

When the public sentiment of our cities and large towns is sufficiently aroused, first to understand the value and importance of milk as an article of diet, especially for the young, and next to know and appreciate the wide difference between good and poor, or between milk as drawn from the cow and ordinary city milkman's milk, that has been subjected to the skimming process, even if nothing worse has befallen it, then consumers of milk will demand a more intimate acquaintance with the producers and their method of production; a more direct connection with the farmers themselves. Then will superior milk command a higher price than the poorer article; then will the army of useless middlemen have an opportunity to retire, and the milk business of our large cities be conducted by the associated efforts of those who produce the milk, and those alone who are entitled to the profit of this important branch of farm economy.—*Boston Cultivator*.

CHEMICAL SOCIETY, LONDON, NOVEMBER.

DR. GLADSTONE, PRESIDENT, IN THE CHAIR.

a—"On Some Hydrocarbons Obtained from the Homologues of Cinnamic Acid," and b—"On Anethol and its Homologues."

By W. H. PERKIN, F.R.S.

a.—Considerable quantities of cinnenyl-acrylic, crotonic and angelic, and phenyl-crotonic and angelic acids were prepared. The hydrocarbons were at first obtained by decomposing the acids by heat; afterwards the process proposed by F. Binder—viz., treating the hydrobromo acids with bases—was found to yield more satisfactory results. A solution of hydrobromic acid in glacial acetic acid, instead of an aqueous solution, answered very well. The following acids were prepared and examined: Hydrobromocinnenyl-acrylic acid $C_{12}H_{13}BrO_2$, fuses 85 deg. to 87 C. Hydrobromocinnenyl-crotonic acid $C_{13}H_{17}BrO_2$ crystallizes in flat, oblique prisms, fuses at 148–150 deg. C. On further heating, HBr is evolved. Hydrobromocinnenyl-angelic acid $C_{11}H_{13}BrO_2$. All these hydrobromo acids, when treated with a cold solution of sodium carbonate or potassium hydrate, decompose, hydrocarbons being produced as follows: isopropylvinyl benzene boils at 203–206 deg. C., sp. gr. at 15 deg. 8902. Heated for a few hours to 150 deg. C., it solidifies to a transparent glassy mass. This change also takes place slowly at ordinary temperatures in daylight. The properties and chemical reactions of this substance are given. The dibromide was prepared, fusing at 71 deg. Isopropylallyl-benzene boils at 229 deg. to 230 deg., sp. gr. 15.890; does not solidify at 15 deg. C. Its formation may be represented thus:—



Cinnenyl-crotonic acid Isopropylallyl-benzene;
or, $C_6H_4(C_3H_7) \cdot CH_2CHBr \cdot CH_2COOH = C_6H_4(C_3H_7) \cdot CH, CHCH_3 + HBr + CO_2$

Hydrobromocinnenyl-crotonic acid

Its dibromide was obtained by shaking the hydrocarbon with bromine. It melts at 59 deg. to a colorless oil, crystallizing beautifully on cooling. Isopropylbutenyl-benzene is a colorless oil, boiling at 242–243 deg.; its sp. gr. at 15 deg. is 8875. It resinifies if kept in contact with the air. Its dibromide was prepared melting at 77 deg. Allyl-benzene boils at 174–175 deg.; sp. gr. at 15 deg. 9180. When heated between 160–200 deg. for sixty hours, it did not undergo any visible change. Its dibromide was obtained as a crystalline mass, fusing at 67 deg. Butenyl-benzene, a colorless oil boiling at 186 to 187 deg. C.; a dibromide was prepared, crystallizing in needles melting at 57 deg. The two last named hydrocarbons have already been obtained—allyl-benzene by L. Rügheimer (*Jour. Chem. Soc.* 1874, p. 894); it has the same constitution as the body prepared by the author. The butenyl-benzene, however, prepared by B. Aronheim (*Deut. Chem. Ges. Ber.* v. 1068) is isomeric with the one now produced—"b." On gently boiling methyl-paroxyphenyl-acrylic acid, an oil gradually distils over, having a fennel-like odor. This body, after purification, had the formula $C_9H_{10}O$, the author proposes to call it vinylic anethol; it boils about 201 to 202 deg.; melts at about 1 to 2 deg. Its formation may be represented thus:—



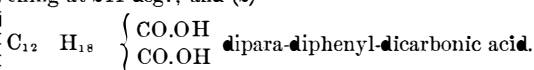
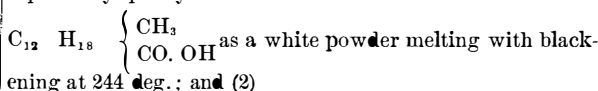
An endeavor was made to prepare this substance by Binder's reaction, but without success. On heating methyl-paroxyphenyl-crotonic acid, an oil distils over, carbonic acid being evolved; by fractional distillation, freezing, and pressing the mass thus obtained between blotting paper, perfectly pure allylic or ordinary anethol was obtained, identical with that obtained from oil of anise. By heating methyl-paroxyphenyl-angelic acid, butenyl anethol is obtained in an impure state; but by treating the hydrobromo derivative of that acid with sodium carbonate, etc., perfectly pure butenyl anethol is obtained; it is crystalline, fusing at 17 deg. C., boiling at 242 to 245 deg.; sp. gr. at 30 deg. 9733; formula, $C_{11}H_{14}O$. In conclusion, the author discusses the formation of the hydrocarbons from the hydrobromo acids by heating with sodium carbonate; he finds that silver nitrate in aqueous solution, sodium acetate, and in some cases even water, may be substituted for sodium carbonate, and yet the hydrocarbon be formed, and concludes that the hydrocarbons are formed simply by the separation of hydrobromic acid and carbonic anhydride. The author remarks that only the hydrocarbons and anethol containing vinyl polymerize when heated, and form compounds corresponding to metacinnamene; also their boiling points differ much more from those of the compounds containing allyl than do the latter from those of the butenyl compounds.

Dr. Gladstone said that the Society had rarely listened to a research so productive of new and interesting substances, and pointed out the interesting results which would probably be obtained by an examination of the refraction and dispersion of these new bodies.

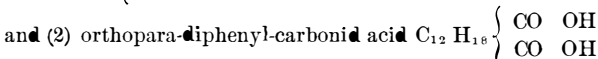
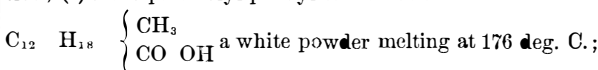
"On Two New Methods for Estimating Bismuth Volumetrically," by M. M. Muir.—Chancel has shown (*Jahrb.* 1860, 612) that bismuth is precipitated in the form of phosphate by the addition of a soluble phosphate to solution of the metal in nitric acid. Both processes are based on this fact. In the first bismuth is thrown down from nitric acid solution after partial neutralization with ammonia, by addition of a standard solution of sodium phosphate; the final point of the reaction is determined by spotting the supernatant liquid on a slab with warm ammonium molybdate solution. The results are approximately accurate. In

the second process the nitric acid solution of bismuth is mixed with an excess of sodium acetate, a measured volume—excess—of standardized sodium phosphate is added, the liquid boiled and filtered, the precipitate is well washed with hot water, and the excess of phosphoric acid determined in the filtrate by titration with a standard solution of uranium acetate. The results are very accurate. This second method is much to be preferred to the first, and it is much more satisfactory than the author's dichromate process (*Chemical Society's Journal* I., 1876, 483).

"On the Oxidation of Ditolyl," by T. Carnelly, D. Sc.—Last year in the production of tolyl phenyl, the author obtained a quantity of liquid and solid ditolyl as a by-product; by fractionating, solid ditolyl melting at 121 deg. C. and two liquid ditolyls boiling about 275 and 285 deg. were obtained. These substances were oxidized with chromic and glacial acetic acid; solid ditolyl gave, on oxidation, (1) dipara-tolyl-phenyl carbonic acid

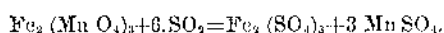


These two liquid ditolyls gave identical results on oxidation; (1) ortho-para-tolyl-phenyl-carbonic acid



a white powder which sublimes before fuming, and finally terephthallic acid. The above experiments show that when sodium acts on a mixture of para and ortho-brom toluene two isomeric ditolyls are produced, and dipara and the ortho-para compounds. The author gives graphic formulae showing the constitutional relations of the above bodies, and concludes by stating that he hopes to be able to prepare the orthoditolyl, from it obtain, by oxidation, diphenic acid, and thus confirm the constitution of phenanthrene. "Note 1."

"On a New Manganese Reaction," by J. B. Hannay.—When a solution of a manganous salt in strong nitric acid is warmed with the addition of crystals of potassic chlorate, the whole of the manganese is precipitated as manganous manganate. If a salt of iron be present, a double manganate of iron and manganese, $2Fe_2(MnO_4)_3 \cdot MnO$. $MnO \cdot 12H_2O$, is precipitated; no other metals seem to be precipitated with manganese under the same conditions. The precipitate is insoluble in nitric and sulphuric acids, and unattacked by caustic alkalis. Hydrochloric acid acts on it, and reducing agents rapidly decompose. Sulphurous acid first attacks the iron, setting free manganic dioxide, which rapidly collects into little nodules, having a considerable degree of coherence. The manganese slowly disappears, the final reaction being

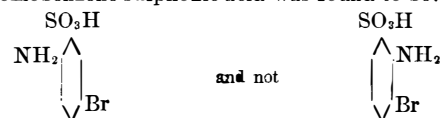


The principal interest in the above reaction is that it furnishes a good method of separating iron from aluminum, etc., without the use of pure caustic soda. The iron compound appears under the microscope as thin flexible plates of a purple-brown color.

METABROMOBENZENESULPHONIC ACID.

By ALFRED THOMAS.

Pure benzenesulphonic acid was prepared and neutralized with silver carbonate, and the still warm liquid treated with bromine until no further precipitate of silver bromide was produced; the liquid was then evaporated on the water-bath, neutralized with barium carbonate, and further evaporated; crystals of barium metabromobenzenesulphonate separated, readily purified by animal charcoal; the mother-liquor contained some barium benzene-sulphonate. From the barium salt the free acid was prepared by treatment with dilute sulphuric acid; and from this nitrometabromobenzenesulphonic acid was obtained by the action of nitric acid; the potassium and ammonium salts are anhydrous, the barium salt is $C_6H_4Br(NO_2)(SO_3) \cdot Ba \cdot 3H_2O$; the calcium salt contains $6H_2O$, the lead salt crystallizes with $3H_2O$, and the silver salt has $1\frac{1}{2}H_2O$. The chloride of this acid melts at 83°, after crystallization from ether. By the action of ammonium sulphide this acid forms amidometabromobenzenesulphonic acid, of which the potassium salt is anhydrous, whilst the barium salt crystallizes with $1\frac{1}{2}H_2O$, and the lead salt with $2H_2O$. By treating this acid with hydriodic acid and amorphous phosphorus at 110°, the bromine is removed, and an amidobenzenesulphonic acid formed; from the solubility of this substance it was recognized as the ortho acid, whence the nitro acid is orthonitrometabromobenzenesulphonic acid; moreover, the relative positions of the lateral chains in orthoamidometabromobenzenesulphonic acid was found to be:—



from the circumstance that on conversion into the diazo-derivatives and treatment with hydrobromic acid, para-dibromobenzenesulphonic acid resulted (where the two Br groups are para with respect to one another, one being meta and one ortho with reference to the sulphonyl-group). The potassium salt of this dibrominated acid crystallizes with $1H_2O$, whilst the barium salt forms needles containing $1\frac{1}{2}H_2O$, and prisms with $5H_2O$.

When orthonitrometabromobenzenesulphonic acid is heated to 160° with alcoholic ammonia, the bromine is removed and amidogen substituted for it, forming orthonitrometamidobenzenesulphonic acid the barium salt of which crystallizes with $1\frac{1}{2}H_2O$; a little of a body melting at 151–152° was formed, probably an impure paranitrobromobenzene, as it seemed to form parabromaniline on reduction with tin and hydrochloric acid.—*Liebig's Annalen*.

The foregoing is an example of the progress of the outlandish terms used by modern chemistry.—[Ed. S. A.]

YELLOW GLASS BETTER THAN BLUE.—According to M. Fano, neurosis of the eye has been successfully treated by the use of spectacles with yellow glasses

ABSOLUTE ELECTROMETER OF THE PHYSICAL SOCIETY, LONDON.

THE President, Prof. G. C. Foster, lately described and exhibited a very simple form of absolute electrometer, which acts on the same principle as Sir W. Thomson's trap-door form of apparatus, but can be constructed at a very moderate cost. To one arm of a balance is suspended, by silk fibres, a zinc, which hangs horizontally in the plane of a sheet of the same metal, forming a guard-plane; and at a distance of about 1 inch below is a flat sheet of zinc, also horizontal. An electrical connection is formed between the guard-plate and suspended disk by a bridge of very fine wire. The method of using the apparatus to determine the potential required for a spark to pass from a Holtz machine through varying thicknesses of air was explained. When the balance has been accurately counterpoised an excess of weight, say 1 grm., is introduced into the scale-pan, and the guard-plate and the lower attracting-plate, as well as the two knobs of a spark-measurer, are connected with the conductors of the machine. If this be now set in action, and the knobs of the spark-measurer be gradually separated, a point will be reached at which the attraction upon the suspended disk just overcomes the excess weight in the balance-pan. The length of spark for which this occurs can now be read off. The difference of the potential causing the spark is given by the formula—

$$\frac{e}{a} \sqrt{8F},$$

where a is the radius of the attracted disk, e its distance from the attracting-plate, and F the force of attraction in dynes. In the apparatus exhibited a had the value 5.195 c.m., and e the value 2.4 c.m., whence, if w be the excess weight in grammes—so that $F = 981w$ —the difference of potential becomes $39 \sqrt{w}$. The proper action of the apparatus depends essentially upon the attracted disk being accurately in the same place with the guard-plate. To facilitate this adjustment each of the silk fibres by which the disk is suspended is attracted to a screw, by which it can be separately raised or lowered; and by means of another screw the small brass plate holding the suspending screws can be raised or lowered as a whole. A few numerical results were given to illustrate the action of the apparatus: these were taken from a set of experiments in which the difference of potential needed to produce sparks in air between two equal brass spheres of 2.61 c.m. radius was measured. The following are the results of a few of the shortest and longest sparks measured:

Length of Sparks.	Difference of Potential.	Mean Electrical Force.
0.1325 c.m.	17.4	131.0
0.1825 "	20.4	117.0
0.2370 "	24.6	104.0
0.6800 "	62.9	93.0
0.7100 "	65.2	92.0
0.7400 "	68.7	93.0

LITHIUM, CÆSIUM, AND RUBIDIUM.

Lepidolite contains very considerable quantities of alumina, which the author proposes to utilise. Its composition is:

Alumina.....	28.54
Silica.....	50.39
Ferric oxide.....	0.73
Alkaline earths.....	1.52
Alkalies.....	16.00
Water.....	2 to 3

The mineral is melted in a reverberatory, suddenly chilled, and pulverized. It is then treated with an equal weight of monohydrated sulphuric acid in a vat lined with lead, and heated with a current of steam. The paste produced is then drawn off before it solidifies, and allowed to stand for twenty-four hours. An excess of water is then added, and the whole is then boiled, and filtered at a boil in a leaden filter-press, or else allowed to settle and decanted without growing cold. The liquid is concentrated to 40° B. in leaden boilers heated by steam, and is then allowed to crystallize. On cooling all the rubidium and the caesium are deposited as an alum along with a very little potassium. The alums of caesium and rubidium are separated by a series of crystallizations. The mother-liquors containing the potash alum and an excess of sulphate of alumina and free sulphuric acid are mixed with a cold concentrated solution of carbonate of potash (25 parts of dry carbonate to 100 of chilled lepidolite). The alum is deposited on cooling as a crystalline powder containing mere traces of iron. The mother-liquors of the alum, still acid, are diluted with water, treated with an excess of carbonate of potash to throw down the alumina, filtered and evaporated to 35° B. Sulphate of potash and a portion of sulphate of soda crystallise out on cooling. The mother-liquors are again digested with powdered carbonate of soda to precipitate lithia. The small quantities of this base still remaining in solution are precipitated with phosphate of soda. The lithic phosphate thus obtained is melted with lime, and the lithia thus liberated is extracted in boiling water. The crude carbonate of lithia precipitated is re-dissolved in boiling water, and causticised with lime. The clear solution, concentrated to 40° B., is then treated with pure carbonate of soda. Carbonate of lithia is then precipitated in a state of purity, and is washed with a little water, then with alcohol, and finally dried.—*Dingl. Pol. Journ.*

EXPERIMENTS ON PRODUCTION OF PLANTS.

PROF. H. HOFFMANN has been for twenty-two years engaged in experiments on the modification of plants by interference in their external vital conditions. He concludes that the cause of the evolution of new species lies, not, as Darwin believes, in outward influences, but in internal organic laws, whose nature is at present concealed.

THE HONEY TRADE.

By ANDREW J. LAWSON.

THE honey trade is a very quiet one, yet there is a good deal of buzz about it. The production of honey has occupied comparatively little attention on the part of the statisticians of the country, who have made a study of the production of the United States a specialty. But it is ascertained that over 150,000 persons in this country are engaged in the keeping of bees. This includes farmers and others, who make the production of honey a part of their occupation; and it is also estimated that these persons have twenty-five apiaries each, a full swarm being estimated at about 20,000 bees. This will give a total of 75,000,000 bees employed in the production of honey for commercial purposes.