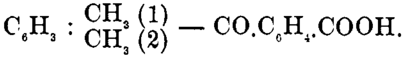
ABSTRACTS.

Abstracts from *Berichte der Deutschen Chemischen Gesellschaft*, by Percy Neymann, Ph. B.

The Action of Sodium on Lupinin. G. Baumert. (Vol. XV., p. 631).—Partly controversial. From a series of experiments it is shown that when sodium acts on lupinin a sodium substitution product is formed, which, in contact with water, exchanges the sodium for hydrogen, hence acting like a sodium alcoholate.

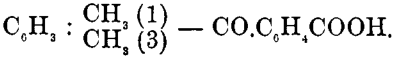
Anhydrolupinin. G. Baumert. (Vol. XV., p. 634). Anhydrolupinin was produced by the action of phosphoric acid anhydride and lupinin chloride, by heating five to six hours to about 190° C.

On the Acids produced from Xylols and Phtalic Acid Anhydride. Franz Meyer. (Vol. XV., p. 636). The new acids may be regarded as hydrocarbons, into which the group $COOH.C_6H_4.CO$ has been introduced. Orthoxylal-phtaloylic acid from ortho-xylol and phtalic acid anhydride has the formula :



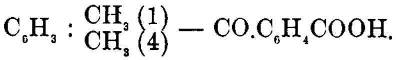
$$C_6H_3 : \left.\begin{matrix} CH_3\,(1) \\ CH_3\,(2) \end{matrix}\right\} - CO.C_6H_4.COOH.$$

Metaxylol-phtaloylic-acid from one part of phtalic acid anhydride to three of metaxylol in presence of one and one-half parts of aluminium chloride has the formula :



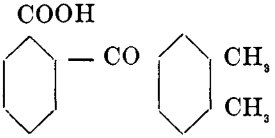
$$C_6H_3 : \left.\begin{matrix} CH_3\,(1) \\ CH_3\,(3) \end{matrix}\right\} - CO.C_6H_4COOH.$$

Paraxylol-phtaloylic-acid from paraxylol and phtalic acid anhydride has the formula :

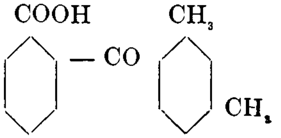


$$C_6H_3 : \left.\begin{matrix} CH_3\,(1) \\ CH_3\,(4) \end{matrix}\right\} - CO.C_6H_4COOH.$$

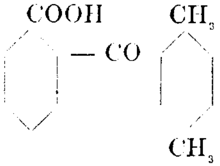
The constitutional formulæ of the three acids would hence be :



from orthoxylol



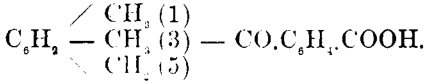
from metaxylol



from paraxylol

On Mesitylenphtaloylic Acid.

J. Gresly and F. Meyer (Vol. XV., p. 639).



$$C_6H_2 \begin{cases} CH_3\ (1) \\ CH_3\ (3) \\ CH_3\ (5) \end{cases} - CO.C_6H_4.COOH.$$

The action of phtalic acid anhydride on mesitylen in presence of chloride of aluminium is analagous to that on metaxyl. Analyses correspond to the formula $C_{17}H_{16}O_3$.

On the preparation of Aromatic Phosphoric Acid Ethers.

A. Weber and R. Heim. (Vol. XV., p. 639). Phenols can be converted into amines and into the aromatic ethers, but the substitution of the hydroxyl group is often found to be very difficult. The authors find that by means of phosphorous oxychloride the ethers can be formed with comparative ease.

On the action of Acetylchloride and Glacial Acetic Acid on Fumaric Acid and on the Decomposition of the Monosubstituted Succinic Acid Anhydrides.

R. Anschuetz and C. Bennert. (Vol. XV., p. 640).—14 grms. of acetylchloride, 28 grms. of glacial acetic acid, and 10 grms. of fumaric acid, when permitted to act upon each other for twelve hours, give a clear, light yellow liquid which, when subjected under ordinary pressure to distillation separates hydrochloric acid copiously, and maleïnic acid anhydride distills over. If the distillation is performed under diminished pressure (11 to 12 mm. mercury) acetyl-chloride, acetic acid and acetic acid anhydride distill over at first ; at 80° maleïnic acid anhydride begins to come over until at 125° to 126° a colorless liquid distills over, which becomes hard. This body was found by analysis to be monochlorsuccinic acid anhydride. Acetyl. chloride and glacial acetic acid react upon each other in such a manner when boiled that by the evolution of hydrochloric acid acetic anhydride is formed. The hydrochloric acid attaches itself to the fumaric acid and forms monochlorsuccinic acid. The latter is converted into monochlor-succinic acid anhydride by acetylchloride.

On Oxalines and Glyoxalines. O. WALLACH. (Vol. XV., p. 644).—Preparation and description of methylglyoxaline, propylglyoxaline, amylglyoxaline, and some of their salts.

On the action of Acid Chlorides and Bromides on Chinones. H. SCHULZ. (Vol. XV., p. 652).—The experiments gave reason for the conclusion that acid chlorides and bromides act in a similar manner on chinones as hydrochloric and hydrobromic acids ; chloridized or bromidized hydrochinonethers are formed. It must be assumed that the respective chlorine or bromine anhydrides split up into the free halogen and the acid radical ; the latter attaches itself to the chinon, and hydrogen atoms of the generated hydrochinonether are substituted by the free halogen.

On the production of active Oxygen. MORITZ TRAUBE. (Vol. XV., p. 659).

On Condensation Products of Aromatic Bases. OTTO FISCHER. (Vol. XV., p. 676).—The aldehydes were made to act either upon the sulphuric or phosphoric acid salts of the aromatic amines in place of, as heretofore, upon the hydrochloric acid salts. The contents of the article give more contributions to the manifold condensations of aldehydes and bases.

Note on Alpha-oxychinolin. KARL BEDALL and OTTO FISCHER. (Vol. XV., p. 683).

On Basic Acetate of Magnesium. W. KUBEL. (Vol. XV., p. 684).—Acetate of magnesium when warmed with an excess of magnesia in aqueous solution is converted into the basic salt in the same manner as lead. The basic acetate of magnesium is highly antiseptic, disinfecting, and especially deodorizing. A solution of basic acetate, somewhat cloudy from the presence of basic magnesium acetate, is known in commerce as sinodor.

On the Compounds of Naphtochinon with Toluidin and Ethylanilin. LEO ELSBACH. (Vol. XV., p. 685).—The ideas of Liebermann regarding the conversion of beta-naphto-chinon-anilid into alpha-naphto-chinon-anilid gave reason to the supposition that other aromatic aminebases could react in a similar manner on beta and alpha-oxynaphtachinon, and that two series of amid compounds would be formed by the two chinones. The author experimented with para-toluidin and the two naphto-chinones and oxynaphto-chinones, and verified the supposition completely. Orthotoluidin was tried in the same manner, but the operations were performed with much greater difficulty. Experiments with an imid base also proved the correctness of the constitution formula set up by Liebermann.

On a new method of preparing Alizarin-Orange. S. E. Simon. (Vol. XV., 692).—Dinitro-oxy-anthraquinone is suspended in boiling water and a small quantity of concentrated caustic soda solution is added. A dark red sodium salt is formed. The solution is concentrated until a flocculent precipitate begins to fall. This is filtered, washed with alkali, and treated with hydrochloric acid. The yellow precipitate is crystallized from glacial acetic acid. The analysis shows the product to be mono-nitro-alizarin. The reaction takes place in correspondence with the following equation :

$$C_{14}H_5O_2\,(OH)\,(NO_2)_2 + KOH = KNO_2 + C_{14}H_5O_2\,(NO_2)\,(OH)_2.$$

A portion of the nitro group escapes in the form of ammonia.

On the Reducing Properties of Living Protoplasma. O. Loewand, Th. Bokarny. Vol. XV. p. 695. Controversial.

Synthesis of Para-propyl Benzoic Acid. Richard Meyer and Erwin Mueller. Vol. XV., p. 698. Para-normal propyl-benzoic acid was obtained by the action of moist carbonic acid on brom-propyl-benzol and sodium. The analysis suggests the formula $C_{10}H_{12}O_2$.

Preparation of Lactic Acid. Heinrich Kiliani. Vol. XV., p. 699. The results of experiments are : 1. The best crude material is invert sugar ; 2. Caustic soda is best ; 3. It is not advantageous to neutralize the entire alcoholic solution with carbonate of zinc. A detailed method of manipulation is appended.

Contribution to the Knowledge of Saccharin. H. Kiliani. Vol. XV., p. 701. Calcium hydrate acts on invert sugar and forms lactic acid. Saccharin was produced as by product. A treatment with oxide of silver shows saccharin to differ in its reactions with this reagent from dextrose and levulose. These, as the author has previously shown, when oxidized in this manner, produce glycolic acid only, besides carbonic, oxalic and traces of formic acids, while from saccharin acetic acid is produced in addition to this acid. This result seems to point out that saccharin contains a methyl group moreover, because when oxidized with potassium permanganate, not only carbonic acid and water, but also acetic acid are formed.

On the Molecular Structure of the Metals. S. KALISCHER. Vol. XV., p. 702. An elaborate paper, giving the results of experiments with the most common metals. The results of all the enumerated experiments may be gathered thus : that the crystalline structure of most metals is their natural condition, and that this may be taken from them, with more ar less difficulty (from some not at all), by mechanical effects, and that many of them can be reconverted into this condition by the aid of heat. By assuming this, the cause of the great electrical conducting power of metallic wires, which they assume after being heated, can be explained.

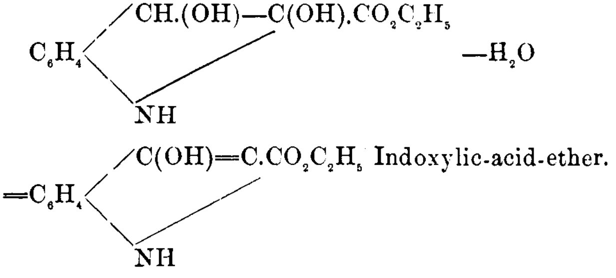
On Isocholic Acid. P. LATSCHINOFF. Vol. XV., p. 713. Partly controversial. The author gives various points showing the difference between cholic and isocholic acids.

On the Action of Bromine in Alkaline Solutions on the Amides. A. W. HOFMANN. Vol. XIV., p. 2725. Vol. XV., pp. 407, 752. 762.

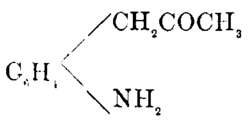
On the Compounds of the Indigo Group. ADOLPH BÆYER. Vol. XV., p. 775. By oxydation of indoxylic-acid-ether by means of acid oxydizing agents three consecutive stages are observed :

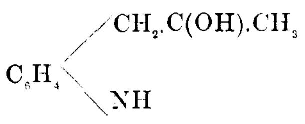
Indoxylic-acid-ether	$C_{11}H_{11}NO_3$
Indoxanhydic-acid-ether	$C_{22}H_{20}N_2O_6$
Indoxanthinic-acid-ether..................	$C_{11}H_{11}NO_4$
Ethyl-oxalyl-anthranilic acid.............	$C_{11}H_{11}NO_5$

Reduction of indoxanthinic-acid-ether takes place in two stages when heated with zinc-dust and acetic acid.

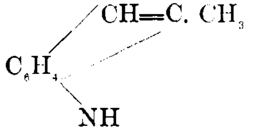


corresponding to the formation of methyl keton from amido-bezyl-methyl-keton.



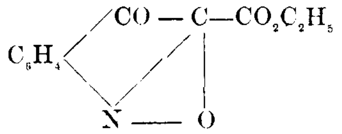


Amido-benzyl-methyl-keton



Methylketon.

The constitution given to isatogenic-acid-ether is shown by the formula.



Hence a group $\underset{\diagdown O \diagup}{N—C}$ is taken up. The author terms this the "carbazoxy group." The action of nitrous acid on the various indoxyl compounds is also discussed by the author. The relations of the indol to the to the indoxyl group are as yet uncertain.

On Monochlorocinamic Acid. G. W. Jutz. Vol. XV., p. 788. By proper treatment of phenyl-dichlor-propionic acid with potassium tartrate, true potassium-chloro-cinamates are formed. They are separated by difference of solubility in alcohol. From the salts two acids were obtained. Monochloro-cinamic-acid melting at 142°-143°, and chloro-cinamic-acid at melting at 114°.

Investigations on the Diffusion of some Organic and Inorganic Compounds. J. D. R. Scheffer, Vol. XV., p. 788.

On Di- and Tri-Phenylphosphin. A. Michaelis and L. Gleichmann. . Vol. XV., p. 801. Diphenyl-phosphin is formed bp treating diphenyl phosphin chloride $(C_6H_5)_2PCl$ with water, or dilute solution of caustic soda, diphenyl-phosphinic acid or its sodium salt being formed at the same time :

$2 (C_6H_5)_2 PCl + 2 H_2O = (C_6H_5)_2 PH + (C_6H_5)_2 PO.OH + 2 HCl$. Triphenyl-phosphin $(C_6H_5)_3P$ is formed when a solution of phosphenylic chloride and brombenzol is left in 3 to 4 times the volume of ether (free from water) with thin strips of sodium. This left to itself for 6 or 10 days at the common temperature, $C_6H_5PCl_2 + 2C_6H_5Br + Na = (C_6H_5)_3 P + 2NaCl + Na Br$.

On Beta-Naphtol-Aldehyd. G. Kauffmann. Vol XV., p. 804. 40 grms. of beta-naphtol are dissolved with 60 grms. of caustic soda in 250 grms. of water and heated on a water bath with 50–60 grms. of chloroform at an upright condenser for several hours. Three compounds are formed. Petroleum benzene dissolves out the aldehyde and a second compound. These two may be separated by acid of caustic soda solution in which this second substance is insoluble. The aldehyde is purified by driving off with steam. The experimenter then formed an acid in order to characterize the aldehyde. A di-naphthol is also formed.

Note on artificially colored claret wines. P. Pastrovich, (Vol. XV, p 808.)

Presence of fuchsin is detected by treatment of the wine with oxide of manganese (braunstein). The wine is not deprived of its color when colored with fuchsin and treated in the above manner 2 mgs. of fuchsin to the litre can be detected.

On the bases produced from the products of addition of chinolin and halogenalkyls. W. La Caste, (Vol. XV, p 809.) Controversial.

On the action of lead and manganese dioxides on halogen metals in presence of acetic acid. C. L. Mueller and G. Kirchner, (Vol. XV, p 812.) Controversial.

The chlorine liberated from hydrochloric acid by means of the binoxide of lead seems to convert the acetic acid into monochloroacetic acid and this again by the formation of lead chloride, carbonic acid and free chlorine is farther oxidized. An aqueous solution heated with $Pb O_2$ produces the products enumerated and after continued boiling of Na Cl $Pb O_2$ and acetic acid the liquid distilled contains a considerable quantity of monochloro-acetic acid. The process is different when binoxide of manganese is used. No chlorine, but only carbonic acid is generated. The monochloroacetic acid is oxidized to carbonic acid and water and manganous chloride is formed.

The nomenclature of complex azo-compounds. K. Heumann, (Vol. XV, p 813.)

The author proposes to name azo-bodies in which two azo-groups are bound to the same hydrocarbon rest diazo compounds. In order to form the name the term—disazo—is appended to the name of the hydrocarbon rest carrying the two azo rests and to this the rests connected with the azo groups are attached. For example: Resorcin-disazo-benzol, benzol-disazo-benzolresorcin.

On the occurrence of Carvacrol in the essential Oil of Satureja Hortensis. E. Jahns, (Vol. XV, p 816.)

The analysis in round numbers of the oil examined:

30% carvacrol.

20% cymol.

50% of a terpen (boiling between 178–180°) besides traces of a phenol having the property of turning iron blue.

On Tetrabromchinolin and Diiodochinolin. Ad. Claus and E. Istel, (Vol. XV, p 820.)

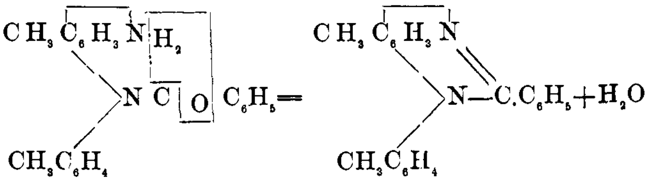
By the action of the halogens in bisulphide of carbon solution two new products were obtained. When chinolin is dissolved in bisulphide of carbon and a solution of bromine in a considerable quantity of bisulphide is gradually added and the solution is then at once evaporated, a red-brown mass is obtained, which analysis shows to be tetrabromchinolin. By the action of sodium amalgam in alcoholic solution a portion of the bromine is taken away even in the cold and a new compound containing bromine but of a basic character is formed. This is undoubtedly not a product of addidition. A bisulphide of carbon solution of chinolin when treated with iodine. The product is one of addition corresponding to the formula $C_9\ H_7\ I_2\ N$.

Contribution to the knowledge of Diphenylamin and Para-ditolyl-amin. Eug. Lellmann, (Vol. XV, p 825).

The benzoyl derivative of diphenylamin $C_6H_5CON\ (C_6\ H_5)_2$ according to the strength of nitrification produces one mono compound benzoyl-para-mono-nitro-diphenylamin and two dinitro compounds benzoyl-ortho-dinitro-diphenylamin and benzoyl-para-dinitro-diphenylamin. By nitrification of benzoyl-para-ditolyl-amin only orthonitro compounds are formed.

On a New Class of Amidines. E. Lellman, (Vol. XV, p 832.)

The benzol compound of para-ditolylamin was subjected to nitrification and the compound formed, *i. e.* benzoyl-ortho-nitro-ditolylamin was reduced by nascent hydrogen. The benzoyl-orthoamido-para-ditolylamin by loss of water was converted into the amidin which must be termed :



para-tolyl-benzenyl-toluylen-amidin.

The Properties and the Atomic Weight of Uranium.

Clemens Zimmermamn, (Vol. XV, p 847).

Prepared by reducing a mixture of potassium or sodium with chloride of uranium by heating in charcoal crucible. Uranium has the color and lustre of silver but is much harder. Striking with a hammer produces sparks. It oxidizes gradually when exposed to the air. It burns when heated on a platinum foil. It is decomposed by nitric acid. Sp. gr. is 18.7. Author gives the atomic weight equal to 240 making it the greatest of all known metals.

Contributions to the Knowledge of Anthramin.

C. Liebermann and A. Ballert, (Vol. XV, p 852).

Prepared from anthral by means of ammonia in aqueous solution Heated in sealed tube with 60 times its volume of ten per cent aqueous ammonia for several hours at 250° Anthramin can also be prepared by heating for eight hours at the return condenser with acetamid.

On Chinolin Derivatives.

Td. Skraup, (Vol. XV, p 893.)

By treating m—nitro and amidotoluol, glycerin and sulphuric acid m—toluchinolin is produced. Partly controversial.

On the Preparation of the Amids of Monobasic Acids of the Fatty Series.

A. W. Hofmann, (Vol. XV, p 977.)

The dry ammonia salts of the acids are subjected to a temperature of 230° under pressure for five or six hours. The tubes then contain an aqueous solution of the ammonia salt and a large quantity of the amid, which in the most advantageous case varies between 80 and 85% of the theoretical result.

On the Preparation of Mustard Oils. A. W. Hofmann, (Vol. XV. p. 985). The double substituted sulpho-urates of the aromatic amines still serve as a starting point. By abstracting one mol. of monamin the mustard oils are produced. Diphenyl-sulpho-urate produces anilin and phenyl mustard oil.

$$CS\,(C_6H_5)_2H_2N_2 = C_6H_5NH_2 + C_6H_5NCS$$

The author found that concentrated solution of phosphoric acid performs the separation with ease and certainty. In all cases over 90% of the theoretical results were obtained.

On the Action of Bromine on Bisulphide of Carbon.—Carl Hell and Fr. Urech, (Vol. XV. p. 987).

The result of numerous elaborate experiments is given in brief by the authors as follows: that without doubt bisulphide of carbon is not at all indifferent towards bromine, that excluding the presence of other bodies it forms a product of addition, but that in presence of water, or what is even more important, in presence of organic acids it can be completely oxidized.

On the Vapor Density of Bromine—Hans Jahn, (Vol. XV. p. 1238).

Two data only have been given before. Mitscherlich finds the vapor density equal to 5.54 and V. and C. Meyer find it 5.38 at a temperature of 99.34° C. The authors experiments are tabulated. If the vapor densities found at different temperatures are collected in a formula

$$D = a + bt,$$

then by the aid of the method of the smallest squares of the constants a and b the probable values obtained are

$$a = 5.8691 \text{ and } b = 0.00153$$

The conclusive table given is (for various temperatures) as follows:

Temperature above boiling point	Density	Deviation from the normal	Difference.
40°	5.7115	3.381	0.554
60°	5.6809	2.827	0.554
80°	5.6503	2.273	0.554
100°	5.6197	1.719	0.554
120°	5.5891	1.165	0.553
140°	5.5585	0.612	0.554
160°	5.5279	0.058	

On the Expansion of Alums. W. SPRING, (Vol. XV. p. 1254). The alums expand equally between 0° and 60°. This simple result which from all appearances is due to the isomorphism of the compounds finds its confirmation in the fact that large potassium, or ammonium-alum crystals can be grown on a chrom-alum core. It is found from the results of the investigation that *Avogadro's* law can be extended to solid bodies and hence the question of determining the molecular weight of solid bodies may soon be defined from this.

Quantitative Determination of Fusel Oil in Brandy.

L. MARQUARDT, (Vol. XV. p. 1370).

In 1000 grms. of a 30% brandy, prepared by mixing of 95% alcohol with water, one grm. of commercial amylic alcohol was dissolved, of this 150 grms. were shaken for 15 minutes with the same volume of water and 50cc of chloroform, and this operation repeated twice with 50cc more. The united 150cc of chloroform are united and again shaken up for 15 minutes with the same volume of water and this is repeated twice with the same quantity of water. The chloroform now containing all the fusel oil and no more alcohol was heated in a well stoppered bottle in a water bath at 85° for about 6 hours together with a solution of 5 grms. of bichromate of potash in 30 grms. of water and with 2 grms. of sulphuric acid. After completed oxidation contents of flask including the chloroform were put into a distillating flask the residue washed out with water and the whole distilled off to about 20cc. The residue was was covered with 80cc of water and distilled off, leaving about 5cc. The distillate, consisting of two layers, was mixed with barium carbonate and digested in the return condenser for 30 minutes. Chloroform was then distilled off, and the remainder evaporated down to about 5cc. The excess of barium carbonate was filtered off, washed with very little water and the filtrate evaporated to dryness. The remainder which weighed 0.396 grms. was dissolved in 100cc of water and a few drops of nitric acid. 50cc were employed for the baryta determination and 50cc for the barium chloride determination. The chlorine determination for 100cc gave 0.0638 grms. of barium chloride which is to be subtracted from 0.396 grms. of the above residue. The difference is 0.3322 grms. 0.18004 grms. of baryta were obtained from 100cc. The baryta corresponding to the chloride must be subtracted *i. e.* 0.0469 grms. There remains 0.13314 grms which is contained in 0.3322 grms. of baryta salt and hence constitutes 40.07% of it. As barium valerianate contains 45.13% of baryta, this salt is the greater constituent of the baryta salt. For one equivalent of baryta two molecules of anylic alcohol are calculated. In the foregoing case 0.13314 grms. of baryta give 0.15315 grms. of anylic alcohol or fusel oil in 150 grms. or 102 grms. in 1000 grms. of brandy.

Artificial Piperin. L. RUEGHEIMER (Vol. XV. p. 1390). When the chloride of piperinic acid is treated with excess of piperidin (both being in solution in benzol fuel from water) chloride of piperidin is separated. After warming and filtering off the chloride, the benzol solution is shaken with dilute hydrochloric acid. The solution is allowed to stand and piperinic acid separates. This is filtered off, the greater part of the benzol is distilled off, ligroin (petroleum naptha) is added until a permanent precipitate is formed. The solution is then allowed to evaporate off gradually and piperin remains in form of well developed crystals.

On the Alterations of Preserved Milk. O. LOEW (Vol. XV. p. 1482). A sample of milk of 400cc. was heated 40 minutes to 101° and examined eight years after. The milk sugar had disappeared and had been transformed into its hydrolytic products of division (lactose and glycose). The casein and albumen had been transformed into pepton. A portion of the pepton had undergone another change, for leucin tyrosin and ammonia were found. The tyrosin was most probably present as its anhydride.

On a New Class of Dye Stuffs. O. FISCHER and CH. RUDOLPH (Vol. XV. p. 1500). The name flavanilin is proposed. The product of heating together for several hours acetanilid and chloride of zinc to 250°—270°, is boiled out with hydrochloric acid, and the dye is precipitated out of the solution by salt and a small addition of acetate of soda. The color of the dye is a beautiful yellow. The ethyl compound is obtained by heating flavanilin with ethyliodide under pressure. The color is orange on silks. Flavenol is the nitrous compound. Flavolin is obtained from flavenol by mixing with zinc-dust and distilling at a dull red heat.

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

On Oxypropyltoluidine. By H. Forster Morley, M. A. (Vol. XLI. p. 387.)

This body is prepared by dissolving paratoluidine in propylene oxide, and distilling. It comes over between 285°—296° C. and is recrystallized from benzol. Its formula was found to be

$$N\ (C_3\ H_7O)\ (C_7\ H_7)\ H$$

Another method of preparing this body is by allowing the above mixture to stand some days, when the new base crystallizes out, and can be re-crystallized from petroleum oil. A third method is by converting the bases into oxalates and crystallizing, the oxalate of the new base being soluble.

Oxypropyltoluidine melts at 74° C, boils at 293° C, is insoluble in water, but soluble in benzol, ether, alcohol, and petroleum. It forms an oxalate with the composition $C_{10}H_{15}NO,\ H_2C_2O_4$.

The author also describes the result of distilling oxypropyltrimethylammonium hydrate, the chief product being propylene glycol, with trimethylamine and carbonic acid; the glycol being mixed with small quantities of other bases.

On some Halogen Compounds of Acetylene. By R. T. Plimpton, Ph. D. (Vol. XLI. p. 391).

Author prepared the tetrabromide, boiling at 110°-111°C, and having a specific gravity of 2.268 at 0°C. The di-iodide was prepared by passing acetylene over iodine moistened with alcohol; it melts at 73°C; it boils at 192°C and is distilled without decomposition. The chloriodide C_2H_2HCl was prepared by passing acetylene through iodine monochloride. It boils at 119°C and the specific gravity at 0°C is 2.2298. The chlorobromide was obtained by treating the chloriodide with bromine; it boils at 81°-82°C Sp. gr. at 0°C=1.8157. Acetylene Bromiodide is prepared by passing acetylene through bromine iodide; its Sp. gr. at 0°C (solid) is 2.750 and at 17°5C=2.6272; it boils at 150°C.

On Dihydroxybenzoic Acids and Iodo-Salicylic acids. By Alex. K. Miller, Ph.D. (Vol. XLI. p. 398).

Author prepared dihydroxybenzoic acids from catechol by heating in a sealed tube with ammonic carbonate, at 130°-140°C for 14-16 hours. Two acids were obtained, protocatechinic acid, and an acid with the formula $C_7H_6O_4$, which differed from the former acid in its crystalline form and its reactions with ferric chloride.

The author also prepared this acid by the action of iodosalicylic acids, obtained by the direct action of iodine upon salicylic acid, and melting potash. The barium salts of the mono and di-iodosalicylic acids were prepared, but could not be separated. Finally the two acids themselves were separated by fractional crystallization. Two crops of crystals were obtained, one melting at 197° and the other at 198°C. The former is para-iodosalicylic acid and analysis gave the formula $C_6H_5I\ (OH).COOH$. This acid was heated with potash and treated with excess of hydrochloric acid. The liberated dihydroxybenzoic acid was separated by ether, and crystallized from water. Its solution gives no precipitate with lead acetate. It melts at 200°C. Heated to 215°C it gave pure quinol. Analysis gave the formula $C_6H_3(OH)_2$, COOH.

The second more soluble iodosalicylic acid obtained above by crystallization melts at 198°C. Analysis gave the formula $C_6H_3I\ (OH).COOH$. By melting this body with potash a dihydroxybenzoic acid was obtained, which differed from the above dihydroxybenzoic acid in its crystalline appearance and reactions with ferric chloride. It also gives a precipitate with lead acetate ; and on heating yields carbonic acid and catechol. It melts at 204°C. Analysis gave the formula $C_7H_6O_4$. The acid so obtained is identical with that obtained from catechol at the beginning of the paper. This completes the series of the six isomeric dihydroxybenzoic acids, and the author gives a valuable table showing the properties of each.