ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

On the Purple Colors Derived from Gold. M. Müller.

The author gives a historical sketch of former writings on this subject and mentions the two theories of the formation of "Purple of Cassius." The one maintained by Gay-Lussac, Proust and Debray, ascribed the color to metallic gold in minute division; the other considered it due to the presence of an oxide of gold, and numbered among its supporters Berzelins, Strecker, and others. J. C. Fisher claimed to have discovered a red modification of the metal which the author, however, believes to have been nothing more than ordinary gold in a finely divided state. He maintains that, in the thinnest possible films, the metal is transparent for the red rays only, and explains the green color seen through gold foil by transmitted light as a phenomenon of optical interference. If the color of the Purple of Cassius is owing to the finely divided metal, a number of analogous products might be formed. Of such he prepared a considerable number, the gold being precipitated on various insoluble bases. Magnesium oxide, suspended in water, being heated with a solution of chloride of gold to near the boiling point, the metal is precipitated on the base in combination with oxygen. A pale yellow precipitate is obtained, which, after repeated washing with water, yields, when heated to redness a fine purple-red pigment. The water of hydration is expelled from the magnesia, the oxide of gold being at the same time reduced to the metallic state. In order to exclude the possibility of an imperfect reduction, the preparation was heated in a current of hydrogen, but the color was not thereby destroyed. For this reason the author decides in favor of the Gay-Lussac theory. Similar results were obtained when using lime, alumina and other bases, the compounds so prepared surpassing in brillancy the well known Purple of Cassius. The author is making experiments with a view to determine how far other metals, especially copper and silver, possess the power of coloring white bases, when precipitated on these in a finely divided state. (*Jour. prakt. Chem.*, **30**, *252*.) H. M. R.

On Metallic Gallium. L. EHRLICH.

Gallium was discovered by Lecoq de Boisbaudran in 1875, in a zinc ore from Pierrefitte, and afterwards found in a variety of blende from Bensberg-on-the-Rhine. The author was the first to prepare the metal in Germany for commercial purposes in the establishment of Dr. Schuchardt. In a preliminary experiment 0.6 grm. of the metal was obtained from 80 kilos of zinc blende. Certain improvements in the process made it possible to extract, within 2–3 days, the gallium contained in 6 cwts. of the mineral. The melting point of the metal is 30.5° and its lustre exceeds that of mercury. (*Chem. Zeit.*, **9**, 78.) H. M. R.

Differential Dilatometer and its Use in Examinations on the Formation of Alums. W. SPRING. (*Ber. d. ch. Ges., 1884*, 404.) J. H. S., JR.

On the Expansion of the Alums. W. SPRING. (*Ber. d. ch. Ges.*, *1884*, 408.) J. H. S., JR.

Influence of Sunlight on the Vitality of the Germs of Microbes. E. DUCLAUX.

"Air and sunlight are considered as having great influence on private and public health, but the measure of their influence was impossible while the vague ideas formerly held on the nature of epidemic and contagious diseases prevailed. In our day the part played by microbes in such diseases, becomes better established and more precise from day to day, and it has become useful to solve the following problem: What influence has sunlight in the destruction of atmospheric germs?"

The author takes into consideration the fact that the germs of aerobean microbes have greater power of resistance than those of the anaerobeans. He made his experiments with germs of *Tyrothrix*, an organism already described by him in his researches on milk. These organisms are destroyers of albuminoids. The species *Tyrothrix scabes* was chosen, as it is easily recognized by its granular aspect. This microbe was cultivated in milk, previously sterilized. Five droplets of this cultivation were placed in a number of sterilized flasks, one droplet to each flask. These flasks were covered with sterilized cotton to allow free access of air. Some of these flasks was exposed to sunlight, while others were placed in a stove and kept at the same temperature as the first, but exposed to diffused light only.

After standing for a certain time, sterilized milk was introduced into each flask. The earliest experiments date three years back, and during that time, not one of the flasks kept heated, but not exposed to direct sunlight, has been sterilized. The spores of *Tyrothrix scabes* preserve their vitality for at least three years, under the combined influence of the action of air and of a tropical heat.

As to the flasks exposed to sunlight, those exposed for two weeks to an August sun showed no decrease of vitality. After exposure to sunlight for one month, there was a decrease in the vitality of the cultivations. After two months of exposure, two flasks in four had become sterile. With Liebig's extract the progression was more marked. One flask in three became sterile at the end of two weeks, two flasks in three at the end of a month and three flasks in three at the end of two months.

Sunlight is then a powerful agent in the destruction of the germs of microbes. (*Comptes Rend.* **100**, 119.) P. C.

ORGANIC CHEMISTRY.

On the Synthesis of the Alkaloids. G. H. Skraup.

The vegetable alkaloids are at present the most prominent subject of chemical investigation, and the general impression seems to prevail that their synthetical production will soon be accomplished. While it is unquestionable that every compound produced in the vegetable organism may ultimately be obtained artificially, a knowledge of the constitution of these compounds must first be gained. The most important result of recent investigations in this field is the demonstration that many of the alkaloids are definitely, others very probably, to be considered derivatives of quinoline and pyridine. Thus quinine, upon oxydation with chromic acid, yields quinic acid $C_{11}H_9NO_3$. It was a fair presumption to look upon this compound as a derivative of quinoline in which one H atom of quinoline is replaced by carboxyl, COOH, and another H by the methoxyl group CH_3O, inasmuch as cinchonine when similarly treated, gives rise to cinchonic acid, $C_{10}H_7NO_2$. But as the structural formula of quinoline admits of 42 possible acids of the composition of quinic acid, so derivable, it was to be determined which of the 42 isomers quinic acid really is. A series of investigations which chanced to supplement each other in a very fortunate manner, has almost positively established the structural formula of quinic acid. This has also made it possible to set up a formula for that group in the molecule of quinine which is converted by oxydation into quinic acid. But this is as far as our present knowledge permits us to establish a structural formula for the alkaloid.

Morphine is very probably a derivative of pyridine and stands, at the same time, in close structural relation to the hydrocarbon phenanthrene—but how great the gap between the knowledge of these isolated facts and the artificial production of morphine?

Atropine, the active principle of belladonna, has been reconstructed synthetically from its decomposition products, tropic acid and tropine. The structure of the former of these is definitely established and tropic acid has been artificially prepared; on the other hand we are as yet ignorant of the constitution of tropine. There is, therefore, no method at present available for producing atropine, independently of the plant from which it is now obtained.

But granting that the structural composition of the alkaloids were clearly established, their production on a technical scale remains a problem which may never be solved, since it is probable that the materials necessary for the artificial manufacture of the alkaloids would be so costly and the process so complex, that their utilization for commercial purposes would be impossible.

It must be remembered also that in many cases the principle as extracted from the plant possesses certain characteristics, e. g., optical properties, not shown by the same substance when obtained by synthesis. It is therefore not impossible that the alkaloids artificially prepared would not be identical in their physiological effects with those obtained from the plants. The efforts of scientific men in the direction of the artificial production of the alkaloids have nevertheless borne fruit, in that they have led to the discovery of a number of new compounds, such as kairine, antipyrine, and thalline, of considerable value in therapeutics and which have been beneficially applied in numerous special cases of disease. (*Chem. Zeit.*, *9*, *218*. *From Pharm. Post.*) H. M. R.

On the Formation of Ptomaines in Cholera. A. VILLIERS.

The existence of poisonous alkaloids, known as ptomaines in the putrefying bodies of animals, suggests the question whether analogous alkaloids may not be found during life in certain diseases. Led by this suggestion, the author undertook, in November, 1884, an investigation upon the bodies of two men who had died of cholera in Paris. The subjects were both of the same age, 63 years; one had died after five days' illness, the other after an illness of one day only. The organs of each were examined within 24 hours after death, and the results as given here were identical in the two cases. Using the method of Stas for separation of the alkaloids, the author obtained a substance plainly characterized by alkaline reaction and other properties of an alkaloid. The alkaloid was most abundant in the intestines from which a quantity equivalent to .02 grm. of its hydrochloride was obtained. The kidneys contained well marked traces, the liver and the blood of the heart scarcely any.

The alkaloid is a liquid having an acid taste, and the odor of hawthorne. It is an energetic base, acts readily upon litmus, and is not liberated by alkaline carbonates, but only by caustic alkalies. Its solution yields a white precipitate with mercury-potassium iodide. Potassium iodide yields a brown precipitate, even in solutions so dilute as not to be precipitated by the double iodide ; the reverse is true as to precipitation of alkaloids ordinarily by these reagents.

With bromine water this alkaloid gives a yellow precipitate, with picric acid a yellowish, with gold chloride a yellowish white, and with tannin or mercuric chloride, white precipitates, the last two only in concentrated solutions. It yields reactions characteristic of the ptomaines with ferric chloride and ferricyanides, and acquires a faint and transient violet color when treated with strong sulphuric acid. Its hydrochloride is neutral to litmus and crystallizes in long, transparent, deliquescent needles. (*Comptes. Rend.*, **100**, 91.) C. E. M.

Certain Derivatives of Mercury Fulminate. (*Preliminary Notice.*) L. SCHOLVIEN.

By the action of dilute sulphuric acid upon sodium fulminate, two acids are formed which are dissolved out by means of ether.

From the ethereal solution there is first deposited a colorless body, crystallizing in needles which gradually becomes yellow. It has acid characteristics and gradually decomposes, forming hydrocyanic acid. It melts at 85°, is easily soluble in water. On evapor-ating the compound with hydrochloric acid, hydroxylamin hydrochloride is formed. The analysis corresponded nearly to HCNO. The second acid is gotten by spontaneous evaporation of the ethereal mother-liquor. It crystallizes from boiling water, is soluble in alcohol, ether, or hot water, soluble with difficulty in cold water, and gives no precipitates with the metallic salts as the first acid does. Analysis leads to the formula HCNO. Silver fulminate is formed by precipitating sodium fulminate with silver nitrate. On heating this with hydrochloric acid hydroxylamin hydrochlorate is formed. Alkaline and metallic chlorides give double salts having the composition $C_2N_2AgRO_2$. By the action of sulphurea on mercury fulminate a mixture of differently constituted compounds of sulphurea and mercuric sulphocyanide is formed; mercuric sulphide and urea are also formed in abundance. The action is violent and carbon dioxide is evolved. (*Jour. f. prakt. Chem.*, **30**, 92.)

F. P. V.

Synthesis of Vinaconic Acid. F. Röder.

By the action of ethylen bromide upon sodium ethylmalonate and saponification of the resulting ether there is formed an acid melting at 139°, and having the formula $C_5H_6O_4$. This is easily soluble in water and crystallizes in efflorescent crystals with 1 mol. H_2O. It forms two classes of salts, $C_5H_5O_4R$ and $C_5H_4O_4R_2$. The author gives it the name Vinaconic acid. It is isomeric with itaconic acid. It unites readily with hydrobromic acid, giving bromethylmalonic acid, a crystalline body melting at 116°. By boiling the aqueous solution of this, a carbobutyrolactonic acid is formed, which gives with bases two series of salts, $C_5H_5O_4R$ and $C_5H_6O_5R_2$. It is a lactonic acid and the carboxyl, derivative of butyrolactone. Heated to 120° carbon dioxide is evolved and butyrolactone formed. Vinaconic acid when heated a little above its melting point, also gives, as decomposition products, carbon dioxide, butyrolactone and an acid, crystalline substance melting at 18°–19°, boiling at 180°–181°, and having, from analysis of its salts, the formula $C_4H_5O_2$. (*Annalen*, **227**, *13.*)

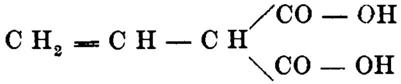
F. P. V.

Camphanic Acid. L. Woringer.

This acid, first prepared by Wredén, yields on distillation, a new lactone, $C_9H_{14}O_2$, campholactone and an isomeric acid, lauronolic acid. Carbon dioxide is evolved at the same time. Complete dedecomposition of the camphanic acid is brought about only by repeated distillations. A better mode of preparing these new bodies is by heating barium camphanate and water several hours in a closed tube at 200°. The lauronolic acid, $C_9H_{14}O_2$, is monobasic. On distillation it changes to a small extent into lactone. Campholactone melts at 50° and boils at 230°–235°. (*Annalen*, **227**, 1.) F. P. V.

Constitution of Vinaconic Acid. R. Fittig.

From its mode of formation this acid is to be looked upon as vinylmalonic acid, with the formula



$$CH_2 = CH - CH\begin{cases} CO - OH \\ CO - OH \end{cases}$$

This explains best the easy change into bromethylmalonic acid and carbobutyrolactonic acid. According to this the same formula would have to be ascribed to the monobasic acid $C_4H_6O_2$, called vinylacetic acid, as to isocrotonic acid, and yet in properties the two are quite different. The author discusses the probability of this not correctly showing the constitution of isocrotonic acid, and also the plausibility of the assumption of Perkin, Jr., that the vinaconic acid is a trimethylendicarbonic acid.—(*Annalen*, **227**, 25.) F. P. V.

On Dicinchonine. O. Hesse.

This alkaloid is found chiefly in the bark of *Cinchona rosulenta* and *C. succiruba.* In the manufacture of quinine it remains in the mother-liquor, and goes over into chinoidine. *C. rosulenta* contains 0.2 to 0.3 p. c., and is best suited for the extraction of this alkaloid. It cannot be directly prepared from chinoidin. It melts at 40°, has the same percentage composition as cinchonine, but the author ascribes to it the double molecular weight, and hence the formula $C_{38}H_{44}N_4O_2$. It is easily soluble in ether, aceton, alcohol, chloroform and benzol, less so in water and insoluble in caustic soda.

The alcoholic solution is strongly basic, very bitter, polarizes light to the left, and gives no color with chlorine, nor the alkaline hypochlorites. It dissolves readily in acid, forming salts. Attempts to change it into cinchonicine failed.—(*Annalen*, **227**, 153.)

F. P. V.

β—Dipropylacrylic Acid from β—Dipropylethylenlactic Acid. A. ALBITZKY.

Two methods were used in the preparation of this acid. The first consisted in the removal of one molecule of water by the action of phosphorous trichloride, the second in distillation, with sulphuric acid. The pure acid, obtained from some of its well crystallized salts, is a hard, white, crystalline substance, easily soluble in alcohol, ether or benzol, less readily soluble in water. It crystallizes from benzol in radiating needles, melts at 80°, 81°, and solidifies again at 73°. Various salts were prepared by saturating the acid with the carbonates, and were analyzed.—(*Jour. f. prakt. Chem.*, **30**, 209.)

F. P. V.

Remarks on Chrysaniline. R. ANSCHÜTZ.

Diacetylchrysaniline. $C_{19}H_{13}N_3$ $(C_2H_3O_2)$.

In order to determine how many amido- groups chrysaniline contained, it was thought best to test this by forming, if possible, an acetyl compound. For this purpose 1 part of chrysaniline was heated in a sealed glass tube for 8–12 hours with 2½ parts of acetic anhydride. In this way a diacetyl compound was produced. If the acetic acid solution of the base be treated with HCl, diacetylchrysaniline chloride is precipitated in yellow flakes, which, when examined under the microscope, are shown to be composed of long yellow needles. This salt is easily soluble in water, and dilute HCl.

Chrysaniline. $C_{19}H_{15}N_3$.

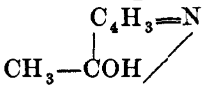
This was obtained from the acetyl compound by boiling it for 8 hours with HCl (1.12 Sp. Gr.), and then decomposing the chloride formed with NaOH. The strong basic character of the acetylchrysaniline gave rise to the theory that perhaps the third N. atom contained in it might be in the same form as in pyridine or chinoline. This question was settled by oxidizing the substance with potassium bichromate and H_2SO_4, acridine being found among the oxidation products. (*Ber. d. chem. Ges., 1884*, 433.)

J. H. S., Jr.

On the Action of Acetic Anhydride and Benzoic Anhydride on Pyrrol. G. L. Ciamician and M. Denstedt.

In a previous communication it was shown that pyrrol, when treated with acetic anhydride, formed two isomeric acetyl compounds, of which the one has the properties of a true acetylpyrrol, while the others contained a hydrogen atom replaceable by silver. This compound, which the authors call pseudoacetylpyrrol, is represented by one of the two following formulas :

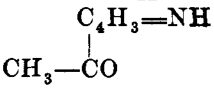
I



$$\begin{array}{l} \quad C_4H_3{=}N \\ \quad\ | \qquad\ / \\ CH_3{-}COH \end{array}$$

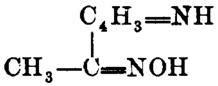
or

II



$$\begin{array}{l} \quad C_4H_3{=}NH \\ \quad\ | \\ CH_3{-}CO \end{array}$$

To determine the presence of a carbonyl group, the substance, dissolved in methylalcohol, was heated to boiling with hydroxylamine chloride and sodium carbonate. A compound melting at 145–146° C. was thus formed :



$$\begin{array}{l} \quad C_4H_3{=}NH \\ \quad\ | \\ CH_3{-}C{=}NOH \end{array}$$

This behavior of the pseudoacetylpyrrol would exclude formula I. Benzoic anhydride reacts similarly to acetic anhydride. (*Ber. d. chem. Ges., 1884*, 432.)

J. H. S., Jr.

On Acridine Picrate. R. Anschütz.

This compound was first noticed while purifying some crude phenanthrene with picric acid. Crystallizes from alcohol in fine, microscopic, prismatic needles of a canary yellow color. It dissolves with great difficulty in cold water, and is partly decomposed in boiling water. (*Ber. d. chem. Ges., 1884*, 438.)

J. H. S., Jr.

On Thallin Compounds. G. Vulpius.

The latest addition to the list of derivatives of chinoline which have been introduced for medical use is a compound which has been named "Thallin." It is a derivative of parachinanisol $C_9H_6N(OCH_3)$ and is described by its discoverer, Skraup, as a tetrahydroparachinanisol $C_9H_6.H_4.N(OCH_3)$. The sulphate and tartrate of this base appear to have valuable properties as antipyretics. Both these salts are manufactured by the "Badische Anilin and Soda-Fabrik," as white, crystalline powders of a bitter taste and an aromatic odor recalling that of anisaldehyde and cumarine. The most characteristic reaction of the salts of "Thallin" is that with ferric chloride; a solution of one part in ten thousand of water is turned deep emerald green by the addition of a drop of ferric chloride solution. This test distinguishes it from various other compounds similarly employed, such as kairin and antipyrin. (*Chem. Zeit.*, **9**, 44, *from Arch. Pharm.*, **21**, *840*.) H. M. R.

Preparation of Iodoform, Bromoform and Chloroform by Electrolysis.

An alcoholic solution of potassium iodide is electrolysed in an apparatus, through which a stream of carbonic acid is conducted during the operation. In the electrolysis of potassium bromide and chloride, the current of carbonic acid is not required. (*Germ. Patent 29,223, 1884, from Chem. Zeit.*, **9**, 40.) H. M. R.

On the Action of Mustard Oils on the Amido- Acids.

O. ASCHAN. (*Ber. d. chem. Gesell.*, *1884*, 420.)

J. H. S., JR.

Coefficient of Refraction of the Hydrocarbon $C_{12}H_{20}$ from Allyldimethylcarbinol.

A. ALBITZKY.

The specific gravity of this hydrocarbon is .8512 at 0°. The coefficient of refraction was determined for the lines α, β, and γ, of hydrogen and Frauenhofer's line D. The results, according to the theory of Brühl, would indicate the presence of three double bonds in the hydrocarbon. The portion boiling at 195°–199°, was taken for this examination.—(*Jour. f. prakt. Chem.*, **30**, 213.)

F. P. V.

Examination of Lactose and Galactose.

W. H. KENT and B. TOLLENS.

The authors state, as the principal results of this examination, that to secure the largest yield of mucic acid from lactose one must act upon 100 gr. lactose, with 1200 c. c. nitric acid (Sp. Gr. 1.15). The yield is 40 per cent. Secondly, lactose yields, on boiling with dilute sulphuric or hydrochloric acids, dextrose as well as galactose. Thirdly, galactose gives, with nitric acid, about 78% mucic acid, and twice as much as was gotten from lactose. On heating with hydrochloric acid, it yields levulinic acid, the formation of which the authors regard as a test for the presence of a carbohydrate. Lastly, on heating mucic acid with water at high temperatures, it is decomposed with the probable formation of dihydromucic acid, pyromucic acid and other substances.—(*Annalen*, **227**, 221.) F. P. V.

On the Synthesis of Piperidine and its Homologues. A. LADENBURG.

The authors have recently described a method of preparing piperidine, obtained by treating pyridine in an alcoholic solution with sodium. The yield, which was very small, has now been much increased by a modification of the process. (*Ber. d. ch. Ges.*, *1884*, 388.) J. H. S., JR.

Preliminary Notice on the Action of Ammonia on Nitrosophenoles. M. TLINSKI.

If nitroso-β-naphthol is heated 10 minutes in a sealed glass tube with aqueous ammonia, a compound is obtained crystallizing in dark green needles. It dissolves readily in hot alcohol; melts at 150–152° C., and dissolves readily in acids, but is reprecipitated by dilute alkalies. If the new compound be heated with a strong solution of KOH, a purple-red solution is obtained, which, on further heating gives off ammonia and becomes filled with beautiful green leaflets having a metallic lustre. Acids transform these into yellow needles with silky lustre. The behavior of the new base led the author to believe that a regeneration of nitroso-β-naphthol had taken place. This, on examination, was found to be the case. (*Ber. d. ch. Ges.*, *1884*, 391.) J. H. S., JR.

On the Action of Hydrochloric Acid upon Amidoazo-Compounds. O. WALLACH and A. KÖLLIKER.

Amidoazobenzol when heated with acetic acid is converted easily into a dyestuff somewhat resembling the indulines. It was found however that strong aqueous HCl produced the same result.

10 parts amidoazobenzol and 100 parts HCl. (1.12 Sp. Gr.) were heated in a flask with inverted cooler for a few hours. At the end of this time the amidoazobenzol was found almost completely decomposed. Steam was now passed through the mixture, which drove off a crystalline compound along with the distillate. After purification this body was found to have the melting point of 129–130° C. The body contains chlorine, and on analysis was found to be trichlorhydrochinone. The original HCl solution was next examined and found to contain large quantities of aniline and paraphenylendiamine. (*Ber. d. ch. Ges., 1884.* 395.) J. H. S., JR.

On a Few Ethers of Nitrosophenol. J. F. WALKER.

The nitrosophenol used in these experiments was prepared in the following manner: A concentrated solution of one mol. of sodium ethylate (in alcohol) and one mol. of phenol is treated with one mol. of amyl nitrate, under constant stirring, then poured into a flat evaporating dish and placed in the air pump over H_2SO_4. In a short time nearly the whole mass solidifies into the sodium salt of nitrosophenol. From this the following compounds were prepared:

Benzoylnitrosophenol.—Obtained by treating nitrosophenol with benzoyl chloride. Yellow needles melting, under decomposition, at 168–175° C.

Ethylcarbonitrosophenol.—Obtained from nitrosophenol and chlorocarboethylether. Crystallizes in golden yellow needles, M. P. 109° C. Acetyl chloride also unites with nitrosophenol, but the resulting compound was very unstable. (*Ber. d. ch. Ges., 1884,* 399.) J. H. S., JR.

Phenylisocrotonic Acid and Nitric Acid. (I) Phenylnitroethylene. HUGO ERDMANN.

Fuming nitric acid reacts at common temperatures on phenylisocrotonic acid, causing violent explosions. At 0° C. the nitric acid dissolves the phenylisocrotonic acid under evolution of CO_2. To avoid decomposition, therefore, it is necessary to carry on the experiment at temperatures below 0° C.

10 grms. phenylisocrotonic acid were dissolved in 100 grms. of cold, fuming nitric acid. The mixture was allowed to rest for a while and then poured over ice. This precipitates a semi-solid,

light, yellow mass, which was drained from the mother liquor and dried on porous plates. After purification from petroleum ether, it is finally obtained in beautiful yellow needles, M. P. 58° C. On oxidation they form benzoic acid. This compound was found to be identical with phenylnitroethylene, $C_6H_5-CH=CHNO_2$, obtained from nitroethane and benzaldehyde. (*Ber. d. ch. Ges. 1884*, 412.)

J. H. S., Jr.

Isomeric Isobutyl-o-amidotoluoles. J. Effront.

Isobutyl alcohol and o-toluidine chloride on being heated to 280°–300° C. unite, forming isobutyl-o-amidotoluol, $C_6H_3-CH_3.C_4H_9-NH_2$. This base is not, however, identical with Erhardt's compound. (*Ber. d. ch. Ges., 1884*, 419.) J. H. S., Jr.

The Discovery of Cocaine. C. Lenken.

Discusses the question of the priority of preparation of lhe alkaloid "Cocaine" from the leaves of *Erythroxylon Coca.* (*Chem. Zeit.*, 9, 155.) H. M. R.

* * *

ANALYTICAL CHEMISTRY.

Determination of Tartaric Acid in crude Tartar, Argols, etc. G. Kaemmer.

The writer has critically examined the method recently proposed by L. Weigert (*Chem. Zeit., 8, 1438*) for the valuation of crude argols, etc.

He characterizes Weigert's process as a modification of a method which has been for ten years in ordinary use, and is known as the "potash method." The latter employs pearlash to convert the tartaric acid of the crude materials into neutral potassium tartrate, from which by means of acetic acid and alcohol it is obtained and estimated in the form of potassium bitartrate.

R. Warrington (*Journ. Chem. Soc., 1875*) called attention to certain defects in this process, the alkali acting as a solvent upon certain coloring matters and foreign substances contained in the argols, which substances are afterwards precipitated on the potassium bitartrate, rendering it difficult to filter the latter, and causing errors in the subsequent volumetric estimation. But as the "Oxalic acid method," which Warrington proposed as a substitute, has been found even more deficient, the "Potash method" is commonly employed at the present day.

The process is the following, viz.:

Two gr. of the sample are placed in a porcelain dish with 5–10 c.c. H_2O and an excess of K_2CO_3 and boiled for 20–25 minutes, stirring constantly and replacing the evaporated water from time to time. The contents of the dish are then diluted with water to measure 100 c.c. and filtered. 50 c.c. of the filtrate, representing 1 grm. of the original sample, are then concentrated as far as possible without, however, evaporating to dryness. Glacial acetic acid in excess (2–3 c.c.m.) is stirred in, after which 50 c.c.m. absolnte alcohol are added, and the vessel set aside for some hours. The precipitate obtained is brought upon a dry filter and washed out with absolute alcohol, and finally titrated with a half-normal caustic soda solution. Each c.c.m.of the alkali indicates 0.075 grm. tartaric acid.

The writer considers the method of Weigert a simplification of the process just described and communicates a series of systematic analyses made for the purpose of comparing the two. The most important result of this investigation is the discovery that absolute alcohol can be quite as well replaced by the ordinary 90 % alcohol, and without impairing the accuracy of the method. (*Chem. Zeit.*, *9, 247.*) H. M. R.

Remarks Concerning the English and Scotch Tar Xylols.

I. LEVINSTEIN.

It has been supposed that the English tar xylols contained no orthoxylol. This the author finds, however, not to be true, as all the xylols examined by him, in the course of a year, contained orthoxylol. In order to determine this, the following method was adopted :

100 c. c. of xylols are placed in a flask, mixed with 40 c. c. HNO_3 (1.40 Sp. Gr.) and 60 c. c. water, and heated to boiling with constant shaking for from thirty minutes to an hour. When no more red fumes are evolved, it is a sign that all the ortho- and paraxylols have been decomposed. The acid is now decanted through a separating funnel, the hydrocarbon washed with NaOH, and then distilled with steam. The distillate consists of metaxylols and

hydrocarbons of the fat series. It is measured and then shaken up for half an hour with 1½ parts concentrated H_2SO_4, which converts the metaxylol into its sulpho- acid. What remains undissolved are hydrocarbons of the fat series.

Estimation of Paraxylols.

100 c. c. of xylols are shaken up for half an hour with 120 c. c. strong sulphuric acid. This converts the ortho- and metaxylols into sulpho- acids. The sulphuric acid is now separated by decantation, and the remaining paraxylols and the hydrocarbons of the fatty series are measured, and then treated with an equal volume of fuming H_2SO_4 (containing 20% anhydride). This dissolves the paraxylol and leaves the fatty compounds behind. The difference between the figures so obtained, and those obtained from the first 100 c. c. of xylols, gixes the amount of paraxylol present. If the sum of the meta- and paraxylol be subtracted from the 100 c. c. of crude xylol, the amount of orthoxylol will be found. (*Ber. d. chem. Ges., 1884*, 444.) J. H. S., Jr.

Certain Titrations with Potassium Permanganate. W. Lenz.

Several series of experiments were made to test the accuracy of potassium permanganate as a means of determining the oxidizable matter in drinking water. In the case of acid solutions (Kubel's method), 100 c.c. water (with organic substance) were mixed with 5 c.c. sulphuric acid and then with the measured amount of permanganate. This was heated to gentle boiling for just ten minutes and then titrated back with oxalic acid. With the same amounts of grape-sugar and varying proportions of permanganate, up to five times the necessary quantity, the amount used in oxidation was considerably less than the theoretical. Even when an insufficient quantity of permanganate was used the solution remained red. When the permanganate remained the same and the grape-sugar varied the permanganate did not afford even a relative determination of the organic substance. When glycerine was substituted for grape-sugar the oxidizing action of the permanganate was even less. The author concludes that under these conditions the permanganate process is not applicable for an absolute nor a relative determination of organic matter. The method of Lalieu for glycerine determination—24 hours maceration of about .5 grm. of substance with a strong alkaline permanganate solution and titration with oxalic acid—gives fair, approximate results. The oxalic acid solutions were always freshly prepared—dilute solutions of oxalic acid can lose 15 per cent. in a week if exposed to diffuse light. Normal solutions in closed flasks keep well in the dark. The addition of boracic acid adds greatly to the keeping power. A deci-normal oxalic acid with 1 per cent. boracic acid did not change in seven months. The boracic acid is without influence upon the determinations of oxidizable matter. (*Zeit. f. anal. Chem.*, **24**, 34.) F. P. V.

Volumetric Estimation of Manganese by Permanganate. C. Meineke.

The method of Volhard (titration with $KMnO_4$ in presence of ZnO) is inaccurate, because the precipitate contains MnO; it is also unstable in presence of weak acids or excess of permanganate, and the exact neutralization of the solution by ZnO, an excess of which is prejudicial, is almost impossible, when the substance contains iron. The author has improved this method by adding the manganous solution at once to a standard solution of permanganate of known volume, but in considerable excess of the quantity required. The excess is then titrated back, with standard solution of antimonious chloride. The precipitate of MnO_2 thus obtained is permanent and free from MnO. A moderate excess of ZnO does not impair the accuracy of the process. A number of results are given, showing concordance of volumetric and gravimetric analyses in pyrolusite, manganiferous iron ore, spiegel, &c. For standardizing permanganate the author prefers crystallized oxalic acid. Anhydrous (sublimed) oxalic acid, which has been recently recommended, has the disadvantage of being very hygroscopic, and does not entirely lose water, which it has once absorbed, even at 100°. (*Repert. anal. Chem.*, **5**, *1*.) A. A. B.

Estimation of N in Nitrates and Nitro-Compounds. C. Arnold.

The substance is burned in a combustion tube, with a mixture of equal parts of sodium formiate and hyposulphite (anhydrous) and soda lime. The mixture containing the substance occupies 10 cm.

in the tube and is followed by 5 cm. of mixture, and 10 cm. of soda lime. Strychnine nitrate yielded N, 10.51–10.55%; theory 10.60%. Potassium nitrate, N 13.7 : theory 13.86. (*Repert. anal. Chem.*, **5**, 42.) A. A. B.

A Modification of Schiff's Apparatus for the Volumetric Determination of Nitrogen. L. GALTERMANN.

A source of error in Schiff's apparatus amounting to several tenths of one per cent., lies in our inaccurate knowledge of the tension of the potash solution, varying at each determination. This is avoided by using a non-calibrated collecting tube and transferring the nitrogen through a narrow connecting tube into a measuring tube filled with distilled water. The results thus obtained differ by a few hundredths only from the theoretical. (*Zeit. f. anal. Chem.*, **24**, 57.) F. P. V.

Analytical Operations and Apparatus. R. WOLLNY.

The author describes first a piece of apparatus which he uses to avoid the transference of a precipitate to the filter, and consequent danger of loss. Also an extracting apparatus which combines digestion with the vapor of the solvent together with an intermittent washing with the condensed fluid. After extraction the solvent can be directly distilled off. The apparatus is capable of many modifications according to the nature of the substance to be extracted. For the descriptions and diagrams the original article must be referred to. (*Zeit. f. anal. Chem.*, **24**, 47.) F. P. V.

A Thermoregulator of Simple Construction, which can also be Used as a Registering Thermometer. E. H. VON BAUMHAUER.

Not intelligible without the accompanying diagrams. (*Zeit. f. anal. Chem.*, **24**, 421.) F. P. V.

◆

INDUSTRIAL CHEMISTRY.

Composition of Maple Sugar and Syrup. H. W. WILEY.

The fresh sap of the sugar maple tree (*Acer Saccharinum*), has been shown by the author in a previous paper (Proc. A.A.A.S., **28**) to contain 2.82% of sucrose as an average of 28 analyses. All of the sugar exists as sucrose, no trace of any reducing sugar being present. The proportion of invert sugar in commercial (pure) maple sugar is very low, although the sap is always evaporated in open pans. In pure aqueous solution, therefore, it is evident that heat alone does not invert sucrose as rapidly as if organic impurities and mineral salts are present.[*] The commercial sugars and syrups are found to be largely adulterated, the former with cane or beet sugar, the latter with starch sugar or glucose. There is no known method of detecting the adulteration of maple sugar with cane or beet sugar, since it is chemically identical with them, and the mixture retains the characteristic taste of maple sugar. Maple sugar, however, is sold at double the price of cane sugar. A patent has been recently taken out in the United States for an extract of hickory bark which is used to impart the maple flavor to syrups and sugars. (*Chem. News*, **51**, 88.) A. A. B.

The Viscosity of Lubricating Oils. C. ENGLER.

The author calls attention to the defects and inaccuracies in the testing of lubricating oils by present methods. He describes an apparatus of his own invention by which these defects are in great measure overcome. The article is scarcely intelligible without the accompanying diagram. (*Chem. Zeit., 9, 189.*) H. M. R.

On the rate of Propagation of Detonation in Solid and Liquid Explosives. M. BERTHELOT.

	METRES PER SECOND.
Compressed, disintegrated gun Cotton	3,903 to 4,267
Granulated gun Cotton	3,767 to 4,770
Starch Powder	5,210 to 5,512
Nitromannite	6,908 to 7,137
Nitroglycerine	1,386 to 1,672
Dynamite	2,333 to 2,753
Panclastite	4,685 to 5,470

(*Comptes Rend.*, **100**, 314.) C. E. M.

---

[*] A residue known as "sand" accumulates in the evaporating pans, however. It is principally calcium malate.—B.

Abstract of American Patents Relating to Chemistry.

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

February 24th, 1885.

312,605.—Eliminating the smell of coal oil.—L. Blumenthal.

312,632.—Furnace for manufacturing iron and steel.—J. Henderson.

312,641.—Manufacture of iron.—J. J. Johnston.

The pig iron is melted and conveyed to a heated receiving chamber, in which it is thoroughly mixed with a mixture of iron ore, lime and salt, after which it is transferred to a boiling furnace.

312,644.—Vacuum pump.—A. Kux.

312,674.—Process of treating oleaginous seeds for the extraction of oil.—A. E. Thornton.

312,727.—Cupola furnace.—J. J. Johnston.

312,728.—Composition of matter for the manufacture of gas.—J. J. Johnston.

Consists of a mixture of pulverized, and desulphurized coal, water and oil.

312,729.—Apparatus for manufacturing gas.—J. J. Johnston.

Coal, or suitable composition of matter, is placed in a vessel within a larger closed chamber, exposed to the heat of the furnace and distilled. In order to dilute the rich gas from the coal or composition, oil and water are supplied in drops to the inner retort on the surface of the coal or composition, and the gas evolved therefrom is mingled with the gas from such coal or composition.

312,730.—Method of manufacturing gas.—J. J. Johnston.

Bituminous coal is pulverized, and the sulphur is mechanically separated. Oleaginous matter and water is then added to the coal, and the mixture is distilled by conducted heat, and the resulting gas is fixed by direct contact with the heat conducting medium.

312,735.—Filtering device.—W. E. Lindsay.

312,759.—Furnace for reducing zinc and other metals.—J. Quaglio.

312,774.—Carburetor.—E. J. Vaughan.

312,777.—Means for carrying off leakage from gas mains.—G. Westinghouse, Jr.

312,784.—Mixed paint.—J. B. Wood.

Consists of creosote or dead oil, coal tar, spirits of turpentine, and plumbago.

312,811.—System of conveying and distributing gas.—A. W. Cadman.

312,814.—Apparatus for treating metals by means of electrolysis.—H. R. Cassell.

312,836.—Carburetor. E. J. Frost.

312,847.—Process of extracting silver, gold and lead from ores.—W. E. Harris.

The process consists in mixing finely pulverized oxide of iron or copper with the gold, silver or lead ores, and then smelting the mixture on a bath of lead.

312,869.—Method of preparing extracts from cereals.—H. Lehrenkrauss.

The grain is soaked to soften the bran coating, and the latter is removed and boiled to extract the nutritious portion. The mixture is then strained and glutinous extract evaporated.

312,894.—Manufacture of alumina by paper mill sludge.—C. V. Petraeus.

Alumina free from iron is made from ferruginous material, by mixing it with the spent soda liquor from the manufacture of wood or straw paper pulp, and evaporating and burning the mixture.

312,904.—Process of treating phosphatic slag.—C. Scheibler.

The process consists in slowly cooling the slag, when a transposition in the constituents of the slag takes place, the phosphoric acid being concentrated in one part, and the iron and manganese in another.

312,945.—Manufacture of parchment paper or leatheroid.—E. Andrews.

312,948.—Apparatus for rectifying spirits and spirituous liquors by electricity.—T. E. Atkinson.

312,954.—Process of preventing tarnishing in silverware.—F. J. Blain.

The silver is wrapped in fibrous material impregnated with a solution of the acetates of lead.

312,995.—Process of preserving meats.—G. Holgate.

The meat is treated with sulphurous anhydride and carbonic acid gas.

March 3, 1885.

313,045.—Compressor for ice making apparatus.—A. T. Ballantine.

313,047.—Method of cooling coils of gas condensers.—V. H. Becker.

Consists in introducing air into the fluid surrounding the coils or pipes.

313,049.—Ventilating measure funnel.—L. Bolus and P. Ellsperman.

313,064.—Apparatus for dipping matches.—E. B. Eddy, G. H. Millen and E. Mousseau.

313,070.—Apparatus for washing.—J. T. Gent.

313,071.—Smoke-consuming furnace.—F. B. Giesler.

313,076.—Case for preserving food.—J. J. Hoyt.

313,077.—Apparatus for emptying barrels or other receptacles containing liquids.—B. F. Hudson.

The apparatus consists of a bung, provided with a delivery tube, and air injecting apparatus.

313,079.—Manufacturing iron and steel.—B. Bayliss, Jr.

313,086.—Artificial Fuel.—G. Leder.

Consists of a mixture of resin and cotton seed hulls.

313,101.—Hydrocarbon furnace.—O. D. Orvis.

313,102.—Lining for the grooves of pipes, welding furnaces.—E. Peckham.

Consists of biscuit or unglazed white or C C ware, or its equivalent, viz.: burned compound of feldspar, kaolin and china clay.

313,106.—Producing transfers of drawings, engravings, &c.—J. Ramsdell.

313,107.—Process of treating paper to preserve it against the corrosive action of acids.—J. Ramsdell.

The paper is treated with glycerine.

313,118.—Red coloring matter.—J. H. Stebbins, Jr.

A red coloring matter denominated "benzolazo-sulphonate of soda-diazo-diethylaniline.

313,157.—Food for infants and invalids.—W. R. Barker and A. L. Savory.

Flour or meal is mixed with fresh milk and cooked and dried at a temperature not below 220° F. The mass is then reduced to powder and mixed with powdered malt.

313,163.—Pharmaceutical still.—J. Berry.

313,164.—Amalgamating pan.—J. A. Bidwell.

313,174.—Filtering paper.—E. W. Carter and D. R. Smith.

The sheet of filtering paper is thicker at, and near its center than near the circumference.

313,177.—Manufacture of tanning extract.—T. F. Colin.

The process consists in passing carbonic acid and sulphurous acid gases and steam through the bark liquor contained in a vacuum pan.

313,203.—Machinery for manufacturing Portland cement.—D. Griffiths.

313,208.—Metal extracting apparatus.—J. L. Hornig.

313,217.—Manufacture of Portland cement.—R. W. Lesley.

Consists in incorporating with the cement material, after calcination, black chalk.

313,236.—Apparatus for ageing and preserving distilled and fermented liquids.—C. W. Ramsay.

313,237.—Apparatus for treating fermented, fermentable, or distilled liquids.—C. W. Ramsay.

313,243.—Air pump.—A. L. Robbins.

313,306.—Apparatus for bleaching and dyeing.—J. Farmer.

313,347.—Glass annealing furnace.—G. Leufgen.

313,348.—Regenerative furnace.—G. Leufgen.

313,369.—Solution of acid phosphate.—C. V. Petraeus.

Consists of dihydrogen sodium phosphate, phosphoric acid and water.

313,401.—Apparatus for drying fertilizers.—H. Breer.

313,403.—Furnace for burning liquid hydrocarbons.—J. Buffet.

313,412.—Waterproof compound.—J. T. Elliot.

Consists of coal tar, Portland cement, calcined gypsum, iron ore, ground slate and resin.

313,430.—Beer-mash tub.—L. S. Kuhn.

313,431.—Process of preparing grain for mashing.—L. S. Kuhn.

313,432.—Machinery for cooking mashes.—L. S. Kuhn.

313,440.—Process of extracting oil from formed oil cake.—J. L. Moss and M. Littell.

The oil cakes are pressed between highly polished plates.

March 10, 1885.

313,468.—Weighing scales.—C. Becker.

313,478.—Apparatus for tanning hides.—J. Davis.

313,501.—Fire-proof building material.—J. C. Kerner.

Consists of sawdust treated with hyposulphite of soda and alum, held together by plaster of paris or lime.

313,508.—Gas burner.—O. D. McClellan.

313,510.—Machine for reducing bagasse to pulp to extract the saccharine matter.—S. C. Meyer.

313,514.—Apparatus for removing paraffine from oil tanks.—J. W. Norton and F. H. Rouse.

313,522.—Hardening and coloring serpentine rock.—J. J. Pratt.

Blocks of the material are exposed to a gradually increasing temperature of from 100° to 1,000°, while protected from cold air, and then gradually cooled.

313,537.—Blast furnace.—D. Sandstrom and J. H. Anderson.

313,542.—Apparatus for tanning.—L. Simpson.

313,543.—Apparatus for tanning.—L. Simpson.

313,575.—Device for generating and burning gases.—R. A. Bury and R. M. Bidelman.

313,629.—Manufacture of cream of tartar.—R. Silverberg.

The process consists in separating the tartaric acid from argols by any approved method, and then treating the mother liquors obtained with soda and potassium chlorate.

313,665.—Process of extracting the oil and albuminoid matter from corn.—F. V. Greene.

The oil and albuminoid matter are separated from the corn in the form of an emulsion, which is freed wholly or partly from water, after which they are separated.

313,693.—Apparatus for cleaning oils.—J. C. Thornton.

313,700.—Process of coating metal.—W. J. Wilder.

Consists in applying a blast of cold air to the reverse side while the hot tin is being applied to the first side.

313,716.—Welding compound.—C. C. Fields.

Consists of sulphate of baryta, prussiate of potash and sal ammoniac.

313,736.—Apparatus for preserving by gases.—G. Holgate.

313,748.—Apparatus for treating ores with superheated steam.—J. H. Mathews.

313,751.—Machine for cleaning and washing bones.—C. Meyer, Jr.

313,754.—Regenerative furnace.—T. T. Morrell.

313,755.—Chemical fire engine.—W. Morrison.

313,779.—Gas lamp.—F. Siemens.

313,795.—Gas fluid.—A. F. Timmerling.
A gas fluid compound of fusel oil, carbon oil (consisting of petroleum distillate at a gravity of about 74° B.) and wood naphtha.

313,823.—Composition for curing paving blocks or bricks.—T. A. Huguenin.
Consists of coal tar, bitumen, pine gum and alum.

313,834.—Gas burner.—W. M. Noel.

W. R.