

gen. Cyanogen also combines directly with the metals Zn, Cd and Fe, at 300°, if heated for some time in sealed tubes. With Cu, Pb, Hg and Ag, the combination is difficult to produce, probably because so high a temperature would be required as would cause a dissociation of the cyanogen gas. Cyanogen seems properly to have a double character, and to belong to both the formine and the ethylic series.

*On Epichlorhydrine*, BERTHELOT (33, 6).—A review and explanation of articles published elsewhere.

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## Berichte der Deutschen Chemischen Gesellschaft.

ABSTRACTOR, H. ENDEMANN.

*On a Series of Aromatic Bases Isomeric with Mustard Oil and other Sulphocyanides*, A. W. HOFMANN (13, 8).—In the preparation of Sell and Zierold's isocyanphenyl chloride by a modified method, using, instead of chlorine, phosphorus pentachloride, the author has obtained the above-mentioned compound, together with another substance, which on analysis proved to be monochlorphenyl sulphocyanide. Chlorine, as also sulphur chloride, did not produce this substance, and with phosphorus pentachloride but 18 per cent. of the theoretical quantity could be obtained.

Monochlorphenyl sulphocyanide is solid at ordinary temperatures, but melts at 24°. Vapor density, found, 82.4; calculated, 84.75. It forms crystallized salts with hydrochloric, sulphuric and nitric acids, and double salts with gold and platinum chlorides, which, however, are at once decomposed by the addition of water. A mononitro compound is produced by the action of nitric acid on a solution of the substance in concentrated sulphuric acid.

The chlorine atom is easily replaced by hydroxyl, by simple boiling with alcohol, or by ethyl, by the action of sodium ethylate.

By other well-known reactions, an amido compound, and an anilide, may likewise be produced.

The monochlorphenyl sulphocyanide loses, by the substitution of chlorine for hydrogen, its properties as a mustard oil. It does not, for instance, form compounds analogous to urea, nor does it lose its sulphur by the action of oxidizing agents, or give any other reaction which would prove its character as a simple derivative of mustard oil. Moreover, it has entirely different properties from all other products of the same atomic composition, derived from either para-, meta- or ortho-chloraniline

The chlor-mustard-oil, under the influence of hydrogen in *statu nascendi*, gives again a substance of the composition of mustard oil, of basic properties, and otherwise differing from the mustard oil from which it has been derived. Experiments, made to determine the constitution of this substance, have so far failed to shed any light on this subject.

**Synthetic Preparation of Formic Acid**, V. MERZ and J. TIBIRICA (13, 23).—The authors have studied carefully the conditions under which carbonic oxide and alkalis produce the greatest yield of formates. They came to the following conclusions:

Carbonic oxide is absorbed by caustic alkalis at about 200°, formates being the result of the reaction.

In order to produce the most perfect possible saturation of all the soda, it should be used in the shape of soda-lime, as porous as possible. The carbonic oxide should not be dried, but should be kept moist by passing it through water. The temperature should not exceed 220°.

Above this temperature, carbonate and free hydrogen are formed. If, in the place of soda, potash is used, this reaction takes place already below 220°.

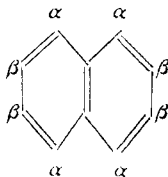
Experiments to produce benzoic acid from sodium phenylate and carbonic oxide, have failed.

**A New Base**, EDGAR F. SMITH (13, 33).—See this JOURNAL, I, 285.

**Products obtained by the Nitration of Metachlorosalicylic Acid**, EDGAR F. SMITH and G. K. PIERCE (13, 34).—See this JOURNAL, I, 288.

**Normal Propylalcohol from Glycerine**, ALB. FITZ (13, 36).—As products of fermentation of glycerine, the author obtained propylalcohol, beside ethyl- and butylalcohol, as before published.

**On the  $\alpha$  and  $\beta$  Position in Naphthalene**, F. REVERDIN and E. NOELTING (13, 36).—The authors give in this short note, some additional reasons why the now generally accepted graphic formula for naphthalene,



as regards the  $\alpha$  and  $\beta$  position in its various derivatives, should be retained.

*On the Action of Sulphuric Acid upon Isomeric Nitramido- and Diamido-Benzoles*, JUL. POST and E. HARDTUNG (13, 38).

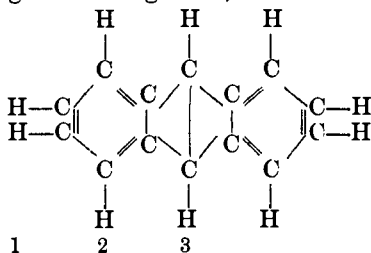
*On the Detection of Alizarine, Isopurpurine and Flavopurpurine in Mixtures, and the Quantitative Determination of Alizarine*, E. SCHUNCK and H. ROEMER (13, 41).—Will be noticed elsewhere.

*Some new Azo-compounds*, J. H. STEBBINS (13, 43).—See this JOURNAL, I, 465.

*Lecture Experiment*, H. SCHULTZE (13, 44).—The author describes an apparatus destined to show the condensation of gases, to an audience.

*The Synthesis of Cumole*, by AD. LIEBMANN (13, 45).—In order to prove the identity of isopropylbenzole with cumole, the author prepared it by the action of benzole chloride on zincmethyl. The identity of the isopropylbenzole thus obtained, was evident from the specific gravity, the boiling point, and the properties of the barium salt of the acid prepared therefrom, all of which coincide with the properties of cumole and its sulpho-derivative.

*The Third Anthracene Monocarbonic Acid*, by C. LIEBERMANN and A. BISCHOF (13, 47).—While but one benzole monocarbonic acid and two naphthalene carbonic acids are known, there should exist three anthracene monocarbonic acids, if the generally accepted graphic formula of anthracene be correct, according to the position of the carboxyhydroxyl group substituted for either one of the hydrogen atoms standing over the figures 1, 2 and 3.



Two of these acids have been already described. The authors have now obtained the third acid, possible according to the theory, by first reducing a commercial anthraquinonemonosulphonic acid, prepared by Meister, Lucius and Bruening, with the aid of hydrogen iodide, to anthracene monosulphonic acid, and converting this by distillation with dry prussiate of potash, into the nitrile, and the latter by the action of alcoholic potash solution into the anthracene monocarbonate. Further examination proved, that a mixture of two acids existed, one

of which gave an almost insoluble barium salt, and was found in this substance in quantity six times greater than that of the other, which gave a soluble barium compound. This acid has already been mentioned by Rath, but while he had obtained it rather as a by-product, it formed in this case the bulk of the material obtained. The analyses of the acid, and of the ethyl ether prepared therefrom, characterize it as anthracene monocarbonic acid.

Oxidation produces an anthraquinone carbonic acid, as in the case of the acid of Rath; it thus differs materially from the anthracene monocarbonic acid prepared by Graebe and Liebermann by the action of carbon oxychloride upon anthracene, which affords by oxidation, anthracene and free carbonic acid.

*On the Composition of Manganese Peroxide produced by the Weldon Process*, JUL. POST (13, 50).—The author gives a series of analyses of the product obtained by the Weldon process.

*Contributions to the Knowledge of the Oxidation of Manganous Hydroxide with respect to the Method for the Regeneration of Manganese Dioxide*, JUL. POST (13, 50).—The author considers it possible, that the absorption of oxygen is facilitated by the presence of a manganese oxychloride.

*The Action of Sulphuric Acid on Phosphates, especially Calcium Phosphate, with respect to the Manufacture of Superphosphates*, JUL. POST (13, 57).

*Monophenylboron chloride and the Pentavalence of Boron*, A. MICHAELIS and P. BECKER (13, 58).—Phenylboron chloride absorbs, at a temperature of 18° C., chlorine, which must be in chemical combination, as a current of carbonic acid gas does not remove it. On taking the glass, containing the compound, from the freezing mixture, chlorine is evolved, while phenylboron chloride and monochlorobenzole, remain. From the increase of the weight of the material, it appears probable that a phenylboron tetrachloride is formed, which is an additional fact in favor of the pentavalence of boron.

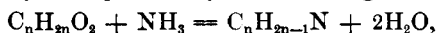
*On Pyridine Carbonic Acids*, S. HOOGWERFF and W. A. VAN DORP (13, 61).—Tricarbopyridinic acid, obtained by the oxidation of quinine and the alkaloids associated with it, is decomposed into dicarbopyridinic acid and carbon dioxide, when heated to 185° or 190°, according to the formula  $C_8H_5NO_6 = C_7H_5NO_4 + CO_2$ . The properties of the acid and its salts make it probable that it is identical with the cinchomeronic acid of Weidel. Heating to 250° produces a further decomposition, the result of which is mainly a monocarbopyridinic acid, which the authors have called pyrocinchomer

onic acid, accompanied by another acid of the same composition, which may be nicotinic acid. The dicarbopyridinic acid produced by the oxidation of chinoline, furnishes, under the same treatment, only nicotinic acid.

*Substances from Tar Produced by the Destructive Distillation of Animal Substances*, H. WEIDEL and G. L. CIAMICIAN (13, 65).—The authors treat in this paper of those constituents of animal tar which are without basic properties. The fraction boiling between 98° and 150° furnished propionic, isobutyric, valerianic and isocaproic ethyl ethers, valeramide, also a peculiar substance furnishing with acids an india-rubber-like mass, then pyrrol, toluole, and ethyl benzole, and other hydrocarbons of the formulæ  $C_9H_{14}$ ,  $C_{10}H_{16}$  and  $C_{10}H_{14}$ . All these substances constitute about 10 to 15 per cent. of the oil.

The next fraction, boiling between 150° and 220°, furnished mainly phenol, homopyrrol, dimethyl pyrrol, and also several of the higher hydrocarbons. This fraction is from 20 to 25 per cent. of the whole oil.

The third fraction, distilled between 220° and 360°, constituted from 60 to 70 per cent. of the oil, and, on examination, yielded beside some tar and ammonium cyanide and carbonate, especially the nitriles of palmitic, stearic and capric acids. There is hardly a doubt but that these are derived from the fats of the bones from which the tar was derived. The reaction by which these nitriles have been formed, may be expressed by the following formula:



a reaction which can easily be demonstrated by distilling a fatty acid, and passing it, with a current of ammonia, through a red hot tube filled with pieces of pumice stone. No such compounds as pyrrol, or pyridine, are formed during this reaction. The presence of these substances must, therefore, depend upon the other constituents of the bones, notably the glue, and similar substances.

*Action of Potassium Ferricyanide upon Morphine*, K. POLSTORFF (13, 86).—Morphine is dissolved in water with the requisite quantity of caustic potash, applying heat gently; after cooling, a solution of a weighed quantity of ferricyanide of potassium is added, while a current of carbon dioxide passes through the liquid. A precipitate is formed, which, according to the authors, has been called oxydimorphine, and which results from the removal of two atoms of hydrogen. It is insoluble in water, alcohol, ether and chloroform. The reaction by which it is formed may best be described by the fol-

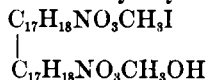
lowing equation:  $2\text{C}_{17}\text{H}_{19}\text{NO}_3 + 2\text{KOH} + 2\text{K}_3\text{Fe}(\text{CN})_6 = 2\text{H}_2\text{O} +$   
 $2\text{K}_4\text{Fe}(\text{CN})_6 + \begin{cases} \text{C}_{17}\text{H}_{18}\text{NO}_3 \\ \text{C}_{17}\text{H}_{18}\text{NO}_3 \end{cases}$  oxydimorphine.

*Schuetzenberger's Oxymorphine*, by K. BROOCKMANN and K. POLSTORFF (13, 88).—The authors have prepared oxymorphine by Schuetzenberger's method, and have come to the conclusion that the product of this reaction is not simply oxymorphine,  $\text{C}_{17}\text{H}_{19}\text{NO}_4$ , but oxydimorphine.

*Action of Potassium Permanganate upon Morphine*, K. BROOCKMANN and K. POLSTORFF (13, 91).—The result of this reaction is likewise not oxymorphine but oxydimorphine.

*On the Action of Air upon Morphine in Ammoniacal Solution*, K. BROOCKMANN and K. POLSTORFF (13, 92).—Oxydimorphine is formed.

*On the Action of Potassium Ferrocyanide upon Methyl-morphine Iodide*, K. POLSTORFF (13, 93).—The result of this reaction is the basic iodide of methyloxydimorphine:



*Methyl-morphine Hydroxide*, K. BROOCKMANN and K. POLSTORFF (13, 96).

*Action of Benzoyl Chloride upon Morphine*, K. POLSTORFF (13, 98).—Morphine, heated for several hours with twice its weight of benzoyl chloride in a sealed glass tube, yields, after treatment with water and a slight excess of ammonia, tribenzoyl-morphine,  $\text{C}_{17}\text{H}_{16}\text{NO}_3(\text{COC}_6\text{H}_5)_3$ .

*Acridine*, C. GRAEBE and H. CARO (13, 99).—Acridine is oxidized only with difficulty. Although it has been held that a mixture of acetic and chromic acids, do not, even after long boiling, oxidize it, the authors found that, on continuing the operation for several days, oxygen may be added, the result of the operation being an indifferent body (*i. e.*, one devoid of either acid or basic characters), possessing apparently the formula  $\text{C}_{12}\text{H}_{11}\text{NO}$ , although the hydrogen was always found higher than theory requires. Distillation with zinc dust converts the product back into acridine. From its behavior it may be considered as a ketone. This reaction will be studied more thoroughly hereafter.

The oxidation of acridine may, however, be effected by the use of permanganate solution, care being taken to avoid an excess of this substance.

Thus a substance is formed, called by the authors acridinic acid, which crystallizes with 2 molecules of water:  $C_{11}H_7NO_4$ . It is bi-basic. On heating to  $130^\circ$ , it loses one molecule of  $CO_2$ , leaving a monobasic acid,  $C_{10}H_7NO_2$ . On heating with slaked lime, 2 molecules of  $CO_2$  are taken out, and chinoline is formed. Acridinic acid must, therefore, be considered as chinolinebicarbonic acid. The authors have also proposed a structural formula, but as they are now continuing their work, and desire to give their theoretical reasonings regarding this subject in another article, this fact is simply mentioned.

*Artificial Alkaloids*, A. LADENBURG (13, 104).—If tropine tro-pate be heated with diluted hydrochloric acid, an alkaloid is produced, which has the same composition with atropine, and has many properties in common with this long known alkaloid. As regards the physiological action of the new alkaloid, the study of which was undertaken by Professors Hensen and Falk, its identity was likewise established.

The author has also prepared a salicyltropeine, which has but weak poisonous properties, and an oxytoluyltropeine or homatropine, which is formed by the action of diluted hydrochloric acid on tropine formo-benzoylate. The physiological action of the latter alkaloid is very energetic, and the same as that of atropine.

The author has commenced the examination of hyoscyamine, and has, so far, ascertained that it is isomeric with atropine, but not identical therewith.

Hyoscyamine, when decomposed with baryta, forms hyoscynic acid, which has already been described, but, probably owing to impurities, its properties have not been correctly stated. It certainly does not melt at  $104^\circ$  to  $105^\circ$ , but above  $116^\circ$ . It has the composition of tropane acid, and is probably identical therewith.