ABSTRACTS.

Abstracts from the *Journal of Chemical Society*, London, by Arthur H. Elliott, Ph. B., F. C. S.

On the Action of Aldehydes on Phenanthraquinone in Presence of Ammonia. (Third Notice). By Francis R. Japp, M. A., Ph. D., and Fred W. Streatfield. Vol. XL., p. 146.

This paper is a continuation of the work of the former of the two authors and Mr. Wilcock (*Chem. Soc. J. Trans.*, 1881, p. 228). The authors give an account of the product obtained by the action of salicylaldehyde upon phenanthroquinone. It has the composition $C_{21}H_{14}N_2O$; crystallizes in very fine silky needles: fuses and decomposes at 270—276°C.; its best solvents are glacial acetic acid and amyl alcohol. Behaves like a phenol with caustic alkalies forming compounds. It has the properties of a weak base also. Fusion with potash gives salicylic acid.

A benzoyl derivative of the above compound was formed, which consisted of crystals of two forms, cubes and needles, fusing at 218—220°C. Analysis led to the formula of a mono-benzoyl derivative $C_{21}H_{13}(C_7H_5O)N_2O$. Authors discuss the constitution of the original $C_{21}H_{14}N_2O$.

The action of parahydroxybenzaldehyde upon phenanthraquinone as above is also described. The product is obtained in fine white needles, not fusing within range of mercury thermometer. Soluble in glacial acetic acid and amyl alcohol, also in dilute caustic alkalies. Its formula is given as $C_{21}H_{14}N_2O$. An acetyl derivate of the preceding body was formed. It crystallizes in needles which fuse at 205—210°C. The formula is $C_{21}H_{13}(C_2H_3O)N_2O$; it is very soluble in glacial acetic acid.

Phenanthraquinone as above was acted upon by orthomethoxybenzaldehyde. The purified product was yellow needles fusing at 207—208.5°C. The mother liquor gives white crystals, fusing at 144.5—145.5°C. The yellow product gave formula $C_{22}H_{16}N_2O$; it is readily soluble in boiling benzine, amyl alchol, and glacial acetic acid, much less soluble in the cold; it is insoluble in dilute acids and caustic alkalies. The white product gave the formula $C_{22}H_{15}NO_2$; it is readily soluble in hot benzine, amyl alcohol and glacial acetic acid; insoluble in dilute acids and caustic alkalies.

Application of the Aldehyde and Ammonia Reaction in Determining the Constitution of Quinones.

By FRANCIS R. JAPP, M.A., Ph.D., and FRED. W. STREATFIELD. Vol. XL., p. 157.

Authors apply the reaction to chryso-quinone and beta-naphtha-quinone. The chryso compound was obtained in silky needles, fusing at 259–265° C., and of a slight yellow tinge. Analysis gave $C_{25}H_{15}NO$ as formula. Sublimation gave a white product. The new body is *benzenylamidochrysole.*

The experiment with beta-naphtha-quinone gave negative results.

On the Action of Sodium Hydrate and Carbonate on Felspars and Wollastonite.

By WALTER FLIGHT, D.Sc., F.G.S. Vol. XL, p. 159.

Author experimented upon adularia from St. Gothard, microlin from Siberia, albite from the Dauphiné, and a specimen of wollastonite from Sweden. These were heated in fine powder with solutions of sodium hydrate of different strengths, and also with solution of sodic carbonate. In the case of sodium hydrate, microlin lost 14.693 per cent. in strong solution and 7.453 in weak solution. Albite, under the same treatment, lost 23.1 per cent. and 9.472 per cent. respectively. The solutions contained both silica and alumina. With sodic carbonate solution albite lost 1.785 per cent.

In the case of wollastonite the sodium hydrate acts as a solvent of the whole mineral.

On Pentathionic Acid. (*Part II.*)

By WATSON SMITH and T. TAKAMATKE. Vol. XL, p. 162.

This paper opens with a defence of the criticisms of V. Lewes' Spring and Th. Curtius upon the authors' previous paper upon this topic. The authors give a number of details of experiments made to establish their position. They have proved "that the attempt to neutralize pentathionic acid with alkaline earth carbonates simply results in the formation of tetrathionates, with separation of sulphur." They further "conclude that on partial saturation of a pentathionic acid solution with an alkali, say potash, we may get a certain amount of potassium pentathionate formed, together with the realization of Stingl and Morawski's equation, $5\ H_2S_5O_6 + 10\ KOH = 5\ K_2S_4O_6 + 5\ S + 10\ H_2O$.

On Some Constituents of Resin Spirit. By G. Harris Morris, F.C.S. Vol. XL, p. 167.

The product obtained from the lower fractions of resin spirit after standing some time with water in large flasks is the subject of this paper. The water solution yields upon evaporation colorless crystals of the composition $C_7H_{14}O_2H_2O$, and with a vapor density 63.6. The crystals are readily soluble in alcohol, ether, benzole. Heated they begin to sublime at 100° C., giving off water. The dehydrated body melts at 89.5 and boils at 195.6° C. without decomposition. The water solution is neutral to test paper, and is not precipitated by basic lead acetate and ammonio-silver nitrate. The crystals warmed with hydrochloric acid and added to alcohol give a fine rose color, which is very characteristic.

The crystals are obtained in the largest quantity from the fraction boiling between 100—105° C., although the fractions from 94—150° C. yield crystals.

A hydrocarbon from resin spirit boiling at 103—104° C. was examined and found to be a heptine with a vapor density of 94.23. By the action of nitric acid a dinitro-heptylene was obtained having the formula $C_7H_{12}(NO_2)_2$; it is easily soluble in alcohol, ether, and benzole, and insoluble in water. It melts at 182° C. The other products of the action of nitric acid upon heptine are carbonic dioxide, formic, acetic, butyric, and succinic acids.

With potassic dichromate heptine gives carbonic, dioxide, and acetic acids. With potassic permanganate it gives an acid not yet examined, and no carbonate.

The crystals mentioned above give with nitric acid the same products as the hydrocarbon, except formic acid. The dehydrated crystals are considered to be methylpropylallyleneglycol. These gave the diacetate $C_7H_{12}(C_2H_3O_2)_2$, which crystallizes in square plates, melting at 68.5° C., and very soluble in alcohol, ether, and benzole.

A bromine compound $C_7H_{12}Br_4$ was also formed from an aqueous solution of the crystals; and by passing gaseous hydriodic acid into the hydrocarbon, C_7H_3I or moniodide was formed.

On the Preparation of Diethylnaphthylamine. By Bernard E. Smith. Vol. XL., p. 180.

This body is best prepared by heating 10 parts of naphthylamime and 15 parts of ethylbromide, with a small quantity of ethyl alcohol to dissolve the naphthylamine, in a sealed tube for 8 hours, at 120°

C. After purification, diethylnaphthylamine is a pale straw-colored oil, boiling at 290° C., and darkening on exposure to light and air. Analysis gave carbon 84.18 and 84.25, hydrogen 8.78 and 8.97, nitrogen 7.25 and 7.33 per cent.

Diethylnaphthylamine hydrochloride is formed by adding hydrochloric acid to the base. The double platinum salt has the formula $(C_{10}H_7\ (C_2H_5)_2\ HCl)_2\ Pt\ Cl_2$. Nitroso-diethylnaphthylamine is formed by adding sodic nitrite to a glacial acetic acid solution of the base. It crystallizes in reddish-golden scales, soluble in ether, alcohol, and benzine, and melting at 165° C.

On the Action of Sulphuric Acid Upon Diethylnapthylamine at High Temperatures. By BERNARD E. SMITH, Vol. XL., p. 182.

Author heated 20 grms of the base with 20 grms of sulphuric acid for eight hours, at 190–210°C. After adding excess of barium hydrate, and decomposing the barium salt with hydrochloric acid, the solution was mixed with excess of ammonia, which gave a white flocculent preciptate. This precipitate, crystallized from alcohol, gave colorless needles, blackened by light and air. This body melts at 190°C, and distills at above 360°C without change. Analysis gives $(C_2H_5)_2\ N.C_{10}H_6.C_{10}H_6N\ (C_2H_5)_2$ as the formula. It is very soluble in hot alcohol, not very soluble in ether, but readily so in benzine and chloroform. The hydrochloride is readily formed from the base.

The solution from the barium precipitate above mentioned, gave an acid with the formula, $HOO_2SC_{10}H_6N\ (C_2H_5)\ _2SO_2OH$.

On the Action of Carbon Oxydichloride (*Phosgene gas*) upon Diethylnaphthylamine. By BERNARD E. SMITH. Vol. XL., p. 185.

The base was dissolved in dry benzine, and the solution saturated with phosghene gas ; a white crystalline mass separated out, which, after evaporating the benzine, was treated with hot water, and dilute hydrochloric acid. The latter only dissolved out the hydrochloride of the original base. The insoluble residue was dissolved in alcohol and crystallized. Fractional distillation gave three distinct bodies: 1. Colorless, transparent body, crystallizing in quadratic prisms, melting at 70° C; with the formula $COCl.C_6H_4\ N(C_2H_5)_2$. 2. A colorless, crystalline body, crystallizing in hexagonal prisms, melting at 225°C, and isomeric with the first body. 3. A colorless crystalline body, crystallizing in rhombs with high refracting power, and melting at 130°C, and containing no chlorine.

By the action of the bodies containing chlorine upon the original base, a compound like the third body $C_{44}H_{47}N_3O_2$ was obtained.

Contributions to the Chemical History of the Aromatic Derivations of Methane.

By RAPHAEL MELDOLA. Vol. XL., p. 187.

Author gives the results of the action of benzyl chloride upon diphenylamine. He concludes that the crude products of the action are derivations of triphenylmethane and diphenylmethane. An account of the preparation of diphenylamine green on a large scale is given, and the formation of an alkaline salt of its sulphonic acid. The crude product was called "Viridine," and the salt of the sulphonic acid an "alkaline green. The constitutional formula of the hydrochloride is given, and the empirical $C_{31}H_{25}N_2Cl$. The formula of the base was found to be $C_{31}H_{26}N_2O$. Author mentions other methods of obtaining the green coloring matter; and compares its absorption spectrum with the absorption spectra of methyl and malachite green. In speaking of the sulphonic acids of diphenylamine, the author mentions two of them, a mono- and a di-sulphonic acid. The chloride separates from the alcoholic solution, containing hydrochloric acid, in a granular state; and the base separates from the alcoholic solution, on adding ammonia, as a gummy mass which becomes solid.

Of the derivations of diphenylmethane formed simultaneously with diphenylamine green, the author mentions a white amorphous powder, melting about 89°C., and giving no color upon oxidation. This proved to be phenylamidodiphenylmethane $C_{19}H_{17}N$. It is soluble in benzine, chloroform, ether and carbon disulphide; insoluble in glacial acetic acid, alcohol and acetone.

By heating diphenylamine with two molecules of benzyl chloride and zinc chloride, the author obtained benzyl-phenylamido-diphenylmethane $C_{26}H_{23}N$.

By the action of benzyl chloride upon aniline, the author dibenzylamido-diphenyl-methane $C_{27}H_{25}N$, which resembles the above-mentioned bodies in appearance, is less soluble in benzine and tolerene, and its solutions give blue fluorescence.

The preceding reaction repeated with acetanilide shewed replacement of the acetyl group by benzyl. All the diphenylmethane derivations in this paper are white amorphous powders. The paper is full of the most interesting theoretical considerations and constitutional formulæ.

Contributions to the Chemistry of Cerium Compounds.

By W. N. Hartley, F. R. S. E. No. XL., p. 202.

Author prepared pure cerium salts by two methods, that of Mosander and that of Bunsen and Bahr. The purity of the salts was determined by comparing photographs of spectra of 10 per cent. solutions of cerium, didymium, and lanthanum, on the same plate.

A very delicate test for cerium is given thus: To the solution to be examined, either neutral or slightly acid, add ammonia acetate and a little hydrogec peroxide. Much cerium if present gives a brown color, and shaking precipitates gelatinous ceric acetate. With a small quantity of cerium the liquid turns yellow without a precipitate forming. By this method one part of cerium can be separated from 100,000 parts of liquid.

The preparation of cerous phosphate is best performed by adding sulphurous acid to the cerous solution, and then adding an acidified solution of sodium phosphate; gently warming causes the precipitate to settle rapidly. The precipitate is white, and dries to a porcelain-like mass, very hard to pulverize. Author makes the composition $CePO_4$, 2 H_2O.

Ceric phosphate was prepared from solutions of ceric nitrate and sulphate, and although the conditions were varied the composition was the same, and the author concludes that there is but one ceric ortho-phosphate $(Ce\ O_2)_4\ (P_2O_5)_3$.

Tne Analysis of Rhabdophane, a New British Mineral.

By W. H. Hartley, F. R. S. E. No. XL., p. 210.

The mineral has the general composition R_3O_3. P_2O_5. 2 H_2O, in which Ce, Di, La, or Yt may wholly or in part replace each other. Author's analysis gave water (loss on ignition) 9.34—silica 0.36—Al_2O_3, Fe_2O_3, with P_2O_5 0.21—magnesium phosphate 1.09—cerous oxide 23.19—lanthanum and didymium oxides 34.77—yttrium oxide 2.09—phosphoric anhydride 24.77 per cent. Author gives the results of a most careful search for yttrium, with tables of the lines obtained in the spectrum, using a Rutherford's grating with 17,460 lines to the inch. There was a complete absence of lines attributable to erbium; but there were four lines in green which the author could not connect with any known element.

This is the first instance on record of yttrium being found in any British mineral.

On Benzyl-Phenol and its Derivations. (*Part II.*) By Edward H. Rennie, M.A., B.Sc. No. XL., p. 220.

Author describes the following bodies : *Benzyl-phenol—sulphonic acid;* not obtained in a pure state as it loses weight at 100° C and partially decomposes. *Mono-nitro-benzyl-phenol,* golden yellow prisms, melting at 74-75 C°, volatile in steam. The potassium derivative, in needles, have a brick-red color. *Amido-benzyl-phenol;* the hydrochloride forms glistening scales, which are unstable. *Dinitro-benzyl-phenol ;* crystallized from alcohol; it melts at 87–88° C. The potassium derivative crystallizes in orange needles and yields benzoic acid with chromic liquor. *Para-nitro-benzoic-acid* was obtained by oxidizing trinitro-benzyl-phenol with chromic liquor ; it melts at 238° C. *Nitro-bromo-benzyl-phenol* prepared from potassium bromo-benzyl-phenol-sulphonate and crystallized from alcohol, gives brilliant yellow scales, melting at 64–65° C. The potassium derivative crystallizes in brilliant red scales. The above sulphonate may also be prepared from nitro-benzyl-phenol-sulphonate by treating with bromine in a glacial acetic acid solution. Several other ways of preparing this body are also given. By acting on the above-mentioned nitro-bromo compound with nitric acid, *Dinitrobromphenol* was obtained, which melts at 118° C., and crystallizes from alcohol in fine, pale yellow needles.

In discussing the constitution of benzyl-phenol and its derivations the author gives the results of experiments upon the oxidization of benzyl-phenol-methyl ether. From this ether he obtained *Methoxy-benzophenone* in four-sided prisms, melting at 61–62° C. From paraoxybenzophenone and methyl iodide he obtain the same body, and hence concludes that it is paramethoxybenzophenone, and that it proves that benzyl-phenol is a para-derivative.

Abstracts from *Berichte der Deutschen Chemischen Gesellschaft,* by L. H. Friedburg.

Bromo-substitution Products of Sebacylic Acid. Fr. Gantter and Carl Hell. (Vol. XV., p. 142.)

It seems, according to these researches, that red phosphorus acts " catalytically." between bromine and sebacylic acid.

Synthesis of the Homologous Phenols. AD. LIEBMANN (Vol. XV., p. 150.) Preparation of isobutyl-phenol, amyl-phenol, butyl-phenol, and benzyl-phenol.

Determination of Sulphurous Acid in Wine. B. HAAS. (Vol. XV., p. 154.)

Lecture Experiments. MAX. ROSENFELD. (Vol. XV., p. 160.) Use of glass tubes for showing the decomposition of water by red-hot iron.

Decomposition of steam by magnesium.

Combustion of ammonia in oxygen.

On the Etherification of the Oxyacids. N. MENSCHUTKIN. (Vol. XV., p. 162.)

A Synthesis of Thymol out of Cuminol. OSCAR WIDMANN. (Vol. XV., p. 166.) Cuminol is transformed into nitro-cuminol, the latter treated with phosphorus pentachloride, is changed into nitro-cymylen-chloride; zinc, and sulphuric acid as reducing agents, hydrogenizing the nitro-chloro compound into cymidin. Nitrite of potash then transforms the cymidin into nitrosothymol, which was proved to be identical with nitrosothymol, prepared from thymol and nitrous acid in the same manner as previously indicated.

This is the first synthesis of a derivative of thymol, hence of thymol.

Preparation of Succinic Acid from Tartaric Acid by Fermentation. F. KONIG. (Vol. XV., p. 172.) The fermenting liquid is a solution of tartrate of ammonia. Acetic and formic acids are formed in varying quantities, also carbonate of ammonia. The process is recommended as a good one for making succinic acid, even on a large scale.

Preparation of Coloring Matter by the Reaction of Aromatic Nitro-substances on Phenols and on Poly-atomic Alcohols in Presence of De-hydrating Agents. HEINRICH. BRUNNER. (Vol. XV., p. 174.) A representative of the first-mentioned series is prepared by reaction between resorcin and nitrobenzol. Of the second class two combinations have been formed, respectively from erythrit and nitro-alizarine, and cane sugar and nitro-alizarine.

Oxy-propyl-toluidin. R. F. MORLEY. (Vol. XV., p. 179.)

Mono-phenyl-boro-chloride and some of its Derivatives. A. MICHAELIS and P. BECKER. (Vol. XV., p. 180.) The mono-phenyl-boric acid has only a mild toxic influence upon the human system, while it is comparatively poisonous for lower organisms, bacteria, &c. The free acid is about ten times stronger as an antiseptic than its sodium salt.

OnTolyl-Methyl-Keton. A. MICHAELIS. (Vol. XV., p. 185).

Reaction between the additional products of Chinolin plus halogen-alkalies and oxide of silver. W. LACOSTE. (Vol. XV., p. 186).

Isolation of basic compounds, corresponding to a quarternary oxide of ammonium, by means of the above named reaction.

Reaction of Dimethyl-phenyl-phosphine upon Bromide of Ethylene. L. GLEICHMANN, (Vol. XV., p. 198).

Researches on the Laws of substitution in the Naphthalene series. HENRY E. ARMSTRONG. (Vol. XV., p. 200).

Formation of basic compounds from acido-amides. O. WALLACH. (Vol. XV., p. 208).

Influence of heat upon Thio-formanilide. W. W. I. NICHOL. (Vol. XV., p. 211).

Syntheses by means of Phenyl-acetylene and its derivatives. ADOLF BAEYER and LUDWIG LANDSBERG. (Vol., XV., p. 212).

On the question of identity between the coloring matter of the Sophora Japonica Capparis Spinosa and Ruta Graveolens, with Quercitrin and Quercetin. P. FOERSTER. (Vol. XV., p. 214).

Decomposition of mono-halogenized crotonic acids by alkalies. R. FRIEDRICH. (Vol. XV., p. 218).

Analyses of some Nephrites of Lake Dwellings. K. SEUBERT and G. LINK. (Vol. XV., p. 219).

The proportions of silicic acid to bases and to water lead to the general formula $R^{II} Si O_3$ of the group of hornblende. They, therefore, belong to the group of veritable nephrit (Cacholong of *Rammelsberg*): occurrence: Maurach on the Bodensee.

On rendering oxygen active. MORITZ TRAUBE. (Vol. XV., p. 222).

Palladium-hydrogen shaken with water and oxygen (air) yields immediately and abundantly peroxide of hydrogen. The oxidizing effects of palladium-hydrogen in presence of oxygen and water are not directly caused by the former, but almost exclusively by the peroxide of hydrogen generated. Potassium iodide starch mixture is excepted. Peroxide of hydrogen does not turn this blue, while palladium-hydrogen and oxygen do. Here palladium transfers the oxygen from peroxide of hydrogen to the iodide of potassium. Nascent hydrogen is not able to render oxygen active by splitting its molecules.

On Anthramin. C. LIEBERMANN and A BOLLERT. (Vol. XV., p. 226).

Anthramin is Liebermann's name for the same compound, which Roemer calls anthracylamin$=C_{14} H_9 NH_2$, and which has been found simultaneously by both gentlemen, independent of each other, in the same laboratory. Anthramin is prepared from anthrol by amidizing it with acetamid in a closed tube at + 280° C., and subsequent distillation of the products of the reaction with potassium hydrate and water. Yield: Twenty per cent of the anthrol.

Cause of Jorissen's reaction for Fusel Oil. K. FOERSTER. (Vol. XV., p. 230).

Fusel oil, heated with aniline and hydrochloric acid, produces a beautiful red coloration of the mixture. On this fact Jorissen has founded a method for testing common alcohol for fusel oil (produced by fermentation).

Foerster's investigation shows that this coloration is due to an impurity, and that neither amylic alcohol nor its homologues cause the reaction.

The impurity was found to be furfurol, of which the property of producing color-reactions with bases of the aromatic series is well known.

The combinations of Benzo-tri-chloride with aromatic Bases. OSCAR DOEBNER. (Vol. XV., p. 232).—The author published, some time ago, his researches on the action of benzotrichloride and phenols, as well as on tertiary aromatic bases, now he deals with the primary and secondary aromatic bases, beginning with aniline. New dyeing substances are among the results of this investigation

Abstracts from the *Comptes Rendus*, by A. Bourgougnon.

Double Salts formed by the Haloid Salts of Mercury.

By M. Berthelot. (No. 7, Feb. 13th, 1882.

Researches upon the Nitrogenized Acids derived from the Acetones.

By G. Chancel. (No. 7, Feb. 13th, 1882).

By the action of nitric acid upon propion and upon butyron, ethylnitrous acid, CH_3,—$C N_2 O_4 H$, and propylnitrous acid, $C_2 H_5$—$CN_2 O_4 H$, are formed. These two compounds are identical with dinitro-ethan and dinitro-propan. The characteristics of all these nitrogenized acids is the univalent group

$$C^1 N_2 O_4 H = C^1 \left\{ \begin{array}{l} —NO_2 \\ —NO_2 \\ —H, \end{array} \right.$$

of which the saturation is completed by one atom of hydrogen (methylnitrous acid) or by an alcoholic radical; the general formula of alkylnitrous acids is then

$$\begin{array}{l} C^n H^{n+1} \\ C^1 N_2 O_4 H \end{array}$$

By the action of reducing agents the group $C N_2 O_4 H$ is transformed into ammonia, hydronylamin and $C O O H$, characteristics of the organic acids.

The formation of alkylnitrous acids by the action of nitric acid upon the acetones is represented as follows :

$$\underbrace{C_7 H_{14} O}_{\text{Butyron.}} + 2 NO_3 H = \underbrace{C_3 H_6 N_2 O_4}_{\text{Propylnitrous acid.}} + C_4 H_8 O_2 + H_2$$

Amylnitrous acid, $C_4 H_9$—$CN_2 O_4 H$. Pentyl or amylnitrous acid is obtained by the reaction of nitric acid upon normal capron.

Amylnitrite of Potassium, $C_4 H_9$—$CN_2 O_4 K$; yellow needles of fatty appearance.

Amylnitrate of Silver, $C_4 H_9$—$CN_2 O_4 Ag$ is like the potassium salt, but less soluble.

Butylnitrous acid, $C_3 H_7$—$CN_2 O_4 H$. Obtained by the action of nitric acid upon the most volatile part of crude capron, distilling at 175° C. Uncolored liquid, heavier than water, transformed into normal butyric acid by reduction.

Butylnitrite of Potassium, $C_3 H_7$—$C N_2 O_4 K$. Yellow prisms.

Butylnitrite of Silver, $C_3 H_7$—$C N_2 O_4 Ag$. Crystalizes with difficulty from a warm saturated solution.

Herylnitrous acid, $C_5 H_{11}$—$C N_2 O_4 H$. Obtained by the action of nitric acid upon methylenanthol,

or hexylmethylacetone, $C_6 H_{13}$—$C O$—$C H_3$
potassium salt $C_5 H_{11}$—$C N_2 O_4 K$
silver salt $C_5 H_{11}$—$C N_2 O_4 Ag$.