THE THIRTY-SECOND GENERAL MEETING OF THE AMERICAN CHEMICAL SOCIETY, HELD AT BUFFALO, N. Y., JUNE 22-24.

OPENING SESSION.

An address of welcome was delivered by President T. Guilford Smith, of the Buffalo Society of Natural Sciences, and the response by Francis P. Venable, president of the Chemical Society. An address on 'The Classification of Carbon Compounds,' by Professor Marston T. Bogert, and one on 'Some Recent Advances in Physiological Chemistry,' by Professor John H. Long, followed. It is probable that both of these addresses will be published later. The following papers were presented:

Note on the Atomic Weight of Carbon: Charles L. Parsons.

As the analyses made during the determinations of the atomic weight of beryllium were of two compounds containing exactly the same elements, two simultaneous equations were obtained which would yield the atomic weights both of beryllium and of carbon, each entirely independent of the other. The calculation gave the figure 12.007 for carbon and 9.112 for beryllium, which is highly confirmatory of the correctness and accuracy of the work on beryllium published in the *Jour. Am. Chem. Soc.*, **26**, 721.

Chemical Glassware: Percy H. Walker.

A series of tests for durability and solubility of beakers and flasks, with analyses and tests of a number of different glasses, was reported upon. The zinc borosilicate glasses are distinguished by permanent trade marks, and are much more resistant to changes of temperature, less soluble in water and carbonated alkalis, but somewhat more soluble in caustic alkalis, than the alkali-lime silicate glasses. The zinc borosilicate glasses are generally of good quality, but much of the alkali-lime silicate glass on the market is very poor.

An Apparatus for Determining the Viscosity of Liquids at Different Temperatures, and *An Apparatus for Determining the Flash-point of Inflammable Liquids:* F. Courtois.

These pieces of apparatus are described and illustrated in the *Scientific American,* May 20, 1905 (p. 408). One of the main features of the flash-tester is the uniformity of level insured by an overflow compartment.

MEETINGS OF THE SECTIONS.

During part of the time the society met in the form of sections, before which most of the papers were read. These were: Section of General and Physical Chemistry, Willis R. Whitney, chairman; Section of Organic Chemistry, Marston T. Bogert, chairman; Section of Agricultural, Physiological and Sanitary Chemistry, John H. Long, chairman; Section of Inorganic Chemistry, L. M. Dennis, chairman. The papers read were:

Vapor Pressure of Sulphur at 100° C.: Hippolyte Gruener.

Dry carbon dioxide, hydrogen and air were passed over sulphur heated to 99°.80 C., saturation of the gas being assured. The sulphur volatilized was collected on the walls of a detachable tube and thus weighed. The results from these gases agreed within 5 per cent., and the vapor pressure calculated from the mean, for S_8, is 0.00718 mm. For 70°, 80° and 90° the vapor pressures are 0.00061 mm., 0.00156 mm. and 0.00287 mm., respectively.

Confirmatory results were obtained by boiling water with sulphur and weighing the sulphur carried over by the escaping steam.

On a New Dynamic Method of Measuring Vapor Tensions of Solutions: Louis Kahlenberg.

This method consists in slowly drawing a known volume of air *over* the liquid whose vapor tension is to be measured, the liquid being placed in a large horizontal glass tube which is constantly agitated to insure complete saturation of the air with the vapor, but not so as to produce spray. The material thus carried over by the air is absorbed in appropriate apparatus and weighed. In the case of solutions a measurement is also made with the pure solvent.

Apparatus for Vapor Heating: H. R. CARVETH and J. P. MAGNUSSON.

The paper reviews the various forms of apparatus which have been suggested for the determination of molecular weights by the vapor heating method and presents a new form. Its distinguishing feature is that while it still permits of the return of the condensed liquid to the boiling flask the latter, being separate from the vapor heater, may in case of breakage be readily replaced.

Tensile Strengths of Aluminum Zinc Alloys: W. D. BANCROFT.

A New Use for the Dilatometer: W. LASH MILLER.

The Hydrolysis of Ammonium Acetate and the Ionization of Water at High Temperatures (100°–156°): ARTHUR A. NOYES and YOGORO KATO.

The figures below are computed from conductivity measurements made with a specially constructed apparatus previously described. Percentage hydrolysis of ammonium acetate at one one-hundredth normal (values vary but slightly with concentration): at 18°, 0.5 per cent.; at 100°, 5.2 per cent.; at 156°, 17 per cent. Ionization constants:

	Water.	Acetic Acid.	Ammonium Hydroxide.
18°	0.66×10^{14}	18.3×10^{6}	17.1×10^{6}
100	48 "	11.4 "	14.0 "
156	155 "	5.6 "	6.6 "
218	200 "	1.9 "	

It will be noticed that the increase in the constant of water and the decrease in those of the acid and base act together in producing increased hydrolysis at high temperatures.

Equilibrium in the System, Beryllium Oxide—Oxalic Acid—Water: CHAS. L. PARSONS and W. O. ROBINSON.

Equilibrium studies of the oxalates of beryllium show that the basic oxalates which have found their way into chemical literature have no basis in fact, but are solid solutions of indefinite composition. The acid oxalate of beryllium also can not be made. The one definite compound of these three components is $BeC_2O_4 + 3H_2O$ at ordinary temperature and $BeC_2O_4 + H_2O$ obtained by heating the first to 100°.

The Phosphates of Calcium: F. K. CAMERON.

In the system $Ca—Po_4—H_2O$, the equilibrium is reached at 25° C. at a slow rate. The ratio PO_4/Ca in the solid phase was found to be 4.6 at a concentration of Ca above 55 grams, and of PO_4 above 423 grams, per liter of solution. Between this point and the second point, whose exact position is still under investigation, the ratio PO_4/Ca in the solid phase was 2.4. At lower concentrations of PO_4 the ratio PO_4/Ca in the solid phase varied continuously from about 2.1 to 0. This shows that at higher concentrations the solid phase is monocalcium phosphate; at intermediate concentrations the solid phase is dicalcium phosphate, and at lower concentrations there is one, or possibly two, series of solid solutions.

The Transmutation of the Elements: H. J. BARNES.

A Strong, Sterilizable, Dialyzing Membrane: H. W. HILL.

Some Notes on Rock Decompositions: ALLERTON S. CUSHMAN.

In studying the action of water on rock powders, the principles of electrolysis and electrical endosmosis were resorted to, since on simple extraction and filtration the insoluble colloid or 'pectoid' decomposition products retain the alkalis. These investigations are as yet unfinished, but it is hoped by this means to study the actual kaolinization of the feldspars in the laboratory. It is also hoped that the determination of the endosmotic constant, according to Wiedermann's formula, of different rock powders will furnish a means of accurately ascertaining the relative rate of decomposition under the action of water.

Some Observations on the Deposition of Alloys from Mixed Solutions: C. B. Jacobs.

In studying the simultaneous deposition of two metals from a mixed solution of their salts, the author found that the difficulty of preventing the solution from attacking and dissolving the more electropositive metal after deposition could be overcome by the use of two anodes, one of the electropositive metal and one of the electronegative metal, connected to separate generators running at different voltages, the current returning through the cathode in the bath by a common third leg to the generators. Alloys of zinc and nickel and of zinc and copper were deposited in this manner from neutral sulphate solutions. With cyanide solutions of copper and zinc a great variety of brass work was plated from the same bath by changing the voltage on either anode, so as to deposit a brass running high in copper and low in zinc, or *vice versa.*

Some Properties of the Metal-Ammoniums: C. A. Kraus.

A study was made of the conductivity and of the conductivity temperature coefficient of the metal-ammonium solutions, from which it develops that the properties of these solutions are very different from those of salt solutions in ammonia. Migration experiments were carried out which show that a metal-ammonium solution may behave like a metallic electrode. The process of solution of a metal in ammonia is not accompanied by electromotive forces. The bearing of the optical properties on the problem of the metal-ammoniums was briefly pointed out.

A Determination of the Coefficient of Expansion of Oxygen: Edward W. Morley and Dayton C. Miller.

The method employed is a differential one, in which two globes, both filled with hydrogen, are connected to a differential manometer, and the difference of pressure of the gas in the two globes is measured at zero and at one hundred degrees, the manometer being at a constant temperature. Oxygen is then put in one of the globes, and by means of the differential manometer the expansion of the oxygen is compared with that of the hydrogen which previously filled the *same* globe. A value obtained some time ago was not final, since the glass of the globes would not endure repeated exposure to steam.

With the present apparatus, a value has been secured which is not subject to much uncertainty. The coefficient of expansion of hydrogen as determined by the *Bureau International des Poids et Mésures* being 0.00366,254, the value of the authors for the coefficient of expansion of oxygen is 0.00367,00.

The Isolation and Properties of Some Electro-Positive Radicals: C. A. Kraus. (By title.)

On the Solubility and Specific Rotatory Power of Carbohydrates and Various Organic Acids and Bases in Pyridine and Other Solvents: J. G. Holty.

Pyridine, the solvent chiefly used in the

experiments, dissolves most of the substances studied except starch and some of the dextrins. Its effect upon their specific rotatory power is marked, decreasing it in some cases and increasing it in others. Rock candy in particles of various assorted sizes gave, with pyridine, solutions of the same concentration.

On the Relation between the Electrolytic Conduction, Specific Inductive Capacity, and Chemical Activity of Certain Liquids: J. H. MATHEWS.

From a study of the dielectric constants of various solvents, as alkyl silicates, mustard oils, pyridine, carbon tetrachloride, etc., and also of solutions made with the same, the conclusion is drawn that this value can not be considered an additive one. Certain acids dissolved in the mustard oils give non-conducting solutions, though retaining their acid characteristics, and alkaloids and amines also yield non-conducting solutions. Addition of water to a solution of trichloracetic acid in benzene produces, up to one tenth of a per cent., very little increase in the conductivity. The work is regarded as an argument against a relation between chemical action and electrolytic phenomena.

Dineric Equilibria: W. D. BANCROFT.

The Proximate Composition and Physical Structure of Trinidad Asphalt: CLIFFORD RICHARDSON.

The material, amounting to six per cent. or over, that remains undetermined in the ordinary proximate analysis is found to consist of volatilized inorganic salt, water of hydration from the clay, and absorbed bitumen. A complete analysis is as follows:

The mineral matter is the residue from the disintegration of granitic rock and consists largely of clay. The hydrocarbons and nitrogen compounds correspond to those found in California petroleum.

	Crude Asphalt.	Crude Asphalt Dried.
Water and gas	29.0%	
Bitumen soluble in hot chloroform	39.7	56.0%
Bitumen adsorbed by clay	.7	1.0
Mineral matter on ignition with tricalcium phosphate	27.3	38.5
Water of hydration in clay	3.3	4.5
	100.0	100.0

Studies on Phosphate Absorption by Soils: OSWALD SCHREINER.

The author is studying the absorption of phosphates by different soil types, obtaining a curve of absorption and then continuing the work by washing out the absorbed phosphates when a maximum absorption has taken place, thus obtaining the washing-out curve. He finds that the absorption curve is much steeper than the washing-out curve and that the absorbed phosphates are washed out much more slowly than they are absorbed, yielding solutions which are very nearly constant in phosphate content, in the case of any given soil type. Both the absorption curve and washing-out curve are different for different soil types and appear to be characteristic of the type. The absorbed phosphates are readily removed by electrolysis in porous cells.

Laboratory Methods for Studying the Formation of 'Alkali': F. K. CAMERON.

An account of methods used in the chemical laboratory of the Bureau of Soils for studying the formation, movement and accumulation of the different types of 'alkali' found in soils in the arid regions of the west.

Electro Double Refraction: HOWARD L. BLACKWELL.

The Action of Ethylene Dibromide on p-Nitrosodialkylanilines, II.: HENRY A. TORREY.

When ethylene dibromide and *p*-nitrosodimethylaniline are heated together at 80°–90°, the following reaction occurs:

$$4C_6H_4N(CH_3)_2NO + C_2H_4Br_2 = [C_6H_4(NO)N(CH_3)_2]C_2H_2 + 2C_6H_4(NO)N(CH_3)_2HBr.$$

That is, the hydrobromide of nitrosodimethylaniline and a base formed from the union of two molecules of dimethylaniline and the acetylene group are produced. The base is proved to be tetramethyldiamidoglyoxine N-phenyl ether,

$$(CH_3)_2NC_6H_4—N(O)—CH—CH—N(O)C_6H_4N(CH_3)_2.$$

The reaction can best be interpreted by the assumption of the formation of an intermediate addition product, from which hydrobromic acid splits off easily. Diethylaniline gives an analogous reaction.

On the Preparation of Various Acyl Derivatives of Dimethyl 4-Amino-o-phthalate: M. T. Bogert and R. R. Renshaw.

On Some Nitro and Amino Derivatives of Fluorescein (preliminary notice): M. T. Bogert and R. G. Wright.

Researches on Pyrimidines: On 2, 5-Diamino-6-oxypyrimidine: Treat B. Johnson.

The True Benzaldehyde-azo-benzoic Acids: Frederick J. Alway.

The Neutral Sulphite Method for Determining Aldehydes in Essential Oils: S. S. Sadtler.

The Detection and Determination of Ethyl and Methyl Alcohols in Mixtures by the Immersion Refractometer: Albert E. Leach and Hermann C. Lythgoe.

The strongest commercial ethyl alcohol (91 per cent. absolute alcohol by weight) gives a reading with this instrument of 98.3° at 20° C., while the reading of methyl alcohol of 91 per cent. strength by weight is 14.9°. Fifty per cent. ethyl alcohol by weight has a reading of 90.3°, while the same strength (50 per cent.) of methyl alcohol reads 39.8°, all readings being made at 20° C.

The detection of wood alcohol by this method is simple and consists in submitting to refraction the distillate which one makes for the determination of ethyl alcohol in the regular manner in beverages, essences, tinctures, extracts or whatever may be the nature of the samples to be examined. If the refraction of the liquid shows the percentage of alcohol agreeing with that obtained from the specific gravity in the regular manner, it may safely be assumed that no methyl alcohol is present. If there is an appreciable amount of methyl alcohol, the low refraction will indicate the fact.

Not only can methyl alcohol be thus readily detected, but the amount may be determined, since addition of methyl to ethyl alcohol decreases the refraction in direct proportion to the amount present.

A Comparison of Methods for the Determination of Fusel Oil: E. M. Chace and W. L. Dubois.

The general scope of the paper is limited to the description and comparison of the Roese and Allen-Marquardt methods, no satisfactory results having been obtained by the colorimetric method. The basis of the Allen-Marquardt method is the separation of the higher alcohols by extraction from brine with carbon tetrachloride, their oxidation to the corresponding volatile acids by acid bichromate solution and their final titration after distillation. It is regarded by the authors of the paper as long and tedious, but more accurate than the Roese method.

A Crucible Method for the Determination of Sulphur, Halogens and Phosphorus in Organic Substances: S. S. Sadtler.

Methods for Examinations of Cellulose Nitrate and Smokeless Powders: Albert P. Sy.

For purposes of classification and naming it is proposed to divide cellulose nitrates (as the nitration products of cellulose are correctly called) into two classes, ether-alcohol soluble, and ether-alcohol insoluble. Each product in each of these classes is then designated according to its nitrogen content expressed in percentage of dry material. After a brief description of cellulose nitrate manufacture, the methods for examination were summarized as follows: (1) Stability tests: potassium-iodide-starch test, German 135° C. test, ordnance department 115° C. test. (2) Analysis: moisture, nitrogen, soluble (ether-alcohol), insoluble (ether-alcohol), soluble in acetone, cellulose, ash, alkalis. (3) Physical examination: compression test, microscopical tests.

Camphoroxalic Acid Derivatives: J. BISHOP TINGLE and WILLIAM E. HOFFMAN, JR.

The condensed formulæ $AgHC_4O_4C_8H_{14}$, $CuC_4O_4C_8H_{14}$ and $Fe(HC_4O_4C_8H_{14})_3$ represent three types of metallic salts prepared. With amines representatives of four types of compounds have been prepared and their properties and constitution studied; there is also a fifth class the constitution of which is uncertain. The amines from which the above-mentioned compounds were prepared were: α-naphthylamine, β-naphthylamine, *p*-toluidine, *m*-toluidine, benzylamine, diethylamine, dimethylamine, methylamine, *o*-phenylenediamine, benzidine, nitrotoluidine, semicarbazine, benzamidine, phenylhydrazine. Certain other amines gave negative or unsatisfactory results.

Rosocyanine: C. LORING JACKSON and LATHAM CLARKE.

Rosocyanine has the same percentage composition as curcumine. Its relation to curcumine was discussed.

The Formula of Curcumine: C. LORING JACKSON and LATHAM CLARKE.

The older formula $C_{14}H_{14}O_4$ is shown to be in harmony with the analyses and is supported by a determination of the molecular weight.

The Reduction of 5-Nitro-4-ketodihydroquinazolines to the Corresponding Aminoquinazolines, and the Preparation of Certain Derivatives of the Latter: M. T. BOGERT and V. J. CHAMBERS.

The Synthesis of 5-Nitro-4-ketodihydroquinazolines from 6-Nitroacetanthranil and Primary Amines: M. T. BOGERT and H. A. SEIL.

On Isomeric O and N Ethers Derived from 2-Alkyl-4-oxy-5-nitroquinazolines and 2-Alkyl-4-keto-5-nitrodihydroquinazolines: M. T. BOGERT and H. A. SEIL.

Some Acyl Derivatives of Homoanthranilic Nitrile and the 7-Methyl-4-ketodihydroquinazolines Prepared Therefrom: M. T. BOGERT and A. HOFFMAN.

The Condensation of Succinylosuccinic Acid Diethyl Ester with Guanidine: A Derivative of 1, 3, 6, 8-Naphtotetrazine, a New Heterocycle: M. T. BOGERT and A. W. DOX.

The Methoxyl Group in Certain Lignocelluloses: ALVIN S. WHEELER.

Influence of Dilution and of the Presence of Lactose and Maltose upon the Osazone Test for Glucose: H. C. SHERMAN and R. H. WILLIAMS.

Some Further Notes on the Possible Existence of Esters of Fulminic Acid: H. C. BIDDLE.

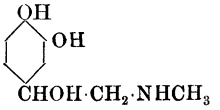
Some Condensation Products of 1-Phenylnaphthalene-2,3-dicarboxylic Anhydride: NORMAN A. DUBOIS.

On Monobromalkylketodihydroquinazolines: W. F. HAND and M. T. BOGERT.

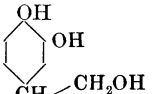
Some New Salts of the Nitrosulphobenzoic Acids: Edward Hart.

Adrenalin, the Active Principle of the Suprarenal Gland: T. B. Aldrich.

The formula $C_9H_{13}NO_3$, first proposed by the author, has been confirmed by various investigators. The structure, several details of which are certain, is possibly represented by one of the two following formulæ:



I.



II.

Compounds synthetically prepared on the lines of formula I. seem to be similar physiologically to adrenalin, but recent work by the author gives like evidence for II. The work is being continued.

The Efficiency of Copper Foil in Destroying Certain Bacteria in Water: W. H. Buhlig.

Several sets of experiments, made along the lines suggested by the recent work of Moore, show that at incubator temperature the typhoid bacillus disappears in a few hours in the presence of copper, but at room temperature, in hydrant water, it persists several days. In the case of the colon bacillus the copper treatment has little practical value, but the dysentery bacillus appears to yield quickly.

Colloidal Suspensions and their Relations to Problems in Water Purification: J. W. Ellms and J. F. Snell.

Turbid water show many of the properties of colloidal suspensions, *e. g.*, the Tyndall effect, migration of the turbidity under the influence of the electric current, coagulation by electrolytes, etc. A possible explanation of the mechanism of coagulation by sulphates of aluminum and iron is the formation of positively charged colloidal hydrates, which precipitate the negatively charged colloidal particles in the water. Experiments are in progress on the relative concentrations of colloidal suspensions and electrolytes required for precipitation and the influence of substances in retarding the coagulation.

The Composition of Cooked Foods: W. D. Bigelow.

Artificial Digestion Experiments: Edward Gudeman.

As the result of a large series of artificial digestion experiments with pepsin and pancreatin on egg albumen with reference to the interference of preservatives, colors, and condiments, the following conclusions are drawn: (*a*) Preservatives and condiments do not interfere with peptic and pancreatic artificial digestion when in the proportion of 1 part to 400 or less, in acid medium. (*b*) Acid preservatives and condiments increase the factor of digestibility in neutral medium. (*c*) In alkaline medium the results are abnormal, retarding the action of ferments. (*d*) Colors, irrespective of source or origin, whether animal, vegetable, mineral or synthetic, do not affect artificial digestion when used in quantities of 1 part or less to 400 parts of the food products. (*e*) Vegetable and synthetic colors are directly digested in the same proportions by pepsin and pancreatin and the actual food value of both classes is the same.

Notes on Occurrence of Pentosans in Second Pressing Cider: J. A. Le Clerc and L. M. Tolman.

Color Tests for Cod-liver Oil: W. D. Bigelow.

The Presence of Hexone Bases in Bacteria: Mary F. Leach.

Dried and pulverized bacteria belonging to the colon group were digested with thirty-three and one third per cent. sulphuric acid for several hours, until the pro-

teid was all decomposed. From the extract thus obtained, lysine was separated as picrate, and the picrate transposed into the chloride. Both salts were identical with the corresponding salts of lysine prepared from gelatin and from fibrin. Thus the presence of a hexone base in the bacterial cell has been established, and one more point of resemblance has been found between bacterial and other proteid.

The Testing of Wheat Flour for Commercial Purposes: HARRY SNYDER.

The points noted or discussed were: the lack of adequate standards for commercial testing of flour; the difficulty of adopting tests suitable to all types of flour; the influence of total proteids on size of loaf and commercial grade; the application and value of gliadin nitrogen determinations; the value of the ash results in determining the grade of a flour or in detecting the mixing of grades; the value of color in determining the commercial grade of a flour, and the influence of the bleaching of flours; and the relation of high bread-making value to nutritive value.

The joint use of baking and chemical tests was recommended. The chemical tests can determine the grade, as patent, straight or clear, while the baking tests can determine the bread-making value of the sample.

The Occurrence of Extractives in Apple Peel: H. C. GORE.

The Pectocelluloses of the Apple: W. D. BIGELOW and H. C. GORE.

The Analysis of Sugar Mixtures: C. A. BROWNE, JR. (By title.)

Chemical Preservatives Used in Food Products. Are They Harmful? E. W. DUCKWALL.

Attention was drawn to the difference between the effect of substances on the growth of bacteria and their effect on the action of digestive ferments.

Experiments have shown that salicylic and benzoic acids in strong solution do not impede peptic digestion more than other substances in a mixed diet, and that the feeding of these preservatives to guinea pigs and rabbits has no action on their growth or organs. It should be noted, however, that the duration of the trial was rather short, while the number of individual tests was small.

Recent Work on Columbium and Tantalum: R. D. HALL.

On the Oxidation of Hydrazine: A. W. BROWNE.

When a solution of hydrazine sulphate is treated with hydrogen peroxide, potassium chlorate, potassium persulphate, ammonium metavanadate or lead dioxide in acid solution, hydronitric acid is formed in very appreciable quantities.

In acid solution potassium permanganate and potassium dichromate oxidize hydrazine sulphate, forming in some cases a trace of hydronitric acid, in others, none at all.

Certain other oxidizing agents, including potassium iodate, bromine water and red lead, yield no hydronitric acid whatever.

The principal reaction involved in the oxidation of hydrazine sulphate is expressed by the equation:

$$N_2H_4 + 2O = N_2 + 2H_2O.$$

The equation for the reaction in which hydronitric acid is formed may be written

$$3N_2H_4 + 5O = 2HN_3 + 5H_2O.$$

The two reactions appear to take place simultaneously.

In the light of this work it is apparent that when an oxidizing agent is to be used in the quantitative determination of hydrazine, or when hydrazine sulphate is to be used in the quantitative determination of an oxidizing agent, care must be taken to

choose materials and arrange conditions, if possible, so that no hydronitric acid shall be formed.

The error introduced by the formation of a given amount of hydronitric acid will obviously be greater if the analysis consist in the measurement of the nitrogen gas evolved than if it consist in the determination of the unused excess of the oxidizing agent.

The Chemical Separation of the Radioactive Types of Matter in Thorium Compounds: Herman Schlundt and Richard B. Moore.

REPORTS FROM INSTITUTIONS.

This valuable feature was continued, thirteen institutions responding. It should be borne in mind that the following extremely condensed summaries of the reports of work in progress during the past year are, in most cases, far from exhaustive.

University of Pennsylvania.—Electrodeposition of lead and mercury from salts and metals, with the use of a rotating anode; also, deposition of cadmium from an ammonia solution, gold from cyanide solution, etc. Methods for complete analysis of alkali halides, etc., with the use of a mercury cathode and silver anode. Investigation of the compounds of columbium and tantalum.

Massachusetts Institute of Technology.—Electrical conductivity of aqueous solutions at high temperatures. Conductivity of fused salts. Ionization of the successive hydrogens of polybasic acids, as phosphoric, sulphuric and hydrogen sulphide. System of qualitative analysis including the rare elements (now completed in outline with the exception of the rare earth group). Separation of electropositive groups and study of the properties of the metal-ammoniums.

University of Wisconsin.—(In addition to work elsewhere reported on at this meeting.) Dielectric constants of oleic acid, oleates, etc. Difference of electrical potential between electrodes of the peroxides of lead and manganese and various solutions. Study of alloys of tin with zinc and with cadmium. Improved static method for measuring vapor tensions of solutions. Equilibrium in the system silver nitrate-pyridine. Numerous experiments on osmosis, the details of which will soon be published.

Johns Hopkins University.—Composition of hydrates formed in aqueous solutions by various electrolytes. Temperature coefficients of conductivity of various electrolytes. Condition of electrolytes in mixed solvents. Electrical method for the combustion of organic compounds. Osmotic pressure of cane sugar solutions. Electrolytic production of pure caustic alkalies. Rate of oxidation of various aromatic compounds by potassium permanganate. Chlorides of orthosulphobenzoic acid. Camphoroxalic acid derivatives. Pinacone-pinacoline rearrangement.

Harvard University.—Study of tetrabrom and of tetrachlor-orthoquinone. Bromine addition products of dimethylaniline. Atomic weights of sodium, cadmium, iodine and other elements. Compressibilities of elements and simple compounds. Electromotive effects; electrostenolysis. Action of potassium iodide on bromanil and chloranil. Action of phenyl hydrazine on various quinones. Action of ethylene dibromide on *p*-nitrosodialkylanilines. Oxidation of organic compounds by air in presence of catalyzers. Determination of phosphoric acid. Preparation of pure nitrogen on a large scale.

Lafayette College.—Salts of *m*- and *o*-nitroparasulphobenzoic acids. Salts of *m*-sulphonitrobenzoic acid. Constitution

of talc. Purification of titanic acid. Some non-aqueous concentration cells.

Ohio State University.—Synthesis of ortho-oxyazo compounds. Action of phosphoric and related acids in the production of esters. Gibbs's method for precipitating magnesium ammonium phosphate. Separation of calcium and magnesium. Apparatus for determining moisture in samples. Electrolytic separation of bismuth.

University of Chicago.—Dissociation phenomena in the sugar group. Constitution of dibromacetylidene. The various forms of liquids and amorphous sulphur. Catalytic action. Stereoisomeric nitrogen derivatives. Radioactivity of uranium compounds. Affinity constants of dibasic acids. The chlorides of manganese. Phenylmalonic nitrile.

Verbal reports were also made by representatives of Cornell University, University of Toronto, University of North Carolina, Columbia University, and the New York Testing Laboratory.

The local committee, of which John C. Miller was chairman, made ample provision for the entertainment of the society, and their services and those of the Buffalo Society of Natural Sciences (in whose rooms the chemical meetings were held), as well as the courtesies of several other local organizations, were recognized in a rising vote of thanks. Carriages were provided on Thursday afternoon for a drive about the city, and many members visited the Gratwick Research Laboratory, where a paper was presented entitled, 'On the Chemical Composition of a Series of Mouse Tumors,' by G. H. A. Clowes and W. S. Frisbie.

The chemical plants both in Buffalo and in Niagara Falls refused admittance, but Mr. Francis A. J. Fitzgerald delivered an interesting address on 'The Electrochemical Industries of Niagara Falls.' The subject was treated from an evolutionary point of view, and the effects of the struggle for existence and the influence of environment considered. In the Hall process for making aluminium the raw material bauxite is now purified by an electric furnace process, and the carbon electrodes baked in an electric furnace. The severe competition brought on in the abrasives market by carborundum has stimulated the production of other artificial abrasives such as 'alundum,' an artificial corundum made by fusing bauxite in the electric furnace. The production of artificial graphite was developed by the demand for graphite electrodes in the electrolytic processes for the production of chlorine, caustic soda, etc. While the problem of making nitric acid from the air has not yet reached the commercial stage, the spark discharge is used industrially for the production of ozonized air for the production of vanillin from oil of cloves. The manufacture of chlorine and caustic alkalies has grown greatly in the last ten years, consequently competition is severe and results in the invention of processes using chlorine gas for the manufacture of carbon tetrachloride, tin tetrachloride, etc. Seeking an outlet for sodium and sodium peroxide, the makers are putting new commercial products on the market, such as 'oxone' a fused form of sodium peroxide which generates oxygen when put in water, and various compounds such as magnesium peroxide, calcium peroxide, zinc peroxide and sodium perborate. Samples of many of the products mentioned in the address were exhibited, and oxygen was generated from oxone by a simple apparatus.

This address was given at the Iroquois Hotel, the headquarters of the meeting, and was followed by an informal luncheon served with the compliments of the hotel.

On Friday afternoon a large number of members availed themselves of a boat trip in the harbor on the city fire tugs, while others visited the soap plant of the Larkin Company. In the evening about eighty attended a subscription dinner at the Hotel Iroquois.

The whole of Saturday was devoted to an excursion to Niagara Falls. A visit to the Power House was followed by a luncheon given by the Natural Food Company, and this by a trip over the Gorge Route.

The total registration at the meeting was 178. The secretary, Dr. W. A. Noyes, announced that as the result of a mail vote with reference to the establishment of an abstract journal in cooperation with the Chemical Society of London and the Society of Chemical Industry, seventy-nine adverse votes had been cast out of a total of about 700 so far received. Four eminent scientists were elected honorary members of the society: Svanté Arrhenius, Walther Nernst, H. W. B. Roozeboom and Julius Thomsen.

The next meeting will be held at New Orleans, December 29 to January 1, 1905–6.

Austin M. Patterson.

SCIENTIFIC BOOKS.

A System of Metaphysics. By George Stuart Fullerton. New York, The Macmillan Company, 1904. Pp. x + 627. Price, $4.

Professor Fullerton makes in the work before us a very creditable attempt to be true to the promise of his title-page; he constantly bears in mind that he has set himself not merely to produce a series of essays on metaphysical subjects, but to set forth the whole scheme of his science in a complete and orderly manner. Only a reader who, like the present reviewer, has himself had occasion to do the same thing can fully appreciate the difficulties of such a task and the recognition fairly due to even a partially successful execution of it. Under Mr. Fullerton's hands the subject falls into four main divisions: Part I., 'The Content of Consciousness,' starting from the standpoint, assumed by the author to be that of psychology, of a world of experiences primarily given as states of the individual consciousness, aims at showing the unsatisfactory nature of such a general conception of the real, and the need for some more fundamental metaphysical interpretation of experience. Part II. discusses the 'external world' in a series of chapters devoted mainly to the doctrine of space and time, and concluding with a rather perfunctory defense of the conception of existence as a perfect mechanism against the 'descriptive' view of mechanical science championed by Kirchhof, Mach, James Ward and others. Part III., 'Mind and Matter,' deals at length, and with much acuteness, with the problem of the relation of mind and body, and contains, besides a very vigorous and damaging attack upon the subjective idealism which denies the reality of any knowledge of things as distinct from our own mental states, Professor Fullerton's own ingenious version of the doctrine of psychophysical parallelism. Finally in Part IV., 'Other Minds and the Realm of Minds,' the author deals with the traditional problems of the old rational psychology and natural theology. Speaking summarily, it may be said that Professor Fullerton's position in metaphysics is that of a critical realist. He holds, that is, that there is a real physical world of extra-mental objects, and that of that world we have a direct, and not merely a symbolic or representative, perception. Further, he maintains that the whole world of minds and bodies alike forms a complete and perfect mechanism, the relation between the bodily and mental aspects of it being a purely logical 'parallelism,' and consequently adopts a purely determinist view of moral action. Finally he so far follows in the footsteps of Kant as to regard the existence of God and the reality of a future life as matters beyond the limits of demonstrative science, but as affording scope for a legitimate exercise of faith.

It is hardly to be expected that the execution of so extensive a work should be equally