ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Determination of the Atomic Weight of Bismuth.

ALEX. CLASSEN.

Three methods of preparing pure bismuth were followed. 1. Bismuth, called *purissimum* in commerce, was used. Of this 250 grms. were dissolved in nitric acid, evaporated and the residue repeatedly evaporated with HCl, until all HNO_3 was driven off. The bismuth chloride, dissolved in conc. HCl was stirred with alcohol and the lead chloride filtered off. The solution was then divided into ten beakers of four liters capacity each and by addition of water, oxychloride was precipitated. The precipitates were washed by decantation, until no more HCl was present, then redissolved in conc. HCl and again precipitated by water. This operation was repeated twelve times. At last the bismuth oxychloride was taken up with conc. HCl, diluted a little with water and precipitated by NH_4OH and ammonium carbonate. Washing by decantation followed, until no more ammonia was present. Again the precipitate was dissolved in conc. HCl and reprecipitated with ammonia and ammonium carbonate. This process was repeated three times. Finally the different precipitates were dissolved in conc. HCl and again BiOCl was precipitated. This was washed, dried and fused with 98 per cent. KCN in a porcelain crucible. The reduced metal again was fused several times with KCN. The regulus was freed from KCN, but not before the mass was absolutely cold. The metallic globules were washed with water and polished on the turn-table. When thus put into closed flasks the metal retains its bright surface for months.

2. The method was practically the same as above, only the raw material was "*bismuth subnitras purissimum*" of commerce, from the same source from which Marignac bought his in times past. The spectrum analysis showed, however, that in spite of all care, lead was retained in the metal. When the nitrate solutions of the

metal obtained were treated electrolytically, lead was found in every one.

3. The bismuth was obtained by electrolysis, with peculiar precautions, from the metal prepared as above dissolved in pure $H NO_3$. About 3 kilos. of the absolutely pure metal were thus obtained. The atomic weight was calculated from bismuth oxide, which, after critical consideration, was considered the safest way. According to this research the atomic weight of bismuth is:

For O = 16 ....208.89830.
" " = 15,96 ....208.37605.

(*Ber. d. Chem. Ges.*, **23**, *938, 1890.*) I. H. F.

Reduction of Oxygen Compounds by Magnesium.

CLEMENS WINKLER.

I. The compounds of elements which, according to the periodic law form the first group, were subjected to this action. Carbonates, hydrates or oxides (according to the ease with which they can be prepared in a pure state) and powdered magnesium were used. The following metals were thus obtained: Na, Li, K, Rb and Cu. Rubidium was reduced with especial facility, so that its preparation in a metallic state from the carbonate in this way is recommended; Cs, Ag and Au were not reduced by Mg. Some of the reductions can be expressed in reactions:

$$Na_2 CO_3 + 3 Mg = 2 Na + C + 3 Mg O.$$

In regard to potassium, the author thinks it likely that it may advantageously be *manufactured* in this way. Further it was found that two of the oxygen atoms in potassium carbonate are more easily taken up by Mg than the third one, showing that the OK group is more easily reduced than CO, and thus proving the correctness of the constitutional formula: $CO (OK)_2$. The experiment proved that the *second* of the following two equations had been realized:

$$\text{I. } CO (OK)_2 + 2 Mg = C + K_2 O + 2 Mg O.$$
$$\text{II. } CO (OK)_2 + 2 Mg = CO + 2 K + 2 Mg O.$$

Also the hydrate was easily reduced:

$$2 KOH + 2 Mg = K_2 + H_2 + 2 Mg O$$

Gold suboxide was reduced by heat alone and was found along with the unchanged magnesium. (*Ber. d. Chem. Ges.*, **23**, *44*, *1890.*) L. H. F.

II. This research comprises the second group, viz.: Be, Mg, Ca, Sr, Ba, Zn, Cd, Hg.

The quantitative proportion in which the oxides of these elements were subjected to the treatment with Mg at high temperatures is indicated in the following:

$$R''O + Mg = R'' + MgO.$$

In some cases also the hydroxides were used.

Beryllium was reduced. Magnesium acting upon magnesium oxide did not produce a suboxide. The reaction performed in a current of hydrogen yielded magnesium crystals of definite shape, seemingly hexagonal; magnesium oxide remained unchanged. Calcium was reduced from its oxide (obtained from marble) but could not be obtained as a regulus. When calcium hydrate was used, calcium as well as hydrogen resulted. It was also shown that magnesium reduced water at high temperatures. Strontium oxide was reduced to strontium, an almost homogenous cylinder consisting of magnesium oxide and metallic strontium was obtained, which retained its consistency when used for a flame reaction in a Bunsen burner. When this mass was heated on a red hot cover of a porcelain crucible the beauty of the flame was dazzling. Barium oxide yielded results similar to those of Ca and Sr; the metal could not be obtained as a regulus. Zinc was reduced but not obtained, being lost by evaporation, as also was mercury. Cadmium coated the whole inside of the operating tube. (*Ber. d. Chem.. Ges.*, **23**, *120*, *1890.*)

III. The third group, containing B, Al, Sc, Y, La, Yb, Ga, In, Tl, were now, as far as available, taken up for this study. Boracic anhydride and borates, under this action, furnished magnesium boride and a liquid as well as a gaseous compound of boron with hydrogen. The body BH_3 was not formed. Aluminium oxide did not furnish pure aluminium. A monoxide, Al O, was formed besides magnesium spinell : $Mg\,Al_2\,O_4$. The monoxide was not prepared in a pure state. Yttrium was reduced from its oxide ;

lanthanum mixed with magnesium oxide was obtained from its carbonate. The amount of gallium oxide used (0.1 grm.) was too small to show a satisfactory result. No regulus of indium could be detected with a lens, when indium oxide was used. Thallium oxide showed reduction in part, but the suboxide was principally formed while thallous carbonate was reduced. (*Ber. d. Chem. Ges.*, **23**, *772, 1890.*) L. H. F.

Preparation of a very Active Platinum Black. O. LOEW.

Fifty grms. of platinic chloride dissolved in 50–60 c. c. in water are mixed with 70 c.c. of formaldehyde of 40–45%. Keeping the mixture cool and adding a solution of 50 grms. Na O H in 50 c.c, H_2O, the greater quantity of the metal is at once separated. After twelve hours, filter with the pump. A yellow liquid runs off, which, on boiling, deposits a little platinum. After the salts are washed out (which is very essential for a good, active platinum black), a deep black solution filters through, some of the exceedingly fine sponge being dissolved. The last traces of salts are separated easily by dialysis, and a deep black translucent liquid results. This, when shaken with a little air and alcohol, instantly develops aldehyde; it also decomposes hydrogen peroxide energetically and thus seems to be a watery solution of platinum, analogous to Muthmann's red solution of elementary silver. The black sponge on the filter begins to absorb oxygen, the temperature rises to 36°–40° C. and bubbles of gas burst forth accompanied by a hissing sound. Then the fine pulp is spontaneously transformed into a porous mass, which is finally washed and dried over sulphuric acid. (*Ber. d. Chem. Ges.*, **23**, *289, 1890.*) L. H. F.

On Beryllium. GERHARD KRÜSS and HERMANN MORAHT.

A kilo. of light green colored leucophane from Arendal in Norway was the starting point of this research. The metal was reduced from its hydrate by magnesium, but could not be obtained pure enough in this way. Then the compound K_2BeF_4 was prepared and the metal was successfully reduced in the form of hexagonal crystals by means of sodium. (*Ber. d. Chem. Ges.*, **23**, *727, 1890.*)

L. H. F.

An Apparatus for Preparing Chlorine. PETER KLASON.

This apparatus is made of clay and resembles in action that of Kipp. Warm water is used as a source of heat. The rubber stoppers, when covered with vaseline, resist the action of chlorine gas perfectly. (*Ber. d. Chem. Ges.*, **23**, *330, 1890.*) L. H. F.

Chemical Analysis of a Meteorite of Carcote. (Chile.) W. WILL and I. PINNOW.

Besides iron chromate, the presence of *two* different silicates were analytically indicated. One, containing the elements according to the formula of olivine, $(Mg\,Fe)_2\,Si\,O_4$, the other, of the composition $R''\,Si\,O_3$, in which $3\,R''\,O$ are partly replaced by $Al_2\,O_3$. (*Ber. d. Chem. Ges.*, **23**, *345, 1890.*) L. H. F.

Synthesis of Iron Pyrites. E. GLATZEL.

Differs from the methods of Berzelius, Wöhler and others, in that the formation of $Fe\,S_2$ is attained according to the equation:

$$3\,Fe_2\,Cl_6 + 2\,P_2\,S_5 = 3\,Fe\,Cl_2 + 3\,Fe\,S_2 + 4\,PSCl_3$$

The iron disulphide thus prepared is obtained quickly and easily in microscopic crystals of very perfect form and of a bright brassy lustre. (*Ber. d. Chem. Ges.*, **23**, *37, 1890.*) L. H. F.

Stereochemical Considerations. ALEX. NAUMANN.

The greatest possible effect of the attractive force between carbon atoms takes place when the directions of attraction coincide with the line which unites the centres of gravity of two such atoms. If the directions of attraction deviate from this line, only that component of the total attraction links the atoms which lies in the direction of this line. (*Ber. d. Chem. Ges.*, **23**, *477, 1890.*)
L. H. F.

ORGANIC CHEMISTRY.

A New Hexylamine and a New Hexyl Alcohol. MARTIN FREUND and PAUL HERRMANN.

A vacancy exists in the hexyl series. Eight acids are theoretically possible, seven of which have been found; only four primary alcohols and but two corresponding amines are known. Some derivatives of diethylacetic acid were prepared. The Ψ-hexylalcohol $(C_2H_5)_2.CH.CH_2.OH$, which may be called diethylcarbin carbinol, possesses an odor suggestive of camphor and at the same time of fusel oil; it boils between 139°–143° C. This is a comparatively low boiling point. But in comparison with the corresponding acids an approximately equal difference is observed :

Normal caproic acid	boils at	205° C.		
Normal hexyl alcohol	" "	157.2°;	diff :	47.8°
Isobutylacetic acid	" "	199.7°		
Isohexyl alcohol	" "	150°	"	49.7°
Methylisopropylacetic acid	" "	?		
Pentyl carbinol	" "	152.5°	"	?
Methylpropylacetic acid	" "	195.4°		
Methylpropylcarbin carbinol	" "	146.8°	"	48.6°

To these must now be added :

Diethylacetic acid, boiling at		190° C.		
Pseudohexyl alcohol	" "	141° C.	"	49°

(*Ber. d. Chem. Ges.*, **23**, *189, 1890.*) L. H. F.

A Compound of Calcium Chloride and Normal Propylic Alcohol, which Moves on Water. CHRISTIAN GOTTIG.

A solution of anhydrous calcium chloride in normal propylic alcohol yields crystals of the composition $CaCl_2 + 3\,C_3H_8O$, which, like the compounds of alkalies and alcohols, moves actively upon water until dissolved, without evolution of a gas. (*Ber. d. Chem. Ges.*, **23**, *181, 1890.*) L. H. F.

Action of Oxygen upon Zincethyl. ROBERT DEMUTH and VICTOR MEYER.

Frankland stated that he obtained $Zn(OC_2H_5)_2$ when oxygen acted upon a dilute solution of zincethyl. According to this, the two oxygen atoms would have been interpolated between zinc and carbon. The body on which Frankland reported and which he called zincethylate, is highly explosive when heated, particularly at reduced pressure. The authors attempt to prove that the substance in question is not zincethylate, but a compound of the structure of peroxides, particularly as it decomposes potassium iodide with liberation of iodine. On distillation with dilute H_2SO_4 alcohol is formed. It is, therefore, more probable that this body has the formula :

$$C_2H_5 - O - O - Zn. C_2H_5.$$

(*Ber. d. Chem. Ges.*, **23**, *394*, *1890*.) L. H. F.

Formation of Anhydrides in the Succinic Acid Series.

VICTOR MEYER and KARL AUWERS.

This formation is facilitated in a remarkable degree by introduction of methyl groups into the molecule. The tetramethylated succinic acid is entirely transformed into its anhydride (which greatly resembles camphor) on mere distillation, or on heating with aqueous HCl in a pressure tube. A comparative research of all methylated succinic acids in regard to the relative ease with which they split off water is recommended. (*Ber. d. Chem. Ges.*, **23**, *101*, *1890*.) L. H. F.

Tetramethylsuccinic and Trimethylglutaric Acid.

KARL AUWERS and VICTOR MEYER.

This research proved the difference in structure of the two isomeric acids by a new method, revealing the structure of fatty acids by their behavior towards bromine. (*Ber. d. Chem. Ges.*, **23**, *293*, *1890*.) L. H. F.

Facts About Paraffin. B. PAWLEWSKI.

Paraffin, when treated with solvents, behaves like a colloid. It yields jellies with benzol, chloroform and especially with ether. In acetic acid it behaves like a crystalloid. The presence of paraffin in crude petroleum, in the form of vaseline, may thus be explained. (*Ber. d. Chem. Ges.*, **23**, *327*, *1890*.) L. H. F.

Synthesis of Glucose. EMIL FISCHER.

Gluconic acid when treated with sodium amalgam in a cold acid solution is transformed into grape sugar. The dextro-mannose (the synthesis of which is described p. 165) is stereo-isomeric with glucose. We have seen that dextro-mannose was prepared, after a number of transformations, from formaldehyde. Dextro-mannose yields an osazone, the mannosephenylhydrazone. A mannonic acid lactone was prepared, and from this mannonic acid. Now mannonic acid has been transformed into the above mentioned gluconic acid, which yields glucose. These results are now available for theoretical considerations in regard to the process of assimilation by plants. (*Ber. d. Chem. Ges.*, **23**, *799, 1890.*) L. H. F.

A New Preparation of Ethylsulphonic Acid. FRIEDRICH MAYER.

Sodium ethylsulphate is treated with sodium sulphite in closed tubes or pressure bottles at 110°-120° C. The reaction runs almost quantitatively, thus :

$$C_2\,H_5\,SO_4\,Na + Na_2\,SO_3 = C_2\,H_5\,SO_3\,Na + Na_2\,SO_4.$$

(*Ber. d. Chem. Ges.*, **23**, *908, 1890.*) L. H. F.

On Propylamine. S. GABRIEL and W. E. LAUER.

It was found that the halogen is also easily replaceable in the propyl compounds and thus permits of many peculiar reactions. The compound of β-brompropylamine with HBr reacts with potassium cyanate to form trimethylene-Ψ-urea. (*Ber. d. Chem. Ges.*, **23**, *87, 1890.*) L. H. F.

Anhydro-bases from Amidomercaptans of the Fatty Series. S. GABRIEL and PH. HEYMANN.

Thiobenzamide and ethylenebromide were allowed to react together and thus μ-phenylthiazoline, $C_9\,H_9\,N\,S$ was formed. When a hydrochloric acid solution of this basis was oxidized with bromine water, benzoic acid and taurin, $SO_3\,H.C_2\,H_4\,NH_2$, separated from a syrup, which was the direct result of that oxidation, and which, doubtless, contained benzoyltaurine. The formation of this latter from phenylthiazoline is easily explained. (*Ber. d. Chem. Ges.*, **23**, *157, 1890.*) L. H. F.

Xylose and Wood Gum from Straw and other Material. E. W. ALLEN and B. TOLLENS.

Cherry wood, straw or loofah are extracted with caustic soda. The extract is precipitated by means of alcohol, thus yielding gum, of which straw from wheat furnished 16 per cent., and this, subjected to hydrolysis, furnished xylose. (*Ber. d. Chem. Ges.*, **23,** *137, 1890.*) L. H. F.

Action of Chlorine on Phloroglucine. TH. ZINCKE and O. KEGEL.

As previously shown, chlorine acts upon phloroglucine, in chloroform solution, to produce hexachlortriketone: $C_6 Cl_6 O_3$. Stannous chloride reduces this to trichlorphloroglucine. The hexylene ring existing in hexachlortriketone is very easily broken, even by water, which splits it into CO_2; $CH\ Cl_2\ COOH$ and $CH\ Cl_2\ CO.CH\ Cl_2$. A hexachloracetylacetone could not be obtained, but octochlor or hexachlordibrom derivatives were prepared. Treated with ammonia, the hexachlortriketone furnishes dichloracetamide only. When $P\ Cl_5$ is allowed to react with hexachlortriketone, hexachlorbenzol, $C_6\ Cl_6$, is formed but no $C_6\ Cl_{12}$. (*Ber. d. Chem. Ges.*, **23,** *230, 1890.*) L. H. F.

Alkylation of Acid Amides. JULIUS TAFEL and CARL ENOCH.

Benzamide and anisamide were used. It is well known that, although hydrogen in acid amides may partially be replaced by metals, such as silver or mercury, these amides will *not* yield alkylamides under the influence of alky liodides.

Now it was found, that, under certain conditions, benzamide may be ethylated, but that the product of reaction is not ethylbenzamide but benzimidoethyl ether, which formerly had been obtained from benzonitrile with alcoholic HCl.

So far only aromatic amides have permitted a successful reaction of this kind. It is surmised, therefore, that the real constitution of these amides, taking benzamide as an example, is

$$C_6\ H_5.\ C.\ OH.\ NH.$$

The corresponding silver salt:

$$C_6\ H_5.\ C.\ OAg.\ NH$$

and the ethyl ether:

$$C_6\ H_5.\ C.\ OC_2H_5.\ NH.$$

This reaction takes place between ethyl iodide and silver benzamide at ordinary temperature. (*Ber. d. Chem. Ges.*, **23**, *103, 1890.*) L. H. F.

Synthesis of Alcohols in the Pyridine Series. ALFRED EINHORN.

Since cocaine has been recognized as a derivative of pyridyl-β-lactic acid, the author has successfully endeavored to prepare this latter from ω-trichlor-α-oxypropylpyridine : $C_5H_4N.CH_2CHOH.CCl_3$, which had been formerly described as prepared (as a condensation product) from α-picoline with chloral. The work will be continued and the products of reduction will be taken up as the next step. (*Ber. d. Chem. Ges.*, **23**, *219, 1890.*) L. H. F.

Symmetrical Tetrabromdiacetyl. H. F. KELLER.

This compound was prepared directly from diacetyl; the reaction does *not* stop at the dibrom derivative but proceeds slowly towards the tetra product, which is thus obtained almost quantitatively. The properties proved to be the same as those of the tetrachlordiacetyl prepared by Levy, Jedlichka and Witte from chloranilic acid by means of $KClO_3$ and HCl. This fact removes the last doubt as to the constitution of tetrachlordiacetyl and shows its connection with diacetyl. (*Ber. d. Chem. Ges.*, **23**, *35, 1890.*) L. H. F.

Synthesis of Chrysene and Related Hydrocarbons. G. KRAEMER and A. SPILKER.

The vapors of naphthalene and cumarone, when jointly passed through an iron tube kept at dull red heat, are decomposed with surprising facility, forming water and chrysene :

$$C_8H_6O + C_{10}H_8 = C_{18}H_{12} + H_2O.$$

Cumarone and benzol distilled together through the same apparatus furnished phenanthrene :

$$C_8H_6O + C_6H_6 = C_{14}H_{10} + H_2O.$$

(*Ber. d. Chem. Ges.*, **23**, *84, 1890.*) L. H. F.

Isocinnamic Acid Present in the Alkaloids accompanying Cocaine. C. LIEBERMANN.

The alkaloidal by-products of cocaine are now technically worked for ecgonin, and thus the raw material for the study of acids split off from these, is more abundantly obtainable. Isocinnamic acid was recognized in them and has subsequently also been found in storax. (*Ber. d. Chem. Ges.*, **23**, *141, 1890.*)

L. H. F.

Action of Carbon Disulphide upon Menthol and Borneol. EUG. BAMBERGER and W. LODTER.

Menthylxanthogenic acid : $C_{10}H_{19}O.CSSH$ and bornylxanthogenic acid: $C_{10}H_{17}O.CSSH$ were prepared, showing the similarity of these camphor alcohols with alicyclic β-tetrahydronapthol, discussed by the authors in a paper of great length immediately preceding. (*Ber. d. Chem. Ges.*, **23**, *213, 1890.*)

L. H. F.

Note on Camphoric Acid. EUG. BAMBERGER.

Experiments showed that at 100° to 120° C. no HBr addition-product could be obtained, nor was the acid attacked by potassium permanganate. Victor Meyer had previously proved that this acid was indifferent to nascent hydrogen. The author concludes therefore that there exists *no* double linking in the molecule of camphoric acid, but that this acid is a tetramethylene derivative. (*Ber. d. Chem. Ges.*, **23**, *218, 1890.*) L. H. F.

Adenine and Hypoxanthine. G. BRUHNS.

Want of clearness and many errors in regard to the properties of hypoxanthine and of the occurrence of adenine are ascribed to the fact that there exists an adenine-hypoxanthine which the author has prepared. This compound has the formula $C_5H_4N_4O.C_5H_5N_5+3H_2O$. It forms an homogeneous hydrochloride, differing in form from either adenine hydrochloride or hypoxanthine hydrochloride. (*Ber. d. Chem. Ges.*, **23**, *225, 1890.*)

L. H. F.

Triphendioxazine by Oxidation of Orthoamidophenol.

Paul Seidel.

The oxidation was performed by heating orthoamidophenol hydrochloride with 30–40 times its weight of water in a flask. attached to a reflux condenser on the water bath, passing at the same time a vigorous current of air through the solution. The raw product obtained was purified successfully only by sublimation. This latter took place upon cast iron plates of 25 cm. diameter, having an upturned edge ½ to 1 cm. broad and 2 to 3 cm. high. Glass plates or unglazed clay plates were used as covers, while a layer of asbestos served as a packing. Three grms., on an average, of perfectly pure crystals could be obtained on one plate. The raw product yields 40 to 60 per cent. substance sufficiently pure for analysis. The substance is a red dye. In all conc. acids it is soluble with deep blue coloration, forming salts, which are decomposed by water. Leuco compounds were prepared and the constitution of the dye was also ascertained by the following synthesis. One mol. of symmetrical diamidoresorcin sulphate heated with two mols. sublimed amidophenol yields a green vapor, which condenses to beautiful red crystals. These latter are identical with the product obtained as described above. Consequently, the dye contains the chromophore group N_2 and must be named triphendioxazine. (*Ber. d. Chem. Ges.*, **23**, *182*, *1890.*) L. H. F.

The Cumarone of Coal Tar. G. Kraemer and A. Spilker.

In the neutral distillates of hydrocarbons from coal tar, remarkable quantities of a substance were found, along with small amounts of a substance containing nitrogen. This latter is nothing but benzonitrile, to which is due, without doubt, the presence of benzoic acid in tar oil or in the residues from phenol. The first mentioned substance is the cumarone, the presence of which in coal tar has so far been unknown. The cumarone is obtained from the well fractioned parts of light tar oils, boiling between 168° and 175° C., after these have been treated successively with caustic alkalies and mineral acids, in order to free them from their constantly associated phenols and pyridine bases. To a kilo. of strongly cooled tar oil, thus prepared, 450 grms. of bromine were slowly added and the dibromcumarone, $C_8 H_6 Br_2 O$, was obtained in the shape of large, prismatic crystals, soluble in chloroform and by means of this rendered quite pure, showing the melting point 88°–89° C. As several kilos. of cumarone were at the disposal of the authors, the older data were re-examined and corrected. Cumarone boils at 170°–171° C. It represents a very permanent and constant compound ; thus it distills off almost without loss from charring when slowly dropped upon melting KOH. Boiling KOH solutions, alcoholic or aqueous, do not attack it. Chlorine substitution products were obtained. With iodine it does not combine at ordinary temperatures. When heated together with iodine, a violent reaction takes place, and the entire mass becomes resinous. Strong mineral acids, *e. g.*, conc. $H_2 SO_4$, transform the cumarone into a resin, representing a polymeric cumarone, called paracumarone. (*Ber. d. Chem. Ges.*, **23**, *78, 1890.*)

L. H. F.

Synthesis of Indigo from Monobromacetanilide. W. Flimm.

This is the first synthesis of indigo from a mono substitution product of benzol. Caustic alkalies acting upon monobromacetanilide (m. p. 131, 5 C°) give rise to different products according to the conditions of work. Aqueous potassium or sodium hydrate destroys the molecule, with formation of aniline and isocyanphenyl. Alcoholic potash acting upon monobromacetanilide gives rise to diphenyldiketonpiperazin. The author added to a solution of monobromacetanilide in absolute alcohol the calculated quantity of sodium, also dissolved in absolute alcohol, and allowed the mixture to stand for a day at the ordinary temperature of the room. Thus ethoxylacetanilide was formed as a faintly yellow oil. But, if monobromacetanilide is melted together with dry caustic alkali, a fused mass is obtained, the solution of which in water soon turns blue and separates indigo ; aniline and isocyanphenyl are also formed. The yield is small, not more than 4 per cent. of the anilide used. The author explains the reaction thus : indigo is not directly formed, but at first either indoxyl or pseudoindoxyl, then by oxidation this intermediate product (which could not be obtained) is changed into indigo. (*Ber. d. Chem. Ges.*, **23**, *57, 1890.*) L. H. F.

Decomposition of Alicyclic (1: 5—Tetrahydronaphthylenediamine) into its optically active components. EUG. BAMBERGER.

Amongst the hydrized naphthalene bases there exist two which contain asymmetric carbon atoms, the alicyclic α–tetrahydronaphthylamine and the alicyclic 1, 5–tetrahydronaphthylenediamine. Both are optically inactive, because they represent (according to their synthesis) compounds of enantiomorphous part-molecules. The diamine was used and Pasteur's method was applied for the splitting of this base into its components, acting as optically equal but in an opposite sense. Salts of dextro- and laevo-tartaric acid, with optically active bodies, show different solubility. Hydrized naphthylenediamine was added to a solution of dextro-tartaric acid in the proportion to form the bitartrate; the base dissolved at once, but the concentrated syrup would not crystallize. Then a minute fragment of a crystal of coniin dextrotartrate was dropped into the liquid, which soon caused the entire syrup to become a crystalline magma. The bitartrate was filtered, decomposed, pressed and treated with HCl gas in ethereal solution; the hydrochloride was obtained and crystallized from water in thick prisms. This salt turned the plane of polarization to the left. The syrup, filtered off from the bitartrate crystals, yielded, after several months' standing, the enantiomorphous form of alicyclic hydronaphthylenediamine. It was also transformed, as above, into the hydrochloride, which crystallizes beautifully and turns the plane of polarization to the right. The corresponding values of rotation are approximately equal. (*Ber. d. Chem. Ges.*, **23**, *201, 1890.*) L. H. F.

On Dextro-Cocaine. ALFRED EINHORN and ALBERT MARQUARDT.

Dextro-ecgoninmethylester and benzoylchloride when heated together to 150°–160° C. furnish, dextro-cocaine quantitatively.

This substance behaves physiologically like common cocaine but with the difference that the local anæsthetic action begins sooner and disappears in shorter time. (*Ber. d. Chem. Ges.*, **23**, *468, 1890.*) L. H. F.

Coloring Matter in Yolk of Eggs. S. BEIN.

The yellow coloring matters from yolk of different kinds of eggs have been called luteines. They may be extracted by ether, alcohol and chloroform. Nitric acid turns them first blue, then yellow. They show 2–3 characteristic bands in a spectroscope. The author claims that air acts upon these coloring substances, particularly when exposed to light. Thudicum's color reactions do not prove, therefore, the absence of yolk of egg in mixtures, nor do they always signify its presence, especially not when nitrogenized products of decomposition are present in these mixtures. (*Ber. d. Chem. Ges.*, **23**, *421, 1890.*) L. H. F.

Synthesis of Mannose and Laevulose. EMIL FISCHER.

The author has now achieved the synthesis of mannit and of laevulose, starting from acroleinebromide, or glycerose or from formaldehyde. All intermediate products were obtained and thus the synthesis of all bodies belonging to the mannit series, except glucose and its derivatives, has been realized. (*Ber. d. Chem. Ges.*, **23**, *370, 1890.*) L. H. F.

Hydrazine from Aldehyde Ammonia. TH. CURTIUS and R. JAY.

Sodium nitrite acting upon a faintly acidulated solution of aldehyde ammonia yields a nitrosamine, the paraldimine $C_6 H_{11} O_2$. C. (N H). H, a liquid, volatile base, which forms paraldehyde and ammonia gas when treated with water. A nitrosoparaldimine was prepared, which is identical with the product obtained directly from aldehyde ammonia by means of nitrous acid. This is a lemon-yellow liquid of camphor-like odor. Moist HCl acting upon nitrosoparaldimine in ethereal solution gives rise to paraldimine hydrochloride; if a second molecule of water reacts with this latter, paraldehyde and ammonium chloride are formed.

The two latter reactions result jointly when the nitroso compound is boiled with acids. The reduction of nitrosoparaldimine by means of zinc dust and glacial acetic acid in ethereal solution led to amidoparaldimine. The hydrochloride of this base, when boiled with dilute sulphuric acid, takes up water and furnishes hydrazin and paraldehyde : $C_5 H_{11} O_2 . HC : N . (NH_2) + H_2 O = C_5 H_{11} O_2 . COH + N_2 H_4$. The yield of hydrazin is not satisfactory. (*Ber. d. Chem. Ges.*, **23**, *740, 1890.*) L. H. F.

On E. Guinochet's Isomeric Carballylic Acid. ROBERT DEMUTH and VICTOR MEYER.

This acid was found to be succinic acid. Guinochet worked correctly, but has made a mistake in his interpretation. (*Ber. d. Chem. Ges.*, **23**, *529, 1890.*) L. H. F.

Stereochemical Arrangement of Atoms in Molecules containing Nitrogen. A. HANTZSCH and ALFRED WERNER.

The main cause for the hypothesis developed here is to be found in the fact, that the attempt to explain the isomeric monoximes and dioximes of benzil in a stereochemical manner led to a conflict with the second proposition of van't Hoff.

The authors overcome this difficulty by assuming that the three valencies of the trivalent nitrogen atom (and perhaps also those of *other* polyvalent atoms) do not, under all conditions, lie in the same plane with the nitrogen atom.

In hydrocyanic acid, for example, the stereochemical view in regard to carbon could not be entertained, if it were not at the same time admitted that the directions of the valencies of nitrogen deviate from their original direction, and that consequently these latter cannot lie in one and the same plane. Maintaining that the three nitrogen valencies (as we find them in NH_3 and similar compounds) do lie in a plane, the authors surmise that in certain compounds containing nitrogen, its three valencies are directed towards the three solid angles of an irregular tetrahedron, while the nitrogen atom occupies the fourth one. Consequently the angles which these directions form with one another are *not* coincident with those of the valencies of a carbon atom. (*Ber. d. Chem. Ges.*, **23**, *11, 1890.*) L. H. F.

Substitution Dependent of the Atomic and Molecular Magnitude of the Substituting Bodies. FRIEDRICH KEHRMANN.

Facts observed in the study of quinon-oximes seem particularly to indicate that the ease of substitution is approximately proportional to the molecular magnitude of substituting bodies already present. This should be understood to mean that any substitution results all the more easily as the molecule of that substituting element, which, by reason of its position, governs the place of substitution, is smaller. (*Ber. d. Chem. Ges.*, **23,** *130, 1890.*) L. H. F.

Determination of the Constitution of Tautomeric Compounds. H. GOLDSCHMIDT and A. MEISSLER.

According to Laar, those compounds are called *tautomeric* which apparently react in a manner indicated by two constitutional formulæ differing from each other. Laar assumes that in such bodies the atoms oscillate between two different positions of equilibrium. This interpretation does not at all permit the use of the words "constitutional formulæ," in the proper sense of the word, which would only permit *one* of those positions (recognized from allied reactions) to be considered as correct. The other position would not belong to the substance *per se,* because the reactions according to which it has been derived, have caused a change of position of atoms within the molecule. Incorrect formulation of the chemical equations for these reactions may be the reason for the apparent contradiction of the principles of structural chemistry which these phenomena of change within the molecule offer.

According to Ostwald's views on the nature of solution of electrolytes, chemical reactions could be explained in a very simple manner. For example : Sodium hydrate acting upon thiacetanilide would ordinarily allow us to expect the following :

$$C_6H_5.NH.CS.CH_3+NaOH=C_6H_5.N.Na.CS.CH_3+H_2O.$$

But we find that a sodium compound is formed, which, according to its chemical reactions, requires the formula $C_6H_5.N:C.CH_3.SNa$, and we are therefore forced to assume that a change within the molecule has taken place. But considering that Na OH in solution is partly dissociated into its ions Na and OH, then we must write the following equation :

$$C_6\ H_5.\ NH.\ CS.\ CH_3 + Na + O\ H = C_6\ H_5.\ N : C.\ (S\,Na).\ CH_3 + H\ O\ H.$$

Many similar cases experimented upon are described in this paper and the authors formulate the following proposition : In reactions of tautomeric compounds, which take place under the influence of electrolytes, the exchange of atoms is caused by the free ions. (*Ber. d. Chem. Ges.*, **23**, *253, 1890.*) L. H. F.

Determination of Vapor-Densities below the Boiling Point of the Substances Tested.

Robert Demuth and Victor Meyer.

The determination of vapor densities by the method of displacement of air has caused several chemists to attempt improvements by working in a part vacuum. But the simple method has thus been hampered by very complicated apparatus. The authors found a method for the determination of the vapor density of bodies which are easily decomposed by using hydrogen gas instead of air. If care is taken that the vapor of the substance tested spreads rapidly through the apparatus a degree of dilution is arrived at, which (like a partial vacuum) permits lower temperatures for the determination. Thus xylol, *e. g.*, was tested at 40 deg. below its boiling point, using common steam as a mantle. For certain chlorides of metals hydrogen cannot be used. Ethyl-ether was determined at 17° C., which was the temperature of the room. (*Ber. d. Chem. Ges.*, **23**, *311, 1890.*) L. H. F.

ANALYTICAL CHEMISTRY.

The Use of Pyrophosphate Double Salts in the Estimation and Separation of Metals by Electrolysis.

Albano Brand.

It has been found that many of the metals contained in solution as double pyrophosphates can be easily separated by electrolysis. Since in this form of combination many of the solutions bear either the addition of ammonium hydrate or carbonate without precipitation, there is the further advantage that the electrolysis may be carried on in alkaline or acid solution ; chlorides, as well as sulphates and nitrates, may therefore be used.

When solutions of sodium or ammonium pyrophosphate are added to neutral solutions of metals, the resulting precipitate is soluble on addition of an excess of the reagent. If such a solution bears the further addition of ammonium hydrate, and also ammonium carbonate, it is (for brevity's sake) termed *normal.* Ammonium hydrate or ammonium carbonate solutions also dissolve the pyrophosphates of those metals, the sodium pyrophosphate solution of which will bear the addition of these reagents without precipitation. These solutions also bear the addition of ammonium oxalate without precipitating.

I.—BEHAVIOR OF METALS IN THE FORM OF DOUBLE PYROPHOSPHATE DURING ELECTROLYSIS.

1. *Nickel.*—Solutions react normal. From the alkaline pyrophosphate solution, especially that containing ammonium carbonate, nickel is easily deposited upon the cathode as a firmly adhering, whitish-gray metal. The deposition begins with a current of 0.1 c. c. of gas per minute. With a current of 2 to 3 c. c. per minute 0.2–0.3 grm. of nickel can be precipitated in twenty-four hours. The same quantity of metal can be precipitated in a few hours by a current of 20 c. c. per minute. The metal should be washed rapidly with distilled water without interruption of the electric current. Finally, wash with absolute alcohol, dry the tared dish at 100° C., cool and weigh. With weak currents through the ammonium carbonate nickel solution a light brown deposit may appear on the anode, but this soon disappears if the current is briefly interrupted.

2. *Cobalt.*—The electrolytic behavior of the pyrophosphate solution is much like that of nickel, the deposited metal having a brownish color. In some respects it behaves like iron, inasmuch as some of the metal is apt to be redissolved. The last traces are separated by a current of 15–20 c. c., and washed without interruption of the current.

3. *Iron.*—Ferric salts react normal. The pyrophosphate is white, and dissolves to a colorless solution in sodium pyrophosphate. On addition of ammonia, the solution turns brownish yellow or brownish red, according to concentration.

Ferrous salts also react normal. The green pyrophosphate solution on the addition of ammonium hydrate gradually turns brown, and after a time deposits basic salts.

The ammoniacal solutions of the double salts of iron, when subjected to electrolysis, deposit a brownish red salt of iron upon the anode, and at the same time metallic iron upon the cathode.

For the electrolytic estimation of iron. only the solution to which ammonium carbonate has been added is suitable.

Although the reduction begins with a light current, to separate the metal rapidly currents of 20–30 c. c. per m. are required.

4. *Manganese.*—The pyrophosphate is readily soluble in ammonia, less readily in sodium pyrophosphates. Ammonium carbonate also dissolves the precipitate, but the solution soon deposits a white salt. Manganese is best separated as a superoxide from the strongly ammoniacal solution. The solution should contain about 15% of strong water of ammonia.

To prepare the electrolyte, add just sufficient sodium pyrophosphate to form the double pyrophosphate, and then dissolve in the requisite amount of ammonia. Make the platinum capsule the positive electrode, and for small quantities of manganese (0.02 g. Mn in 100 c. c.) use a current of 0.1 c. c. per m. For larger amounts of Mn, begin with a light current (0.01 c. c. for 0.1 grm. Mn in 100 c. c.). Towards the end the current must not exceed 0.4 c. c. Wash only with water, and finally weigh the manganese as Mn_3O_4.

5. *Zinc.*—Solutions react normal. For the quantitative estimation the ammoniacal solution of the double salt, or better still, the solution to which ammonium carbonate has been added, is suitable for electrolysis, the metal being deposited as a zinc-gray, firmly adherent film. If much zinc is present (over 0.2 grm.) the bulk of it should be precipitated with a current of 5–10 c. c. per minute, increasing the current towards the end to 15–20 c. c. A wire anode is preferable to foil. Wash without interruption of current.

If zinc and iron occur together, the former can be precipitated completely only when the iron is present in large excess.

6. *Cadmium.*—Pyrophosphate soluble in large excess of the sodium pyrophosphate, much more readily in ammonia. Addition of ammonium carbonate causes a precipitate. For electrolysis the strongly ammoniacal pyrophosphate solution is the most suitable. Begin with a current of 2–3 c. c. ; after a few seconds reduce to 3 to 1. c. c., and after the bulk of the metal has been precipitated increase the current to 5 c. c. at the finish. The metal thus separated is dense, crystalline, and of silvery white color.

7. *Copper.*—Solutions react normal. For electrolysis the double pyrophosphate solution without further additions is the most suitable. A current of 0.1 c. c. per minute, which should be increased to 1 c. c. towards the end, precipitates the copper as a firm metallic film.

8. *Silver.*—The pyrophosphate is almost insoluble in excess of sodium pyrophosphate, but dissolves readily in ammonia or ammonium carbonate. The salt precipitated by ammonium pyroph. is soluble in excess of the reagent, and also in ammonium carbonate, but ammonium hydrate again precipitates the salt from this solution.

For electrolysis, a solution of the sodium double salt acidulated with nitric acid is the most suitable. Begin with a current of 0.01 c. c. and increase it to .2 c. c. towards the end.

9. *Mercury.*—The mercurous pyrophosphate is readily soluble in the sodium or ammonium pyrophosphate, but in these solutions addition of ammonia or ammonium carbonate causes dark gray precipitates. The mercuric pyrophosphate is insoluble in sod. pyroph., but dissolves readily in ammonia or ammonium carbonate solution.

For electrolysis the solutions of the mercuric double salts, to which ammonia or ammonium carbonate have been added, are the most suitable. Mercurous salts must first be oxidized to mercuric salts. A current of 2 c. c. per m. will deposit 1 g. of metal in 5–6 hours.

10. *Tin.*—The stannous and stannic pyrophosphates dissolve readily in the sodium or ammonium pyroph. solution and bear the

addition of ammonium carbonate; but ammonia causes precipitation. The quantitative estimation was not found satisfactory.

11. *Chromium.*—Solutions react normal. During electrolysis the chromium oxidizes to chromic acid both in alkaline and acid solution. If Ni and Co are present with the chromic double salt in alkaline solution they (Ni and Co) are precipitated quantitatively. But if chromic acid be present from the beginning, neither Ni or Co will be deposited even with strong currents. In presence of iron in the ammonium carbonate solution, a reddish yellow salt appears on the cathode, containing iron and pyrophosphoric acid. If iron be in solution with chromic oxide, metallic iron is first deposited during electrolysis, but the deposition ceases as soon as chromic acid is formed.

12. *Lead.*—Pyrophosphate is soluble in excess of sodium pyrophosphate and the solution bears addition of ammonium carbonate, but is precipitated by ammonia. Not suitable for quantitative estimation by electrolysis.

13. *Thallium.*—Behavior of the pyrophosphates much like that of the lead salts.

14. *Bismuth.*—The pyrophosphate solution is precipitated by ammonia, but not by ammonium carbonate. For quantitative estimation add to the acid and somewhat dilute solution 4 or 5 times as much sod. pyrophosphate as is required to form double pyrophosphate. Add sufficient ammonium carbonate to make the solution alkaline, and then add 3–5 grms. of ammonium oxalate in solution. Begin with a current of 0.1 c. c. to 1 c. c., according to the quantity of Bi in solution, increasing current towards the end to 2–3 c. c. By the above method 1 grm. of Bi may be brought into solution in 200 c. c. Occasionally it is best to begin with a current of 1–2 c. c., and after a few seconds to decrease to required degree. About .25 grms. Bi may be deposited within 12 hours by beginning with a current of .5 c. c. and ending with one of 5 c. c. Towards the end of the reaction traces of superoxide are apt to appear on the anode, but these can be removed by means of conc. oxalic acid solution. The deposited bismuth is best weighed as an oxide, readily obtained by dissolving the deposit in HNO_3, evaporating, and finally igniting at a red heat. For the electrolysis use an anode of wire.

15. *Antimony.*—Ammonium carbonate is miscible with the pyrophosphate solution, but ammonia causes precipitation. From the solutions currents of .1–0.3 c. c. separate the metal quantitatively, but the deposit does not adhere firmly enough for quantitative estimation.

II.—SEPARATIONS.

SEPARATION OF MANGANESE FROM OTHER METALS.

The property of manganese separating as a superoxide from strongly ammonical solutions, but remaining in solution as a double manganic salt in acid solution, suggests two methods for the separation. From those metals whose salts bear the addition of ammonia the Mn may be separated as a superoxide, or in case the metals are reducible from acid solution to separate the metals first.

1. Mn from Ni, Cu, Cd, Zn, Hg.

The separation of Mn from Fe and Co in the ammoniacal solution by electrolysis is not practicable. From nickel the manganese is readily separated by electrolyzing the solution of the double pyrophosphate after adding about 15% of stronger water of ammonia. An electrode of platinum wire is the most suitable.

The Mn is readily separated from copper since the latter is readily deposited from the ammonium solution by very weak currents. The platinum capsule is used as the cathode. For larger quantities of Cu or Mn the method under II., 2, is preferable.

2. Mn from Cu, Cd, Hg.

Manganese is readily separated from all metals which are reduced by electrolysis in acid solutions. The separation from Fe, Ni and Co is possible, but it requires very strong currents. From Cu and Cd it is easily separated in weak sulphuric acid solutions, or from Cu and Hg in nitric acid solutions.

Acidulate the pyrophosphate solution with the requisite acid, and separate Cu with a current of 3–4 c. c.; Hg by a current of 0.2–0.5 c. c.; and Cd according to I., 6. After evaporating the bulk of the washing so as to concentrate the solution add oxalic acid to reduce the manganese to manganous salt, cool, add ammonia and deposit the manganese as superoxide by means of a weak current.

3. Mn from Fe and Co.

To separate iron from manganese add to the neutral solution containing this metal so large an excess of sod. pyrophosphate that the precipitate is redissolved. Add 4–8 grms. of $(NH_4)_2C_2O_4$ in solution. Deposit the iron on an electrode of platinum wire, and as soon as deposition is complete remove and dip the electrode into distilled water and wash it. An electrode of 1.5 mm. diam. wire, having about 7–8 sq. cm. surface, and weighing 14.5 grms. was sufficient for 0.2 g. iron. If much iron is present begin with a current of 5 c. c., and finish with a 15–20 c. c. current. After the removal of the iron acidulate the solution with $H_2 SO_4$, and reduce with $H_2 C_2 O_4$. After adding 15 conc. ammonia (Sp. Gr. .900), separate the manganese as a superoxide. The less iron there is in proportion to the manganese, the more reliable is the method.

4. Cd from Zn, Fe, Ni, Co.

Cadmium is separated readily from all metals not reduced in sulphuric acid solutions. By use of the double pyrophosphate, salts Zn, Fe, Ni, and Co, after the separation of the Cd, may be deposited direct by supersaturating the solution with ammonium carbonate and subjecting it to electrolysis. It is immaterial whether the sodium pyrophosphate is added before or after the separation of the Cd.

5. Cd from Zn, Ni, Mn.

Method the same as the above, but sodium pyrophosphate must first be added to keep the manganese from precipitating. The washings (after separation of Cd) are finally concentrated, reduced with oxalic acid, cooled, an excess of ammonia is added and the operation is proceeded with according to I., 4.

6. Fe, Ni, Co, Zn, from Al, Mg, Ur.

Of the alkaline earths Mg alone forms a pyrophosphate soluble in excess of the precipitant and which bears the addition of ammonium carbonate. Ammonia causes precipitation. Uranium double salts behave much like the magnesium salt. The aluminium pyrophosphate is further soluble in ammonia.

On electrolyzing the ammonium carbonate solution of the double pyrophosphates of Fe, Ni, Co, or Zn, containing also those of Al,

Mg, Ur, the former are reduced and the latter remain in solution thus enabling a separation. (*Ztschr. Anal. Chem.*, **28**, *581–605.*)
J. F. G.

Concentration of Reagents. R. BLOCHMANN.

With the exception of the concentrated acids and of the *waters* containing H_2S; BaO; CaO; $CaSO_4$ or Br, etc., etc., the degree of concentration of all of which requires special attention, it is well to prepare reagent solutions which shall be approximately normal.

The beginner in qualitative analysis should thus be led to avoid an excessive use of reagents. Moreover, the qualitative tests performed with such solutions will offer quantitative indications in regard to the substances found. (*Ber. d. Chem. Ges.*, **23**, *31, 1890.*)
L. H. F.

A New Gas Volumeter. G. LUNGE.

This apparatus allows the direct measuring of gases without any further calculation or correction for temperature and pressure. The amount of nitrogen, *e. g.*, after a combustion is read directly in milligrammes and $\frac{1}{10}$ mgrms. after proper cooling, without the use of a barometer or thermometer. (*Ber. d. Chem. Ges.*, **23**, *440, 1890.*)
L. H. F.

Separation and Quantitative Determination of Tin and Titanium. A. HILGER and HEINRICH HAAS.

Stannic acid is separated from titanic acid by subjecting the mixture at a dull red heat to the reducing action of hydrogen. Stannic acid is reduced to metal, titanic acid is not. The reduced tin is dissolved from the mixture by means of hydrochloric acid of 20 per cent., which does not dissolve titanic acid. (*Ber. d. Chem. Ges.*, **23**, *458, 1890.*)
L. H. F.

Separation of Vanadic from Tungstic Acid. CARL FRIEDHEIM.

Berzelius' and Gibbs' methods are used jointly and with slight changes. The tungstic acid is almost quantitatively precipitated by water from hydrochloric acid solution of mercurous tungstate. (*Ber. d. Chem. Ges.*, **23**, *353, 1890.*)
L. H. F.

Determinations of Sulphur in Albumin free from Ash.

ERICH HARNACK.

The preparation and the properties of ash-free albumin have already been described. (*Ber.*, **16**, *1889.*) The sulphur determinations have now been repeated. It has been found recently that the *old* method for determining sulphur in albumin bodies is the only reliable one, viz., carefully melting them with caustic alkali and KNO_3, eventually using Hammarsten's modification, consisting in a previous destruction through conc. HNO_3. The caustic potash should be prepared from potassium, since the commercial hydrates (*alcohole depuratum*) contain sulphur.

A true formula for albumin cannot yet be obtained. But the average of five analyses shows 1.91% of sulphur, while Loew's formula: $(C_{210} H_{330} N_{52} O_{66} S_3)$ which is three times that of Lieberkühn, requires 2.03% of sulphur. This is a close approximation. Finally, the author draws attention to the fact that the ratios of sulphur to carbon in the three substances: egg albumin, globulin from pumpkin seed and hæmoglobin are as 1:2:5. (*Ber. d. Chem. Ges.*, **23**, *40, 1890.*) L. H. F.

Quantitative Determination of Egg Substance.

S. BEIN.

Yolk of egg contains two substances, the glycerine phosphoric acid and lecithin, both of which are soluble in ether. The lecithin is an ether of distearylglycerinphosphate with neurine. According to Gobley, the egg yolk contains 7.2 per cent. lecithine and 1.2 per cent. glycerine phosphoric acid. Taking into consideration the formulæ of these two compounds, the determination of phosphoric acid in the ash of the ethereal extract admits of a quantitative determination. The presence of 1.12902 grms. of phosphoric acid would indicate 100 grms. of yolk of egg. This analysis is applied in forensic cases. (*Ber. d. Chem. Ges.*, **23**, *423, 1890.*)

L. H. F.

Abstracts of American Patents Relating to Chemistry.

(*From the U. S. Patent Office Gazette.*)

(*Issued April 29th, 1890.*)

426,489.—Filter. W. Connolly.

426,504.—Laundry blue. G. R. B. Kempton.

Consists of a saturated solution of alum, sodium chloride, and color soluble in water.

426,513.—Composition of matter for making billiard balls, combs, etc. J. H. Patterson.

Consists of zinc white, shellac, camphor, alcohol, nitrogenized rags and French chalk with glycerine, castor oil and alcohol.

426,519.—Artificial fuel. E. K. Baoyerlin.

Consists of coal, wood charcoal, sodium carbonate, sodium nitrate, nitric acid, potassium chloride, manganese dioxide, potassium permanganate, borax, held together by a suitable binding material.

426,633.—Waterproofing composition for paper. H. J. Bird.

Consists of petroleum residuum, known as "tailing," the pitch from distillation of petroleum, and asphalt.

426,643.—Process of manufacturing porous earthenware. W. Lenderoth.

The process consists in subjecting a mixture of clay, sand, sawdust and lime first to such a degree of heat as will reduce the sawdust to ashes and will combine said ashes with the heated lime into a flux, and in afterward increasing the temperature to cause said flux of lime and ashes to incrust and vitrify around the cells without at the same time vitrifying the mixture of clay and sand.

426,756.—Water filter. H. J. Becker.

426,820.—Glass melting pot. E. Kaye.

426,823.—Apparatus for manufacturing gas. G. Leisner.

426,897.—Welding compound. C. Wrigley.

Consists of borax, ammonium chloride and resin.

426,933.--Process of manufacturing antiseptic paper. A. Grossich and P. Matcovich.

426,945.—Filter. P. A. Maignen.

426,965. –Beer filtering apparatus. P. Seibel.

426,982.—System of filtration of water for city or town supplies. J A. Crocker.

426,995.—Beer filtering apparatus. J. W. Hyatt.

(Issued May 6th, 1890.)

427,167.—Heat insulating compound. N. C. Fowler.

Consists of sifted or lixiviated ashes, calcium carbonate, finely divided combustible fibre, lampblack and pumice stone.

427,187.—Photographic or laboratory lamp. H. G. Ramsperger.

427,197.—Carburetor. W. H. Shannon.

427,225.—Carburetor. J. J. Cooper.

427,236.—Filtering apparatus. W. M. Jewell.

427,379.—Gas burner. E. F. Trent.

427,410.—Process of extracting oil. W. T. Forbes.

The process consists in treating oleaginous material with a solvent, then expelling the dissolved oil and solvent from the mass by centrifugal force, then introducing steam to vaporize any of the solvent remaining in the residuum, then drying the same by applying centrifugal force, all of the different steps of the process being applied while the material operated upon is contained in the revolving chamber of a centrifugal machine.

427,467.—Obtaining chlorine. R. Dormer.

The process consists in adding to the manganese dioxide or Weldon mud only one-half the usual quantity of hydrochloric acid used in the Weldon process, and also sufficient sulphuric acid to convert into sulphates all the compounds of manganese and lime present, and then adding sufficient calcium chloride to reconvert the manganese sulphate into chloride.

427,487.—Carburetor. J. S. Tibbets.

(Issued May 13th, 1890.)

427,553.—Yeast cake. J. W. Cameron.

Dry yeast is preserved by it forming into cakes or balls, each of which is first coated with sugar, and then with some innocuous waterproof substance.

427,564.—Carbonic acid compound of metaamidophenol. R. Gnehm and J. Schmid.

427,565.—Carbonic acid compound of dimethyl metaamidophenol. R. Gnehm and J. Schmid.

427,591.—Wall covering composition. R. B. Martin and E. H. Martin.

Consists of citric acid, sulphurate of lime, sand and water.

427,595.—Hydrocarbon burner. W. S. More.

427,620.—Obtaining permanent hydroquinone. K. Scholz.

Hydrochinone is crystallized from a solution containing sulphuric acid.

427,626.—Apparatus for making vinegar. C. W. Shedd.

427,654.—Glass furnace. J. B. Archer.

427,679.—Dynamite. P. Germain.

Uses spongy vegetable matter—such as the pith of elder and other plants, the porous part of cocoanut husks, spongy agaric or the like—for holding nitroglycerin. This spongy matter is rasped and boiled in an alkaline solution, separated by levigation, washed, and dried.

427,697.—Apparatus for dyeing hides. J. Kristen.

427,707.—Mixer for explosives. W. R. Quinan.

427,721.—Barrel lining. A. Zinsser.

Consists of deodorized copal, resin, india rubber, a non-drying fat, with coloring matter, such as asphalt.

427,744.—Process of obtaining chlorine compounds from natural gas. T. F. Colin.

Chlorine and natural gas or methane are mixed within a chamber or retort, which is maintained at a proper temperature. The gases are ignited and the reaction is kept up by an electric spark of proper tension. The hydrochloric acid is then absorbed, and the methyl chloride liquefied.

427,747.—Apparatus for the manufacture of gas. W. M. Cosh.

427,765.—Ice machine and method of operating same. W. T. Hildrup, Jr., and T. H. Butler.

427,779.—Food compound or condiment. M. B. Manwaring.

Consists of diastase and salt.

427,786.—Welding compound. H. S. McLeod.

Consists of borax, salt, and iron chips or filings.

427,794.—Filter press. B. Remmers.

427,819.—Hydrocarbon burner. J. Adams.

427,820.—Hydrocarbon burner. J. Adams.

427,832.—Carbureting apparatus. G. H. Burrows.

427,892.—Method of lining boilers, etc., with lead. G. R. Noble.

A layer of tin is interposed between the iron and lead.

427,906.—Filter. C. G. Purdy.

427,946.—Hydrocarbon burner. J. Adams.

427,969.—Welding compound. W. G. Clark.

A flux for uniting copper to other metals, consisting of silicious sand, ferric oxide, alumina and calcium carbonate.

428,015.—Incrustation preventive. J. W. Mitchell.

Consists of soda ash, pure mineral oil, oil of pennyroyal, copper sulphate and tannin.

428,017.—Process of making white lead. A. Orr.

The process consists in mixing litharge and water in about equal proportions, with a small quantity of acetic acid, in about the proportion of one pound or less of acetic acid for every hundred pounds of lead oxide, injecting carbon dioxide into the mixture, and at the same time agitating the latter.

(Issued May 20th, 1890.)

428,087.—Process of electro-deposition. D. Garrett.

The process consists in first making a mold or matrix of a metal or alloy fusible at a lower temperature than either of the metals to be deposited; second, depositing a thin film of bright metal on the matrix or mold; third, depositing the precious metal on said thin film of bright metal; fourth, depositing the base metal deposit on said coating of precious metal; fifth, melting away the fusible mold or matrix, and finally removing the preparatory film of bright metal by buffing.

428,101.—Apparatus for extracting hops. J. Irlbacker.

428,114.—Welding compound. A. D. Le Roy and C. A. Lowell.

Consists of heating furnace cinder, iron drillings and borax.

428,121.—Apparatus for manufacturing salt. A. Miller.

428,125.—Gas holder. A. Newell.

428,127.—Gas holder. A. Newell.

428,146.—Process of producing indelible aniline ink. J. Schiffmann.

Consists in causing the slow oxidation of a mixture of aniline oil and hydrochloric acid by an oxidizing agent, while the bases are in excess of the acid, dissolving the violet coloring matter produced in an acid, and filtering.

428,161.—Preserving compound. J. R. Bate and F. W. Owen.

Consists of sulphur, carbon, borax, sodium chloride, and calcium chloride, in combination with suitable means for combustion thereof, and the bringing of the fumes or gases of such combustion in contact with the animal body to be preserved.

428,162.—Filter. E. Bourne.

428,219.—Composition of matter. A. J. McDarmel.

Is to be used in making manifold manuscript copies, and consists of glycerin, oxalic acid, alcohol, white glue, carbolic acid, water and gum arabic.

428,237.—Gas producer. W. J. Taylor.

428,281.—Evaporating apparatus. A. Miller.

428,282.—Process of manufacturing salt. A. Miller.

428,286.—Phenyldihydroquinazoline. C. Paal.

Medical compound having the formula $C_{14}H_{12}N_2$.

428,408.—Process of making bleaching powder and caustic soda. J. D. Pennock and J. A. Bradburn.

The process is as follows: First, salt is heated in a still by steam or its equivalent with nitric acid; second, the resulting gases, nitrosyl chloride and chlorine, are passed through a vessel containing nitric acid and manganese dioxide, the resulting gas, chlorine, being passed through a washer, and then to the bleaching powder chamber; third, the nitric acid in the sodium nitrate is recovered by furnacing with oxide of iron, and the mixture lixiviated to recover caustic soda; the nitric acid in the manganese nitrate is recovered by heat, and the manganese dioxide used over again.

428,456.—Apparatus for compressing air or other gases. E. F. Clarke.

428,468.—Process of recovering glycerin from spent soap lye. A. Domeyer and O. C. Hagemann.

428,469.—Apparatus for concentrating spent soap lye. A. Domeyer and O. C. Hagemann.

428,470.—Apparatus for the distillation of concentrated soap lye. A. Domeyer and O. C. Hagemann.

428,471.—Process of distilling glycerin recovered from spent soap lye. A. Domeyer and O. C. Hagemann.

428,484.—Process of purifying glycerin. O. C. Hagemann.

428,486.—Washing compound. E. Hand.

Consists of paraffin wax, sperm oil, alcohol and oil of mirbane.

428,509.—Process of recovering glycerine from spent soap lye. E. K. Mitting.

The lye is neutralized with acid and concentrated until it is saturated with salts, after which it is treated with cellulose or equivalent fibrous or cellular substance, and an excess of acid, and filtered to remove the precipitated impurities. It is then neutralized with an alkali and concentrated.

428,510.—Process of recovering glycerin from spent soap lye. E. K. Mitting.

428,530.—Rosinduline monosulpho acid. C. Schraube.

428,566.—Treatment of metallic precipitates. E. K. Mitting.

W. R.