

## ABSTRACTS.

*Journal of the Society of Chemical Industry.* Vol. II., p. 488. December 20th, 1883. London Section.

**On a New Residual Product from Coal Gas.** H. L. GREVILLE

The product under consideration is carbon disulphide. Incidentally the process of purifying gas at the Commercial Gas Works, where the experiments were made is described. Lime is used to remove the  $\text{CO}_2$  and iron oxide to remove the  $\text{H}_2\text{S}$ . To remove the  $\text{CS}_2$ , of which there are about 30 or 48 grains in the 100 feet of crude gas, purifiers are used containing lime through which gas has been passed containing  $\text{H}_2\text{S}$  but no  $\text{CO}_2$ . When saturated, the lime has a bright orange-red color. By distilling this lime with water  $\text{CS}_2$  was obtained, amounting to between 1 and 2 per cent. on the amount of substance taken. Picked specimens yielded 3 to 4 per cent. The lime remaining in the retort is suitable for re-charging the lime purifiers. The author proposes to use the  $\text{CS}_2$  to extract the sulphur from the iron oxide. Since the authorities on the subject say that boiling sulpho-carbonates with water yields  $\text{H}_2\text{S}$  and not  $\text{CS}_2$ , it is surmised that the orange-red compound obtained is something other than calcium sulpho-carbonate. The author is engaged in an investigation of the subject.

In analyzing the material it is distilled with lead acetate, the  $\text{CS}_2$  in the distillate being converted into xanthate by being caught in solution of alcoholic potash. This product is then oxidized by potassium permanganate, the excess of permanganate destroyed by oxalic acid, and the sulphur determined as barium sulphate. In weighing out portions of crude  $\text{CS}_2$  for analysis the method of weighing an alcoholic solution of potash in a flask, dropping in the  $\text{CS}_2$  and weighing again, was found to be the most satisfactory plan.

In the discussion which followed, Mr. S. H. Johnson stated that when the price of sulphur was £4 per ton or less, it would not pay to extract the sulphur from the spent oxide of the purifiers.

E. W.

**Note on the Stassfurt Potash Industry.** (P. 492.) C. N. HAKE.

By agreement between the owners of the Stassfurt mines, the daily out-put of Carnallite is to be limited to 3,000 tons daily, sup-

plied by five companies. In July two other mines will participate in the production. No limit has been as yet placed on the out-put of Kainite. E. W.

**Liquid Carbonic Acid Under Regulated Pressure. (P. 493.) A. ZIMMERMANN.**

A cylinder containing 10 litres of liquid carbonic acid under 36 atmospheres pressure was exhibited, and the construction of the cylinder described. The use of the gas evolved from the cylinder for cleaning beer, and at the same time giving it a sparkle, was practically illustrated. E. W.

LIVERPOOL SECTION.

**Analytical Examination of Tars Recovered in the Coking of Coal by the Jameson and the Simon Carve's Processes, and in the Condensation of the Fuel Gases from Blast Furnaces by the Alexander and McCosh Process. (P. 495.) W. SMITH.**

To prepare the samples for fractional distillation, the tars were kept for several hours in vessels surrounded by warm water, and as much as possible of the water separating, decanted off. After placing about 2½ litres of the tar in a retort, the temperature is brought to 60 or 70° C. and kept there for some time, a slow current of air being passed through the tar in order still further to remove the water. After the removal of the water in this way, the distillation may be conducted without danger of frothing.

The table of comparisons of the different yields on distillation of the tars is as follows in percentages:

Temperature C.	Jameson Oven No. 2.	Coke ovens, Oven No 3.	Blast Furnace.	Simon Carve's.
Below 150	0.8	1.1	4.2	6.7
230	9.2	22.9		
300	36.0	37.7	10.	19.8
350	6.7	10.5		
400	19.0	13.8	18.8	36.5
About 400° and upwards.	15.3	8.9		

The crude phenols from the blast furnaces contain more carbolic acid and cresols, than those from the Jameson coke ovens.

E. W.

**The Patent Law as Amended in 1883.** (P. 501.) W. P. Thompson. MANCHESTER SECTION. E. W.

**On Gaseous Fuel.** (P. 504.) L. T. WRIGHT.

The percentage value of the different products to gas companies is thus stated :

	Gas.	Coke.	Tar.	Ammonia.	Sundries.
Nottingham, 1881 and 1882,	75.06	8.29	8.21	3.27	5.17
South Metropolitan, 1883,	72.05	15.18	5.34	7.04	.39
Gaslight and Coke Co. 1883,	78.47	11.43	2.98	6.86	.26
Compagnie Parisienne, 1881,	70.70	18.00	3.41	1.91	6.00

The store of heat in the gas is about 17 per cent. of that in the coal. The following is a summary of the results calculated on the cost of to a consumer of different materials which might be offered as fuels:

Fuel.	Cost.	Average Caloric (Kilo-cent.)	Cost per million Calories.
			£. s. d.
Coal,	22s. per ton,	8,300 per kilo.	6 6
Coal gas, 16 candle,	3s. 1,000,	5,555 per cu. metre,	1 0 9½
Water gas,	1s. 10d. p'r 1,000,	2,826 " " "	1 5 0
Generator gas,	1s. 10d. " " "	950 " " "	3 14 2

The "generator" gas is such as may be produced by passing air over heated coke, the gas being assumed to have the theoretical composition of CO 34.3 % N 65.7 %.

Theoretically this would yield 1048 calories per cubic metre, but for the purposes of calculation it is assumed that it would yield about 950 cal.

E. W.

NEWCASTLE SECTION.

**On the Titration of Sulphurous Acid and its Salts.** (P. 513.) G. LUNGE.

In confirmation of Thompson's results it was found that  $\text{Na}_2\text{SO}_3$  imparts a neutral tint in solution to phenolphthalein and rosolic acid, but that with litmus, phenacetolin and methyl orange the neutral point is obtained when  $\text{NaHSO}_3$  is present in a solution. The color-changes with methyl orange are very sharply marked, while they are indistinct with litmus and phenacetolin.

E. W.

**On the Action of Soda, Lime and Magnesia on the Salts of Ammonia and Organic Amines, and on the Titration of Aniline. (P. 514.) G. LUNGE.**

Account of experiments with a view to determine which of the three—Na OH, CaO or MgO were best suited for the expulsion of ammonia by distillation in analytical operations. It was found that either might be used if an excess were employed and if the distillation were kept up for at least three hours. In distilling with an excess of ammonium chloride, CaO and NaOH liberated their full equivalent of  $\text{NH}_3$ , while MgO liberated only about 85 per cent. of its equivalent. Salts of volatile fatty or aromatic amines (ethylamine or aniline) acted in the same manner as the ammonia salts.

The acid in neutral aniline salts can be titrated with normal potash solution, using phenolphthalein as an indicator, just as if the aniline were not present. With methyl orange, however, the neutral aniline salts give a neutral reaction, and the aniline itself shows the reaction of a base. The change of color is not very sharp after 92 to 94 per cent. of the amount of acid required by theory has been added. The use of alcohol of over 25 per cent. strength for dissolving the aniline renders the color-change still slower, and with pure alcohol there is no change of color at all. In titrating with toluidin, the change of color was very slow, though with paratoluidin it was very sharp. Quinoline gives a pretty sharp change of color also,

E. W.

**BIRMINGHAM AND MIDLAND SECTION.**

**The Distillation of Coal and Recovery of Hydrocarbons from the Gas. (P. 515.) G. E. DAVIS.**

An interesting history of the progress of gas manufacture in England is first given. In connection with the utilization of the ammonia it is noted that low temperatures on the retorts increase the yield of ammonia. The author proposes to use two towers, or in some cases three, in which the ammonia may be absorbed by sulphurous acid in the proportion suitable for the production of bisulphite under the pressure of air, and evaporating the liquor by the waste heat of the retorts, by which means ammonium sulphate is obtained.

The hydrocarbon oils (crude benzol) it is proposed to extract by passing the gas through the "yellow oil" of the tar distiller—the fraction between the creosote and anthracene oil—keeping the oil

at a temperature of about 40° F. The liquid hydrocarbons are then obtained by steaming the oil. In the author's experiments about 4½ gallons of crude benzol were obtained from the gas from a ton of coal. The results of a fractional distillation of the product are given in detail.

It is observed that until 1876 benzol was not recognized as a constituent of coal gas.

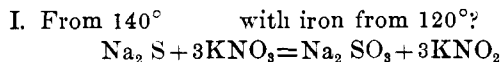
In the discussion that followed, Prof. Tilden remarked that over twenty years ago he had seen a process, intended to demonstrate the presence of benzol in coal gas. The gas was passed through strong nitric acid, and nitro or binitro-benzine thus obtained. E. W.

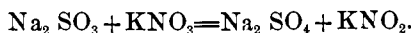
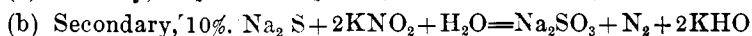
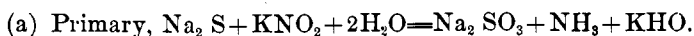
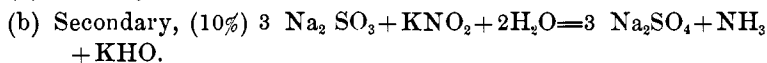
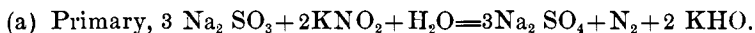
**On the Oxidation of the Sulphur Compounds Occurring in the Manufacture of Caustic Soda.** (P. 525.) G. LUNGE and J. H. SMITH.

The results of numerous laboratory experiments in the use of nitrites and nitrates are given together with equations, followed by a short criticism of the conclusions of other experimenters on the subject.

The conclusions are given as follows:

1. Under no circumstance is *nitrate* reduced directly to a lower form than that of nitrite.
2. *Nitrate* in its reduction to nitrite, is capable of oxidizing sulphide to sulphite, and sulphite to sulphate, from about 140° C.
3. *Nitrite* oxidizes sulphide to sulphite, chiefly with reduction to ammonia, at temperatures from about 200° C. At very high temperatures, exceeding 360° C, it oxidizes sulphite, chiefly with reduction to nitrogen.
4. Neither *nitrate* nor *nitrite* has any action whatever upon this sulphate as such, *i. e.*, before it is split up, but they oxidize the sulphite and sulphide, into which it is split up, exactly as they would the individuals under the same conditions.
5. The presence of iron, in every case, hastens but does not alter the results of the action. The following equations represent all the possible cases of the action of nitrate and nitrite on the sulphide, sulphite, and thiosulphate, both in the presence and absence of iron. About 10 per cent. may be taken as the proportion of total sulphur oxidized according to the secondary equations:



II.  $\text{KNO}_3$  remains.From  $140^\circ$  with iron from  $120^\circ$ ? $\text{Na}_2\text{SO}_3$  remains. See IV.III.  $\text{Na}_2\text{S}$  remains.From  $200^\circ$  with iron from  $140^\circ$ ? $\text{Na}_2\text{S}$  remains; add  $\text{KNO}_3$ . See I. $\text{KNO}_2$  remains. See IV.IV. Neither  $\text{KNO}_3$  nor  $\text{Na}_2\text{S}$  remainsAfter  $360^\circ$ ? With iron; before  $360^\circ$ . $\text{Na}_2\text{SO}_3$  remains; add  $\text{KNO}_3$ . See II.

E. W.

**On the Cause of the Diminishing Flame in Lamps Fed with Inferior Kerosene.** (P. 536.) T. NAKAMURA.

It was observed that much of the "kerosene" imported to Japan from the United States gave a fairly good light with a fresh wick, but the light obtainable after a time diminished, and no scraping of the wick would improve it. The investigation was undertaken to discover the cause, if possible. A fractional distillation of three different brands of the "kerosene" showed that these kerosenes contained large proportions of heavy oils, about 75 per cent. of the samples distilling at temperatures above  $200^\circ\text{C}.$ ; Sp. Gr. 0.70 to 0.796; flashing points  $74$  to  $77^\circ\text{F}.$  The residues in the retorts yielded much paraffine and vaseline. The fraction of the distillate coming off between  $180^\circ$  and  $280^\circ\text{C}.$  was turbid, and on standing an acid, aqueous liquid separated. The presence of water in the wick was suspected to be one of the chief causes of the loss of illuminating power of the oil. This was proved to be the case, for on drying, the wick, it was found to give a light of the original intensity.

E. W.

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*London Section.*

**Discussion on the Desirability of Uniform Methods and Bases of Analysis, and the Practicability of Establishing an International Agreement Concerning them. (P. 2.)**

Some of the points made in this interesting discussion were as follows:

It would be objectionable to reduce chemical analysis to a purely mechanical operation.

Many chemists regard their methods of analysis as their capital, and accordingly refuse to communicate them.

Some also will refuse to follow certain prescribed methods on the ground that they are competent to judge for themselves.

A modification of a prescribed method, e. g., a little more or a little less acid, where the use of it is prescribed, may give a high or a low result.

Rules cannot be laid down to meet every case. In this connection the variable results for Manganese, in some Spanish iron ores, was quoted. The ores were found to contain Ti and Ba, which, in some cases, had been partially or entirely weighed with the iron and in other cases not.

Truthful reports are not always desired by the client. In some cases the reports are known not to be truthful, but conventional, as in the case of soda, where the molecular weight of NaO (old system) was taken as 32 in 1836, and is still adhered to; the difference being about 1% in favor of the manufacturers. The Cornish copper assay, which may be in error to the extent of 2%, was also quoted. A dealer in articles, bought and sold by analysis, stated that the dealers and manufacturers adapted themselves to such conventionalities with regard to the tests, and regulated their business accordingly so that the variation between the chemists' reports and the facts, did not make so much difference as it might seem.

Sir F. Able advocated the adoption of a decimal system in commerce as a step toward uniformity in estimating the commercial value of various articles. On this point he was opposed by Sir F. Bramwell, an engineer, who claimed that the use of a decimal system made people incapable of mental arithmetic.

It was finally resolved to recommend to the General Council the appointment of a committee to determine in what cases, if any, it is desirable to obtain such international agreement. E. W.

*Liverpool Section.*

**Results of the Examination of the Tar from Sutherland's Gas Producers.** W. Smith. (P. 9.) The Sp. Gr. of the tar was 1,085.

The result of the first distillation of 2.5 litres afforded (by weight) oils 36.9%, coke 30.5%, water and loss 32.6%.

The oils were again fractioned, the fractions treated with soda and sulphuric acid, and again fractioned; in each case the distillates, which solidified on cooling, were set aside for determining paraffine. The largest yield was of oils distilling at 230°-250°, at 250°-300° and of paraffine, the latter in proportion to of 6.7 per cent. on the tar. No naphthalene was obtained. E. W.

**Discussion of M. W. P. Thompson's Paper on the New Patent Law.** (P. 11.)

*Manchester Section.*

**Gas Making by Coopers' Lime Process, with Notes on a Method of Gas Analysis for use in Gas Works.** J. A. Wanklyn. (P. 12.)

For testing the gas, it is proposed to use a bottle, having a capacity of one-tenth of a cubic foot, fitted with a hollow stopper in which the solution of the reagent may be placed.

The bottle is inverted, filled with the gas by displacement, the stopper inserted containing a measured amount of the reagent of known strength, e. g., lead acetate for  $H_2S$ , and the bottle is well shaken. The contents are tested for  $H_2S$  by lead paper, and the process is repeated until the lead solution is no longer blackened. From the amount of lead solution used, the amount of  $H_2S$  present may be calculated. For carbonic acid, baryta water is used in the stopper, the barium carbonate being filtered off and weighed. For ammonia, the Nessler reagent is used if the amount is small. If large, it must be estimated by alkalimetry.

The Cooper process consists in mixing  $2\frac{1}{2}$  parts of slaked lime with 100 of the coal, and charging this into the retorts.

The advantages claimed are: 1st, a large yield in ammonia; 2d, a slight increase in the amount of gas; 3d, a marked diminution in the amount of sulphur in the gas.



With a coal containing 1.7 per cent sulphur, gas has been made by this process, containing 3 grains S per 100 feet, while the purifiers last for a very long time.

In the discussion which followed it was suggested that some kinds of coal were more suitable than others as regards mixing with the lime, or as regards the amount of ash and sulphur in the coke. The loss of the sale of spent oxide (£4,000 for 1883 at the Manchester Corporation Works) was mentioned as an objection to the process.

As to the objectionable nature of sulphur in the gas, opinions differed. It was claimed by one speaker that the use of the lime lowered the temperature of the retorts to such an extent that less gas was obtained. E. W.

*Newcastle Section—General Meeting.*

**International Methods of Sampling and Testing.** J. Patinson. (P. 17.)

A review of the points suggested at the meeting of the London Section. The author suggests that adopting certain methods of analysis would limit original research as to methods. The establishment of some sort of a court of appeal was also suggested.

In the discussion, attention was called to discrepancies in results on soda, phosphoric acid in fertilizers, tannins and acetic acid. The resolution proposed in the London Section was finally passed.

E. W.

**A Review of the Present Methods of Preparing Hydrobromic Acid, and a Description of a Process for Preparing it from Bromide of Zinc and Sulphuric Acid.** A. Sommer. (P. 20).

The methods recommended are classified as follows:

1st. Direct combination of Br and H, with the agency of heat, contact with red-hot Pt, as wire, sponge or tube, red-hot, porcelain tube or electric spark. These methods are troublesome, but are preferable where a pure, anhydrous acid is desired.

2. Decomposition of hydrogen compounds by Br, H<sub>2</sub>S in aqueous solution of Br, H<sub>2</sub>S in CS<sub>2</sub> solution of Br, Br with paraffin at 185°C, Br with sulphites or thio-sulphates. These methods are wasteful in material. The Br is largely retained in the residues.

3d. Decomposition of compounds Br with solid metalloids by the action of water,—sulphur bromide, antimony bromide, phosphorus bromide. The latter method requires considerable care to avoid explosion in forming the  $PBr_5$ . The author describes a method which he has found safe and profitable. It consists in allowing the Br to drop gradually from a stopcock funnel upon a mass of phosphorus under water, which is kept cold. The liquid is drained from the phosphorus,  $H_2S$  passed through it to separate the As (an inevitable impurity in commercial phosphorus) and the liquid is distilled. The HBr should not be allowed to come in contact with organic substances.

4th. Decomposition of metallic bromides by acids. Sulphuric, phosphoric and tartaric acids have been used. With tartaric acid there is loss of material. Phosphoric acid is costly. Sulphuric acid, with some bromides, liberates Br and  $SO_2$  which contaminates the product, if the acid is above a certain strength. So far as  $ZnBr_2$  is concerned, it has been found that any acid containing under 80 per cent.  $H_2SO_4$  can be safely used.  $BaBr_2$ , made either by forming  $NH_4 Br$  and decomposing by  $Ba CO_3$ , or by the reaction of Ba S and Br distilled with  $H_2SO_4$ , gives a good product, though the process is somewhat lengthy. KBr with  $H_2SO_4$  is expensive. The author's process is minutely described. It consists in forming a  $ZnBr_2$  solution by the action of Br on metallic zinc, in presence of water, the mixture being kept cold,—evaporating the solution to dryness and heating until the edges begin to fuse. A retort is then charged in the proportions of 1 mol  $ZnBr_2$ , 10 mol.  $H_2O$  and 2 mol.  $H_2SO_4$  and the acid distilled off. The distillate invariably contains  $H_2SO_4$ , and Ba  $Br_2$  or Ba  $(HO_2)$  in sufficient amount to saturate all the  $H_2SO_4$  must be added, and a second distillation made.

E. W.

### Converting Sulphides into Sulphates by Means of Nitric and Hydrobromic Acids. (P. 23.) A. Sommer.

After digesting with fuming nitric acid, until the acid ceases to act energetically, small portions of hydrobromic acid are added.

E. W.

*Bulletin de la Société Chimique de Paris.* (Vol. XLI. No. 1. Jan. 5th, 1884).

**Remarks on Thermochemical results.** M. BERTHELOT.  
(P. 4). An attack on Mr. Thomsen's work on Thermochemistry.  
E. W.

**Researches on Nitrogen Iodide.** A. GUYARD. (P. 12).

The nitrogen iodide, obtained by the action of aqueous ammonia on iodine, is decomposed by light, with effervescence of nitrogen. The violet rays have the least effect, and is greatest in the yellow rays. In pure water the action begins at first with effervescence followed by a violent explosion. In ammonia, of 22° B, it effervesces steadily without explosion. The rapidity of decomposition is proportional to the intensity of the light. The iodide forms with equal facility in light or in darkness, but in the light it forms faster than it decomposes. It is proposed to measure the intensity of light by measuring the nitrogen evolved, when iodine and ammonia of 22° B are allowed to act upon one another. Half of the iodine used always goes to form ammonium iodide. Equations, illustrating the action of formation, decomposition in the light, etc., are given.  
E. W.

**Researches on the Double Iodide of Copper and Nitrogen.** A. GUYARD. (P. 10).

A tolerably concentrated solution of an alkaline biniodide, when added to an ammoniacal solution of copper, affords a crystalline precipitate of a violet garnet shade, consisting of a combination of  $\text{NH}_2\text{I}$  with  $\text{Cu I}$ . The compound is stable when dry or in its mother liquor, but is decomposed by water and liquid ammonia. E. W.

**Action of Iodine on Potassium Seleniocyanate.** A. VERNEUIL. (P. 18).

A concentrated solution, composed of 93 parts I, 120 parts KI, and 100 parts water, when run, drop by drop, into a 10 per cent. solution of potassium seleniocyanate, clouds, turns red, and finally deposits red crystals. On analysis, these crystals were found to contain iodine, which the author believes to be due to an impurity in the state of cyanogen iodide.

The true composition is believed to be  $\text{C}_6 \text{N}_3 \text{KSe}_3 \cdot 2\text{HO}$ . (Old system).

The substance has an unpleasant odor of both hydrocyanic acid and seleniuretted hydrogen. It is decomposed by water or by heat-

ing to 120°. Insoluble in ether, chloroform and CS<sub>2</sub>. With absolute alcohol it decomposes, depositing selenium, and affording a brown substance soluble in alcohol, C<sub>6</sub>N<sub>3</sub>KSe<sub>6</sub>, having the same properties of decomposability and solubility, as the first mentioned compound. E. W.

**On the Emetics of Mucic and Saccharic Acid.** D. KLEIN. (P. 20).

By introducing antimonious acid into a boiling solution of sodium bimucate, a compound analogous to sodium tartar emetic is produced, the tartaric acid being replaced by mucic acid. The analysis of the compound and some of its properties are given. The acid saccharates appear to form similar compounds, but as yet no crystallizable compounds had been obtained. E. W.

**Determination of Tannin Contained in Vegetable Substances. Principally in the Bark of Oak, Birch, Fir Quebracho, Cinchona, etc.** M. PERRET. (P. 22).

For this method are used: 1, a solution of egg albumen, containing 20 grms. in 100 cc. of water (unfiltered). 2. A solution containing 10 grms. dry aluminium sulphate in 100 cc. of water (unfiltered).

For the process, 20 grms. of the bark to be analyzed is extracted with water by two boilings of 15 minutes each. The liquors are united and evaporated to 100 cc. This is then cooled to 70°, and the albumen solution added little by little, so long as a precipitate forms, the solution being constantly agitated. The solution is brought to a boil, and the moment it boils the aluminium sulphate solution is added from a burette, the solution being briskly agitated. The addition of the aluminium sulphate is kept up until the precipitate becomes granular and compact and separates from the solution. It is then cooled, filtered through a weighed filter, washed with hot water and dried until it ceases to lose weight. From the weight of the filter and precipitate is deducted that of the filter, that of the albumen, and that of the aluminum sulphate. The remainder represents the tannin in the sample. The author finds, by experience, that whatever the combinations into which the sulphuric acid of the aluminum sulphate may enter, the weight of the precipitate is increased by an amount exactly equal to the weight of that of sulphuric acid, and, therefore, the entire weight of the aluminium sulphate is to be deducted. E. W.

*Session of the Society of Dec. 28th, 1883.*

M. Manuméné spoke of the synthetical formation of  $\text{Cu}_2\text{S}$ , by pressure, and of the formation of  $\text{Cu}_3\text{O}_3$ , by heat, as confirmation of his theories advanced on the subject.

As regards the apparent variations in the atomic weight of carbon spoken of by M. Schutzenberger, the speaker attributed them to slight experimental errors.

M. Longuinie communicated results of experiments on the calorific powers of isomeric and homologous actions and others. The two isomeric acetones gave essentially the same amounts of heat, with homologous acetones the addition of each  $\text{CH}_2$  caused an increase of about 158,000 calories. The difference in amount of heat developed by the diethylic and dimethylic ethers of carbonic acid was somewhat less than is usual between homologues.

M. Guntz had measured the heat of neutralization of alkaline and alkaline earth hydrates by H F. The heat developed is something less than that for the chlorides.

MM. Oechsner and Essner had oxidized the beta-lutidine derivation of brucine. On treating the resulting liquid with cupric acetate a compound yielding an acid with the properties of nicotianic acid, another compound containing an acid which yielded pyridine by distillation over lime, and cupric formate and acetoformate.

M. Oechsner had attempted to hydrogenize beta-lutidine, but thus far without success, in obtaining a stable hydride. He also described some of the properties of the lutidine from coal tar, which is peculiar in being soluble in water in all proportions.

M. Lemoine spoke of the hydrocarbons and higher alcohols contained in petroleum, describing octyl, nonyl and decyl hydrides and their derivatives, specimens of some of which were exhibited.

J. H. S., jr.

### **Experiments on the Combustion of the Diamond. C. FRIEDEL. (P. 100.)**

The oxygen used was made from  $\text{KClO}_3$ , and carefully purified. The combustion was effected in porcelain tubes, as the Bohemian glass was found to be too fusible.

After setting up the apparatus, experiments in blank were first made. In the unsuccessful experiments with Bohemian glass tubes

it was observed that the diamonds did not coke, but presented a dull, partially corroded surface. The results were as follows :

Diamond taken.	Ash.	Co <sub>2</sub> obtained.	at wt C.
0.4705 gms.	0.0007 gms.	1.7208	12.017
0.8621 “	0.0005 “	3.1577	12.007

In the above Cape diamonds were used. Some magnetic and some crystalline particles were found in the ash. Some Brazil diamonds were found to contain black carbonaceous particles. J. H. S., jr.

**Response to the Reclamation of MM. C. Vincent and Delachanal.** F. SESTINI. (P. 104.)

With regard to priority in methods of preparing sulpho carbonates. J. H. S., jr.

**On a Fraud in Tartar Emetics.** J. CASTELLIAZ. (P. 106.)

The potassio-antimonic oxalate is frequently offered instead of the tartrate. The former contains 23.67 per cent. antimony oxide as against 43.7 per cent. in the genuine article. The fraud may be detected by dissolving in water, adding acetic acid, and then calcium chloride solution. The oxalate gives an immediate precipitate, while the tartrate gives none. The detection of sodium phosphate, which is sometimes fraudulently added, is more difficult.

J. H. S., jr.

**On the formation of Acetylene at the expense of Iodoform.** P. CAZENEUVE. (P. 106.)

Silver, mercury, copper, iron and zinc, or mixtures of them, in a fine state of division, as well as nascent hydrogen, when brought in contact with iodoform in presence of moisture, give rise to the formation of iodides and acetylene, even in the cold, though the action is more rapid if the mixture be heated. Beside the acetylene, two other compounds are formed, the one a gas with a fœtid odor, the other a very dense liquid containing iodine, but having the odor of chloroform.

J. H. S., jr.

**Heat of Neutralization of the Alkaline and Alkaline Earth Bases by Hydrofluoric Acid.** M. GUNTZ. (P. 110.)

The heat of neutralization is somewhat less than for the corresponding chlorine compounds. The list of formation of hydrofluoric acid is probably less than 32.9 cal.

J. H. S., jr.

**Note on the Observations of M. Spring.** E. JANNETTAZ.  
(P. 114.)

The author denies first, that pressure determines crystallization, and, second, that pressure determines combination.

Schistosity, and not chrySTALLINITY, appear to result from pressure, and the small amount of combination detected in mixtures of sulphur with various metals after subjection to pressure, is attributed to the heat developed. J. H. S., jr.

**Note on the Development of Schistosity in Compressed Bodies.** ED. JANNETTAZ.

Resumé of some experiments undertaken to combat the views advanced by Mr. Spring. J. H. S., jr.

**On the Second Anhydride of Mannite.** A. FANCONNIER.

The method of preparing this body is described in detail. It has the formula  $C_6H_{10}O_4$ , is slightly deliquescent, and dextrorotatory. Being isomeric, with the mannide described by Berthelot, the author names it *isomannide*.

The method of preparation and elementary analyses of several derivatives are given.

**Action of Cyanogen on the Toluidines.** J. A. BLADIN.  
(P. 125.)

The preparation, salts, and some derivatives of cyanogen compounds of para and metatoluidine are described. J. H. S., jr.

*Zeitschrift f. Anal. Chem.* 1884.

**On the Estimation of Phenole, in Creosote Oil.** By DR. KLEINERT. (P. 1.)

The author, after collecting the oil, proceeded as follows :

1 part of the acid oil was shaken up with 30 times its weight of warm water, and placed aside to settle.

The oil not dissolved was freed from water, and submitted to fractional distillation. Up to  $180^\circ C$ . a few turbid drops of liquid had distilled over. The receiver was now changed. The temperature rose to  $208^\circ$ , and then slowly to  $215^\circ$ . The distillation was not continued above this, as the author only wished to know if the acid oils contained, besides phenole, any other compound of the same, or nearly the same boiling point, which would behave in contact with bromine in the same manner as carbolic acid. But as the existence of such a body is hardly to be expected, it now becomes necessary to study the properties of the other higher-boiling oils in relation to bromine.

500 g. of crude oil was submitted to fractional distillation.

At first, by low temperature, a little water passed over. The temperature then rose to 180°, and up to this point only a little oil had distilled over.

The temperature was then raised to 190°, and a small amount of oil, free from water, passed over. At 210° the oil distilled more freely. At 212°, white fumes of low tension passed over, and from 218°—222° the temperature rose very slowly.

The temperature then rose slowly to 250°, 260°, and 265°, and only a few oily drops passed over, which partially solidified in the neck of the retort and receiver to a mass of the consistency of butter.

The distillation was stopped at 270°, and the distillate placed for three days in a cool room, during which time its yellow color changed to reddish brown, and deposited a solid, yellowish body. Previously the specific gravity of the liquid at 13°, was found to 1.007.

The solid body was separated from the fluid, washed with alcohol, dissolved in petroleum ether, and allowed to evaporate slowly. Strongly lustrous crystals were obtained, which were washed with alcohol and dried. From its melting point and boiling point it was found to be naphthaline.

The dark red liquid was shaken up with 300 c. c. caustic soda solution of 1.25 Baumé, and placed aside to settle. It separated after a while in two layers. The top one, of the same color as the distillate, was clear, and amounted to 130 c. c. The lower one was brown, and amounted to 270 c. c.

After the neutral oils had been separated, the caustic soda was decomposed with muriatic acid, and the acid oils precipitated, after being freed from salt, were submitted to fractional distillation.

At 100°. Water passed over.

At 110°. White vapors appeared, a milky fluid passed over, and the thermometer rose slowly

to 120°. The vapors ceased to appear at 115°, and the thermometer rose rapidly

to 170°. Here the receiver was changed. The temperature then rose to 190°.

At 190°. Only a little oil had passed over.

At 195°. White vapors appeared again, and the temperature rose slowly.

At 198°. The thermometer remained stationary for a while, and then rose very slowly to 199°, 200°, 203°, 205°, and from there it rose more rapidly to 220°.

At 230°. A dark yellow oil began to pass over.

At 240°, 250°. Only a few drops passed over.

At 260°. Only a very little distilled over.

At 265°. The retort became filled with yellow fumes, and as only a small residue was left in the retort, the distillation was stopped.

All that had distilled up to 170 was allowed to rest, and separated



into two layers, the lower one being oily, while the upper one was watery.

The oil was examined for carbohc acid, as follows :

- (a) With piece of pine wood ; turned light blue.
- (b) With chloride of lime solution ; weak reaction.
- (c) With ferric chloride ; violet-colored solution.
- (d) With bromine water ; slight turbidity.

The distillate of the acid oils, which had been distilled from 170°—265°, was redistilled. The following fractions separated, and as before, were tested for carbohc acid:

- |           |     |  |
|-----------|-----|--|
| 170°—200° | (a) | Light blue coloration.   |
|           | (b) | Plainly visible blue solution.   |
|           | (c) | Violet solution, changing color.   |
|           | (d) | Turbidity and precipitation.   |
| 200°—220° | (a) | Yellow, with blue coloration above wetted surface.   |
|           | (b) | Light bluish solution.   |
|           | (c) | Violet solution, soon decomposing.   |
|           | (d) | A much more pronounced white precipitate.  |
| 220°—230° | (a) | Slightly blue above wetted surface.  |
|           | (b) | On adding ammonia, white precipitate soluble in water, and giving a yellow solution with chloride of lime. |
|           | (c) | Violet solution.   |
|           | (d) | Heavy white precipitate.   |

In all the three portions, sub. a, b, c, the presence of phenole is verified.

The neutral oils which separated from the distillate, after treating with caustic soda solution, were likewise submitted to fractional distillation.

At 110° a few drops passed over, the temperature then rose to 150°, and the liquid began to boil, after which the temperature rose rapidly to 170°, 180°, 190°, and a large amount of oil distilled over. At 200° the receiver was changed. From 208° the temperature rose slowly to 215°, remained stationery for a short time, and finally rose to 250°. The distillation was stopped here, and the two fractions were treated, (a) with chloride of lime, (b) with ferric chloride, (c) with bromine water.

- |      |            |            |   |
|------|------------|------------|---|
| I.   | 150—200°   | (a)        | Below blue and above red.   |
|      | (5 c. c.)  | (b)        | .....   |
|      |            | (c)        | Turbidity.  |
| II.  | 200—250°   | (a)        | Bluish, above orange.   |
|      | (75 c. c.) | (b)        | .....   |
|      |            | (c)        | Turbidity.  |
| III. | 200—250°   | (39 c. c.) |   |
|      |            | (a)        | Below reddish, above slightly blue.   |
|      |            | (b)        | On adding ammonia, reddish solution.  |
|      |            |            | On adding chloride of lime, greenish, then yellow, and at last loss of color. |

- (c.) Violet, soon losing color.  
 (d.) Heavy white precipitate.
- IV. 250°—290° (7 c. c.)  
 (a.) Yellowish.  
 (b.) Ammonia added to dilute solution produced a reddish color.  
 (d.) Much heavier white precipitate.

The author, after numerous other experiments, came to the following conclusions:

- (1) All distillations furnish between 150° and 200°, the smallest distillates.
- (2) It is not to be surmised that in liquids distilling at a temperature of 200° we should meet with carbolic acid, as the latter boils at 184°—185°, but strange to say, the fractions obtained between 200°—250° are really the richest in carbolic acid.
- (3) The acid oils contain bodies boiling above 250° which behave like phenole in contact with bromine.

If, therefore, we estimate the phenole in a sample of ereosote oil, according to Koppeschaar's method, we do not get the largest yield from the phenole itself, but from other bodies contained in the oil, which are soluble in water, and have higher boiling points.

J. H. S., JR.

**A few remarks on the practicability of Schlösing's Ammonia-Estimation Process for Plant Extracts.** BY E. SHULZE. (P. 13.)

The author states that the presence of glutamine and asparagine materially affects the correctness of Schlösing's method, but that with proper precautions, the method may be employed.

Thus, if it is desired to make an ammonia estimation of a plant extract containing asparagine, and we change the standard acid, standing over the extract after a period of 48 hours, and titrate back, the error will be only a small one, even if a considerable amount of asparagine be present.

Suppose, for example, that the substance under examination should contain 0.20 per cent. N, in form of ammonia, and 10 per cent. of asparagine, we would probably find 0.22 per cent. nitrogen, as ammonia, provided the asparagine in the extract does not undergo a heavier decomposition than in pure solutions.

After various other remarks on this subject, the author concludes that, with proper care, the ammonia in extracts containing asparagine may be nearly all absorbed by the standard acid after the lapse of about 48 hours.

J. H. S., JR.

**On the Estimation of Organic Matter, According to Methods Depending on the Reduction of Potassium Permanganate.** BY DR. A. R. LEEDS. (P. 17.)

The author found, after numerous experiments, that the methods

of Förehhammer, Kubel-Tiemann, and Schulze-Frommsdorff, are liable to error, and that it was better to operate at nearly a boiling temperature, which he obtained by placing the flask containing the water in a water-bath which heated contents to 99° C. The heating was maintained for ten minutes.

He also found that the results thus obtained agree with those depending on the reduction of silver nitrate to metallic silver in the presence of organic matter.

J. H. S., JR.

**On a Method for the Precipitation and Quantitative Estimation of Digitaline, Digitaline, and Digitine.** BY R. PALM. (P. 22.)

The author proceeds as follows :

The coarsely powdered herb is thoroughly extracted with water, and the extract filtered through bone black till nearly colorless, and the filtrate treated with lead acetate till complete precipitation ensues. The precipitate is collected on a filter, and the filtrate is treated with lead acetate and alcoholic ammonia, (12 parts lead acetate and one part Liquor Dzondii), till no further precipitation occurs. This last precipitate is composed of lead oxide and the glucoside of digitalis. After washing, it is collected on a filter and rubbed up with water to the consistency of a thin paste. It is then decomposed by treating with sulphuretted hydrogen. The precipitate is collected on a filter. The aqueous filtrate contains all the digitaline, while digitaline and digitine remain on the filter with the lead sulphide. By treating the lead precipitate with chloroform, and evaporating the extract, digitaline may be obtained in a crystalline form. Lastly, by extracting the lead precipitate with alcohol, and evaporating the latter, digitine is left behind in a pure condition.

The property of digitaline, to be precipitated with lead acetate and alcoholic ammonia, is of great use in detecting it in poisoning cases, as the process is applicable to even very small quantities, it being completely precipitated.

In poisoning cases, the lead precipitates of these three poisonous glucosides may at once be distinguished from one another by the following reactions :

1. The precipitate of picrotoxine is more slimy, and turns saffron-yellow when treated with strong sulphuric acid.
2. The precipitate of digitaline is gelatinous, and turns flesh colored when treated with sulphuric acid.
3. The lead precipitate of solanine is sandy, and turns dark fawn color when treated with sulphuric acid. By adding to the mixture a little sugar it turns first violet, and then blue.

J. H. S., JR.

*Chemisches Central-Blatt.* 1884.

**On a Few Physical Properties of Chemical Compounds.**  
**F. NIEMÖLLE.** (P. 1.)

The author finds that the refracting index  $n$ , and the gravity  $d$ , of all gases, change with the atmospheric pressure and temperature, in such a manner, that the quotient  $B = \frac{n-1}{d}$  remains constant.

This quotient, which he calls the "specific refracting property" of the substance, depends solely upon the chemical nature of the gas.

Accurate experiments on a series of liquid bodies, also proved that the quotient  $B$ , stands likewise in relation with pressure and temperature. Thus Landolt observed that, in ethyl alcohol  $B$ , at  $12^{\circ}$  C, has the value 0.4426, while at  $28^{\circ}$  C it has the value 0.4423. He is, therefore, lead to believe that  $B$ , in liquid chemical compounds, depends principally upon their constitution.

Numerous experiments lead to the following laws :

(1.) "Isomeric substances have the same specific refracting indices."

(2.) "That physical mixtures have the same indices as chemical compounds of the the same percentage composition."

(3.) "That the molecular structure is without influence on the size of the molecular refraction."

"The molecular refraction of a molecule is the sum of the atomic refractions of the molecule. Each atom exercises, in each molecule, a similar influence."

J. H. S., Jr.

**Formulae, to estimate the proportion in which two solutions of known per centage should be mixed, in order to obtain another solution of the desired per centage.** By R. RIETH. (P. 54.)

As an example, the author gives the following figures :

Suppose, that 2grm. hydrochloric acid require for neutralization 12.5 c.c. normal, KOH solution, and that another 2grm. of a different acid, should require 16.8 c.c. The relation between them may be expressed as follows :

TOO DILUTE.	REQUIRED STRENGTH.	TOO CONCENT.
12.5	13.7	16.8
DIF. 1.2		DIF. 3.1

Now as it is necessary to take more of the third, the weaker the first ; or more of the first, the stronger the third, 3.1 dilute acid + 1.2 pts. concentrated acid must be taken in order to obtain 4.3 pts. acid of the desired strength.

These proportions are best calculated to an even number, or say, 1,000 c.c.

We therefore get the following equation :

$$4.3 : 3.1 = 1,000 : x$$

$$x = 720.93 \text{ cc. dilute acid.}$$

According to the same rule ; the amount of concentrated acid is 279.07 c.c. By mixing the two acids, 1 lit. acid of the required strength (25%) is obtained.

J. H. S., JR.

*Journal of the London Chemical Society.*

**On the Estimation of Starch.** C. O'SULLIVAN. No. CCLIV. (P. 1.)

The process, as applied to the cereals, involves the treatment of the flour with ether to remove fat, with alcohol of .90 specific gravity, to remove sugars, albuminoids other than casein, etc., and with water at 35°-38° C to remove amylans, etc. These solvents are without action on starch.

Purified starch is then converted by specially prepared diastase into maltose and dextrin, which are the sole products, and the residue after this action of diastase is shown to be free from starch. Maltose and dextrin are then determined in the solution by the saccharimeter. Malted grains yield maltose to the alcoholic extract among the other sugars, but dextrin is not present in either alcoholic or aqueous extract. Raw grains, of *average ripeness*, yield neither soluble starch nor either of its decomposition-products to the aqueous solution. The errors of the process lie within 0.5 %

A. A. B.

**On the Oxidation of Phosphorus at a Low Temperature and the alleged Decomposition of Phosphorous Anhydride by Sunlight.** R. COWPER and V. B. LEWES. No. CCLIV. (P. 10.)

Detailing the results obtained by passing of air over fused phosphorus and the exposure of the product to sunlight. The deposit

obtained in the tube is shown to be a mixture of phosphoric and phosphorous anhydrides with pure phosphorus in crystals, the latter becoming amorphous phosphorus when exposed to sunlight.

A. A. B.

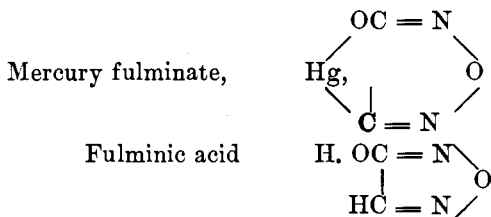
**On the Constitution of the Fulminates.** E. DIVERS and H. KAWAKITA. No. CCLIV. (P. 13.)

The authors, acting on Steiner's recommendation of mercury fulminate as a source of pure hydroxylammonium chloride for which one of them had need, were led into an investigation of the fulminates. Fuming hydrochloric acid, acting on dry fulminate, yields almost the theoretical proportion of hydroxylamine, accompanied by formic acid into which all carbon of the fulminates is converted. *Dilute* acid yields also a trace of HCN. No oxalic acid results from action of acids upon fulminates, although carbonic acid is set free when sulphuric acid is used.

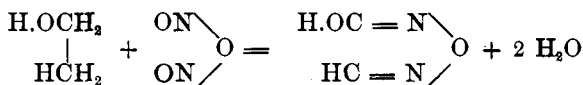
A. A. B.

**Theory of the Constitution of the Fulminates.** E. DIVERS No. CCLIV. (P. 19.)

The fulminates being known to contain two isonitrosyl radicals or their equivalents, and two formic carbons, the author discusses the earlier formulæ given by Berzelius, Kekulé, Armstrong, and Steiner and advances the hypothesis that the fulminates are formed (1) from an alcoholic residue in which hydrogen has been replaced by a metal, and which retains only C and O, and (2) a condensed hydroxylamine residue. After discussing the formula of hydroxylamine which is regarded as *amidogen oxide* (NH<sub>2</sub>)<sub>2</sub> O the author deduces the following formulæ :



The latter is formed by the reaction.

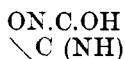


Nitrate of silver or mercury is necessary to fix the spontaneously decomposable fulminic acid as it is formed. A. A. B.

**Note on the Formation and on the Constitution of the Fulminates.** H. E. ARMSTRONG. No. CCLIV. (P. 25.)

A criticism upon the last paper. Nitrous acid, not nitrous anhydride, is concerned in the reaction. The assumption of Divers that the  $\text{CH}_3$  group exchanges 2 H for N.OH is unwarranted. The alcohol in formation of fulminic acid undergoes successive hydroxylation, in accordance with a known reaction, and hydroxyethylalcohol,  $\text{CH}_2(\text{OH})\text{CH}(\text{OH})_2$ , is formed. This compound the author regards as the primary source of the fulminate, "which is formed from it by simultaneous, or it may be consecutive, action of nitrous acid and hydroxylamine.

Fulminic acid is written



A. A. B.

**On Liebig's Production of Fulminating Silver without the use of Nitric Acid.** E. DIVERS and M. KAWAKITA. No. CCLIV. (P. 27.)

The statement of Liebig (*Ann. Pharm.* 5, 287) that fulminating silver separates when nitrous acid is passed into an alcoholic solution of silver nitrate is incorrect. The needle-like crystals described by Liebig, were found to be silver nitrate. Neither under the conditions described, nor by the use of silver nitrite, could the fulminate be obtained. The essential condition seems to be a vigorous oxidation of alcohol by nitric acid in presence of either mercury or silver nitrate.

Attempts were made to obtain copper fulminate but without success. The result is ascribed to "the active catalytic oxidizing power of cupric salts, which affects the action of nitric acid upon copper (Acworth and Armstrong) and so readily causes the destruction of hydroxylamine (or isonitrosyl hydride) is sufficient to explain the failure."

A. A. B.

**The Illuminating Power of Ethylene when burnt with Non-Luminous, Combustible Gases.** PERCY F. FRANKLAND. No. CCLIV. (P. 30.)

The author refers to the similar investigation of Frankland and Thorne, relating to the luminosity of benzol (*Chem. Soc. J.* 33, 89). His results are summarized as follows.

1. That pure ethylene, when burnt at the rate of 5 cubic feet per hour from a Referee's argand burner, emits a light of 68.5 standard candles.

2. That the illuminating power of equal volumes of mixtures of ethylene with either hydrogen, carbonic oxide or marsh gas, is less than that of pure ethylene.

3. That when the proportion of ethylene in such mixtures is above 60 per cent. the illuminating power of the mixture is but slightly affected by the nature of the diluent. When, on the other hand, the proportion of ethylene in such mixtures is low, the illuminating power of the mixture is considerably the highest when marsh gas is the diluent, and the lowest when the ethylene is mixed with carbonic oxide.

4. That if 5 cubic feet of ethylene be uniformly consumed, irrespectively of the composition of the mixture, the calculated illuminating power is in every case equal to or actually greater than that of pure ethylene, until a certain degree of dilution is attained. This intrinsic luminosity of ethylene remains almost constant when the latter is diluted with carbonic oxide, until the ethylene forms only forty per cent. of the mixture after which it rapidly diminishes to zero, when the ethylene forms only 20 per cent. of the mixture. When the ethylene is diluted with hydrogen, its intrinsic luminosity rises to 81 candles when the ethylene constitutes 30 per cent. of the mixture, after which it rapidly falls to zero when the ethylene amounts to only 10 per cent. In the case of mixtures of ethylene and marsh gas, the intrinsic luminosity of the former is augmented with increasing rapidity as the proportion of marsh gas rises, the intrinsic luminosity of ethylene, in a mixture containing 10 per cent. of the latter, being between 170 and 180 candles.

A. A. B.

*Chemical News.* Vol. 49.

**Notes on the separation of Selenium and Tellurium from each other and their preparation from Lead-chamber deposit.** MASACHIKA SHIMOSÉ. P. 26.

**On the Determination of the Number of Atoms in a Molecule.** C. A. SEYLER. P. 31.

For determination of molecular weight where the method by vapor density is inapplicable and in bodies comparatively free from crystalline structure, which tends to produce abnormal changes



of volume in solidifying, the following rule is given: "The difference between the real density just before and just after fusion, divided by the experimental latent heat gives the number of atoms in the molecule."

"Real density" is defined as a value depending upon intermolecular distance and is obtained by dividing the relative weight (Sp. gr.) referred to hydrogen, by the molecular weight of the body or where this is unknown by the atomic weight, assuming that the molecule in this case has but one atom. Latent heat of fusion of mercury, calculated as above, is 2.7; the experimental value of Persson is 2.8.

The author concludes that "real density" is proportionate to absolute temperature and suggests that the density of liquids at their boiling points should be proportionate to latent heat of condensation.

A. A. B.

**The Molecular Volume of Salt Solutions.** W. W. J. NICOL. P. 37.

Attempts to establish a connection between the composition of a salt and its molecular volume, analogous to the law of Kopp for organic liquids, have been but partially successful. The state of molecular aggregation and the magnitude of intermolecular spaces are comparable only in salts which are strictly isomorphous. When salts are dissolved in water, however, the molecular interspaces are approximately coextensive. The author considers this conclusion, reached in a former paper, to be now established by recent work of Groshaus (*Wiedemann's Ann.* Nov., 1883) and Bender (*Ib.* Dec., 1883) and announces the following law: "In diluted solutions (1 equivalent to 200 H<sub>2</sub>O) the volume of a metal in a salt is independent of the salt-radical with which it may be combined" and *vice versa*. He finds by experiment that the volume-change on double decomposition attended by precipitation is constant in reactions between BaCl<sub>2</sub> or Ba(NO<sub>3</sub>)<sub>2</sub> and Na<sub>2</sub>SO<sub>4</sub> or K<sub>2</sub>SO<sub>4</sub> and hopes, by a continuation of his experiments, to be able to recognize water of constitution of a salt in solution.

A. A. B.

**Determination of the At. wt. of Oxygen.** T. HILDRICH. P. 37.

Discusses the methods of preparing hydrogen in which have been used in determinations of the At. wt. of O by the CuO process, and the subsequent manipulation, indicating possible errors.

A. A. B.

**On the use of Litmus, Rosolic Acid, Methyl-orange, Phenacetolin and Phenolphthalein as Indicators.** R. T. THOMSON. P. 32 and p. 38.

Continuation of previous experiments. A comprehensive summary of the work is given in a table showing the behavior of these indicators in titration of a great variety of compounds.

**Estimation of Cl. Br. and I. in presence of one another.** F. MAXWELL-LYTE. P. 55.

All of the halogens are precipitated as silver salts, weighed, dissolved in very dilute solution of KCN treated with a weight of KBr equal to that of the precipitate, and then with excess of dilute  $H_2SO_4$ . The precipitate is collected and weighed, dissolved again and treated as before, using one and a quarter times its weight of KI instead of KBr, dried and weighed again. The second precipitate contains all silver as bromide except what was bromide or iodide already, and the third all silver as iodide except what had previously been iodide. A. A. B.

**Rapid Filtration.** B. F. DAVENPORT. P. 57.

In a note to the Editor the author describes an apparatus for pressure-filtration, in which the funnel is covered by a thick sheet of rubber weighted down by a heavy plate of glass. The filter is supported by a perforated cone, as usual, and pressure upon the surface of the liquid is supplied by a Fletcher's foot-blower, which forces air into an opening made through both plates. A. A. B.