splitting up into the corresponding mercury salt and acetone.

The process may be explained by the following reactions:

(1) $6\ Hg\,Cl_2 + 3\ H_2O + 2\ C_3\,H_4 = 3\ Hg\,Cl_2.\ 3\ Hg\,O.\ 2\ C_3H_4 + 6\ H\,Cl.$

(2) $3\ Hg\,Cl_2.\ 3\ Hg\,O.\ 2\ C_3\,H_4 + 6\ H\,Cl = 6\ Hg\,Cl_2 + 2\ C_3\,H_6O + H_2O.$

These two reactions can, according to circumstances, be made to take place separately or together, as may be desired. Mercuric bromide seems also to react on allylene, while, on the other hand, mercuric iodide does not. After experiments, the author concludes:

1. That allylene reacts with all mercuric salts, but that the products obtained differ from one another, according as the reactions took place in acid or alkaline solutions.

2. The hydration of allylene by means of mercuric salts is characteristic of the general reaction of this hydrocarbon with mercuric salts in acid solutions. In this case, also, complex mercuro-acetone compounds are formed, but are decomposed the moment they are formed, with liberation of acetone.

3. The structure of ketones, in relation to that of the hydrocarbons, which are derived from the latter by means of mercuric salts, may be determined according to the following rule:

In unsymmetrical hydrocarbons, the hydrogen of the molecule of water we wish to bind, unites with that carbon atom which is held by three bonds, or which is hydrogenized; the oxygen, on the other hand, unites with the non-hydrogenized carbon atom.

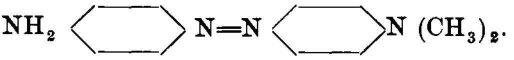
In symmetrical hydrocarbons, on the contrary, the elements of water divide themselves evenly on both sides of the triple bond. (*Ber. d. ch. Ges.* 1884. 13.) J. H. S., Jr.

Researches on Secondary and Tertiary Azo-Compounds.

R. MELDOLA.

By the action of diazoparanitrobenzene upon a solution of dimethylamine hydrochloride, the author obtained paranitrobenzine-azodimethylamine hydrochloride. The properties of the free base and of the corresponding amido-base are described. The latter furnishes an exceedingly delicate test for nitrous acid, preferable in some respects to the test with metaphenylenediamine.

The constitution of the base may be written



The remainder of the paper is devoted to a study of the action of diazotized metanitraniline upon primary, secondary and tertiary monamines. (*J. Ch. Soc.* CCLVI., 106). A. A. B.

Studies on the Hydrocarbons and Higher Alcohols Obtained from American Petroleum. G. Lemoine.

A detailed report of the results of experiments on octylic, nonylic and decylic compounds, confirmatory of those of MM. Pelouze and Cahours. (*Bul. Soc. Chim.* XLI. 161.) E. W.

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

M. Gustavson, by treating the volatile portions of petroleum with bromine in the presence of aluminum bromide obtained crystalline bromine derivatives C_6Br_6 and C_6Br_5, CH_3.

The process permits the detection of aromatic compounds in the presence of large amounts of paraffins.

M. Sabaneeff describes some combinations of acelytene, vinyl and ethylene.

M. Lwoff gives the results of researches on the action of chlorine on isobulytene. Isobulytene chloride was not detected among the products of the reaction.

M. Danilewski gave the result of examination of albuminoid substances. Myosine is a basic substance. Myosines from different sources have different powers of saturation. They all contain small amounts of calcium, magnesium and phosphoric acid. These may be removed by neutral acids, but the myosine is then transformed into syntonine. Myosine and syntonine have a rotatory power which may be destroyed by the prolonged action of a 1 per cent. solution of HCl. Mysostroine, a weak base, was also found in muscular tissue.

Caseine was found to be a combination of nucleine with protalbumen. The products of decomposition of albumenoid substances were also studied. E. W.

M. Ritza gave an account of the properties of the camphor extracted from Lechum palustre. White crystalline solid fusing at 104° to 105°, boiling at 202°. Observed vapor density 8.1. Formula $C_{15}H_{24}O$. or $C_{16}H_{26}O$.

M. Lidoff presented a note on the solubility of aniline in solutions of its salts. A concentrated aqueous solution of the chlorhydrate will dissolve aniline in all proportions.

MM. Lidoff and *Loukianoff* gave a method for the determination of glycerine in alizarine oil.

M. Pelopidas communicated an application of the principles of the periodic system to organic substances. (*Bul. Soc. Chim.*, XLI. 253).
E. W.

ANALYTICAL CHEMISTRY.

On the Conversion of Hyposulphites, into Sulphates, by means of Potassium Permanganate. G. BRUGELMANN.

A concentrated solution of potassium permanganate is added to the boiling solution of hyposulphites under examination, until it has assumed a distinct violet color. The excess of permanganate is then decomposed by adding alcohol and the precipitate of $Mn_2 O_3$ is filtered and washed with hot water. The filtrate is heated till all the alcohol has been expelled.

Sodium hyposulphite, on being heated with potassium permanganate, splits up according to the following reaction:

$2\ KMn\ O_4 + Na_2\ S_2\ O_3 = K_2\ SO_4 + Na_2\ SO_4 + Mn_2\ O_3$. The sulphuric acid is then estimated as $Ba\ SO_4$. (*Fres. Zeit.* 1884. 41.)
J. H. S., JR.

Remarks on Azotometry. CARL MOHR.

After some remarks the author proceeds as follows:

If an ammonia salt is to be examined, a two per cent. solution of it is made, if on the contrary a fertilizer is to be examined, 5 or 10 g. are taken, and the solution is made up to 100 c. c.

10 c. c. of this solution are allowed to flow into a 150 c. c. flask, containing 50 c. c. of a solution of bromine in sodium hydrate. The evolution of gas follows quietly, without producing much heat, and the results are said to be quite accurate. (*Fres. Zeit.* 1884. 26.)
J. H. S., JR.

On the Estimation of Nitrogen. DR. RUBE.

The author states that he has made about 3,000 nitrogen determinations, using Ruffle's method, and always obtained good results. He attributes the failures reported by others in using this method to improper application of it. (*Fres. Zeit.* 1884. 43.) J. H. S., JR.

Apparatus for Reducing Measured Volumes of Gas to Normal Conditions.

U. KREUSLER. (*Ber. d. ch. Ges.* 1884. 29.) J. H. S., Jr.

Contributions to the Development of the Sprengel Air Pump.

C. H. GIMINGHAM.

Perfection in the instrument is only to be attained by a careful regulation of diameter and length of fall tubes employed. The length of the fall tube should be about 39 inches. The most satisfactory results as to amount of mercury used were obtained by a fall tube of 1.8 m.m. diameter, the mercury running at the rate of 100 c.c. in five minutes. For measurement of the vacuum produced, the McLeod guage (Phil. Mag. May, 1874) is used. (*J. Soc. Ch. Ind.* III. 2. 88.) E. W.

An Improved form of Orsat's Apparatus for Estimation of Oxygen.

J. B. C. KERSHAW.

The author calls attention to an error incident to the ordinary form of the apparatus, depending upon the difference of level of the absorbing liquid within and without the vessel, and suggests a modification of the apparatus to correct it. (*Chem. News*, XLIX, 73). A. A. B.

On the Alkaline Reaction of Glass, as an Error, in Analysis.

By U. KREUSLER and O. HENZOLD.

A number of interesting experiments were here made, which clearly prove that water reacts on the various kinds of glass with more or less energy, dissolving enough, in some cases, to produce errors in analysis. (*Ber. d. ch. Ges.* 1884. 34.) J. H. S., Jr.

Analysis of Pure Wines.

R. FRESENIUS and E. BORGMANN. (*Fres. Zeit.* 1884. 44.) J. H. S., JR.

On the Estimation of Tartaric Acid in Wine.

R. KAYSER.

A statement of some of the errors involved in the estimation of tartaric acid in wines by titration. (*Fres. Zeit.* 1884. 28.)
J. H. S., JR.

On the Quantitative Spectroscopic Examination of Different Samples of Pure Indigo.

C. H. WOLFF. (*Fres. Zeit.* 1884. 29.) J. H. S., JR.

The Hygrometer in the Desiccator. Dr. E. Fleischer.

The author finds that calcium chloride is not as good an absorbent of moisture as has been supposed, and also finds from hygrometric experiments that sulphuric acid will not only absorb more moisture, but will do so four times as rapidly as calcium chloride. (*Fres. Zeit.* 1884. 33.) J. H. S., Jr.

On Some Improvements in the Estimation of Tannins. H. R. Proctor.

The principal modification (Loewenthal's method) consists in the addition of a small amount of pure kaolin to the solution containing the tannate of gelatine in suspension, with vigorous agitation. Thus treated, the precipitate filters readily without necessity for tedious waiting. The author prefers to express the percentage of tannic acid in terms of oxalic acid.

Oser's number for quercitannic acid (62.36) is not very far from the molecular weight of oxalic acid (63), and he considers it preferable to employ a standard which may be readily verified. (*J. Soc. Ch. Ind.* III. 2. 82.) E. W.

On the Existence of Phosphoric Acid in Ammonium Molybdate. M. Rupfferschlager.

It is noted that phosphoric acid has not been recognized as a constituent of any of the molybdenum minerals except in one case.

The yellow precipitate which frequently forms in the molybdate reagent is not the phospho-compound.

The reagent as usually made is too highly concentrated. The formula given by Fresenius is considered satisfactory. (*Bul. Soc. Chim.* XLI. 172.) E. W.

On a New Qualitative Method of Separating Tin, Antimony and Arsenic. By Emil Berglund.

This process is based upon the fact that the sulphides of tin, antimony and arsenic, on being boiled with oxide of copper in an alkaline solution, lose their sulphur and pass over into the corresponding oxygen-compounds. Thus stannic sulphide in caustic soda solution is oxidized to stannic oxide.

In a similar manner antimony trisulphide and arsenic trisulphide are oxidized respectively to antimonic and arsenic acids.

(*Ber. d. ch. Ges.* 1884. 95.) J. H. S., Jr.

An Alcohol Lamp with Constant Level. C. REINHARDT.

(*Fres. Zeit.* 1884. 40.) J. H. S., JR.

On the Numbering of Porcelain Crucibles. C. REINHARDT.

The author numbers the crucibles with a mixture composed of silica, litharge, boracic acid and some metallic oxide, as chromic oxide, etc., which are finely ground in an agate mortar with a little aniseed or lavender oil. The crucibles, after being painted with this mixture, are gradually heated in a muffle until the color has completely burned in. (*Fres. Zeit.* 1884. 42.) J. H. S. JR.

Note on the Stability of Hypobromite Solution, and its Use for the Titration of Oils, etc. A. H. ALLEN.

The results of experiments by boiling or keeping the solution of bromine in caustic soda are given in detail. The conclusions are: 1. The presence of excess of caustic soda greatly increases the stability of hypobromite solutions. 2. Most solutions of brominated soda lose a little of their available bromine by boiling. 3. The solution of bromine in excess of caustic soda solution has, after boiling, all the practical advantages which would be possessed by a concentrated solution of free bromine, not liable to loss by volatilization or change in strength by keeping.

The reaction on first dissolving the bromine is:

$$2\,NaHO + Br_2 = NaBrO + NaBr + H_2O.$$

If the solution is boiled, or is kept some time the following reaction occurs: $3\,NaBrO + 3\,NaBr = NaBrO_3 + 5\,NaBr.$

The action of HCl on the first solution would be:

$$3\,NaBrO + 3\,NaBr + 6\,HCl = 6\,NaCl + 6\,Br + 3\,H_2O.$$

If the transformation into bromate has proceeded with more or less completeness, there is no theoretical loss of available bromine, the reaction being

$$NaBrO_3 + 5\,NaBr + 6\,HCl = 6\,NaCl + 6\,Br + 3H_2O.$$

A peculiar fact was observed, viz., that the bromine found in the brominated soda by titration was always slightly in excess of the proportion actually used by weight. In the discussion it was suggested that a new determination of the atomic weight of bromine was desirable. (*J. Soc. Ch. Ind.* III. 2. 65.) E. W.

Determination of Fat Acids in Oils. CH. E. SCHMITT.

FERMENTATION in oils causes fat acids to separate from glycerine. This is notably the case with oleic acid. Fat acids are not objectionable for soap making or wool cleaning, but they are very much so for machinery, as they act on metals in the same manner as mineral acids, although less violently.

The only process now used is that of Burstyn. It is based on the property possessed by strong alcohol of dissolving fat acids, while neutral fats are not perceptibly soluble.

The operation consists in shaking up 100 grammes of the oil with 100 grammes of alcohol 95%. The shaking should be energetic and often repeated. After settling for some hours, the alcohol, with the fat acids in solution rises to the top. This alcohol is separated ; 20 c.c. are taken with a pipette and tested by a standard alkaline liquid. The acid obtained corresponds to sulphuric acid. This is multiplied by 5, which gives the quantity of oleic acid, as this acid generally predominates.

A controversy having arisen about oil purchased by a house in Lille, the author was led to examine Burstynn's process.

A volume of the alcoholic solution of fat acids equal to 20 c.c. was evaporated in a stove at 100° to 105° C, until the weight becomes constant. The following oils were examined :

	Burstyn's Process.	By Weight.
Sweet Almond Oil	0.37	0.28
Pure Olive “	0.514	0.600
Acid Olive “	6.83	6.
“ “ “	9.23	10.15
“ “ “	12.70	13.
French Rape Seed Oil	0.85 to 0.90	0.65 to 90
Bombay “ “ “	0.75	0.25
Dunkirk Codfish “	0.677	0.422

The process of Burstyn gives results which may be considered satisfactory. Alcohol dissolves volatile acids which are lost by evaporation, and also coloring and odorous substances which have no action on an alkaline solution. The influence of volatile substances is to give gravimetric results lower than those by Burstyn's process, while coloring and odorous substances tend to give higher results as they have no action on the standard alkaline solution.

Turmeric gives better indications with fat acids than either litmus or phenolphthalein. (*Mon. Scientifique.* 3. XIV. 205.)

P. C.

The Separation of Benzine, Toluene and Xylene from Crude Gas Tar, Naphtha and Crude Gas Benzines. J. VON HOHENHAUSEN.

The method for testing the crude product is given as follows: In a flask of 500 c.c. capacity fitted with a stopper carrying both a stop-cock funnel and a safety tube, are placed 100 c.c. of the benzine to be tested, and a cold mixture of 150 gms. nitric acid (80° Tw), and 200 gms. sulphuric acid (170° Tw), are gradually added, the temperature of the mixture being kept down by using cold water on the outside, and regulating the addition of the acids. Constant shaking is necessary to insure the reaction, and this must be kept up after adding all the acid until the contents of the flask are cold. After separating the acid and washing with dilute caustic soda, and finally with water, the amount of nitrobenzine obtained is determined.

This product may be further tested as follows: 100 c.c. are placed in a retort, and after distilling off about 98 per cent., the residue should still be liquid. The first 30 c.c. distilling over is treated with 70 c.c. of sulphuric acid (of 170° Tw), when all the nitrobenzine dissolves, and the non-nitrated hydrocarbons will separate. These should be again treated with the nitro-sulphuric acid mixture, when there is a rise in temperature, if any benzine remains. After all the benzine has been converted into the nitro-compound, the hydrocarbons undissolved by concentrated sulphuric acid may be separated and determined.

The different forms of apparatus (Vedle's toluene apparatus, Egrot's system and Vedle's system) for the refining of commercial benzine are described, the description being illustrated by cuts. (*J. Soc. Ch. Ind.* III. 2. 73.)

E. W.

On the Quantitative Determination of Ortho-Meta-and Paraxylene. I. LEVINSTEIN.

The boiling points of these hydro-carbons are:

Orthoxylene	141° – 142°c.
Metaxylene	140° – 141°c.
Paraxylene	136° – 137°c.

Fractional distillation cannot be used to separate these.

The metaxylene is the only one possessing at present any technical value.

A. *To Determine Metaxylene.*—Take 100 cc of the crude sample, heat at 100°C with 40 c.c. nitric acid (80° Tw), and60 c. c. water, for half an hour, or until red fumes are no longer evolved, keeping the mass well mixed. Separate the hydrocarbons from the acid, add excess of caustic soda, and distill with wet steam. The hydrocarbons distilling over consist of metaxylene and some of the paraffines. On separating these hydrocarbons from the water, and mixing wit about 1½ times their volume of concentrated sulphuric acid, th metaxylene dissolves by stirring for about half an hour, leaving the paraffines. Measurement of the amount of hydrocarbons before and after the sulphuric acid treatment gives the proportion of metaxylene. The nitric acid· treatment, converts the ortho- and paraxylene into compounds soluble in caustic soda, while the metaxylene is unaffected.

A liberal washing with caustic soda may be substituted for the distillation.

B. *To Determine Paraxylene.*—Treat 100 c.c. of the crude xylene with 120 c.c. sulphuric acid (of 170° Tw), and mix for about half an hour. Paraxylene and paraffines remain undissolved. Separate and measure these. Dissolve out the paraxylene by addition of an equal volume of fuming sulphuric acid, and heating on the water bath for a short time. Separate and measure the paraffines and determine the paraxylene by difference as before. Pure paraxylene may be obtained from this mixture with the paraffines by distilling with wet steam. The first portions coming over contain the paraxylene ; distill these again with dry heat, collecting all that comes over up to 138°C; crystallize out by a freezing mixture, and press the crystals between filter paper.

C. *To Determine Orthoxylene.*—The amount may be estimated approximately by deducting from 100 the sum of the percentages of paraffines and meta- and paraxylene.

For a closer determination convert the ortho and metaxylenesulphuric acids obtained in B into their calcium, and afterwards into their sodium salts. Concentrate the solution of the latter until the large prisms of ortho-salt begin to crystallize out. Allow to cool and separate a second crop of crystals by further concentration ; redissolve and recrystallize the products. The distinction between the crystals of the ortho and of the meta- salt is easily perceived. The ortho- salt has the composition :

$$C_6 H_3 (CH_3)_2 . SO_3 Na + 5 H_2O.$$

In determinations of boiling points the thermometer was immersed in the liquid, the bulb being about half an inch from the bottom of the retort. (*J. Soc. Ch. Ind.* III. 2. 77.) E. W.

INDUSTRIAL CHEMISTRY.

On the Disposal of Sewage Sludge. C. C. Hutchinson.

By "sewage sludge" is meant the slimy mud deposited or depositable from sewage, the solids consisting in large proportion of organic matters containing 90 to 95 per cent. of water. The method described by the author consists in filtration of the sludge by filter presses of special construction. The press cakes thus obtained still contain about 50 per cent. of water, are inodorous, easily handled, and dry rapidly down to about 20 per cent. of water. A mixture of equal parts of aluminium and calcium sulphates is used as a precipitant before filtering the sludge. The press cake is fully equal to farm yard manure as a fertilizer. At Coventry, where a plant such as is described has been in operation for 2½ years, the cost is sixpence per ton of wet sludge, or half a crown per ton of pressed cake. The air-dried pressed cake is sold at from two shillings to three and sixpence per ton. The place contains a population of about 45,000, and 476 tons of wet sludge are treated daily.

In reply to a question the author stated that about five-sixths of the nitrogenous matter in the sewage passed away in the effluent, while about one-sixth remained in the sludge.

The press cake (50 per cent. water) contained 0.84 per cent. ammonia, and 1.81 per cent. phosphate of lime. (*J. Soc. Ch. Ind.* III. 2. 41.) E. W

The Porter-Clark Process. J. H. Porter.

Description, with illustration, of the plant for this method of softening water. Lime water is mixed with the water to be softened and the mixture is passed through filter presses. At the London and Northwestern Railway locomotive sheds at Camden 7,000 gallons

of water are treated per hour, the hardness being reduced from 17° or 18° to 4°. Other results are quoted where the hardness is reduced from over 20° to 4° or less. (*J. Soc. Ch. Ind.* III. 2. 51.)
E. W.

Note on the Printing of Natural Indigo on Calico. R. Bourcart.

Description of the plant, with plans and illustrations, and of the processes used by Messrs. Schlieper & Baum, of Elberfeld. The process depends upon the reducing action of glucose, in presence of alkalies, at 100°C upon indigo. The color, which is made very thick for printing, is a mixture of indigo paste, caustic soda, and of mixed roasted and unroasted Indian corn-starch. The cloth is previously padded in a solution of glucose, and dried, the color is printed on, and the goods are then steamed, which causes the soda to dissolve, and brings the indigo in contact with the glucose. After thorough washing, the goods are dried and oxidized at the same time, and finally brightened by boiling with a weak solution of caustic soda, which is more satisfactory than a soap bath. Specimens are inserted in the text, showing the results with "printed indigo." "indigo printing on turkey red cloth," "indigo and sulphur resist," "white and yellow resist with indigo," "white and red mordant resist," and "half resist." The use of artificial indigo is not favored by the author, on account of the unpleasant odor of the sodium xanthate used, which is persistently retained by the goods. (*J. Soc. Ch. Ind.* III. 2. 55.) E. W.

Influence of Plaster of Paris on the Composition and Chemical Characters of Wine. M. Magnier de la Source.

Ten kilogrammes of grapes were divided into two equal portions. One portion was allowed to ferment without the addition of any foreign body, while the other portion had 100 grammes of sulphate of lime added. The fermentation of both were finished in twenty days.

These two wines differed by their chemical characters, as shown by their reactions with borax, basic lead acetate, and aluminium acetate.

The color of the natural wine was yellowish, while the plastered wine was of a pure, bright red. Cream of tartar was present in the natural wine (nearly 2 %) but there was none in the plastered wine. (*Comptes Rend.* XCVIII. 110.) P. C.

Presence of Diamonds in a Pegmatite from Hindustan. M. Chaper.

In Griqualand diamonds are found in a rock but it is doubtful whether this consolidated, serpentinous mud is the bed-rock of diamonds. At any rate, diamonds are not found in their bed-rocks either in India or in Brazil.

The author has had the good fortune to find diamonds associated with corundum in a pink pegmatite from the Naizam, in the neighborhood of Bellary, presidency of Madras.

The diamonds are in octahedra. (*Comptes Rend.* XCVIII. 113.)

P. C.

On the Influence of the Temperature of Distillation on the Composition of Coal Gas. L. T. Wright.

An account of experiments with a small gas-making apparatus, in which, with all parts complete as in actual work, a charge of only $\frac{1}{1000}$ of a ton was used.

The influence of increasing temperature is shown by a series of analyses representing the composition of the gas made from four charges, each worked at a different temperature, the temperatures ranging from dull red to bright orange heat. Volume of product increases with temperature, and illuminating power decreases, although there is a slight increase in total candle power per ton of coal with increasing temperature.

H and CO increase with temperature, CH_4 and other hydrocarbons decrease, while N is nearly constant at all temperatures. The effect of increased duration of heating is similar to that of increased temperature. (*J. Ch. Soc.* CCLVI. 99). A. A. B.

Gaseous Fuel Applied to the Heating of Gas Retorts. C. Hunt.

Descriptions are given of different systems for regenerative heating of retorts. Regeneration without recuperation (heating of the air) cannot be made satisfactory. Uniformity of temperature throughout the setting is an important point. In recuperation, the use of the thinnest material, consistent with strength and durability, and long contact both for air and waste heat, must be secured. As to forms of producers, there is a great difference of opinion. For economy and convenience the generator should form a part of the construction of the setting. The saving in fuel effected by the systems now available amounts to between 20 and 40 per cent. and upward. The question of the value of by-products is, however, one which has to be considered by gas companies in considering the question of the adoption of the regenerator system. The intensity of heat obtained by some systems has caused trouble in the clogging of the stand pipes or the hydraulic main.

It is suggested that the production of gas for distribution as fuel at cheap rates may be much nearer realization than is suspected by many. (*J. Soc. Ch. Ind.* III. 2. 89.) E. W.

Coal Gas as a Labor-saving Agent in Trade. F. FLETCHER.

A lecture delivered before the Society of Arts, Jan. 30, 1884, in which an extended description is given of new forms of burners and new applications of gas for heating purposes. (*Chem. News*, XLIX, 74). A. A. B.

An Attempt to Utilize Waste Heat by Perkin's Pipes. F. HURTER.

The attempt in the case described resulted in failure, although seems probable that with some modifications in the system adopted, success might be attained. (*J. Soc. Ch. Ind.* III. 2. 67.) E. W.

On Lilienfein's Lamp, for Low Boiling Petroleum. DR. UNECH.

(*Fres. Zeit.* 1884. 35.) J. H. S. JR.